NOTES ON DAAKIE (PORT V ATO): 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 work¹ 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 orthography, and used here.

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* 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 16 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.
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*. 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, e.g. *tyenem* [tʃɛnem] ‘home, village’, *dyung* [dʒuŋ] ‘mat’, *syep* [ʃep] ‘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]em* ‘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:

<table>
<thead>
<tr>
<th></th>
<th>Labial</th>
<th>Labiovelar</th>
<th>Labiodental</th>
<th>Alveolar</th>
<th>Palatal</th>
<th>Velar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voiceless</td>
<td><em>p</em></td>
<td><em>p</em>&lt;sup&gt;w&lt;/sup&gt; (<em>pw</em>)</td>
<td><em>t</em></td>
<td></td>
<td></td>
<td><em>k</em></td>
<td></td>
</tr>
<tr>
<td>Prenasalized</td>
<td><em>m</em>&lt;sup&gt;b&lt;/sup&gt;</td>
<td><em>m</em>&lt;sup&gt;h&lt;/sup&gt; (<em>mh</em>)</td>
<td><em>n</em></td>
<td></td>
<td></td>
<td><em>ŋ</em></td>
<td></td>
</tr>
<tr>
<td>Nasal</td>
<td><em>v</em></td>
<td><em>s</em></td>
<td><em>h</em></td>
<td><em>r</em></td>
<td></td>
<td><em>l</em></td>
<td></td>
</tr>
<tr>
<td>Fricative</td>
<td><em>j</em>&lt;sup&gt;y&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>(3)</th>
<th>Short vowels</th>
<th>Long vowels</th>
</tr>
</thead>
<tbody>
<tr>
<td>i (i)</td>
<td>[i] (u)</td>
<td>i: (ii)</td>
</tr>
<tr>
<td>e (é)</td>
<td>[ø] (ó)</td>
<td>e: (ee)</td>
</tr>
<tr>
<td>ε (e)</td>
<td>[œ] (o)</td>
<td>ε: (ee)</td>
</tr>
<tr>
<td>(æ(á)) a (a)</td>
<td>(æ:(á)) a (aa)</td>
<td></td>
</tr>
</tbody>
</table>

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

(4) /i/ vs. /iː/ [tisi] ‘draw in sand’ [tisiː] ‘fall down’
/a/ vs. /æ/ [da] ‘blood’ [daː] ‘language’
/o/ vs. /œ/ [so:ɡɔː] ‘together’ [sɔɡɔ] ‘hold’
/ʊ/ vs. /uː/ [ut] ‘house’ [uːt] ‘to scoop’

The vowel æ is assumed here to capture a probably recent change that led from Daakaka syllables C_Lja(C¬V) to Daakie syllables C_L(aj)æ(C¬V), where C_L are the labial consonants /p, b, v, m/ and C¬V are non-velar consonants, and the glide j in Daakie is reduced or optional. Examples are Daakaka/Daakie pairs [pjan]/[p(aj)æn] ‘under’, [bjar]/[b(aj)æt] ‘bed, floor’, [vjan]/[v(aj)æn] ‘go’, [vjar]/[v(aj)æt] ‘wood borer’, [mjan]/[m(aj)æn], ‘eye’, ‘underdone’, [mjar]/[m(aj)æt] ‘unripe; mad; selfish’, [m yap]/[mæp] ‘heavy’ and [bja]/[b(aj)æ] ‘to plant’ For minimal pairs in Daakie, cf. [pan] ‘his mouth’, [man] ‘male’ (not a loanword), ‘his⁴, [mat] ‘our (including addressee)⁴ and ‘map’ ‘nut species’. The sound change is less pronounced in long vowels, cf. [vjaː]/[væː] or [vːaː] ‘hand’, ‘germinated coconut’. It is reduced or lacking in syllables with velar coda consonants, e.g. [pən] or [pəŋ] ‘fire’, [pək] ‘choose’, [pɑh] ‘fragrant’, [libɑk] ‘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: [ŋeːlɛ] ‘flying fox’ [ŋeːle] ‘to sell’; [ŋele] ‘axe’ [teː] ‘to warm oneself’; [bʊɛ] ‘at first’ [bʊe] ‘song, tamtam’ The realization of /e/ and /ɛ/ is variable depending on the context, and is often realized as [ɛː:]. 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’

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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’
[golø] ‘to block’ [golœ] ‘to walk on knees’
[ly] ‘to pluck fruit’ [sø] ‘hit, e.g. by arrow’ [sœ] ‘reef’
[ly] ‘to talk’ [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, [ɔ:] 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-initial 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’
[ŋuŋø] ‘yellow’ [ŋorok] ‘far away’
(8) [ut] ‘louse’ [ot] ‘place’ [orø] ‘chase’
(9) [pune] ‘narrate’ [pø] ‘white, light’
[pulse] ‘to climb’ [pøpø] ‘white, barren’ [pøpœ] ‘carry on shoulders’
[mu] ‘earthquake’ [mørø] ‘old’
[bulyly] ‘insect sp.’
[ulu] ‘slack’ [boelop] ‘long’

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) [tûtœ] ‘carry’ [tûtørœ] ‘breadfruit’
[dynj] ‘custom’ [dølo] ‘voice of’
[nynjø] ‘yesterday’ [nøn] ‘face’
[mury] ‘small’ [vœrølø] ‘two’ [vœrœ] ‘old’

(11) [jœv] ‘turtle’ [nœj] [vœ] ‘machete’

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’ [nuñnuñ] ‘ask’ [nop] ‘fall asleep’

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).

(13) [nøn] ‘face’ [vøt] ‘stone, money’
(14) [lok] ‘my heart’ [lom] ‘your heart’ [løn] ‘his heart’ [løt] ‘our heart’

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.

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\(^6\) The role of following alveolar consonants is also apparent in /mju:len/ ‘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 silií

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, paucal7, plural) and four persons (1st, 2nd, 3rd and inclusive 1st + 2nd). The following table gives the paradigm for pronouns and for realis subject markers.

<table>
<thead>
<tr>
<th>Person</th>
<th>Singular</th>
<th>Plural</th>
<th>Dual</th>
<th>Paucal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ngyo na-m</td>
<td>keme keme-m</td>
<td>komoo komo-m</td>
<td>kememdyee kidy-m</td>
</tr>
<tr>
<td>1+2</td>
<td>et da-m</td>
<td>adoo do-m</td>
<td>adyee dye-m</td>
<td>Pronoun SM</td>
</tr>
<tr>
<td>2</td>
<td>ngyak ko-m</td>
<td>kimim ki-m</td>
<td>kamoo ka-m</td>
<td>kamdyee-kamdyee-m</td>
</tr>
<tr>
<td>3</td>
<td>mwe, me, mwi, mi, mo, mu, ma</td>
<td>ngyee la-m</td>
<td>kolo-kolo-m</td>
<td>ki(l)yyee kiyye-m</td>
</tr>
</tbody>
</table>

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

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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, m- is deverbialized, to m. If the following verb stem has an initial labial (non-velarized) consonant, velarization is lost, cf. me pâne ‘roast’, me bâ ‘plant’, me mee ‘come’, me van ‘go’, but mwe pwet ‘stay’, mwe mwetmwet ‘short’. If the stem 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 yang ‘strong’, mi nyuu ‘grow’, mwi idi ‘take’, mo longane ‘hear’, mu tuluh ‘slippery’, mu lupwe ‘hide’, mu wu ‘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 mân ‘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 \( m(V) \) suggest 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.

\[
\begin{align*}
\text{(21) a. } & \quad \text{IP (Subject)} \left[ \text{I}_1 \right] \text{SM-MOD} \left[ \text{VP \left[ \text{Verb (Object) (Adjuncts)} \right] } \right] \\
\text{b. } & \quad \text{IP (Subject)} \left[ \text{I}_1 \emptyset \text{MOD} \right] \left[ \text{VP \left[ \text{MOD-Verb (Object) (Adjuncts)} \right] } \right]
\end{align*}
\]

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:

\[
\begin{align*}
\text{(22) } & \quad \text{mo longbini ka be van lan vele kekeli} \\
& \quad \text{3SG.RE want that 3SG.IR go LOC island small}
\end{align*}
\]

‘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).

\[
\begin{align*}
\text{(23) } & \quad \text{yaa te van te pwet}^{11} \text{ ti piipili mwe kuoli=mee}^{12} \text{ tyenem} \\
& \quad \text{sun 3SG.DST go 3SG.DST PROG 3SG.DST red 3SG.RE return-come home}
\end{align*}
\]

‘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:

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\(^9\) 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

Lalinda with Langievot ³⁶⁶-¹⁰-¹⁶-¹⁳ 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*

lisepsep ³⁵⁷.³⁵⁸-¹⁶-¹⁴ want COMP.NR ³⁵⁷.³⁵⁸ sit.down=for

‘The lisepsep¹⁴ 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

taro introduced ³⁵⁷.³⁵⁸ grow ³⁵⁷.³⁵⁸ slow

‘This Fiji taro is growing slow.’

(27) *meerin na-m mee o-ke-le na-m lehe*

long.time.ago ¹⁵-¹⁶-¹⁴ come LOC-COMP-PROX ¹⁵-¹⁶-¹³ look

‘long time ago, I came here, I looked.’

(28) *ko-m ko=ot¹⁷ mo-nok¹⁸ ko-m ta=kuu–kuu¹⁹ yee mwi²⁰ ti–tisii*

²⁰-¹⁵-¹⁶-¹⁴ clear=grounds RE-finish ²⁰-¹⁵-¹⁴ cut.out tree ³⁵⁷.³⁵⁸ fall.down.DISTR

‘after you clear the grounds, you cut out the trees, they fall down’

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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 mwi ‘fall’).

²⁰ This is a serial verb construction: By cutting out the trees, an event occurs where multiple objects fall down.
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 mo-mele  Jemis3.029

\[3SG.RE\] hear \[COMP.RE\] child \[DEM.SG\] \[3SG.RE PROG\] \[3SG.RE talk\] \[RE-this.way\] ‘He heard that the child was talking in this way.’

(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 [hospital] em ne\(^{23}\) mese=en byen ke popat mwe te ye-k  Boa1

\[1SG.RE\] stay \[house TR\] sick-\[NOM\] because \[COMP.RE\] pig \[3SG.RE cut leg-1SG\] \[0.79\] ‘I stayed in the hosp. because the pig bit my leg.’

(33) bili ke mwe saa=kuu wilin by-en me mee me timaleh man soo mu wuo  Bong2.

\[time\] \[COMP.RE\] \[3SG.RE\] take.off \[skin.TR\] body-3SG \[3SG.RE\] come \[3SG.RE\] child male \[SG.IND\] \[3SG.RE\] good \[0.022\] ‘When he took of his skin, he became a good-looking young man.’

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.’

\[\text{21}\] 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’.

\[\text{22}\] Also, kege; these two complementizers are also used for relative clauses.

\[\text{23}\] The transitive marker ne can also form relational nouns; here ‘house of sickness’

\[\text{24}\] Command can also be issued by using the bare verb stem, e.g. Sengane! ‘Give it!’

\[\text{25}\] Before verbs with initial vowels, [p] is reduced to [ʋ], leading to the realization [naʋidi]

\[\text{26}\] 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 reasons. 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.
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.

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 \textit{kiibele} ‘to know’ is used (similar to English \textit{to know that} / \textit{how}).

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

We expect irrealis to occur in the complement clauses of non-factive presuppositional attitude verbs like \textit{deme} and \textit{notnot} ‘think’. However, the content of thought is typically expressed in

\[\text{(22)}\quad \text{na-m longbini ka na-p pune punen soo}\]
\[\text{(38)}\quad \text{mwe p\^ane basee kingyee-ye mwe neknak ka bu du ba ane}\]
\[\text{(39)}\quad \text{ngale la-m kiibele ka la-p kuo soo\textasciitilde soo}\]
\[\text{(40)}\quad \text{a-na-p ane s\^owe bili ka ot bi mitmyet}\]
\[\text{(41)}\quad \text{na-p sengane de-re\textasciitilde mee na-p ane}\]

\[\text{2SG-IR give some-DETR come 1SG-IR eat.TR}\]

\[\text{man NSPEC-some FUT-3SG-IR come 3SG-IR take picture of.REF probably}\]

\[\text{‘Some man or other will come and/to take a picture of it (a palm tree with five branches)’}\]

\[\text{‘I want to tell a story.’}\]

\[\text{‘He roasted the birds and was ready to eat them.’}\]

\[\text{‘Then they knew/were able to run away one by one.’}\]

\[\text{‘What will I eat when it is dark?’}\]
direct 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*<sup>31</sup> *mon la-m deme ka te met byen b-on mwe sek* Saelas.026
demon<sup>PL</sup> too<sup>3PL-RE</sup> think<sup>COMP,IR</sup> dead<sup>3SG,DST</sup> because<sup>3SG,RE</sup> smell<sup>3SG</sup> stink<sup>3SG,RE</sup>

‘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<sup>COMP</sup> 3SG,IR feel<sup>3SG EMPH</sup> finish

‘The incubator bird, when it feels its egg(s) finished,

*a-be mee mwe*<sup>32</sup> *pisih pán weren kege mwe pwet mwi tivin weren*<sup>33</sup>
fut<sup>3SG,IR</sup> come<sup>3SG,RE</sup> lay.eggs under<sup>X,PLACE</sup> comp,rel<sup>3S,RE</sup> stay<sup>3S,RE</sup> bury<sup>TR</sup> 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<sup>3PL,DIST</sup> 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<sup>go</sup> village<sup>COMP</sup> 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).<sup>34</sup>

---

<sup>31</sup> Nominal number is marked by postposed pronouns, e.g. *temát koloo* ‘demon<sup>DUAL</sup>’, *temát kiyee* ‘demon<sup>PAUCAL</sup>’.

<sup>32</sup> 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 phenomenon related to performance.

<sup>33</sup> Locative relative clauses are constructed with *weren* (or *oren*) as head and as resumptive pronoun.

<sup>34</sup> 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 pretendó que nessuno dica niénte ‘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 notselaaane ‘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 notselaaane ka na-n govene ti-ri desoo
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-em35 ne nek ne ti-ri kingyee ye
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 \( \leq \), where \( i \leq i' \) stands for: \( i \) is before \( i' \), or \( i = i' \). The relation \( \leq \) is meant to be a partial order, that is, it may be that \( i \leq i' \) and \( i \leq i'' \), but neither \( i' \leq i'' \) nor \( i'' \leq i' \). The set \( \{ i' \mid i' \leq i \} \) singles out the ‘realis’ portion of indices relative to \( i \), a linear order. The set \( \{ i' \mid i < i' \} \) 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.

\[
\text{(51)} \quad \left[ \text{IP } \text{Enet} [3\text{sg}] \left[ \text{I'} \text{mo} \left[ \text{RE} [3\text{sg}] \right] \right] \left[ \text{VP gone} [\text{VP pàng}] \right] \right]
\]

‘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 to truth values, e.g. \( \llbracket \text{VP gone pàng} \rrbracket \)(\( i_0 \)) = \( \lambda i \lambda x [x \text{ makes fire at } i] \).\(^{37}\) 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).

\[
\text{(52)} \quad \llbracket \left[ \text{I} [\text{I}_0 \text{RE}] \text{VP} \right] \rrbracket \left( i_0 \right) = \lambda i \lambda i' \lambda x [i' \leq i \land \llbracket \text{VP} \rrbracket \left( i_0 \right) (i'(x)) \land \exists i' \leq i_0 [\llbracket \text{VP} \rrbracket \left( i_0 \right) (i'(x))]]
\]

\[
\text{(53)} \quad \llbracket \left[ \text{VP Enet} [3\text{sg}] [\text{I'} \text{moRE}] [3\text{sg}] \left[ \text{VP gone pàng} \right] \right] \rrbracket \left( i_0 \right)
= \lambda i \lambda i' [i' \leq i \land \exists i' \leq i_0 [E. \text{ makes fire at } i' \land \exists i' \leq i_0 [E. \text{ makes fire at } i']]]
\]

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

\[
\text{(54)} \quad \llbracket \left[ \text{CP} \left[ \text{C}_0 \exists \right] \text{IP} \right] \rrbracket \left( i_0 \right) = \lambda i \exists i' [\llbracket \text{IP} \rrbracket \left( i_0 \right) (i')]
\]

\(^{36}\) 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 \( \text{vaven desoo} \) ‘some woman or other’ in sentences like \( \text{vaven desoo tere mee} \) ‘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 \( \text{[VP Enet [I'm mee] [me gone pàng]]} \) ‘Enet came and made fire’. The underlying rule for clause chaining is as follows, where ‘\( \approx \)’ stands for a suitable relation between the two indices, e.g. \( i'' \) immediately precedes \( i' \): \( \llbracket [I'I'; I'_2] \rrbracket \left( i_0 \right) = \lambda i \lambda i' \lambda x \exists i'' [\llbracket I'_1 \rrbracket \left( i_0 \right) \left( i''(x) \right) \land i'' \approx i' \land \llbracket [I'_2] \rrbracket \left( i_0 \right) (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 1\(^{st}\) person singular modal marker \( \text{nam} \).
Notice that in spite of the precondition it is informative to claim that the proposition (55) 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).

\[
\begin{align*}
(55) & \quad \llbracket \text{CP} \exists \text{IP } \text{Enet}_{[3\text{sg}]} \left[ \text{mo}_{[\text{RE}[3\text{sg}]} \left[ \text{VP gone páng} \right] \right] \rrbracket (i_0) \\
& \quad = \lambda i \exists i' \left[ i' \leq i \land \text{E. makes fire at } i' \land \exists i'' \leq i_0 \left[ \text{E. makes fire at } i'' \right] \right]
\end{align*}
\]

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 \( \lambda i[\text{E. makes fire in } i] \) 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).

\[
\begin{align*}
(56) & \quad \llbracket \text{ForceP } \text{Force0 Assert} \text{ CP} \rrbracket (i_0) = \llbracket \text{CP} \rrbracket (i_0)(i_0) \\
(57) & \quad \llbracket \text{ForceP Assert} \text{ CP } \exists \text{IP } \text{Enet}_{[3\text{sg}]} \left[ \text{mo}_{[\text{RE}[3\text{sg}]} \left[ \text{VP gone páng} \right] \right] \rrbracket (i_0)(i_0) \\
& \quad = \exists i' \left[ i' \leq i_0 \land \text{E. makes fire at } i' \land \exists i'' \leq i_0 \left[ \text{E. makes fire at } i'' \right] \right]
\end{align*}
\]

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 \( \exists i'' \leq i_0 \left[ \text{E. makes fire at } i'' \right] \), 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 \( \text{ke}^{40} \) 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 \( \text{mo} \) and the precondition due to the realis complementizer \( \text{ke} \). The two preconditions express the same thing; hence \( \text{ke} \) and realis clauses fit to each other.

\[
\begin{align*}
(58) & \quad \llbracket \text{CP ke} \text{p₀ ke} \text{ CP} \rrbracket (i_0) = \lambda i \lambda R \forall i'' \left[ R(i)(i'' \rightarrow \llbracket \text{CP} \rrbracket (i'')) \right] \land \llbracket \text{CP} \rrbracket (i_0)(i_0) \\
(59) & \quad \llbracket \text{ke} \text{ cp } \exists \text{IP } \text{Enet}_{[3\text{sg}]} \left[ \text{mo}_{[\text{RE}[3\text{sg}]} \left[ \text{VP gone páng} \right] \right] \rrbracket (i_0)(i_0) \\
& \quad = \lambda i \lambda R \forall i'' \left[ R(i)(i'' \rightarrow \exists i'' \leq i_0 \left[ \text{E. makes fire at } i'' \right] \right] \\
& \quad \land \exists i'' \leq i_0 \left[ \text{E. makes fire at } i'' \land \exists i'' \leq i_0 \left[ \text{E. makes fire at } i'' \right] \right]
\end{align*}
\]

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

\[
\begin{align*}
(60) \quad & \text{a. } \llbracket \text{VP kiibe} \text{le } \left[ \text{cp ke Enet mo gone páng} \right] \rrbracket (i_0) \\
& \quad = \lambda i \lambda x \forall i'' \left[ \text{EPIST}(i)(i'')(x) \rightarrow \exists i'' \leq i_0 \left[ \text{E. makes fire at } i'' \land \text{precond.1} \right] \right] \land \text{precond.2} \\
& \text{b. } \llbracket \text{ForceP Assert } \text{cp } \exists \text{IP } \text{Lising}_{[3\text{sg}]} \left[ \text{mwe}_{[\text{RE}[3\text{sg}]} \left[ \text{VP kiibe} \text{le ke Enet mo gone páng} \right] \right] \rrbracket (i_0) \\
& \quad = \exists i'' \leq i_0 \left[ \text{EPIST}(i)(i'')(L'') \rightarrow \exists i'' \leq i_0 \left[ \text{E. makes fire at } i'' \land \text{precond.1} \right] \right] \land \text{precond.2} \\
& \quad \land \exists i'' \leq i_0 \left[ \forall i'' \left[ \text{EPIST}(i)(i'')(L'') \rightarrow \exists i'' \leq i_0 \left[ \text{E. makes fire at } i'' \land \text{precond.1} \right] \right] \land \text{precond.2} \right]
\end{align*}
\]

\(^{40}\) \text{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, \( \text{EPIC}(i)(i')(x) \) 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 \( \text{kibele} \) with realis complementizer receives the meaning of English \( \text{know} \) ‘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, \(-\text{re}\), its simplest interpretation is as in (61). It allows for vacuous binding of the outer index \( i' \), leading to interpretations like in (62).

\[
(61) \quad \left[ [\chi \text{ RE-N VP}] \right](i_0) = \lambda i \lambda i' \lambda x \neg \exists i'' \leq i \left[ \left[ \text{VP} \right](i_0)(i'')(x) \right]
\]

\[
(62) \quad \left[ [\text{ForceP ASSERT CP} \exists [\text{IP Enet} [\text{tere RE-N}][\text{VP gone pàng}]]] \right](i_0)
\]

\[= \exists i'[\neg \exists i'' \leq i_0 \land \text{E. makes fire at } i'']\]

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 \( i_0 \).

\[
(63) \quad \left[ [\chi \text{ IR VP}] \right](i_0) = \lambda i \lambda i' \lambda x \left[ i < i' \land \left[ \left[ \text{VP} \right](i_0)(i')(x) \right] \right]
\]

\[
(64) \quad \left[ [\text{IP Enet}[[b\text{we}][\text{IR}][\text{gone pàng}]]] \right](i_0) = \lambda i \lambda i' \left[ i < i' \land \text{E. makes fire at } i' \right]
\]

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 \( \exists i' [i_0 < i' \land \text{E. makes fire at } i'] \). 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 \( \text{FUT} \) 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 \( i' \leq i \).

\[
(65) \quad \left[ [\text{CP FUT IP}] \right](i_0) = \lambda i \forall i' \left[ i \leq i' \rightarrow \exists i'' \left[ i' \sim i'' \land \left[ \text{IP} \right](i_0)(i'(i'')) \right] \right]
\]

\[
(66) \quad \left[ [\text{CP FUT [IP Enet] [b\text{we}][\text{IR}][\text{gone pàng}]]] \right](i_0)
\]

\[= \lambda i \forall i' \left[ i \leq i' \rightarrow \exists i'' \left[ i' \sim i'' \land i < i'' \land \text{E. makes fire at } i'' \right] \right]
\]

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 restriction of negation to reference situations (cf. Partee 1973).

\(^{43}\) Alternatively, irrealis expresses the relation \( i < i' \lor i \leq i' \), 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) $\left[\text{ForceP} \\text{PREF} \text{IP}\right](i_0) = \forall i, i' [\text{maximally similar to } i_0 \land \left[\text{IP}(i_0)(i) \land \neg\left[\text{IP}(i_0)(i') \rightarrow \text{speaker}(i_0) \text{ prefers } i \text{ over } i'\right]\right]$ 

(68) $\left[\text{ForceP} \\text{PREF} \left[\text{IP} \text{kop}_{[3\text{SG}]} \text{gone páng}\right]\right](i_0) = \forall i \forall i' [\text{maximally similar to } i_0 \land \left[\text{addr}(i_0) \text{ m. fire in } i \land \neg\left[\text{addr}(i_0) \text{ m. fire in } i'\right]\right] \rightarrow \text{speaker}(i_0) \text{ prefers } i \text{ over } i']$

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

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

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. $Kye-m[3\text{PAUC}][\text{RE}]\text{kiibele ka Jisas abwe}_{[\text{FUT}][\text{IR}][3\text{SG}]}\text{kuone kiyee ‘They thought that Jesus would help them’}$, 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. $\left[[\text{VP} \text{kiibele} \left[\text{cP} \text{ka} \left[\text{IP} \exists [\text{IR} \text{gone páng}]\right]\right]\right]\right](i_0) = \lambda i \lambda x \forall i'' [\text{ABILITY}(i)(i'')(x) \rightarrow \exists i' [i'' < i' \land x \text{ makes fire at } i'']]$

b. $\left[[\text{CP} \exists [\text{IP} \text{Enet}_{[3\text{SG}]} \text{mwe}_{[3\text{SG}]} [\forall \text{VP} \text{kiibele} \text{ka bwe gone páng}]]\right]\right](i_0) = \lambda i \exists i' [i' \leq i \land \forall i'' [\text{ABILITY}(i')(i'')(E.) \rightarrow \exists i''' [i'' < i''' \land E. \text{ makes fire at } i''']] \land ... ]$

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) $\left[[\text{CP} \text{ka IP} \text{CP}]\right](i_0) = \lambda i \forall i' [\left[\text{IP}\right](i_0)(i) \land \rightarrow \text{CP}(i_0)(i')]$

(72) $\left[[\text{ForceP} \text{ASSERT} \left[\text{CP} \text{molo}_{[cO} \text{ka}_{[CP} [\text{IR} \text{gone dátili}] [\text{CP} \text{t} \text{abe}_{[\text{FUT}][3\text{SG}]} \text{pisih}]]\right]\right]\right](i_0) = \forall i' [i_0 < i' \land \text{bird feels egg in } i' \rightarrow \forall i'' [i_0 \leq i'' \rightarrow \exists i''' [i'' < i''' \land i'' < i''' \land \text{bird lays egg in } i''']]$
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 i₀.

(73) \[ [[\text{DIST} \ VP]](i₀) = \lambda i \lambda x \exists i' \leq i \forall i'' [i' \leq i'' \leq i \rightarrow [[\text{VP}]](i₀)(i'')(x)] \]

(74) \[ [[\text{IP yad}] [te_{[3\text{s}]_\{\text{vert}\}} [\text{VP van}]]]](i₀) = \lambda i \exists i' \leq i \forall i'' [i' \leq i'' \leq i \rightarrow \text{the sun goes (down) at } i''] \]

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 C⁰. That is, Spec-CP specifies the domain of the quantifier. This leads to representations as in (76), which state that there is an i ≤ i₀ such that the sun is going down at i, and Enet makes fire at i. By implicature, we have that i is before i₀, as otherwise two realis clauses would have been used.

(75) \[ [[\text{CP Spec-CP} [C_\{C_0 \text{ QU}\} \text{ IP}]](i₀) = \lambda i [[\text{QU}]: [[\text{Spec-CP}} (i₀) ([[\text{IP}]](i₀)]\]

(76) \[ [[\text{ForceP ASSERT} [\text{CP} [\text{IP yad}] [te_{[3\text{s}]_\{\text{vert}\}} [\text{VP van}]] [C \exists [[[\text{VP Enet} [3\text{s}]_\{\text{vert}\} \text{ gone pàng}]]]]]](i₀)
= \exists i: [\exists i' \leq i \forall i'' [i' \leq i'' \leq i \land \text{the sun goes at } i''] [i \leq i₀ \land \text{E. m. fire at } i \land \exists i' \leq i₀ [[[\text{E. m. fire at } i']]]] \]

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 adverbs like meerin, which restricts the index to times long before i₀, i.e. i << i₀, cf. (77). It also can be a silent operator, which then will be i < i₀, as i ≤ i₀ would be expressed by realis, and i₀ < i by irrealis.

(77) \[ [[\text{ForceP ASSERT} [\text{CP meerin} [C_\{3\text{s}\}_\{\text{vert}\} [r \text{ lat} [3\text{s}]_\{\text{vert}\} \text{ pwee}]]]](i₀)
= \exists i: [i << i₀ \exists i' \forall i'' [i' \leq i'' \leq i \land \text{there are many demons at } i'']] \]

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) \[ [[\text{AP ke} \text { IP}]](i₀) = \lambda i \lambda x [[\text{IP}]](i₀)(i)(x) \land [[\text{IP}]](i₀)(i₀)(x) \]

(79) \[ [[\text{NP yenem} [\text{AP ke} [\text{IP} [i \text{ to}_{[3\text{s}]_\{\text{vert}\}} [\text{VP bo}]]]]]](i₀)
= \lambda i \lambda x [x \text{ is a village in } i \land \exists i' \leq i \forall i'' [i' \leq i'' \leq i \rightarrow x \text{ is big in } i'] \land \exists i' \leq i \forall i'' [i' \leq i'' < i₀ \rightarrow x \text{ is big in } i₀]] \]

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.

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44 The type of the resulting IP is just a proposition, not a relation between indices. We could impose type equality by a dummy index i″, as in λi″λi″λx[3i″ \leq i″ \forall i'' [i″ \leq i″ \leq i \rightarrow [[\text{VP}]](i″)(i″)(x)].

45 With a generic or universal quantifier in this position, we would get a generic clause.
Modal sentences with the Bislama loan case, R(i)(i′) identifies the indices i′ that do not violate the rules that obtain in i. The application that in case the modal relation R is not specified explicitly, it is understood as deontic. 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 ∃i″ ≤ i′ \forall i″ \leq i′ → you(i_o) choose coconut 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_o; this implicates the counterfactuality of such conditionals. The representation is somewhat simplified, by eliminating quantifications related to the stativity of the distal marker.

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.

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). 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

\[ \lambda i \forall x \left[ \text{think}(i)(i') \rightarrow \exists i'' \leq i' \left[ \text{truthful}' \right] \right] \]

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 ∃i″ ≤ i′ \forall i″ \leq i′ → you(i_o) choose coconut at i″

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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.

\[(86) \quad \llbracket [_{cp} \text{ ka } [_{i\text{p} \text{ kon}_{2\text{so}_{i\text{a}}} \text{ peten}}]](i_0) = \lambda i \forall i'[R(i)(i') \rightarrow \text{you}(i_0) \text{ truthful at } i'] \rrbracket \]

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 ‘\(\Phi\) is presupposed’ -- it is true if \(\Phi\) is true, and undefined else. For readability, I will render this presupposition in italics.

\[(87) \quad \llbracket [_{cp} \text{ ka } \text{IP}] \rrbracket (i_0) = \lambda i \forall i'[R(i)(i') \rightarrow \llbracket \text{IP} \rrbracket (i_0)(i') \land \partial [\forall i'[R(i)(i') \rightarrow \llbracket \text{IP} \rrbracket (i_0)(i') \lor \exists i' [R(i)(i') \rightarrow \neg \llbracket \text{IP} \rrbracket (i_0)(i')]]] \]

I will write for the presupposed part \(\partial \forall i'[R(i)(i') \rightarrow \text{you}(i_0) \text{ afraid at } i']\), 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’.

\[(88) \quad \llbracket [_{cp} \text{ sa } \text{cP}] \rrbracket (i_0) = \lambda i [\neg [\llbracket \text{cP} \rrbracket (i_0)(i)]] \]
\[(89) \quad \llbracket [_{cp} \text{ sa } [_{cp} \text{ ka } \text{wel-em}_{2\text{so}} \text{ ne}_{3\text{so}_{i\text{a}}} \text{ nek}]] \rrbracket (i_0) = \lambda i [\neg [\forall i'[R(i)(i') \rightarrow \text{you}(i_0) \text{ afraid at } i'] \land \partial [\forall i'[R(i)(i') \rightarrow \neg [\neg [\text{you}(i_0) \text{ afraid at } i']]]]] \]

We have a similar effect if an \(N\) clause is embedded by a verb 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.

\[(90) \quad \exists i \leq i_0 [\forall i' [\text{ABIL}(i)(i')(E.) \rightarrow E. \text{ moves at } i'] \land \partial [\text{excluded middle}]]] \]
\[(90) \quad \forall i \leq i_0 [\forall i' [\text{ABIL}(i)(i')(E.) \rightarrow E. \text{ moves at } i'] \land \partial [\text{excluded middle}]]] \]

In the case of negative-implicating verbs like \text{notselaane} ‘think wrongly’, cf. (48), we have in addition to the modal relation, here \text{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, \text{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 \text{notselaane} cannot subcategorize for realis or irrealis modality, and it is implicated that the subcategorized proposition is not true.
(91) a. \[ [[vp \text{ notselaane}]](i_0) = \lambda i \lambda i' \lambda x[[\text{THINK}(i)(i')(x) \land \neg [i' \sim i_0]]] \\
\]
b. \[ [[vp \text{ notselaane} \left[ s \text{ ka ne}_{[s]}\text{kuu} \right]]](i_0) \\
= \lambda i \lambda x[\forall i'[[\text{THINK}(i)(i')(x) \land \neg [i' \sim i_0]] \rightarrow x \text{ moves at } i'] \land \partial(\text{excluded middle})] \\
\]
c. \[ [[\text{ForceP} \text{ ASSERT} \exists [vp \text{ Enet}_{[s]} [r \text{ [mwe}_{[s]}\text{al} [vp \text{ notselaane ka ne kuu}]]]]](i_0) \\
= \exists i \leq i_0 [\forall i'[[\text{THINK}(i)(i')(E.) \land \neg [i' \sim i_0]] \rightarrow E. \text{ moves at } i'] \land \partial(\text{excluded middle})] \\
\land (\text{realis precondition}) \\
\]

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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