# Notes on Daakie (Ambrym, Vanuatu): Sounds and Modality

Manfred Krifka

Institut für deutsche Sprache und Linguistik, Humboldt-Universität zu Berlin
Zentrum für Allgemeine Sprachwissenschaft (ZAS) Berlin
krifka@rz.hu-berlin.de

## 1. Background

Project *Languages of Southwest Ambrym*, VolkswagenStiftung, DoBeS (2009-2012).

The project targets three languages of Ambrym: Daakaka (cf. Kilu von Prince, this conference), Daakie (previously known as "Port Vato", current talk), and Ralkalaen. Michael Franjieh (SOAS) currently investigates North Ambrym. The four languages are closely related. Southeast Ambrym is relatively distinct, closely related to Paamese.

Previous description based on the related, but now moribund language Lonwolwol: Paton W.F. 1971 [1956]. *Ambrym (Lonwolwol) Grammar.* Canberra: ANU.
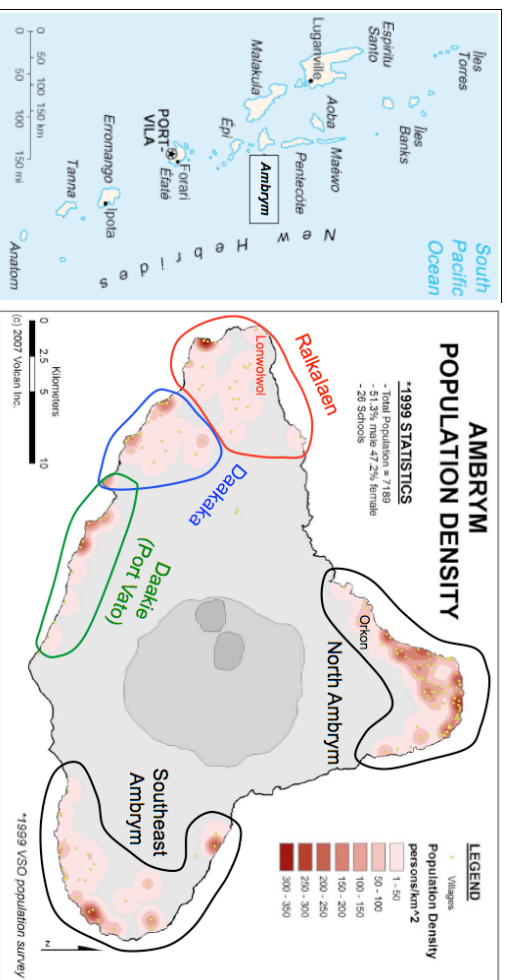


This presentation is based on ongoing field work on Daakie (2010, 4 months). Except for phonology and morphology, little systematic elicitation was done; generalizations are based on transcribed recordings (> 2500 clauses so far).

Thanks to Kilu von Prince for very helpful discussion.

## 2. Phonology

### 2.1 Consonants

| | Labial | Labiovelar | Labiodental | Alveolar | Palatal | Velar | Glottal |
|---|---|---|---|---|---|---|---|
| Voiceless Stop | p | pʷ (pw) | | t | | k | |
| Voiced/Prenasal. | ᵐb(b) | bʷ (bw) | | ⁿd(d) | | ᵑg(g) | |
| Nasal | m | mʷ (mw) | | n | | ŋ(ng) | |
| Fricative | | | v | s | | | h |
| Trill | | | | r | | | |
| Lateral | | | | l | | | |
| Approximant | | ʋ(w) | | | j(y) | | |

➤ Voiceless / Voiced stop distinction rather Non-prenasalized / Prenasalized; neutralized in syllable coda (voiceless), cf. irrealis marker *b-V* 3SG vs. 1SG *na-p*.

➤ *h* occurs in syllable coda, cf. *teh* 'sea, salt' corresponds to *-s* in Daakaka (*tes*), In onset position within words, *s/h* variation in context *e e*, cf. *lehe/lese* 'see', with *h* an innovatity; but the contrast is still phonemic (see below). No occurrence of *h* word-initial except non-phonemically with words with vocalic onsets, e.g. *mok (h)em* 'my house'.
cf. *sok vakten* 'my boat'. No occurrence of *h* word-initial except non-phonemically with words with vocalic onsets, e.g. *mok (h)em* 'my house'.

➤ *r/t* variation in syllable coda, e.g. *obwer/obwet* 'taro', *-t* innovation?

➤ *v* can be realized as bilabial [β], sometimes lax, difficult to distinguish from ʋ.

➤ *ŋ* occurs in onsets and offsets, e.g. *nungnung* 'ask', *ngepngap* 'ready'

➤ *tj, dj, kj, gj, sj* fused: /tjenem/ [tʃɛnem] 'homr', /sjep/ [ʃʲep] 'grow', /djun/ [dʒun] 'mat'

➤ Labiovelars *pʷ, bʷ, mʷ* only before high fronted vowels /i/ and /e/

### Some minimal pairs

(1)
| | | |
|---|---|---|
| /p/ vs. /b/ | [pa] 'carry fruit' [ba] 'to plant', [pi:] 'cough', [bi:] 'together' |
| /p/ vs. /pʷ/ | [petpet] 'bind (a person)' [pwet] 'stay.sg', 'prog.sg' |
| /b/ vs. /bʷ/ | [bi:] 'together' [bʷi:] 'butterfly' |
| /m/ vs. /mʷ/ | [met] 'dead' [mʷet] 'short' [mere:] 'cook's comb' [mwere:] 'mad' |
| /k/ vs. /g/ | [kahe] 'to wash' vs. [gahe] 'to pull out' |
| | [kuly] 'dog' [guly] 'to block access to a place' |
| /s/ vs. /h/ | [vese] 'to be able to' [vɛhe] 'to carry'; [tase] 'peel' [-tahe] 'again' |
| /s/ vs. /r/ | [vese] 'to be able to' [vere] 'take out' (differences of vowel probably due to coarticulation) |
| /v/ vs. /ʋ/ | [vere] 'take out' vs. [ʋere] 'fruit' |

## 2.2 Vowels

The vowel system is rather complex in comparison to other languages of SW Ambrym.

| Short vowels | | | Long vowels | |
|---|---|---|---|---|
| i | [y] | u | i: ⟨ii⟩ | u: ⟨uu⟩ |
| | [ø] | o ⟨ó⟩ | e: ⟨ee⟩ | o: ⟨óó⟩ |
| ε ⟨e⟩ | [œ] | ɔ ⟨o⟩ | | |
| æ ⟨é⟩ | | a | a: ⟨aa⟩ | ɔ: ⟨oo⟩ |

Length contrast:

(2)
/i/ vs. /i:/  [tisi] 'draw in sand' [tisi] 'fall down'
/e/ vs. /e:/  [te] or [tɛ] 'cut' [tee] 'look', [ʊe] 'water' [ʊɛ:] 'fruit'
/a/ vs. /a:/  [da] 'blood' [daa] 'language', [ba] 'to plant' vs. [baa] 'to fight'
/o/ vs. /o:/  [so:gɔ:] 'together' [sogɔ] 'hold'
/u/ vs. /u:/  ?

Height contrasts:

(3)
[min] 'drink'   [mɛnɛ] 'come from'   [mæn] 'laugh'
[mɔp] 'cloud'   [mon] 'too'
[ty] 'beat'     [tøl] 'chicken'
[ki:] 'dig'     [te:] 'look'         [mæ:] 'bread'   [ma:t] 'emerald dove'
[so:] 'one'     [so:] 'pregnant'     [du:t] 'woods'

The short vowel ε apparently does not contrast with a short e, and the long vowel ee does not contrast with a long ɛ:. Assumption: the quality distinctions are a consequence of lenght.

Vowel æ
Sometimes realized with glide ʲæ, historic shift /ja/ → /æ/, cf. Daakaka [mjan] Daakie [mæn] 'laugh'. Only in syllables with labial onsets.

(4)
[pæn] 'under' [pan] 'to branch', 'his/her mouth'
[mæn] 'laugh, be glad' [man] 'male, 3SG.POSS'
[mæt] 'eye, not done (for food)' [mat] 'still/yet, 1SG.POSS'
[mæne] 'with, to' [mene] 'to come from'
[væt] 'wood borer (insect)' [vatingi] 'tell good, right'

"Umlaut"
Allophonic variation of rounded short vowels, back vs. fronted. Presumably recent, does not exist in other languages of Ambrym (but noticed by Paton and in word list of Tryon 1976).

➤ Short back vowels fronted after all apical onset consonant and /j/, /v/, /u/ if word final, followed by apical consonant (/t/, /n/, /r/), or syllable with fronted vowel /u/, /o/, /ɔ/ → [y], [ø], [œ] / $ {t, d, n, s, l, r, j, v, u} __ {$$, t, n, r, $Vfront}

(5) Examples of vowel fronting
/t/  [ty] 'beat drum' [tø] 'chicken' [tœ] 'behind', [tøtœ] 'carry' [tøtœ] 'breadfruit'
/d/  [dy] 'to stay' [dø] 'lichi' [dœ] 'slow' [dœn] 'drown' [dœn] 'bend' [dø] 'voice'
/n/  [nynjø] 'yesterday' [nøn] 'face'
/s/  [sy] 'pluck' [sø] 'hit' [sœ] 'reef' [sørø] 'talk' [sœrœ] 'to reach'
/l/  [ly] 'hide' [lø] 'two', [lœ] 'reef'
/r/  [mury] 'small' [ørœ] 'two' [mœrœ] 'leaf'
/j/  [jøvø] 'turtle' [njø] 1SG [jœ] 'machete'
/v/  [vy] 'introduced' [vø] 'quiet' [vølœn] 'hair' [væve] 'weave' [væt] 'stone'
/u/  [kuœ] 'walk [ja:puœ] '(old) man'

(6) No fronting due to following phonemes
/t/ [top] 'erupt' [toʋa] 'come out' [uku] 'fell' **[tuluh] 'smooth'**
/d/ [dom] 'yams, year' [dokɔ] 'pull'
/n/ [nunpun] 'ask', [nop] 'fall asleep'
/s/ [suburu] 'mat' [sok] 'my' [sowe] 'what'
/l/ [luh] 'move, swamphen', [lobo] 'elephantiasis' [lɔk] 'laplap'
/r/ [rɔk] 'far away'
/j/ [jun] 'wash' [jɔh] 'smoke'
/v/ [vɔh] 'paddle'

➤ Vowel fronting after labial consonants: less regular, not after /b/, restricted with /u/
/u/, /o/, /ɔ/ → [y], [ø], [œ] / $ {p, υ} __ (exceptions as above)
/o/, /ɔ/ → [ø], [œ] / $ m __ (exceptions as above)

(7) Examples of vowel fronting
/p/ [pøpø] 'white, light' [pøpœ] 'carry'
    no fronting: [pɔpɔ:] 'in-law' [pɔpat] 'pig'
/m/ [mylen] 'small' [mørø] 'old' [mœt] 'straight'
    but: [mury] 'small' [mulypʷe] 'hide', [mo] harmonic form of 3SG.REAL
/υ/ [ʊœ] 'stringray'

(8) No fronting of /u/:
/p/ [pulø] 'climb' [pun] 'narrate' [ʊuʋœ] 'roasted bredfruit'

(9) No fronting after /b/:
/b/ [bun] 'smell' [bulyly] 'insect sp.' [bo] 'grandfather' [bɔt] 'stick',

➤ No fronting after velar consonants /k/, /g/, /ŋ/ and in syllable-initial position
/k/ [kuly] 'dog' [kɔ] 'to hunt'
/g/ [gumu] 'hold tight' [gɔlø] 'block' [gɔlœ] 'walk on knees'
/ŋ/ [ŋunuø] 'yellow', [ŋorok] 'far away', [ŋɔso:le] 'this one'
-  [ut] 'louse' [utlø] 'hunt' [ot] 'place' [orø] 'chase'

# 3. Modality

The basic TAM distinction is Realis/Irrealis, not tense. Predication is marked by an auxiliary-like element that encodes agreement features of the subject and modality of the agreement.

## 3.1 Realis and irrealis modal marker: Forms

Free subject pronouns, the realis modal marker, and the irrealis modal marker.

| Person | Singular | Plural | Dual | Paucal |
|---|---|---|---|---|
| 1 | ngyo / na-m / na-p | kemem / keme-m / keme-p | komoo / komo-m / komo-p | kidyee, kememdyee / kidye-m / kidye-p |
| 1+2 | | et / da-m / da-p | adoo / do-m / do-p | adyee / dye-m / dye-p |
| 2 | ngyak / ko-m / ko-p | kimim / ki-m / ki-p | kamoo / ka-m / ka-p | kamdyee / kamdye-m / kamdye-p |
| 3 | ngye / be, bi, ba, bo, bu / mwe, me, mwi, mi, ma, mo, mu | laa / ngyee / la-m / la-p | koloo / kolo-m / kolo-p | kidyee, kiyee / kiye-m / kiye-p |

Realization of 3rd person singular form *mV* (similar for *bV*):

➤ Base form: *mwe*. Examples: *mwe sengane* 'give', *mwe tangale* 'reach', *mwe ret* 'hot', *mwe deme* 'think', *mwe le* 'be married', *mwe kie* 'say'

➤ If the following verb stem has an initial labial (non-velarized) consonant, velarization is lost. Examples: *me pâine* 'to roast', *me ba* 'plant', *me mee* 'to come', *me van* 'go', but: *mwe pwet* 'stay', *mwe mwetmwet* 'short'

➤ If the stem of the following verb is high (i, u, o – with e, it stays e) or contains the glide /j/, we find a homorganic vowel: *m(w)i, mu, mo, m(w)e* (recall that velarized *mw* only occurs before i and e). The realization of /u/ and /o/ is [u] and [o], not [y] and [ø], i.e. there is no fronting.
Examples: *mwi tili* 'poke', *mwi kii* 'dig', *mi pii* 'cough', *mi bii* 'together', *mi mihmih* 'wet', *mi yah* 'strong', *mi myuu* 'grow', *mwi idi* 'take', *mo longane* [lonane] 'hear', *mu tuluh* 'slippery', *mu lupwet* [lypwet] '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*, too. E xamples: *ma tangale* 'reach', *ma ka* 'fly', *ma ane* 'eat', but not *\*ma pan* 'fork', *\*ma mân* 'laugh'.

These forms are not always reflected in the writing of the examples.

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Sketch of optimality-theoretic rendering of fronting of back vowels /u/, /o/, /ɔ/

| | *Front V$Back V: | *Front V: | *Front $bV | *Front $C_Lab u | *Front $V, $CV | Front VC_Alveol | *Front VC | Front Assim. | true to Input |
|---|---|---|---|---|---|---|---|---|---|
| ☞ [tɔ] [tø] | | | | | | | | | * |
| ☞ [tø] | | | | | | | | | |
| ☞ [tøp] [tɔp] | | | | | | | | * | * |
| ☞ [dɔn] | | | | | | * | * | * | * |
| [ut] | | | | | | | * | * | * |
| ☞ [yt] | | | | | * | * | * | | * |
| ☞ [gɔn] | | | | | | * | * | * | * |
| ☞ [gøn] | | | | | * | * | * | | * |
| ☞ [pulø] | | | | | * | | * | * | * |
| [pylø] | | | | * | | | * | | * |
| ☞ [bɔt] | | | * | | | | * | * | * |
| ☞ [tɔɔ] | | | | | | | | * | * |
| [tøø] | | * | | | | | | | * |
| ☞ [tuluh] | | | | | | | ** | * | * |
| [tulyh] | | | | | | | * | ** | ** |
| [tylyh] | | | | | | | * | * | ** |

Not explained: [myłen] but [mury].

## Diphthongs

➤ /uø/, /eu/, /ie/, /ae/, /ou/, /aɔ/
[kuøli] 'return' [meu] 'alive' [kie] 'say' [berae] 'close up' [ðou] 'string' [aᵐbaɔn] 'wing'

## Syllable structure

➤ (C₁)(A)V(:)(V)(C₂), where C₁ ≠ /h/, A = /j/, C₂: voiceless plosive, nasal, /h/, /r/(/t/)
➤ Maximally two morae: *(C)(A)V:C, *(C)(A)VVC

## Word accent

Little investigated so far. On penultimate or ultimate, influence on vowel realization:
(10)  [pø`pø] 'white, light' [`pøpœ] 'carry on shoulders'

In languages of the region, e.g. Paamese and Southeast Ambrym, the initial segment of a stem can alternate with tense/mood inflection (cf. Crowley on SE Ambrym, in Ross e.a. #). This stem alternation is minimal in Daakie; it seems restricted to the verbal stems *momele/bomele* 'do in that way' and *momiye/bomiye* 'do in this way'.

Why not tense?

An alternative analysis: *m-* is nonfuture tense. But as *b-* is used for future tense and for modal statements, a more succinct description is: Future is a type of modality, expressing not yet realized events and states (hence irrealis); *b* is used for irrealis statements in general; the complementary form *m* is used for realis modality.

## 3.2 Uses of Realis

Past time reference, real world:

(11)  *meerin    na-m    mee    o-kele    na-m    lehe*
long.time 1-RE come place-PROX 1-RE look
'long time ago, I came here, I looked.'

Present time reference, real world:

(12)  *obwer    anvu    mi    myuu    mo    do*
taro introduced 3S.RE grow 3S.R slow
'This Fiji taro is growing slow.'

Past time reference, fictional world

(13)  *me    pwet    me    sela    wilin    talin    bye-n*
3.RE PROG 3.RE put.on skin.TR body.TR body-3SG
'he was/is putting on the skin of his body'

Present time reference, specification of a rule

(14)  *ko-m    koot    munok    ko-m    takukuu    yee    mwe    titisii*
2S-RE weed COMPLETE 2S-RE cut.out tree 3SG.RE fall.down.DISTR
'after you cleared the grounds, you cut out the trees, they fall down'

Generic reference

(15)  *ngale    obwet    ten    misyoo    la-m    ba    mu    du    ne    kon    kinyee*
after taroo true some 3P-IR plant real stay TRANS corn DEM
'then they plant some island taro to stay with that corn.'

To know that (complementizer *ke*)

(16)  *mo-mele    me    kiibele    ke    vanten    musyoo    la-m    du    o-kiye*
RE-this.way RE know COMP man some.PL 3PL-RE stay LOC-DIST
'This way, he knows that some men stay there.'

(17)  *byen    tere    kiibele    ke    me    naren*
from.TR 3SG.RE.NEG know COMP 3SG.RE child.REL-3SG
'therefor she didn't know that it was her child.'

## 3.3 Uses of Irrealis

Present time reference of realis, future time reference of irrealis, complementizer *ka*

(18)  *na-m    longbini    ka    na-p    pune    punen    soo*
1SG-RE want COMP 1SG-IR tell story one
'I want to tell a story.'

Future time reference without complementizer:

(19)  *na-p    idi    ok    masolo*
1SG-IR take POSS.FOOD.1SG fish
'I will take my fish.'

(20)  *na-p    gone    gyehen    desoo    bi    yah*
1SG-IR do.TR work-NOM some 3SG-IR strong
'I will do some strenuous work.'

Command, future time reference without complementizer

(21)  *ki-p    tee-ne    mee    na-m    min    na-p    yah*
2SG-IR look-TR come 1SG-RE drink.TR 1SG-IR strong
'You look and come, I drank it and I will be strong.'

Purpose clause, without complementizer

(22)  *la-m    van    la-p    pungot*
3PL-RE go 3PL-IR collect.shellfish
'They went to collect shellfish on the reef.'

Future time reference (or optative, obligation) with complementizer:

(23)  *na    ka    na-p    punen    kastom    punen    soo*
1SG COMP 1SG-IR tell custom story one
'I will / want to tell a custom story.'

(24)  *ka    na-p    puló    lan    liiye    kele    gon*
COMP 1SG-IR climb at tree DEM.PROX EMPH
'I will / have to climb this tree.' (talking about a wish/necessity in the past)

Future time reference, expected event:

(25)  *kolo-n    du    tyenem,    tahto-ne    ka    yaa    be    lot-ne    saloo    ot    be    goló*
2DU-R stay home wait-TR COMP sun 3SG.IR heat-TR 2D.POSS place 3S.IR dry
'The two stayed home, waiting that the sun would heat their place and make it dry'

Proposal for future action:

(26) *yaapuo ngyee la-m kie ka ki-p kukao*
old.man GROUP 3SG.R say COMP 2PL-IR run.away
'The men, they said "Let's run away"'

Indirect speech:

(27) *Inet me kie ka be van*
Inet 3SG.R say COMP 3SG.IR go
'Inet said that she would go.'

To know how:

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

(29) *me kiibele ka ba ane an vih ngyee bili ke la-m myen*
3SG-RE know COMP 3SG.IR eat.TR POSS.FD.3SG banana GROUP time COMP 3PL-RE ripe
'He knew that he should eat his bananas when they are ripe.'

Protasis of conditionals:

(30) *ka bu pwee keme-m pare me van*
COMP 3SG.IR full 1PL.EXCL fasten.TR 3SG.R go
'if it (a grass container for eggs) is full, we fasten (it) and it goes'

Protasis and apodosis of conditionals:

(31) *molo ka bo longane diliri gon munok,*
namalao COMP 3SG.IR feel egg-3s EMPH finish
'The namalao, when it feels its egg(s) finished,'

*a be mee me pisih pän weren kege me pwet me tivin weren*
DISC 3SIR 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.'

## 3.4 Semantics of realis/irrealis distinction

Realis/Irrealis in a branching time model

➤ Clauses are interpreted with respect to a world/time index i
(utterance index, can be fictional or mythical, as in custom stories)

➤ the set of world/time indices is ordered by an ordering relation ≤,
this is a branching order that branches towards the future, reflecting the fact that the past
is fixed, the future is open.

(32) $\forall i, i' \in I[i \not\leq i' \wedge i' \not\leq i \rightarrow$
  $\exists i''[i'' \leq i \wedge i'' \leq i'] \wedge$
  $\neg\exists i''[i \leq i'' \wedge i \leq i'']]$

each pair of unrelated indices
has a common predecessor
but no common successor
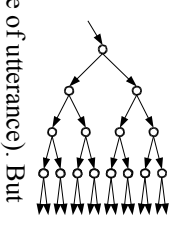
Expressions are interpreted with respect to an index i (world and time of utterance). But
typically, the precise index is not known – there are many candidates.

A first interpretation proposal: Realis/irrealis introduce indices

➤ Notation conventions:

(33) [[ ]]: interpretation function    Φ: meta-variable for clauses
i: index of interpretation    RE, IR: Realis, irrealis operator

➤ Realis mode restricts indices to those i' such that i' ≤ i.

(34) $[[\text{RE } \Phi]](i) = [[\text{RE}]](i)([[\Phi]])$    with $[[\text{RE}]] = \lambda i \lambda p \exists i'[i' \leq i \wedge p(i')]$
  $= \exists i'[i' \leq i \wedge [[\Phi]](i')]$

➤ Use of irrealis, by **implicature**, is used for reference to indices i' where i' ≰ i.

(35) $[[\text{IR } \Phi]](i) = [[\text{IR}]](i)([[\Phi]])$    with $[[\text{IR}]] = \lambda i \lambda p \exists i'[p(i')]$:
  $= \exists i'[[[\Phi]](i')]$,
  by **implicature**: $= \exists i'[(i' \not\leq i) \wedge [[\Phi]](i')]$

This means that IR signals either i < i' (future reference) or i ≰/≱ i' (subjunctive and other
modal reference), but it allows for i' ≤ i, as we have i' ≰ i just due to implicature.

A slightly different version: Realis/irrealis pick up index already introduced

Often, the interpretation index is anaphorically related to an index already introduced. Take
(11). The temporal adverbial *meerin* introduces an index i' that is long before the utterance
index i, and the following clauses are interpreted with respect to i'. (We may call i' the "event
index" to distinguish it from the "utterance index" i). Notice that the contribution of realis, i'
≤ i, is satisfied.

(36) *meerin na-m mee okele na-m lehe*
long.time.before 1SG-RE come here 1SG-RE look
  $\exists i'[i' << i$    $i' \leq i]$

It is plausible to assume that the meaning component i' ≤ i of realis is **presupposed** – realis
does not assert that the proposition it applies to is true in the real world, but rather can be
applied only if the event index i' is before or equal the utterance index i. If an event index i'
was not introduced explicitly before, then it can be **accommodated** – this is a common way
to satisfy presuppositions. In a narrative, newly introduced event indices typically are located
after the event index that was introduced immediately before (cf. modelling in Discourse
Representation Theory: Kamp & Reyle 1993). Applied to our example:

(37) *meerin na-m mee okele na-m lehe*
long.time.before 1SG-RE come here 1SG-RE look
  $\exists i'[i' << i$    $i' \leq i$    $\exists i''[i' < i'' \leq i$    $i'' \leq i]$

We find similar anaphoric chains in the realis case. See (25) as an example; I assume that the complementizer *ka* introduces a new index (see below for a refined analysis).

(38)

| kolo-m | tahto-ne | ka | yaa | be | lot-ne | saloo | ot | be | goló |
|---|---|---|---|---|---|---|---|---|---|
| 2DU-R | wait-TR | COMP | sun | 3SG.IR | heat-TR | 2D.POSS | place | 3S.IR | dry |
| $i'\leq i$ | $[i'\leq i$ | | $i''\nleq i$ | | | $\exists i'''[i'''\lhd i''\nleq i$ | | $i''\leq i$ | |

(39) $i$: index of interpretation of words, $i'$: anaphoric index
$\lambda X\text{---}X\text{---}[...X...]$: function with domain restricted to $\text{---}X\text{---}$ (presupposition)

(40) $[\![RE\ \Phi]\!](i)(i') = [\![RE]\!](i)(i')([\![\Phi]\!])$
with $[\![RE]\!] = \lambda i\lambda i'\lambda p.i'\leq[p(i')]$, where $i'\leq i$: presupposed
$= i'\leq i[[\![\Phi]\!](i')]$

(41) $[\![IR\ \Phi]\!](i)(i') = [\![IR]\!](i)(i')([\![\Phi]\!])$
with $[\![IR]\!] = \lambda i\lambda i'\lambda p[p(i')]$
$= [\![\Phi]\!](i')$, with implicature: $i'\nleq i$

Implementation of Realis/Irrealis as predicate modifiers

Interpretation of realis / irrealis marker, $\pi$: predicate

(42) $[\![RE\ \pi]\!](i)(i') = [\![RE]\!](i)(i')([\![\pi]\!])$
with $[\![RE]\!] = \lambda i\lambda i'\lambda P\lambda x.i'\leq[P(i')(x)]$, where $i'\leq i$: presupposition
$= \lambda x.i'\leq i.[[\![\pi]\!](i')(x)]$

(43) $[\![IR\ \pi]\!](i)(i') = [\![IR]\!](i)(i')([\![\pi]\!])$
with $[\![IR]\!] = \lambda i\lambda i'\lambda P\lambda x.[P(i')(x)]$, no presupposition for indices
$= \lambda x.[[\![\pi]\!](i')(x)]$

Example interpretations: Realis

(44) $[\![Inet\ [me\ van]]\!]$
$= [\![Inet\ [RE\ van]]\!]$
$= \lambda i\lambda i'[[\![RE]\!](i)(i')([\![van]\!])([\![Inet]\!](i)(i'))]$
with $[\![Inet]\!](i)(i') = Inet$, $[\![van]\!] = \lambda i\lambda x[x\ \text{goes at}\ i]$
$= \lambda i\lambda i'.i'\leq[Inet\ \text{goes at}\ i']$, where $i'\leq$: presupposition

Example interpretations: Irrealis

(45) $[\![meerin\ [Inet\ [me\ van]]]\!]$
$= [\![meerin]\!]([\![Inet\ [me\ van]]\!])$
$= \lambda i\lambda i'[[\![RE]\!](i)(i')([\![van]\!])([\![Inet]\!](i)(i'))]$
with $[\![meerin]\!] = \lambda i\lambda r\lambda i'\exists i'''[i' << i \wedge r(i)(i')]$:
$= \lambda i\lambda i'\exists i'''[i'\leq[Inet\ \text{goes at}\ i']$ (as presupposition $i' \leq i$ is satisfied).

Example interpretation: Irrealis

(46) $[\![Inet\ [be\ van]]\!]$
$= [\![Inet\ [IR\ van]]\!]$
$= \lambda i\lambda i'[Inet\ \text{goes at}\ i']$

As the irrealis does not anchor the index of interpretation, $i'$, to the index of utterance, $i'$, this would result in a highly under-informative statement. If existentially quantified, the resulting

proposition would be true if at some index or other, Inet goes. Hence for any informative use, $i'$ has to be anchored in one way or other.

We will discuss propositional attitude predicates and the future interpretation as mechanisms that provide for such anchorings.

## 3.5 Propositional attitude verbs
Reminder of standard treatment of modal predicates

Modal statements are standardly interpreted as involving an "accessibility relation" R from one index (typically the index of utterance) to another index (the index of interpretation i).

(47) *John must have a car:*
$\forall i'\in R(i)[John\ has\ a\ car\ at\ i]$; epistemic or deontic necessity
$R(i)$: what is known in i or what is allowed in i .

(48) *John may have a car:*
$\exists i\in R(i)[John\ has\ a\ car\ at\ i]$; epistemic or deontic possibility; R as above.

(49) *Mary thinks that John has a car:*
$\forall i'\in THINK(i)(m)[John\ has\ a\ car\ at\ i]$; epistemic or deontic possibility; R as above.
$THINK(i)(m)$: indices that are compatible with what Mary thinks in i.

Proposal for propositional attitude verbs in Daakie

▸ The complementizer expresses a necessity modal, with unspecified accessibility relation

(50) $[\![ka]\!] = \lambda i\lambda i'\lambda r\lambda R\forall i'\in R[r(i)(i'')]$

▸ Propositional attitude verbs introduce an accessibility relation

(51) $[\![kie]\!] = \lambda i\lambda i'\lambda M\lambda x\exists R[say(i')(R)(x) \wedge M(i)(i')(R)]$
where $say(i')(R)(x)$: x says something in $i'$,
and R is the modal accessibility relation created by x saying something,
and M represents the contribution of the subcategorized sentence.

Putting things together

(52) $[\![Abel\ [me\ [kie\ [ka\ [Inet\ be\ van]]]]]\!]$

a. $[\![ka\ [Inet\ be\ van]]\!]$
$= \lambda i\lambda i'[[\![ka]\!](i)(i')([\![Inet\ be\ van]\!])]$
$= \lambda i\lambda i'\lambda R\forall i'\in R[Inet\ \text{goes at}\ i'']$

b. $[\![kie\ [ka\ Inet\ be\ van]]\!]$
$= \lambda i\lambda i'[[\![kie]\!](i)(i')([\![ka\ [Inet\ be\ van]]\!])]$
$= \lambda i\lambda i'\lambda x\exists R[say(i')(R)(x) \wedge \forall i'\in R[Inet\ \text{goes at}\ i'']]$

c. $[\![me\ [kie\ ka\ Inet\ be\ van]]\!]$
$= \lambda i\lambda i'[[\![RE]\!](i)(i')([\![kie\ ka\ Inet\ be\ van]\!])]$
$= \lambda i\lambda i'\lambda x.i'\leq \exists R[say(i')(R)(x) \wedge \forall i'\in R[Inet\ \text{goes at}\ i'']]$

d. $[\![Abel\ [me\ kie\ ka\ Inet\ be\ van]]\!]$
$= \lambda i\lambda i'.i'\leq \exists R[say(i')(R)(Abel) \wedge \forall i'\in R[Inet\ \text{goes at}\ i'']]$

In words: Abel said something in the past of i which created an accessibility relation R such that at all indices in R, Inet goes.

Realis mood in the complement clause is excluded because it would restrict the indices of the accessibility relation to the indices that precede the index of utterance. This would presuppose the truth of the embedded clause.

Other propositional attitude predicates: *longbini* 'want' (18), *tahto-ne* 'wait for/expect' (25), *kiibele* 'know how' (28).

The accessibility relation may be specified by the context, e.g. (23), (24).

## 3.6 Factive predicates

The predicate *kiibele* can be interpreted as 'to know how' (then it requires *ka* + irrealis, as expected) or as 'to know that' (then it seems to require another complementizer, *ke*, + realis). This suggests that *kiibele* in this use is factive (it presupposes the truth of the embedded clause), which is reflected in the realis morphology. Other cases:

(53)  mwe lese ke popat me vangare ngyo
      3s.RE look COMP pig 3s.RE jump.on 1sg
      'He saw that/how the pig jumped on me.'

(54)  la-n tee=kiibele ke me leplap
      3PL-RE look=know COMP 3SG.RE change.face
      'They recognized that he had changed his face.'

(55)  na-m teli na-m longane ke ye-k mi yah
      3SG-RE walk 3SG-RE feel COMP leg-1SG 3SG.RE strong
      'I walked, I felt that my leg was strong.'

The complementizer *ke* is also used in relative clauses, and hence presumably does not introduce a modal statement. Assumption: It creates a proposition.

(56)  $[\![popat\ me\ vangare\ ngyo]\!]$
      $= λiλi'.i'≤i[$the pig jumped in i' on speaker$]$
      $[\![ke]\!] = λiλi'λrλi''[r(i)(i')]$
      $[\![ke\ [popat\ me\ vangare\ ngyo]]\!]$
      $= λi''λi'≤i.[$the pig jumped in i'' on speaker$]$
      $[\![Inet\ mwe\ lese\ [ke\ popat\ me\ vangare\ ngyo]]\!]$
      $= λi''λi'≤i'[$Inet gets visual information in i'' of the proposition:
      $λi'.i'≤i.[$the pig jumped in i' on speaker$]$

Sketch of proposal: Getting visual information of some proposition p presupposes that p is true. Hence instead of p, the "realis" part of p can be taken – the set of those indices i'' that are both in p and for which it holds that i'≤i.

This predicts that, if the main clause is irrealis, then the embedded clause must be irrealis as well. Unfortunately, no example in the corpus yet.

(57)  Abel me kie ka Inet be lese ke popat be/me? vangare Sam
      Abel 3SG.RE say COMP Inet 3SG.IR see COMP pig 3SG.IR/RE jump.on Sam
      'Abel said that Inet saw that the pig jumped on Sam.'

## 3.7 Future interpretation of irrealis

Future interpretation:

We have seen examples that irrealis can be expressed as referring to future time, e.g. (19), (20). Irrealis clauses like (46) do not express any relation between the index i' at which the proposition is interpreted, and the index of utterance i. It just states that at some index or other, Inet goes.

This is highly under-informative. However, by the principle of relevance, we can assume that the index i' is in some sense relevant for the purpose of communication.

It cannot be an index such that i'≤i, otherwise the RE operator would have been used.

One set of relevant indices that is disjoint from the set $\{i'|i≤i\}$ is the set of indices that follow the utterance index, $\{i'|i<i'\}$. This gives us the **future** interpretation.

However, in a branching time model, future is a necessity operator, as it states that for every future continuation there is some index at which the sentence is true. This requires a "silent" modal operator that states that for every continuation (history) of the utterance index i, there is an i' in that continuation such that the proposition is true at i'.

Worked-out proposal:

A **history** is defined as a maximal linear subset of the set of indices **I**:

(58)  h is a history in I, h∈H(**I**), iff h ⊆ **I**, h is a linear order, and there is no h' with h ⊂ h' with h' ⊆ **I** that is a linear order.

Definition and use of future operator, an operator that can be accomodated:

(59)  $[\![FUT]\!] = λiλr∀h∈H(\mathbf{I})[i ∈ h → ∃i'[i' ∈ h ∧ r(i)(i')]]$

(60)  $[\![FUT\ [Inet\ be\ van]]\!]$
      $= λi[[\![FUT]\!](i)([\![Inet\ be\ van]\!])$
      $= λi∀h∈H(\mathbf{I})[i∈h → ∃i'[i'∈h ∧ Inet\ goes\ at\ i']]$

This is true at i iff in all histories, there is an index i' at which Inet goes. As realis is avoided, we do not refer to a particular index i' in the past. Hence i' must be interpreted as being in the future.

## 3.8 Negation

Preliminary considerations

How will negation be expressed in a realis/irrealis system? Take the realis case. Under either of the possible scopes of negation with respect to the realis operator, we get the same interpretation (notice that presuppositions are not affected by negation).

(61) [[Inet [me [NEG [van]]]]]
[NEG [Inet me van]]]
= λiλi'.i'≤i ¬[Inet goes at i']

This reading is too weak: It says that there will always be indices before the utterance index i at which Inet doesn't go.

### The expression of negation

Indeed, negation is not expressed orthogonal to the mood system, but it is a mood itself.
There is a realis negation and an irrealis negation.

(62) a. Realis negation: *-ro*, *-re*, 3rd singular *tere*
    b. Irrealis negation *-n*, 3rd singular *ne*

Realis negation
Present time reference:

(63)

| *kele* | *me* | *libyeledame* | *soo* | *timinyeh* | *mun* | *tere* | *libyeledame* | *pópó* |
|---|---|---|---|---|---|---|---|---|
| PROX | 3SG.RE | kava | one | different | FOC | 3SG.RE.NEG | kava | white |

'This is a different kind of kava, this is not white kava.'

(64)

| *na-re* | *lese* | *ngyak* |
|---|---|---|
| 1SG-RE.NG | see | 2SG |

'I don't see you.'

Past time reference:

(65)

| *a* | *syebolo* | *tere* | *lehe* |
|---|---|---|---|
| DISC | kingfisher | 3SG.RE.NEG | look |

'and/but the kingfisher didn't look'

Irrealis negation

Wish that something does not happen, with negative complementizer *saka*

(66)

| *saka* | *ko-n* | *kyet-bini* | *ngyo* |
|---|---|---|---|
| COMP.NEG | 2S-IRRNEG | bite.dead | 1SG |

'Please don't bite me dead.'

Negation under scope of negation, with negative complementizer *saka*

(67)

| *ko-re* | *longa-ne* | *na-m* | *kie* | *ka* | *saka* | *la-n* | *sogo* | *dom* | *pipili* |
|---|---|---|---|---|---|---|---|---|---|
| 2S-RE.NEG | hear-TR | 1SG-RE | say | COMP | COMP.NEG | 3P-IR.NEG | take | yams | red |

'you don't here me say that they should not take the red yams.'

General time reference

(68)

| *byen* | *söwe* | *ke* | *tere* | *vese* | *ka* | *da-n* | *lese* | *God?* |
|---|---|---|---|---|---|---|---|---|
| from | where | COMP | 3SG.RE.NEG | able | SUB | 1PL.ING-IR.NEG | see | God |

'Why is it not possible that we see God?' (from katechism)

Sketch of analysis of realis negation:

Assume that the "event time" i' can be an extended interval, where ⊑ is the part relation between intervals.

(69) $[[tere]] = λiλi'λPλx.i'≤i→∃i''⊑t[P(i'')(x)]$,
where ⊑: part relation, indices may be intervals

(70) $[[Inet [tere van]]]$
$= λiλi'.i'≤i→∃i''[Inet goes at i']$, where i'≤i; presupposition

In words: Speaker refers to a salient reference time i' that is before i, and states that i'' does not contain any time t'' such that Inet goes at i''.

Notice that this allows for it to be the case that Inet went at some other times. (B. Partee's puzzle of *I didn't turn off the stove*).

Justification of negation being part of the modal system: Negation is a modal operator, with the subindices of the reference index i' as accessibility relation. There is no other way to feed negation compositionally into the representation of a clause containing RE, as in (44).

### Sketch of analysis of irrealis negation

Irrealis negation only occurs in the scope of a negative complementizer *saka* or of another negation. Hence it is not interpreted itself, but expresses agreement with higher negation (negative concord).

Interpretation of negative complementizer; illustration with example (66)

(71) $[[saka]] = λiλi'λpλR¬∃i''∈R[p(i'')]$

(72) $[[ko-n kyet-bini ngyo]]$
$= λiλi'[adr bites-dead sp at i']$, negation not interpreted

$[[saka [ko-n kyet-bini ngyo]]]$
$= λiλi'[[[saka]](i)(i')([[ko-n kyet-bini ngyo]](i)(i')]$
$= λiλi'λR¬∃i''∈R[adr bites-dead sp at i']$,
R to be specied by embedding predicate or context.

## 3.9 The distal (?) modality

There is another modal element expressed by the suffix *-t* or by the free form *te* for 3rd sing.
Refers to background state, disconnected to narrative story line.

(73)

| *moron* | *soo* | *te* | *pwet* | *okele* |
|---|---|---|---|---|
| old.person | one | 3S.DIST | stay | LOC.DIST |

'One old person lived / used to live there.'

Use for adjectival, numerical qualifications (states)

Manfred Krifka — Institut für deutsche Sprache und Linguistik, Humboldt-Universität zu Berlin — Zentrum für Allgemeine Sprachwissenschaft, Berlin — krifka@berlin.de — 12.03.2011

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(74) *liimatebe    kiye    mo    toptopan    te    worolim*
     black.palm    DEM.PROX    3SG.R    branch    DIST    five
     'This blackpalm has five branches', 'branches out in five'

Use in temporal clauses, also disconnecting story line.

(75) *leng    musyoo    ka    te    van    borop-ne    me    me    tabini*
     wind    one    COMP    DIST    go    close:TR    3SG.R    cut    3SG.R    cut.dead
     'One time when he came close, he slashed and killed him.'

Resultative perfect

(76) *na-t    ba    kumala    buk    okele    du    tu    muo*
     1SG-DIST    plant    sweet.potatoe    already    LOC.PROX    stay.PL    DIST    at first
     'I have already planted sweet potatoe here, it grew fine at first (?)'

Informal characteriziation of *te*: This is a realis mode, but different from *-m* realis. It doesn't express a relation between i and i', but introduces its own i'' with i'' ⊆ i.

| | Keep V: | Keep $V, KV | VHarm prec.Syll. | Back Assim apikal | Keep VC$ | *Labial +y | Front Assim. | Keep Input |
|---|---|---|---|---|---|---|---|---|
| [to] | | | | | | | | |
| [tø] | | | | | | | * | * |
| ☞ [top] / [|tøp] | | | | | * | | | * |
| [don] | | | | | * | | | |
| [døn] | | | | * | * | | * | * |
| ☞ [ut] / [yt] | | * | | * | * | | | * |
| ☞ [gon] / [gøn] | | * | | * | * | | | * |
| ☞ [pulø] / [pylø] | | | | | | * | * | * |
| ☞ [too] / [tøø] | * | * | | | | | * | * |
| ☞ [tuluh] / [tulyh] / [tylyh] / [tyluh] | | | * | | * * | | ** * * | * * * |

## 3.10 Realization of realis/irrealis marker

The underlying representation of the realis marker is *mw* (labiovelar nasal) realized as *m* where *mw* cannot be realized, and with a homorganic vowel

## 4. Texts

| vaaven | mu | syoo | lam | du | vaa, | lam | kie | ka | la | vaa | lon | tavo |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| woman | RL | form-group | 3PL-RL | PROG | go | 3PL-RL | say | COMP | 3PL | go | in | bush |

'A group of women was going, they said that they go into the bush.'

| a | la-m | van | to | tavo |
|---|---|---|---|---|
| DISC | 3PL-RL | go | behind | bush |

'And they went behind to the bush.'

| ngale | soo | mu | sóógo | timaleh |
|---|---|---|---|---|
| after | one | RL | pregnant.with child | |

'After, one was pregnant with a child.'

| soo | mu | sóógo | timaleh | me | pwet | la | van | lon | tavo |
|---|---|---|---|---|---|---|---|---|---|
| one | RL | pregnant.with child | | RL | stay | 3PL | go | to | bush |

'One was pregnant with child, she stayed, they went to the bush.'

| la | van | la-m | ta | lokuo |
|---|---|---|---|---|
| 3PL | go | 3PL-RL | cut | edible.leaves |

'They went and cut leaves.'

| mo | ke | mo | sóógo | waawaa | mi | ligi | lon | tavo |
|---|---|---|---|---|---|---|---|---|
| RL | COMP | RL | pregnant.with child | | RL | put | in | bush |

'The one that was pregnant with a child gave birth in the bush.'

| mi | ligi | lon | tavo | ngale | mo | pwet |
|---|---|---|---|---|---|---|
| 3.RL | put | in | bush | after | 3.RL | stay |

'She gave birth in the bush, after he (the child) stayed there.'

| mo | pwet | lon | tavo, | a | ngyee | la | vehe | lokuo | la | mee | tyenem |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RL | stay | in | bush | DISC | group | 3PL | carry | edible.leaves | 3PL | come | home |

'He stayed in the bush, and the group (of women) carried the leaves and went home'

| tyen | waa | | | | |
|---|---|---|---|---|---|
| la-m | mee | em, | waa | mo | pwet | lon | tavo |
| 3PL-RL | come | home | baby | RL | stay | in | bush |

'They came home, the baby stayed in the bush.'

## 5. Questions

Question verbs:

(77)
| ngva | mah |
|---|---|
| k | du | ko-m | a | okele |
| 2SG | PROG | 2SG-R | hat | PROX |
| | | do.w | | |

'What are you doing here?'