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NOTES ON DAAKIE (PORT VATO): SOUNDS AND MODALITY

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PREFACE

The 18th annual meeting of the Austronesian Formal Linguistics Association (AFLA 18) was held March 4-6, 2011, at Harvard University. A total of 30 presentations representing the work of 43 researchers were given, including three plenary talks by Robert Blust, Marc Brunelle, and Manfred Krifka. In addition to work on the syntax of Austronesian languages, the original focus of AFLA, researchers presented analyses of phenomena from a variety of core linguistics subfields including phonetics, phonology, and semantics, as well as their interfaces. In order to personalize the meeting and highlight the strong historical component of Harvard's Department of Linguistics, we also encouraged the presentation of work dealing with diachronic analyses of language phenomena. The culmination of these efforts appears here in these Conference Proceedings, which include twelve papers presented during the conference.

Throughout this process we have received generous support from a variety of sources within the Harvard Community. Financial support came from the Office of the Dean of the Faculty of Arts of Sciences, the Office of the Provost, Linguistics Circle: A Workshop of Linguistic Interfaces, the GSAS Research Workshop in Indo-European and Historical Linguistics, the GSAS Research Workshop in Language Universals and Linguistic Fieldwork, and the Harvard GSAS Graduate Student Council. Student participants in the volunteer effort include Michael Erlewine, Ruthe Foushee, Laura Grestenberger, Christopher Hopper, Julie Li Jiang, Caitlin Keenan, Louis Liu, Andreea Nicolae, Hazel Pearson, and Cheng-Yu Edwin Tsai. We also gratefully acknowledge the encouragement, endorsement, and assistance of the Harvard Department of Linguistics.

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To the groups and individuals who made this conference possible, and to the many researchers who made the event as enriching and stimulating as it was, we offer our sincerest thanks.

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NOTES ON DAAKIE (PORT VATO): SOUNDS AND MODALITY*

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The paper reports from ongoing field work on Daakie (South Ambrym, Vanuatu), also known as Port Vato. It presents results about two topics: (a) the phonology, especially the vowel system, which includes a fronting of back vowels triggered by alveolar consonants; (b) the marking of finiteness, which includes a realis/irrealis distinction, a marker for distal modality, and a marker mostly used in negative contexts expressing something akin to negation concord.

1. Introduction

This paper* is a first report of ongoing field work[1] on the language Daakie in South Ambrym, Vanuatu. The language is known as "Port Vato", after one of the villages where it is spoken; however, Daakie is the name locally used. The language has about one thousand speakers and is closely related to the neighboring language Daakaka. There is no specific treatment of the language (cf. Lynch & Crowley 2001), though some data can be found in Paton (1971), who focuses on the closely related language Lonwolwol, now nearly extinct. Also, there is a word list in Tryon (1976).

I will deal with two topics of Daakie, which should be of theoretical interest: First, the phonology, in particular the vowel system, which exhibits allophones triggered by unusual factors. And second, the finiteness marking of clauses, which is based on modality, not tense.

2. Phonology

2.1 Consonant system

The consonant system of Daakie is presented in the following table, where angular brackets give the graphemes proposed for the orthoraphy, and used here.

* I gratefully acknowledge the generous funding by Volkswagen Foundation (DoBeS program) given to the Zentrum für Allgemeine Sprachwissenschaft (ZAS) Berlin, the general support of ZAS by the BMBF, Förderkennzeichen 01UG0711, and support by Humboldt University zu Berlin. Thanks to my language informants, in particular Abel Taso, Paul Tomo and Chief Jack Samuel of Port Vato, and to Chief Filip Talevu of Emiotungan, the main NiVanuatu field worker of the project. Thanks also to participants of AFLA 18 at Harvard University, and of the workshop *Speaking of Possibility and Time II* at the University of Göttingen in June 2011. Thanks to Susanne Fuchs for crucial hints on the part on phonology. I am especially indebted to Kilu von Prince, who is working within the same project on the neighboring language Daakaka, and shared her insights with me. In particular, many points concerning the modality system came up in the course of discussions with her.

[1] About 6 months in 2010 and 2011; the corpus includes about 5 hours of transcribed recordings, mostly narratives, and written translations.

(1)

	Labial	Labiovelar	Labiodental	Alveolar	Palatal	Velar	Glottal
Voiceless	p	p^w ⟨pw⟩		t		k	
Prenasalized	^{m}b⟨b⟩	b^w⟨bw⟩		^{n}d⟨d⟩		^{ŋ}g⟨g⟩	
Nasal	m	m^w⟨mw⟩		n		ŋ⟨ng⟩	
Fricative			v	s			h
Trill				r			
Lateral				l			
Approximant	ʊ⟨w⟩				j⟨y⟩		

There is a voice distinction for stops that is realized as voiceless (not aspirated, sometimes slightly voiced) vs. prenasalized. This distinction is neutralized in the syllable coda, where only voiceless stops occur (cf. e.g. irrealis marker *b* in *be* 3SG vs. *p* in *na-p* 1SG). As is typical for the languages of the region, there is a class of labiovelar consonants, written as *pw, bw* and *mw*[2]. They only occur before high frontal vowels, e.g. *pwee* 'full', *bwii* 'butterfly', *mwih* 'dirty'. Consonant-glide combinations [tj], [dj], [sj], written *ty, dy, sy,* result in fused realizations, eg. *tyenem* [tʃɛnem] 'home, village'*, dyung* [dʒuŋ] 'mat', *syep* [ʃʲep] 'sugar cane'. [h] occurs in syllable codas, cf. *teh* 'sea, salt', and in intermedial position, as in *lehe* 'see'. In initial position, there is no phonemic [h], but words with initial vowel can be realized with initial [h], as in [(h)ɛm] 'house'. This variation is disregarded in writing. Daakie [h] corresponds to [s] in the neighbouring language Daakaka (cf. *tes* 'sea, salt', *lese* 'see'). We can assume a sound change [s] to [h] that is completed in syllable codas and ongoing in onsets in intermediate positions, where there are still a few s/h minimal pairs. Another ongoing sound change is evident in the r/t variation in syllable codas, cf. *obwir/obwet* 'taro', where Daakaka has *obwir*. Otherwise, /r/ is a rare consonant if it were not for its use to mark the realis negative (see below), due to a sound change of /r/ to /d/ in initial position (cf. e.g. *rom* > *dom* 'yam', 'year'). The following list gives a number of minimal pairs that motivate the assumed phonemic distinctions:

(2)

/p/ vs. /b/	[pa:] 'to drop' [ba:] 'to fight', [pi:] 'cough' [bi:] 'together'
/p/ vs. /p^w/	[pih], [pihgare] 'fasten' [pwih] 'full'
/b/ vs. /b^w/	[bi:] 'together' [b^wi:] 'butterfly'
/m/ vs. /m^w/	[met] 'dead' [m^wet] 'short', [mere:] 'cock's comb' [mwere:] 'mad'
/k/ vs. /g/	[kahɛ] 'to wash' [gahɛ] 'to pull out'
/s/ vs. /h/	[vɛse] 'to be able to' [vɛhe] 'to carry', [tase] 'peel' [-tahe] 'again'
/h/ vs. ∅	[tɛh] 'sea' [tɛ] 'cut' [tɛ:] 'look'
/s/ vs. /r/	[ʊɛse] 'to be able to' [ʊɛre] 'fruit'
/v/ vs. /ʊ/	[vɛre] 'take out' vs. [ʊɛre] 'fruit'

[2] This deviates from the established writing for languages of Vanuatu, p̃, b̃ m̃, as this is difficult to reproduce.

2.2 Vowel system

The following table illustrates the phonological contrasts in the vowel system:

(3)

Short vowels		
i ⟨i⟩	[y] ⟨u⟩	u ⟨u⟩
e ⟨é⟩	[ø] ⟨ó⟩	o ⟨ó⟩
ɛ ⟨e⟩	[œ] ⟨o⟩	ɔ ⟨o⟩
($^{(j)}$æ⟨á⟩)	a ⟨a⟩	

Long vowels	
iː ⟨ii⟩	uː ⟨uu⟩
ɛː ⟨ee⟩	oː ⟨óó⟩
	ɔː ⟨oo⟩
(æː⟨áá⟩)	aː ⟨aa⟩

Length contrast is evident from a considerable number of minimal pairs:

(4) /i/ vs. /iː/ [tisi] 'draw in sand' [tisiː] 'fall down'
/ɛ/ vs. /ɛː/ [tɛ] 'cut' [tɛː] 'look', [ʊɛ] 'water' [ʊɛː] 'fruit'
/a/ vs. /aː/ [da] 'blood' [daː] 'language'
/ɔ/ vs. /ɔː/ [kɔ] 'look out for, hunt' [kɔː] 'ripe', [soːgɔː] 'together' [sogɔ] 'hold'
/o/ vs. /oː/ [soːgɔː] 'together' [sogɔ] 'hold'
/u/ vs. /uː/ [ut] 'louse' [uːt] 'to scoop'

The vowel æ is assumed here to capture a probably recent change that led from Daakaka syllables $C_L$ja($C_{\neg V}$) to Daakie syllables $C_L{}^{(j)}$æ($C_{\neg V}$), where C_L are the labial consonants /p, b, v, m/ and $C_{\neg V}$ are non-velar consonants, and the glide j in Daakie is reduced or optional. Examples are Daakaka/Daakie pairs [pjan]/[p$^{(j)}$æn] 'under', [bjar]/[b$^{(j)}$æt] 'bed, floor', [vjan]/[v$^{(j)}$æn] 'go', [vjar]/[v$^{(j)}$æt] 'wood borer', [mjan]/[m$^{(j)}$æn], 'eye', 'underdone', [mjar]/[m$^{(j)}$æt] 'unripe; mad; selfish', [myap]/[mæp] 'heavy' and [bja]/[b$^{(j)}$æ] 'to plant' For minimal pairs in Daakie, cf. [pan] 'his mouth[3]', [man] 'male' (not a loanword), 'his[4]', [mat] 'our (including addressee)[4]' and 'map' 'nut species'. The sound change is less pronounced in long vowels, cf. [vjaː]/[v^{j}æː] or [v^{j}aː] 'hand', 'germinated coconut'. It is reduced or lacking in syllables with velar coda consonants, e.g. [p^{j}æŋ] or [p^{j}aŋ] 'fire', [p^{j}ak] 'choose', [p^{j}ah] 'fragrant', [lib^{j}ak] 'banyan tree'. Here, /æ/ is written as ⟨á⟩ except after /v/, where we write /va/, as there are no minimal pairs.[5]

The height contrast with front vowels /ɛ/ vs. /e/ carries limited weight; so far, three minimal pairs were found: [ŋɛlɛ] 'flying fox' [ŋɛle] 'to sell'; [tɛlɛ] 'axe' [tɛle] 'to warm oneself'; [b^{w}ɛ] 'at first' [b^{w}e] 'song, tamtam' The realization of /ɛ/ and /ɛː/ is variable depending on the context, and is often realized as [e(ː)]. There is no corresponding contrast for long vowels. In contrast, the height contrast with long back vowels is well established:

(5) /uː/ vs. /oː/ vs. /ɔː/ [uː] 'mountain' [oː] 'casuarine (tree)' [ɔː] 'coconut'
[suː] 'slack' [soː] 'pregnant' [sɔː] 'one, a'

[3] Or 'her mouth'; Daakie lacks gender. *pan* is an inflected relational noun; cf. *pok* 'my mouth', *pam* 'your mouth'.
[4] For drinkable objects and objects related to the house. Daakie has three possessive classes, cf. footnote 26.
[5] Also, in Daakaka, syllables /va.../ do not exist in contrast to /vya.../, except in loans such as *Vanuatu* and *vatu.*

For the basic form of short vowels, only few height contrasts can be found, cf. [bo] 'rotten' [bɔ] 'big', [golø] 'to block' [gɔlø] 'dry'. But in certain contexts, the short back vowels [u], [o], [ɔ] are fronted to [y], [ø], [œ]. Here we find considerably more minimal pairs:

(6)	[dy] 'to stay (pl.)'		[dœ] 'lychee', 'slow'
	[ly] 'to hide'	[lø] 'two', 'vomit'	[lœ] 'leaf (of)'
		[golø] 'to block'	[golœ] 'to walk on knees'
	[sy] 'to pluck fruit'	[sø] 'hit, e.g. by arrow'	[sœ] 'reef'
		[sørø] 'to talk'	[sœrœ] 'to reach'
	[ty] 'to beat'	[tø] 'chicken'	[tœ] 'behind'
	[tyty] 'to fight'	[tøtø] 'white, light'	[tøtœ] 'to carry'

The height contrasts between medium-high and medium-low vowels are phonemically distinct only in open syllables. This also holds for the front vowels [ɛ] and [e], as well as for the long back vowels, [o:] and [ɔ:]. There are no minimal pairs in closed syllables (but see footnote 10).

The rules leading to vowel fronting are quite complex. There is no fronting directly following a velar consonsonant, /k/, /g/, /ŋ/, cf. (7), or in vowel-inital position, cf. (8) — recall that such vowels may be preceded by by phonetic h. Fronting after labial consonants does not affect /u/ but only the medial vowels /o/ and /ɔ/, cf. (9).

(7)	[kuly] 'dog'		[kɔ] 'hunt'
	[gumu] 'hold tight'	[golø] 'to block'	[gɔlœ] 'walk on knees'
	[ŋuŋuø] 'yellow'	[ŋorok] 'far away'	
(8)	[ut] 'louse'	[ot] 'place'	[orø] 'chase'
(9)	[pune] 'narrate'	[pø] 'white, light'	
	[pulœ] 'to climb'	[pøpø] 'white, barren'	[pøpœ] 'carry on shoulders'
	[mu] 'earthquake'	[mørø] 'old'	
	[bulyly] 'insect sp.'		[bœlop] 'long'
	[ʊuly] 'slack'		[ʊœ] 'stringray'

Fronting is triggered most consistently after alveolar consonants /t/, /d/, /n/, /s/, /l/, /r/, cf. (6) and (10). Furthermore, it appears after /j/, /u/ and /v/, cf. (11).

(10) [tøtœ] 'carry' [tøtørœ] 'breadfruit'
[dyen] 'custom' [døløˀ] 'voice of'
[nynjø] 'yesterday' [nøn] 'face'
[sylywip] 'fruit dove', [sørø] 'talk' [sœrœ] 'to reach'
[mury] 'small' [ʊœrøløˀ] 'two' [mœrœ] 'old'

(11) [jøvø] 'turtle' [ŋjø] PRON.1SG [jœ] 'machete'
[vy] 'white man, introduced' [vøn] 'quiet' [vøløn] 'hair' [vœvœ] 'weave'
[kuœ] 'walk' [ja:puœ] '(old) man' [ʊuœ] 'good'

However, vowel fronting is blocked in closed syllables, cf. (12), except when the syllable coda is itself an alveolar consonant, cf. (13). The phonological nature of these rules is particularly obvi-

ous when we consider the paradigm of the relational noun with stem *l-* 'heart', cf. (14), and the relational noun/preposition *s-* 'with' (e.g. *som narem* 'you with your child'), cf. (15).

(12)	[top] 'erupt'	[dom] 'yams, year'	[nuŋnuŋ] 'ask'	[nop] 'fall asleep'
	[suburu] 'mat'	[sok] 'my'	[luh] 'swamphen'	[lok] 'laplap pudding'
	[rɔk] 'far away'	[juŋ] 'wash'	[jɔh] 'smoke'	[vɔh] 'paddle'
(13)	[nøn] 'face'	[vøt] 'stone, money'		
(14)	[lok] 'my heart'	[lom] 'your heart'	[løn] 'his heart'	[løt] 'our heart'
(15)	[sok] 'I with ...'	[som] 'you with ...'	[søn] 'he with ...'	[søt] 'we with ...'

Following syllables have an effect on preceding ones. If one syllable does not show vowel fronting, this also applies to the preceding ones, cf. (16). But this rule only holds within stems. There is no change in the paradigm of the relational noun [døl-], cf. (17).

(16) [tuku:] 'fell', [tuluh] 'slippery', [toʊa] 'come out'
[dumuʃœ] 'tree top', [dokɔ] 'pull'
[sumolœ] 'steps cut in tree trunk', [soʊe] 'what'
[loku:] 'vomit' [lɔkɔ] 'walk', [lobo] 'elephantiasis'

(17) [dølom] 'your voice', [døløn] 'his/her voice', [døløt] 'our voice', [dølo:] 'their voice'

The vowel shift described here is apparently an ongoing phenomenon. It is lacking in the neighbouring language Daakaka and in the language of North Ambrym, and it is present for considerable variation among speakers. In any case, there is currently no minimal pair, which is evidence for the allophonic character of vowel fronting for the language at the current stage.

2.3 Theoretical implications

The perhaps most interesting aspect of the Daakie sound system is vowel fronting. Such phenomena are known as being triggered by vowels of preceding or following syllables (e.g., German umlaut); here, the conditioning is by and large by initial consonants, typically alveolar consonants, in the same syllable. Fronting of back vowels by alveolar (or coronal) consonants has been observed and studied before (see e.g. Flemming 2003, Harrington e.a. 2011), and there appear to be plausible physiological reasons (e.g., coarticulatory attraction of the tongue by the alveolar consonant). Data in Daakie may be particularly revealing as for the conditions under which this coarticulatory process is blocked (e.g., in closed syllables, but not in closed syllables that have an alveolar coda).[6] Also, there might be a relation to the fact that the three height distinctions /u/, /o/ and /ɔ/ lead to minimal pairs only after alveolar consonants: It is conceivable that fronting the vowels increases their perceptual distinctiveness.

[6] The role of following alveolar consonants is also apparent in /mju:lɛn/ 'life, soul', derived from /mju:/ 'to grow, to be alive', which is often realized as [my:len]. This is the only case of a long umlauted vowel that I could find.

3. Modality

3.1 Basic sentence pattern; person/number distinction; the modal markers

We now turn from phonology to a central feature of the syntax and semantics of Daakie. The basic sentence structure is given schematically in (18), and is illustrated with an example in (19).

(18) (Subject) SM Verb (Object) (Adjuncts), where SM: Subject+Modality marker.

(19) *temát ngyee la-m vehe ngye lan silii* Boa3.28
demon PL 3PL-RE carry PR.3SG LOC path
'The demons carried him on the path.'

The focus of this article is on the SM marker. It indicates phi-features of the subject (number/person) and the modality of the clause. In (19), *la-* marks 3rd person plural, and *-m* marks realis.

The agreement system is quite complex. As it is typical for the languages of the area, there are four numbers (singular, dual, paucal[7], plural) and four persons (1st, 2nd, 3rd and inclusive 1st + 2nd). The following table gives the paradigm for pronouns and for realis subject markers.

(20)

Person	Singular	Plural	Dual	Paucal	
1	*ngyo* *na-m*	*kemee* *keme-m*	*komoo* *komo-m*	*kememdyee* *kidye-m*	Pronoun SM
1+2		*et* *da-m*	*adoo* *do-m*	*adyee* *dye-m*	Pronoun SM
2	*ngyak* *ko-m*	*kimim* *ki-m*	*kamoo* *ka-m*	*kamdyee* *kamdye-m*	Pronoun SM
3	*ngye* *mwe, me, mwi, mi, mo, mu, ma*	*ngyee* *la-m*	*koloo* *kolo-m*	*ki(l)yee* *kiye-m*	Pronoun SM

There is no subject marker for 3rd person singular. The bare modality marker *m* (or *mw*) is followed by a vowel homorganic to the vowel of the following verb.[8]

[7] Dual and paucal are used frequently; dual if reference is to exactly two entities, paucal if reference is to a member of a family or a group of friends. The size of the group appears of secondary importance. Switches between paucal and plural reference do occur in the corpus; there are no switches between dual and paucal or plural.

[8] The base form is *mwe, cf. mwe sengane* 'give', more precisely 'he/she gives/gave', *mwe tangale* 'reach', *mwe ret* 'hot', *mwe deme* 'think', *mwe le* 'married', *mwe kie* 'say'. As suffix to an SM marker, *mw-* is develarized, to *m*. If the following verb stem has an initial labial (non-velarized) consonant, velarization is lost, cf. *me páne* 'roast', *me bá* 'plant', *me mee* 'come', *me van* 'go', but *mwe pwet* 'stay', *mwe mwetmwet* 'short'. If the vowel of the following verb is high (i, u, o), including glides y and w, we find a homorganic vowel: *m(w)i, mu, mo, m(w)e* (recall that velarized *mw* only occurs before i and e). Examples: *mwi tili* 'poke', *mwi kii* 'dig', *mi pii* 'cough', *mi bii* 'be together', *mi mihmih* 'wet', *mwi yah* 'strong', *mi myuu* 'grow', *mwi idi* 'take', *mo lóngane* 'hear', *mu tuluh* 'slippery', *mu lupwet* 'hide', *mu wuo* 'good' but *mwe don* [dœn] 'bend', *mwe notnot* [nœtnœt] 'think'. If the stem of the following verb is low (a) and the initial consonant is not labial, then we optionally have *ma*. Examples: *ma tangale* 'reach', *ma ka* 'fly', *ma ane* 'eat', but not **ma pan* 'fork', **ma mán* 'laugh'. We always find *ma* if the verb stem starts with *a*, cf. *ma ane* 'eat (transitive)', *ma are* 'bite'.

The formal properties of the modal marker *m(V)-* suggests that this might not be a 3rd person singular modal marker, but rather a bare modal marker that is unspecified for person and number, and used for 3rd person singular reference. It is used with serial verbs referring to inherent properties of events, as e.g. in *lam sóró me van lamwiye* 'they talked loudly', lit. 'they talked it went up'. The varying forms of this modal marker suggest that it forms a phonological word with the verb stem; however, this is not reflected in the proposed orthography. If the modality marker is represented as the head of a clause (as category I^0), then we can assume the structure (21)(a) for sentences with overt subject markers, and (b) and for sentences that lack them (3rd person singular). In the last case, there is either an agreement relationship between a non-realized modal head and the verb (shown here), or the verb moves to the position of the modal head.

(21)a. [$_{IP}$ (Subject) [$_{I'}$ [$_{I0}$ SM-MOD] [$_{VP}$ [$_{V}$ Verb] (Object) (Adjuncts)]]]
b. [$_{IP}$ (Subject) [$_{I'}$ [$_{I0}$ ∅[MOD]] [$_{VP}$ [$_{V}$ MOD-Verb] (Object) (Adjuncts)]]]

The second modal marker will be called "irrealis"; an alternative name could be "potential". As bare marker in the 3rd person singular it is realized as *bwe, bwi, be, bi, bo, bu, ba*, under the same conditions as the realis marker. Hence the underlying form is *bw-*. As suffix to the subject marker it is realized as *-p* due to final devoicing and de-velarization in the coda.[9] The following example illustrates one use of the irrealis, to express embedded clauses denoting intentions:

(22) *mo* *longbini* *ka* *be* *van* *lan* *vele* *kekeli* PSak2.10
3SG.RE want that 3SG.IR go LOC island small
'He wanted to go to a small island.', lit. 'He wanted that he goes to a small island.'

Furthermore, there is a marker *t*, which will be called "distal", for lack of a better term. It is realized as suffix *-t* to the subject marker, and as *te, ti, to, tu*[10] in case of 3rd person singular reference. One of its uses is to indicate a time at which some event happened, as in (23).

(23) *yaa* *te* *van* *te* *pwet*[11] *ti* *piipili* *mwe* *kuoli=mee*[12] *tyenem* Ilsong2.021
sun 3SG.DST go 3SG.DST PROG 3SG.DST red 3SG-RE return-come home
'When the sun was getting red, he went back home.'

Realis negation is realized by the suffix *-re*, and as *tere* for 3rd person singulars:

[9] If the following verb has an initial labial consonant, the suffixes *-m* and *-p* are not realized, cf. *la van* 'they go'. This is disregarded in the proposed orthography, which has *lam van* and *lap van*.
[10] In this case, o and u do not change their vowel quality, i.e. we have [to], [tu], not [tø]. [ty]. Hence we have potential minimal pairs with [tø] 'chicken', [ty] 'beat drum'. However, notice that the stem of the bare distal marker is [tV], with homorganic vowel V, not [to] or [tu]; such realizations cannot constitute minimal pairs.
[11] The verbs *pwet* (singular subject) and *du* (non-singular subject), basic meaning 'stay', are used to express progressive aspect; in this grammaticized form reading, *du* lost its restriction to non-singular subjects.
[12] In the glosses, "=" marks word formation. Daakie has productive verb formation with suffixes that often are derived from verbs and sometimes still can be used as verbs, e.g. *mee* (or *me*) 'to come'.

(24) *Lalinda mane Langievot, kolo-re wuwuo ne koloo*[13] Andri.005
Lalinda with Langievot 3DU-RE.N peaceful TRANS PRON.3D
'Lalinda and Langievot were not in peace with each other.'

In non-realis negative environments, we find the modal suffix *-n*, realized as *ne/ni/no/nu* for 3rd person singular. In dependent clauses, it expresses negative concord with the main clause:

(25) *lisepsep tere longbini ka ne tah=tone* HG.181
lisepsep 3SG.RE.N want COMP.NR 3SG.N sit.down=for
'The lisepsep[14] did not want to wait for it.'

This survey exhausts the inventory of the five modal markers. We will have a closer look at their uses in the next section and then propose a theory to explain their distribution.

3.2 The uses of the modal markers.

We first turn to the uses of realis and irrealis modality. The central role of this distinction has been variously acknowledged for languages of Vanuatu; cf. Crowley (1982) for Paamese, François (2002) for Araki and Pearce (2010) for Unua.

Realis is used in main clauses for reference to ongoing (26) and past (27) events in the real world, for generic statements (28), and also for events in fictional worlds (29).[15]

(26) *obwer anvu mi myuu mo do*[16] Jemis2.054
taro introduced 3SG.RE grow 3SG.RE slow
'This Fiji taro is growing slow.'

(27) *meerin na-m mee o-ke-le na-m lehe* Bong2.027
long.time.ago 1SG-RE come LOC-COMP-PROX 1SG-RE look
'long time ago, I came here, I looked.'

(28) *ko-m ko=ot*[17] *mo-nok*[18] *ko-m ta=kuu~kuu*[19] *yee mwi*[20] *ti~tisii* Jemis2.008
2SG-RE clear=grounds RE-finish 2SG-RE cut.out tree 3SG.RE fall.down.DISTR
'after you cleared the grounds, you cut out the trees, they fall down '

[13] As in other languages of Vanuatu, there are no reciprocal or reflexive pronouns.
[14] A mischievous dwarf-like creature living in the bush with long hairs and the ability to fly.
[15] Paton (1971) analyzed this mood as a present tense in Lonwolwol, explaining the use to refer to past events as historic present. But as this is the general narrative form, an analysis in terms of realis mood is more plausible.
[16] This is an event-related serial verb construction. The example says, literally: This taro is growing, and it (the growing) is slow. Notice that the second predication is also marked as for modality.
[17] From *ko* 'look out for' and *ot* 'place, ground'; realized as a two-syllable word, [kɔˈɔt].
[18] Forms based on *-nok* are grammaticalized serial verb constructions expressing perfective aspect
[19] The tilde indicates reduplication. Suffixal reduplication as in *takuukuu* 'cut-remove' applies to distributed objects. Prefixal reduplication as in *ti~tisii* 'fall-down' applies to multiple entities; here the stem *tisii* already selects for a multitude of subjects (in contrast to *muet* 'fall').
[20] This is a serial verb construction: By cutting out the trees, an event occurs where multiple objects fall down.

(29) *mwe pwet mwe sela wilin talin*[21] *bye-n* Bong2.012
3.RE PROG 3S.RE put.on skin.TR body.TR body-3SG
'he was/is putting on the skin of his (= another man's) body'

Realis modality furthermore occurs in certain embedded clauses, like in the complements of factive propositional attitude verbs, cf. (30), (31), and in factive adverbial clauses like reason and temporal clauses, cf. (32), (33). In these cases, a different complementizer is used: *ke*[22] instead of *ka*. We distinguish these complementizers in the glosses as COMP.RE and COMP.IR.

(30) *mo longane ke timaleh kiye mwe pwet mo sóró* Jemis3.029
3SG.RE hear COMP.RE child DEM.SG 3SG.RE PROG 3SG.RE talk
'He heard that the children were talking.'

(31) *mo-mele mwe kiibele ke vanten mu-syoo la-m du o-ki-ye* Jemis1.012
RE-this.way 3SG.RE know COMP.RE man RE-some 3PL-RE stay LOC-COMP-DIST
'This way, he knows that some men stay there.'

(32) *na-m pwet em ne*[23] *mese=en byen ke popat mwe te ye-k* Boa1.079
1SG-RE stay house TR sick-NOM because COMP.RE pig 3SG.RE cut leg-1SG
'I stayed in the hospital because the pig bit my leg.'

(33) *bili ke mwe saa=kuu wilin by-en me mee timaleh man soo* Bong2.022
time COMP.RE 3SG.RE take.off skin.TR body-3SG 3SG.RE come child male SG.IND
'When he took of his skin, he became a boy.'

We now turn to irrealis modality. Irrealis is used in embedded clauses expressing intentions, cf. (22), but also in main clauses that express commissives, jussives, and commands[24]:

(34) *na-p*[25] *idi ok*[26] *masólo* Aila2.024
1SG-IR take POSS.FOOD.1SG fish
'I will take my fish.', 'I promise to take my fish.'

(35) *la-m kie ka da-p van tyenem* Bong1.046
3PL-RE say that 12PL-IR go home
'They said, let's go home.'

[21] In addition to relational nouns, Daakie has transitive nouns that have to be followed by a possessor. The example, literally, refers to 'the skin of the body of his body'.
[22] Also, *kege*; these two complementizers are also used for relative clauses.
[23] The transitive marker *ne* can also form relational nouns; here 'house of sickness'
[24] Command can also be issued by using the bare verb stem, e.g. *Sengane!* 'Give it!'
[25] Before verbs with initial vowels, [p] is reduced to [ʊ], leading to the realization [naʊidi]
[26] There are three possessive classes in Daakaka, the *ok* class (for food items and for animals), the *mok* class (for items related to the home and to drinking) and the *sok* class for everything else. This said, it should be noted that agreement is also determined by formal reaons. For example, *dom* 'yam' is also used to refer to the year (the growing cycle of the yam); *ok dom* means both 'my yam' and 'my years', even though years are not edible.

(36) *ko-p sengane de-re*[27] *mee na-p ane* Boa2.076
2SG-IR give some-DETR come 1SG-IR eat.TR
'Give me some of it and/so that I will eat it.'

Irrealis is also used for reference to future events. In this case, the subject marker is often preceded by *a.* In the proposed orthography, *a* is prefixed to the modality marker.

(37) *vanten desoo*[28] *a-be mee bwi idi pija en*[29] *dout* Jemis2.086
man NSPEC-some FUT-3SG.IR come 3SG.IR take picture of.REF probably
'Some man or other will come and/to take a picture of it (a palm tree with five branches)'

We now turn to irrealis in embedded clauses. Generally, we find irrealis in non-factive complement clauses, with the complementizer *ka,* as in the expression of intentions, cf. (22) and (38), for possibilities (39) and for the expression of ability (40), for which the verb *kiibele* 'to know' is used (similar to English *to know that / how*).

(38) *na-m longbini ka na-p pune punen soo*[30] Andri2.002
1SG-RE want COMP.IR 1SG-IR tell story one
'I want to tell a story.'

(39) *mwe páne basee kingyee-ye mwe neknak ka bu du ba ane* Boa3.039
3SG-RE roast bird DEM.PAUC-DIST 3SG-RE ready COMP 3SG.IR stay.PL 3SG.IR eat.TR
'He roasted the birds and was ready to eat them.'

(40) *ngale la-m kiibele ka la-p kuo soo~soo* Adam1.022
then 3PL-RE know COMP.IR 3PL-IR run one-REDUP
'Then they knew/were able to run away one by one.'

With temporal clauses, we can observe a contrast similar to German *als* 'when' (past reference) and *wenn* 'when, if' (non-past reference), here expressed as *bili ke* with realis clause, cf. (33), and *bili ka* with irrealis clause, cf. (41).

(41) *a-na-p ane sówe bili ka ot bi mitmyet* JoAlvi.028
FUT-1SG-IR eat.TR what time COMP.IR place 3SG.IR dark
'What will I eat when it is dark?'

We expect irrealis to occur in the complement clauses of non-factive presuppositional attitude verbs like *deme* and *notnot* 'think'. However, the content of thought is typically expressed in dir-

[27] *de* is a transitive noun referring to parts of an object; *-re* is detransitivizing it, referring to some contextually given entity.
[28] *desoo* is a form of the quantifier *musyoo* that occurs with non-specific reference, in particular, in irrealis and negated contexts and in questions. Even though the *desoo* phrase precedes the irrealis marker, it is interpreted within its scope.
[29] *en* is a marker postposed to nouns that indicates relation to a discourse referent introduced before.
[30] Note the use of *soo* instead of non-specific *desoo*, as the speaker wants to tell a specific story.

ect speech, and hence typically in realis modality. Interestingly, if it is clear that the content of the thought is false, *distal* modality is used, as in (42), from a story where it is clear that the person referred to is in fact not dead.

(42) *temát ngyee*[31] *mon la-m deme ka te met byen b-on mwe sek* Saelas.026
demon PL too 3PL-RE think COMP.IR 3SG.DST dead because smell-3SG 3SG.RE stink
'The demons, too, thought that he was dead, as he stank (lit. his smell was stinking)'

Finally, irrealis modality is used in conditional clauses, as the following example shows:

(43) *molo ka bo longane diliri gon monok,* Abel2.010
incubator.bird COMP 3SG.IR feel egg.3SG EMPH finish
'The incubator bird, when it feels its egg(s) finished,

a-be mee mwe[32] *pisih pán weren kege mwe pwet mwi tivin weren*[33]
FUT-3S.IR come 3SG.RE lay.eggs under X.PLACE COMP.REL 3S.RE stay 3S.RE bury.TR X.PLACE
then it comes and lays eggs under the place where it stays and buries them.'

We turn to distal modality. As we have seen with (23), it is used to specify a time with respect to which the main clause is to be interpreted. It expresses a similar meaning as the *bili ke* construction, cf. (33). Distal modality is also expressed for scene-setters at the discourse level:

(44) *meerin temát la-t pwee* Boa3.025
before demon 3PL-DIST many
'In times before, there were many demons.'

(42) above illustrated another use, in complement clauses of propositional attitude verbs that are assumed to be false. The distal is also used for "adjectival" modification, as in (45), where the adjective *tobo* is inflected as distal and related to the noun with the complementizer *ke*.

(45) *ko-p bwengbang van tyenem ke to-bo* Ilson2.013
2SG-IR play go village COMP DIST-big
'You can play towards the big village.'

Distal modality is also used in conditional clauses when it is indicated that the protasis might not be satisfied, as in (46). Hypothetical conditionals are also constructed with distal modality and the complementizer *ka*, as in (47).[34]

[31] Nominal number is marked by postposed pronouns, e.g. *temát koloo* 'demon DUAL', *temát kiyee* 'demon PAUCAL'.
[2] Here, irrealis is possible as well. In general, switch from irrealis to realis in clauses following an irrealis clause is possible; this is perhaps a phenomenen related to performance.
[3] Locative relative clauses are constructed with *weren* (or *oren*) as head and as resumptive pronoun.
[4] These examples are elicited, as such sentences did not occur in the corpus.

(46) *Ko-p pyak ne ti-ri koloo le, vih mane vyoh.*
2SG-IR choose TR IDEF.NHUM-DETR two PROX banana with ripe.coconut
'You choose one of these two, the banana or the coconut.

Ko-t pyak soro ke tu wuo, a-ko-p idi popat desoo.
2SG.DIST choose reach COMP 3SG.DIST good FUT-2SG-IR take pig NRE.one
If you choose right, then you get take a pig.'

(47) *Ka ko-t pyak ne vyoh, a-ko-t idi popat.*
COMP 2SG-DIST choose TR coconut 2SG-DIST take pig
'If you had chosen the coconut, you would have gotten the pig.'

We finally turn to the modal marker *n*, which we just call N modality, where N stands for its two uses, the expression of necessity and the indication of negation. It typically occurs in the scope of negation when otherwise we would expect irrealis modality, as in the embedded clause in (25). This can be analyzed as a case of irrealis modality showing negative concord, similar to negative concord of negative expressions in subjunctive clauses with a negation in the matrix clause in languages like Italian, e.g. *Non pretendo que nessuno dica niente* 'I don't pretend that anyone said anything' (cf. Zeijlstra 2004). The N marker also occurs in clauses embedded by certain negative-entailing verbs like *notselaane* 'think wrongly', cf. (48), again similar to negation concord in Romance triggered by verbs with meanings like 'doubt', cf. Spanish *Dudo que el bebé este mirando a nadie* 'I doubt that the baby is looking at anyone'.

(48) *na-m notselaane ka na-n govene ti-ri desoo* Boa1.47
1SG-RE think.wrongly that 1SG-N make IDEF.NHUM-DETR NSPEC-SOME
'I couldn't do anything', 'I wanted to do something but I couldn't.'

But this modal marker can also occur in main clauses. The negation of irrealis clauses is expressed by an N-marked clause, headed by the complementizer *sa* and the complementizer *ka*.

(49) *sa ka wel-em*[35] *ne nek ne ti-ri kingyee ye* Abel3.154
COMP.NEG COMP.NR skin-2SG 3SG.N afraid TR IDEF-NHUM-DETR DEM.PL LOC.DIST
'Don't be afraid of those things.'

There is also a rare use of *-n* in which it expresses a deontic modal necessity. Such examples do not occur in the corpus, but could be elicited; they were discovered by von Prince for Daakaka. Deontic necessity is often expressed by the Bislama loan *mas* 'must' (cf. von Prince 2011).

(50) a. (*ka*) *ko-n peten*
COMP.NR 2SG-N tell.truth
'You must tell the truth.'

b. *ko-p mas peten*
2SG-RE must tell.truth
'You must tell the truth.'

[35] Emotions are typically denoted by clauses which involves a predication on a relational subject denoting a body part of the carrier of the emotion. The example, literally, means 'your skin must not be afraid of those things'.

3.3 Sketch of a theory of the semantics of the modal markers

In this section I try to outline a possible way to model the meaning and use of the different modal markers of Daakie. I assume that the distribution of the modal markers is essentially governed by their meanings, and not just due to syntactic agreement. I should stress that this is not meant to be a final treatment, and I refrain from giving detailed compositional meaning rules here.

As for the underlying model structure, I assume a set of world-time indices ordered by a relation ≤, where i ≤ i′ stands for: i is before i′, or i = i′. The relation ≤ is meant to be a partial order, that is, it may be that i ≤ i′ and i ≤ i″, but neither i′ ≤ i″ nor i″ ≤ i′. The set {i′ |i′ ≤ i} singles out the 'realis' portion of indices relative to i, a linear order. The set {i′ |i < i′} is the 'irrealis' portion, the set of indices into which i might develop, which is not a linear order. This model structure captures the intuition that for any given moment, the past is fixed but the future is open.

I assume syntactic structures as in (51) as input to semantic interpretation. The modus marker is head of the IP, expressing agreement with the subject in the SpecIP position.

(51) $[_{IP}$ *Enet*$_{[3sg]}$ $[_{I'}$ $[_{I0}$ *mo*$_{[RE][3sg]}]$ $[_{VP}$ *gone* $[_{NP}$ *páng*]]]]]
'Enet made / is making fire.'

Expressions are generally interpreted with respect to the context index (here referred to as i_0). A VP is interpreted as a function that maps the context index to a function from entities[36] to truth values, e.g. $[\![[_{VP}$ *gone páng*$]]\!](i_0) = \lambda i \lambda x$[x makes fire at i].[37] Modal markers introduce a second index, resulting in a relation between two indices. In Reichenbachian terms, the first index is the reference index, and the second the event index.[38] Realis modality is particularly complex; it states that the VP is true at the second index, that the second index precedes the first, and that there is an index at or before the context index i_0 at which the VP is true, cf. (52). For our example we get the result in (53).

(52) $[\![[_{I}$ $[_{I0}$ RE$]$ VP$]]\!](i_0) = \lambda i \lambda i' \lambda x[i' \leq i \wedge [\![VP]\!](i_0)(i')(x) \wedge \exists i' \leq i_0[[\![VP]\!](i_0)(i')(x)]]$[39]

(53) $[\![[_{IP}$ *Enet*$_{[3sG]}$ $[_{I'}$ *mo*$_{[RE][3sG]}$ $[_{VP}$ *gone páng*$]]]\!](i_0)$
$= \lambda i \lambda i'[i' \leq i \wedge$ E. makes fire at i′ $\wedge \exists i' \leq i_0$ [E. makes fire at i′]]

The event index i′ is existentially closed at the level of the CP; I assume here a silent syntactic operator ∃ as head of the CP, which leads to the interpretation in (54), exemplified in (55):

(54) $[\![[_{CP}$ $[_{C0}$ ∃$]$ IP$]]\!](i_0) = \lambda i \exists i'[[\![IP]\!](i_0)(i')]$

[36] The subject may also be of higher type, in which case higher-typed arguments should be allowed as well.. This is the case with non-specific indefinites as *vaven desoo* 'some woman or other' in sentences like *vaven desoo tere mee* 'no woman came'. Higher-typed arguments allow for a narrow-scope interpretation of such subjects.

[37] The context index i_0 allows for contextual expressions, e.g. reference to speaker or day of utterance.

[38] The introduction of a second index i′ allows for clause chaining, as in $[_{IP}$ *Enet* $[_{I'}$ $[_{I'}$ *me mee*$]$ $[$*me gone páng*$]]]$ 'Enet came and made fire'. The underlying rule for clause chaining is as follows, where "≈" stands for a suitable relation between the two indices, e.g. i″ immediately precedes i′: $[\![[_{I'}$ I'_1 $I'_2]]\!](i_0) = \lambda i \lambda i' \lambda x \exists i''[[\![I'_1]\!](i_0)(i'')(x) \wedge i'' \approx i' \wedge [\![I'_2]\!](i_0)(i')(x)]$

[39] We could also take care of subject agreement by restricting the subject argument x, e.g. to atomic entities in the case of singular, or to the speaker in case of the 1st person singular modal marker *nam.*

(55) $[\![[_{CP} \exists\ [_{IP}\ \textit{Enet}_{[3SG]}\ [\textit{mo}_{[RE][3sg]}\ [_{VP}\ \textit{gone páng}]]]]]\!](i_0)$
$= \lambda i \exists i'[i' \leq i \wedge$ E. makes fire at $i' \wedge \underline{\exists i' \leq i_0[$E. makes fire at $i']}]$

This is a proposition that applies to indices i for which it holds that they are preceded or equal to an index i′ at which the proposition λi[E. makes fire in i] is true, provided that this proposition is true at some index i′ before or equal to the index of interpretation i_0. This latter condition, here underlined, enforces a realis interpretation; if not satisfied, the proposition (55) will necessarily be false. This is a *precondition* of the realis modality, not a presupposition, as the proposition is false and not undefined if the precondition is not satisfied. – If this proposition is asserted at the index of interpretation i_0, which we assume to happen at a syntactic level like ForceP, we arrive at a truth value, following the general rule in (56), exemplified in (57).

(56) $[\![[_{ForceP}\ [_{Force0}\ \text{ASSERT}]\ \text{CP}]]\!](i_0) = [\![\text{CP}]\!](i_0)(i_0)$
(57) $[\![[_{ForceP}\ \text{ASSERT}\ [_{CP} \exists\ [_{IP}\ \textit{Enet}_{[3SG]}\ [\textit{mo}_{[RE][3SG]}\ [_{VP}\ \textit{gone páng}]]]]]\!](i_0)(i_0)$
$= \exists i'[i' \leq i_0 \wedge$ E. makes fire at $i' \wedge \underline{\exists i' < i_0[$E. makes fire at $i']}]$

Notice that in spite of the precondition it is informative to claim that the proposition (55) is true at i_0; we get truth if $\exists i' \leq i_0$[E. makes fire at i′], and falsity otherwise. The precondition does no harm for non-embedded realis clauses, but expresses a suitable restriction for embedded ones.

Embedded clauses are headed by complementizers that, in the current analysis, express themselves modal notions. The realis complementizer *ke*[40] expresses a universal quantification over indices that are accessible via a modal relation R, and in addition a precondition that the proposition that it applies to is true. The resulting syntactic category of embeddable clauses is called cP. The interpretation is given in (58), and exemplified in (59) with the precondition due to the realis marker *mo* and the precondition due to the realis complementizer *ke*. The two precondtions expresses the same thing; hence *ke* and realis clauses fit to each other.[41]

(58) $[\![[_{cP}\ [_{cP0}\ \textit{ke}]\ \text{CP}]]\!](i_0) = \lambda i \lambda R[\forall i'[R(i)(i') \rightarrow [\![\text{CP}]\!](i_0)(i)] \wedge \underline{[\![\text{CP}]\!](i_0)(i_0)}]$
(59) $[\![[_{cP}\ \textit{ke}\ [_{CP} \exists\ [_{IP}\ \textit{Enet}_{[3SG]}\ [_{I'}\ \textit{mo}_{[RE][3SG]}\ [_{VP}\ \textit{gone páng}]]]]]]\!](i_0)$
$= \lambda i \lambda R[\forall i'[R(i)(i') \rightarrow \exists i' \leq i$[E. makes fire at $i' \wedge \underline{\exists i' \leq i_0[$E. makes fire at $i']}]$
$\wedge \underline{\exists i' \leq i_0[$E. makes fire at $i' \wedge \underline{\exists i' \leq i_0[$E. makes fire at $i']]}]$

The relation R is specified by embedding verbs that define an accessibility relation, e.g. by the verb *kiibele* ‘think, be able to’. The subject argument is projected, resulting in the following interpretation, where the two preconditions in (59) are abbreviated.

(60) a. $[\![[_{VP}\ \textit{kiibele}\ [_{cP}\ \textit{ke Enet mo gone páng}]]]\!](i_0)$
$= \lambda i \lambda x[\forall i'[\text{EPIST}(i)(i')(x) \rightarrow \exists i' \leq i$[E. makes fire at $i' \wedge \underline{\text{precond.1}}]] \wedge \underline{\text{precond.2}}]$
b. $[\![[_{ForceP}\ \text{ASSERT}\ [_{CP} \exists\ [_{IP}\ \textit{Lising}_{[3SG]}\ [_{I'}\ \textit{mwe}_{[RE][3SG]}\ [_{VP}\ \textit{kiibele ke Enet mo gone páng}]]]]]\!](i_0)$
$= \exists i \leq i_0[\forall i'[\text{EPIST}(i)(i')(\text{L.}) \rightarrow \exists i' \leq i$[E. makes fire at $i' \wedge \underline{\text{precond.1}}]] \wedge \underline{\text{precond.2}}$
$\wedge \underline{\exists i \leq i_0[\forall i'[\text{EPIST}(i)(i')(\text{L.}) \rightarrow \exists i' \leq i}$[E. makes fire at $i' \wedge \underline{\text{precond.1}}]] \wedge \underline{\text{precond.2}}]]$

[40] *ke* also occurs as complementizer for relative clauses; I do not treat this use here.
[41] In a sense, this is a semantic version of feature checking.

Here, EPIST(i)(i′)(x) expresses that the index i′ is epistemically accessible to x at the index i, that is, i′ corresponds to what x knows in i. The first precondition in (a) must be satisfied, otherwise x would believe a contradiction. Also, the second precondition in (a) must be satisfied, otherwise the VP could not lead to a true sentence. Hence *kiibele* with realis complementizer receives the meaning of English *know* 'to believe something that is true'. The full sentence (b) also carries the realis precondition coming from the main clause.

As for the realis negation marker, *-re*, its simplest interpretation is as in (61). It allows for vacuous binding of the outer index i′, leading to interpretations like in (62).[42]

(61) $[\![[_{I'}\ \text{RE-N}\ \text{VP}]]\!](i_0) = \lambda i \lambda i' \lambda x \neg \exists i'' \leq i [[\![\text{VP}]\!](i_0)(i'')]$

(62) $[\![[_{\text{ForceP}}\ \text{ASSERT}\ [_{\text{CP}}\ \exists\ [_{\text{IP}}\ \textit{Enet}\ [\textit{tere}_{[\text{RE-N}][3\text{SG}]}\ [_{\text{VP}}\ \textit{gone páng}]]]]]\!](i_0)$
$= \exists i' [\neg \exists i'' \leq i_0 \wedge \text{E. makes fire at } i'']]$

We now turn to irrealis modality. I assume that it is interpreted as in (63), exemplified in (64). Hence, it claims that the clausal proposition is true at some later index.[43] In a branching time model, this means that the proposition may become true, which would be aptly captured by the alternative term "potentialis". But notice that irrealis does not express any relation to i_0.

(63) $[\![[_{I'}\ \text{IR}\ \text{VP}]]\!](i_0) = \lambda i \lambda i' \lambda x [i < i' \wedge [\![\text{VP}]\!](i_0)(i')(x)]$

(64) $[\![[_{\text{IP}}\ \textit{Enet}_{[3\text{SG}]}\ [\textit{bwe}_{[\text{IR}][3\text{SG}]}\ [\textit{gone páng}]]]]\!](i_0) = \lambda i \lambda i' [i < i' \wedge \text{E. makes fire at } i']$

Irrealis modality in simple clauses is used for future reference. In a linear time structure, this could simply be rendered by existentially quantifying over the index i′, and by applying the resulting proposition to the index of utterance, i_0, leading to the representation $\exists i' [i_0 < i' \wedge$ E. makes fire at i′]. However, in a branching-time structure, this is not sufficient, because it would just express that it is *possible* that Enet will make fire. We rather need a quantification over *all* future continuations, or perhaps all expectable continuations. Interestingly, we find that future is not expressed by simple irrealis mood, but in conjunction with a prefix *a-*. I assume that this prefix indicates the presence of a future operator that expresses a quantification over continuations. This meaning can be expressed by the FUT operator (65), and is illustrated in (66). Here, $i \sim i'$ expresses that i and i′ are part of the same history, i.e. $i \leq i'$ or $i' \leq i$.

(65) $[\![[_{\text{CP}}\ \text{FUT}\ \text{IP}]]\!] = \lambda i \forall i' [i \leq i' \rightarrow \exists i'' [i' \sim i'' \wedge [\![\text{IP}]\!](i_0)(i)(i'')]]$

(66) $[\![[_{\text{CP}}\ \text{FUT}\ [_{\text{IP}}\ \textit{Enet}_{[3\text{SG}]}\ [a_{[\text{FUT}]}\ \textit{bwe}_{[\text{IR}][3\text{SG}]}\ [\textit{gone páng}]]]]]\!](i_0)$
$= \lambda i \forall i' [i \leq i' \rightarrow \exists i'' [i' \sim i'' \wedge i < i'' \wedge \text{E. makes fire at } i'']]$

However, we do find bare realis clauses for the expression of preferences for the future, cf. (34) to (36). This is not the place to go into the representation of such world-to-word directed

[42] There are other ways of interpretation, e.g. by interpreting i′ as an extended reference index, and having $\neg \exists i''$ range over parts of the index i′; this captures the restricteion of negation to reference situations (cf. Partee 1973).

[43] Alternatively, irrealis expresses the relation $i < i' \vee i \leq i'$, where the second disjunct is pragmatically implicated to be false due to competition with the realis marker.

speech acts, but it is clear that they would need the meaning encoded in the irrealis IP. Making use of the semantics of desire in the style of Heim (1992), this can be implemented as follows:

(67) $[\![[_{\text{ForceP}}\ \text{PREF}\ \text{IP}]]\!](i_0) = \forall i,i'[i,\ i'$ maximally similar to $i_0 \wedge [\![\text{IP}]\!](i_0)(i_0)(i) \wedge \neg[\![\text{IP}]\!](i_0)(i_0)(i')$
$\rightarrow$ speaker(i_0) prefers i over $i']$

(68) $[\![[_{\text{ForceP}}\ \text{PREF}\ [_{\text{IP}}\ kop_{[2\text{SG}][\text{IR}]}\ gone\ páng]]]\!](i_0)$
$= \forall i \forall i'[i,\ i'$ maximally similar to $i_0 \wedge$ [addr(i_0) m. fire in i] $\wedge \neg$[addr(i_0) m. fire in $i']$
$\rightarrow$ speaker(i_0) prefers i over $i']$

Irrealis in embedded clauses is headed by the complementizer *ka*, which has the same modal meaning as *ke* except for the realis precondition:

(69) $[\![[_{\text{cP}}\ ka\ \text{CP}]]\!](i_0) = \lambda i \lambda R \forall i'[R(i)(i') \rightarrow [\![\text{CP}]\!](i_0)(i')]]$

As before, the embedding predicate specifies the accessibility relation, which will be again illustrated with *kiibele*. This can have an epistemic reading with *ka* clauses, cf. *Kye-m*$_{[3\text{PAUC}][\text{RE}]}$ *kiibele ka Jisas abwe*$_{[\text{FUT}][\text{IR}][3\text{SG}]}$ *kuone kiyee* 'They thought that Jesus would help them', but *kiibele ka* + irrealis clause is frequently interpreted as 'to know how', under the condition that subject of main clause and subject of embedded clause are coreferential. I assume that *kiibele* also encompasses the notion of ability, which then leads to interpretations like the following:

(70) a. $[\![[_{\text{VP}}\ kiibele\ [_{\text{cP}}\ ka\ [_{\text{CP}}\ \exists\ [_{\text{IP}}\ \_\ [_{\text{I}'}\ bwe_{[\text{IR}][3\text{SG}]}\ [_{\text{VP}}\ gone\ páng]]]]]]]\!](i_0)$
$= \lambda i \lambda x \forall i'[\text{ABILITY}(i)(i')(x) \rightarrow \exists i''[i' < i'' \wedge$ x makes fire at $i'']]$

b. $[\![[_{\text{CP}}\ \exists\ [_{\text{IP}}\ Enet_{[3\text{SG}]}\ [_{\text{I}'}\ mwe_{[3\text{SG}][\text{RE}]}\ [_{\text{VP}}\ kiibele_2\ ka\ bwe\ gone\ páng]]]]]\!](i_0)$
$= \lambda i \exists i'[i' \leq i \wedge \forall i''[\text{ABILITY}(i')(i'')(\text{E.}) \rightarrow \exists i'''[i'' < i''' \wedge$ E. makes fire at $i''']] \wedge \ldots]$

ABILITY(i)(i″)(x) holds if the index i″ is compatible with the abilities of x at the world i. The formula in (b) states that for all indices i″ that are compatible with the abilities of Enet at i′, there is an index i‴ following i″ at which she makes fire. That is, the making of fire is not excluded at the indices that are compatible with the abilities of Enet. The formula in (b) leaves out the realis precondition introduced by the main clause, for simplicity.

The use of irrealis in conditionals, cf. (43), can be explained if we assume that the protasis clause specifies the accessibility relation. The underlying syntactic structure still needs closer examination; one option is given in (71), and exemplified in (72). This states that for all future indices i′ at which the incubator bird feels an egg, there is an index i‴ following i′ at which it lays an egg. Taken literally, this expresses a generalization about the future only, but it can be implicated that it also holds about the past.

(71) $[\![[_{\text{CP}}\ [ka\ \text{IP}]\ \text{CP}]]\!](i_0) = \lambda i \forall i'[[\![\text{IP}]\!](i_0)(i)(i') \rightarrow [\![\text{CP}]\!](i_0)(i')]$

(72) $[\![[_{\text{ForceP}}\ \text{ASSERT}\ [_{\text{CP}}\ molo_i\ [_{\text{C0}}\ ka\ [_{\text{IP}}\ t_i\ bo_{[3\text{SG}][\text{IR}]}\ longane\ diliri]]\ [_{\text{CP}}\ t_i\ abe_{[\text{FUT}][3\text{SG}][\text{IR}]}\ pisih]]]]]\!](i_0)$
$= \forall i'[i_0 < i' \wedge$ bird feels egg in $i' \rightarrow \forall i''[i_0 \leq i'' \rightarrow \exists i'''[i'' \sim i''' \wedge i' < i''' \wedge$ bird lays egg in $i''']]]$

We now turn to distal modality. Distal is typically used for stative predications, that is, for progressives, habituals, or adjectival predications. Also, it is not used to express a proposition

that includes the time of utterance itself, except with adjectives. The use for stative predication is expressed here by a universal quantification over the indices of an interval; the exclusion of the reference time by absence of reference to i_0.

(73) $[\![[_{I'}\ \text{DIST}\ VP]]\!](i_0) = \lambda i \lambda x \exists i' \leq i \forall i'' [i' \leq i'' \leq i \rightarrow [\![VP]\!](i_0)(i'')(x)]$

(74) $[\![[_{IP}\ yaa_{[3SG]}\ [te_{[DIST][3SG]}\ [_{VP}\ van]]]]\!](i_0) = \lambda i \exists i' \leq i \forall i'' [i' \leq i'' \leq i \rightarrow$ the sun goes (down) at $i'']$

One prominent use of distal is the setting of time for the interpretation of the following clause, cf. (23). We assume that the distal clause specifies the event time of the realis clause, where the distal clause occupies the specifier of CP position. This is interpreted as in (75), where QU is the quantifier in the position of C^0. That is, Spec-CP specifies the domain of the quantifier. This leads to representations as in (76), which state that there is an $i \leq i_0$ such that the sun is going down at i, and Enet makes fire at i. By implicature, we have that i is *before* i_0, as otherwise two realis clauses would have been used.

(75) $[\![[_{CP}\ \text{Spec-CP}\ [_{C'}\ [_{C0}\ QU]\ IP]]]\!](i_0) = \lambda i\ [\![QU]\!]: [\![\text{Spec-CP}]\!](i_0)\ [[\![IP]\!](i_0)]$

(76) $[\![[_{\text{Force}P}\ \text{ASSERT}\ [_{CP}\ [_{IP}\ yaa_{[3SG]}\ te_{[3sg][DIST]}\ van]\ [_{C'}\ \exists^{44}\ [_{IP}\ Enet_{[3SG]}\ mo_{[3SG][DIST]}\ gone\ páng]]]]\!](i_0)$
$= \exists i: \exists i' \leq i \forall i'' [i' \leq i'' \leq i \wedge$ the sun goes at $i''] [i \leq i_0 \wedge$ E. m. fire at $i \wedge \underline{\exists i' \leq i_0 [\text{E. m. fire at } i']}]$

Distal clauses as discourse frame setters, as in (44), can be interpreted in case they involve a restrictor in the distal clause itself. This restrictor can be specified by adverbials like *meerin*, which restricts the index to times long before i_0, i.e. $i << i_0$, cf. (77). It also can be a silent operator, which then will be $i < i_0$, as $i \leq i_0$ would be expressed by realis, and $i_0 < i$ by irrealis.

(77) $[\![[_{\text{Force}P}\ \text{ASSERT}\ [_{CP}\ meerin\ [_{C'}\ \exists\ [_{IP}\ temat_{[3SG/PL]}\ [_{I'}\ lat_{[3PL][DIST]}\ pwee]]]]]\!](i_0)$
$= \exists i: i << i_0\ \exists i' \forall i'' [i' \leq i'' \leq i \wedge$ there are many demons at $i'']$

Another use of distal modality is with adjectival modification, cf. (45). In this case, we find the realis complementizer *ke,* for which I propose the interpretation in (78) in its adnominal use, which leads to interpretations as in (79).

(78) $[\![[_{AP}\ ke\ IP]]\!](i_0) = \lambda i \lambda x [[\![IP]\!](i_0)(i)(x) \wedge \underline{[\![IP]\!](i_0)(i_0)(x)}]$

(79) $[\![[_{NP}\ tyenem\ [_{AP}\ ke\ [_{IP}\ \_\ [_{I'}\ to_{[3SG][DIST]}\ [_{VP}\ bo]]]]]]\!](i_0)$
$= \lambda i \lambda x [x$ is a village in $i \wedge \exists i' \leq i \forall i'' [i' \leq i'' \leq i \rightarrow x$ is big in $i'] \wedge$
$\underline{\exists i' \leq i \forall i'' [i' \leq i'' < i_0 \rightarrow x \text{ is big in } i_0]}]$

Distal modality can be used with propositional attitude verbs, leading to a non-factive interpretation, cf. (42); the underlying interpretation is illustrated in (80). In contrast to irrealis clauses, distal avoids reference to future indices with respect to the index i, implicating counterfactuality.

(80) $[\![[_{VP}\ deme\ [_{cP}\ ka\ [_{IP}\ te_{[3SG][DIST]}\ met]]]]\!](i_0)$
$= \lambda i \lambda x \forall i' [\text{THINK}(i)(i')(x) \rightarrow \exists i'' \leq i' \forall i''' [i'' \leq i''' \leq i' \rightarrow$ he is dead at $i']]$

[44] With a generic or universal quantifier in this position, we would get a generic clause.

Furthermore, distal is used in conditional clauses, as in (46) and (47). For (46), we get the following interpretation under the assumption of a future marker as in (65), and the assumption that Spec-CP expresses a restrictor of the quantifier in C^0. In this case, the stativity component of the distal is not relevant, but notice that it does not constitute a problem either; for an achievement predicate like *pyak* 'choose' the restrictor $\exists i'' \leq i' \forall i''' [i'' \leq i''' \leq i' \rightarrow ...i''...]$ amounts to [...i′...].

(81) $[\![[_{\text{ForceP}}\ \text{ASSERT}\ [_{\text{CP}}[_{\text{IP}}\ \textit{kot}_{[2\text{SG}][\text{DIST}]}\ \textit{pyak ne vyoh}]\ [_{\text{C}'}\ \text{FUT}\ [_{\text{IP}}\ \textit{akop}_{[\text{FUT}][2\text{SG}][\text{IR}]}\ \textit{idi popat}]]]]]\!](i_0)$
$= \forall i'$: $\exists i'' \leq i' \forall i''' [i'' \leq i''' \leq i' \rightarrow$ you(i_0) choose coconut at i″]
$[i_0 \leq i' \rightarrow \exists i'' [i' \sim i'' \wedge i_0 < i'' \wedge$ you(i_0) get pig at i″]]

For (47) we assume an interpretation related to (71), in which the protasis restricts the modal quantifier. Crucially, (82) does not state anything about indices that are situated in the future relative to i_0; this implicates the counterfactuality of such conditionals. The representation is somewhat simplified, by eliminating quantifications related to the stativity of the distal marker.

(82) $[\![[_{\text{ForceP}}\ \text{ASSERT}\ [_{\text{CP}}\ [\ \textit{ka}\ [_{\text{IP}}\ \textit{kot}_{[2\text{SG}][\text{DIST}]}\ \textit{pyak ne vyoh}]]\ [_{\text{CP}}\ \textit{akot}_{[\text{FUT}][2\text{SG}][\text{DIST}]}\ \textit{idi popat}]]]\!](i_0)$
$= \forall i'$: [you(i_0) choose coconut at i′] [$R(i_0)(i') \rightarrow \exists i''[i' \sim i'' \wedge$ you(i_0) get a pig at i″]]

We now turn to the remaining modal marker, N. I assume that *n*-marked IPs simply denote the VP proposition, cf. (83). Similar to the distal marker, it does not relate the event index i to a reference index. Such clauses can be used to express commands, as in *Kon peten!* 'Be truthful!', perhaps in a similar way as infinitives can be used to express commands in German, cf. *Die Wahrheit sagen!* We can assume that an imperative marker in the ForceP takes such a proposition, and expresses a command that the proposition should be made true with respect to the index of interpretation, or another index that the speaker refers to.

(83) $[\![[_{\text{I}'}\ \text{N}\ \text{VP}]]\!](i_0) = \lambda i \lambda x [[\![\text{VP}]\!](i_0)(i)]$
(84) $[\![[_{\text{IP}}\ [_{\text{I}'}\ \textit{kon}_{[2\text{SG}][\text{N}]}\ \textit{peten}]]]\!](i_0) = \lambda i$[you($i_0$) are truthful at i]
(85) $[\![[_{\text{ForceP}}\ \text{COMMAND}\ [_{\text{CP}}\ \text{REF}\ [_{\text{IP}}\ \textit{kon peten}]]]]\!](i_0)$:
speaker(i_0) commands addressee(i_0) to act such that $[\![\textit{kon peten}]\!](i_0)(\text{REF}(i_0))$ = true,
where REF(i_0) is the index that speaker(i_0) refers to at i_0, condition: $i_0 < \text{REF}(i_0)$.

Clauses with N marker can also be used in modal clauses headed by the complementizer *ka*, as in *ka kon peten* 'You must tell the truth', cf. (50)(a)[45]. This meaning arises through the complementizer *ka*, which we have analyzed as expressing a modal notion by itself. We assume that in case the modal relation R is not specified explicitly, it is understood as deontic. In this case, R(i)(i′) identifies the indices i′ that do not violate the rules that obtain in i. The application of the basic proposition to i′ is to be understood as saying that whenever the issue (here of you being truthful or not being truthful) arises at i′, the proposition (here of you being truthful) obtains.

[45] Modal sentences with the Bislama loan *mas*, cf. (50)(b), pose the problem that the irrealis marker occurs left of *mas* but should be interpreted in its scope. A possible analysis has *mas* introduce a universal quantification over indices defined by a relation R, which is specified by the irrealis relation $\lambda i \lambda i' [i < i']$.

(86) $[\![[_{cP}\ ka\ [_{IP}\ kon_{[2SG][N]}\ peten]]]\!](i_0) = \lambda i \forall i'[R(i)(i') \rightarrow$ you(i_0) truthful at $i']$

To deal with the uses of the *n* marker in negative contexts, we have to enrich the meaning of *ka* by a lexical presupposition that the modalized proposition is either true at all indices i' in $R(i)(i')$, or at none. The assumption of such an "excluded middle" presuppositions was defended by Gajewski (2005) in his treatment of NEG raising phenomena. Hence we replace (69) by (87), where $\partial\Phi$ stands for 'Φ is presupposed' -- it is true if Φ is true, and undefined else. For readability, I will render this presupposition in italics.

(87) $[\![[_{cP}\ ka\ IP]]\!](i_0) = \lambda i[\forall i'[R(i)(i') \rightarrow [\![IP]\!](i_0)(i')] \wedge$
$\partial[\forall i'[R(i)(i') \rightarrow [\![IP]\!](i_0)(i')] \vee \forall i'[R(i)(i') \rightarrow \neg[\![IP]\!](i_0)(i')]]]$

I will write for the presupposed part $\partial\forall i'[R(i)(i') \rightarrow \{\neg\}[\![IP]\!](i_0)(i')]$, for short. Irrealis negation clauses as in (49) can be analyzed as applying a negative complementizer *sa* to a cP; due to the presupposition, this results in narrow-scope negation, meaning 'you should not be afraid'.

(88) $[\![[_{CP}\ sa\ cP]]\!](i_0) = \lambda i[\neg[\![cP]\!](i_0)(i)]$

(89) $[\![[_{CP}\ sa\ [_{cP}\ ka\ wel\text{-}em_{[2SG]}\ ne_{[3SG][N]}\ nek]]]\!](i_0)$
$= \lambda i\ [\neg[\forall i'[R(i)(i') \rightarrow$ you(i_0) afraid at $i'] \wedge \partial\forall i'[R(i)(i') \rightarrow \{\neg\}[you(i_0)$ *afraid at* $i]]]]$
$= \lambda i\ \forall i'[R(i)(i') \rightarrow \neg$ you(i_0) afraid at $i']$

We have a similar effect if an N clause is embedded by a verb expressing a modal relation that itself is negated, as in (25). This is illustrated with (90), with the resulting meaning that for all indices before or equal the index of interpretation, the indices compatible with the ability of Enet exclude that Enet moves at those indices.

(90) a. $[\![[_{VP}\ kiibele_2\ [_{cP}\ ka\ ne_{[3SG][N]}\ kuu]]]\!](i_0)$
$= \lambda i\lambda x[\forall i'[ABIL(i)(i')(x) \rightarrow x$ moves at $i'] \wedge \partial\forall i'[ABIL(i)(i')(x) \rightarrow \{\neg\}x$ *moves at* $i']]]$

b. $[\![[_{ForceP}$ ASSERT $[_{CP}\ \exists\ [_{IP}\ Enet\ [_{I'}\ tere_{[3SG][RE.N]}\ [_{VP}\ kiibele_2\ ka\ ne\ kuu]]]]]]\!](i_0)$
$= \neg\exists i \leq i_0[\forall i'[ABIL(i)(i')(E.) \rightarrow E.$ moves at $i'] \wedge \partial[$*(excluded middle)*$]]$
$= \forall i \leq i_0 \neg[\forall i'[ABIL(i)(i')(E.) \rightarrow E.$ moves at $i'] \wedge \partial[$*(excluded middle)*$]]$
$= \forall i \leq i_0[\forall i'[ABIL(i)(i')(E) \rightarrow \neg E.$ moves at $i']]$

In the case of negative-implicating verbs like *notselaane* 'think wrongly', cf. (48), we have in addition to the modal relation, here THINK, the restriction to those indices that are not true with respect to the index of interpretation, that is, to indices preceding or following the index of interpretation, cf. (91). Hence, *notselaane* identifies those indices that are compatible with what the subject thinks, but for which the speaker excludes that they correspond to indices before or after the index of interpretation. With this restriction, verbs like *notselaane* cannot subcategorize for realis or irrealis modality, and it is implicated that the subcategorized proposition is not true.

(91) a. $[\![[_{VP}\ notselaane]]\!](i_0) = \lambda i\lambda i'\lambda x[$THINK$(i)(i')(x) \wedge \neg[i' \sim i_0]]$

b. $[\![[_{VP}$ *notselaane* $[_{cP}$ *ka* $ne_{[3SG][N]}$ *kuu*$]]]\!](i_0)$
$= \lambda i \lambda x[\forall i'[[\text{THINK}(i)(i')(x) \wedge \neg[i' \sim i_0]] \rightarrow x \text{ moves at } i'] \wedge \partial[(\text{excluded middle})]]$

c. $[\![[_{\text{ForceP}}$ ASSERT $[_{CP} \exists$ $[_{IP}$ $Enet_{[3SG]}$ $[_{I'}$ $[mwe_{[3SG][RE]}$ $[_{VP}$ *notselaane ka ne kuu*$]]]]]]]\!](i_0)$
$= \exists i \leq i_0 [\forall i'[\text{THINK}(i)(i')(E.) \wedge \neg[i' \sim i_0]] \rightarrow E. \text{ moves at } i'] \wedge \partial[(\text{excluded middle})]]$
$\wedge$ <u>(realis precondition)</u>]

This concludes the short sketch of a theory capturing the five modal markers of Daakie and their interplay with complementizers like *ke, ka* and *sa,* embedding predicates like factive and non-factive propositional attitude verbs, and conditional clauses. As stated at the outset, it is preliminary in various respects – especially in spelling out how the meanings are derived in a compositional way. Yet it should be clear that they present a system of modal markers that is quite different from better known systems involving tense markers such as past and future, or modal markers such as indicative and subjunctive – a system that can be fruitfully investigated with the tools of compositional modal semantics.

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