Ability, causation and culmination in Malagasy

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1.0 Introduction

Puzzle about maha-:
- Malagasy is a language with non-culminating accomplishments (1)a.
- Voice prefix maha- entails culmination (1)b.

(1) a. Nisambotra alika io zaza io nefa faingana loatra ilay alika PST-AT-catch dog DEM child DEM but fast too DEF dog ka tsy azony.
COMP NEG do-3
‘This child caught a dog #but it was too fast, so it didn’t get caught by him.’

b. Nahasambotra alika io zaza io # nefa faingana loatra ilay alika PST-AHA-catch dog DEM child DEM but fast too DEF dog ka tsy azony.
COMP NEG do-3
‘This child managed to catch a dog #but it was too fast, so it didn’t get caught by him.’

- maha- is claimed to be ambiguous, and allow both an ability reading (2)a and a causative reading (2)b (adapted from Phillips 2000). Unintentionality is a third reading (see (14) below).

(2) a. Mahaongotra fantsika amin’ny tanana Rabe. [ability reading] PRS-AHA-pull.out nail with DET hand Rabe
‘Rabe can pull out nails with his hands.’

b. Mahafinaritra an’i Soa Rabe. [causative reading] PRS-AHA-happy ACC DET Soa Rabe
‘Rabe makes Soa happy.’

Central question: if we take non-culminating accomplishments to be the default case in Malagasy, what makes maha- sentences entail culmination? How does culmination relate to the different readings of maha- sentences?

Main aim: provide a syntax-semantics interface of maha- that accounts for the observations concerning culmination in (1) and ambiguity in (2).

Our hypothesis: maha- introduces a double prevention relation (Wolff 2007, 2014). Double prevention ensures culmination and accounts for the range of readings labeled enablement, causation and unintentionality in the literature.
• Organization of the paper:
  Section 2: Background on Malagasy grammar
  Section 3: Data on non-culminating accomplishments
  Section 4: Our analysis
  Section 5: Conclusion

2.0 Background on Malagasy

• Austronesian language spoken in Madagascar, fairly rigid VOS word order
• Rich voice system:
  • Actor Topic – agent as the subject, as in (3)a.
  • Theme Topic – theme subject, as in (3)b.
  • Circumstantial Topic – almost any other non-core argument can be the subject (in (3)c it is an instrument).

(3) a. Actor Topic (AT) – Subject is agent
   Nanapaka ity hazo ity tamin’ ny antsy i Sahondra.
   PST-AT-cut DEM tree DEM PST-with DET knife DET Sahondra
   ‘Sahondra cut this tree with the knife.’

b. Theme Topic (TT) – Subject is theme
   Notapahin’i Sahondra tamin’ ny antsy ity hazo ity.
   PST-TT-cut DET Sahondra PST-with DET knife DEM tree DEM
   ‘Sahondra cut this tree with the knife.’

c. Circumstantial Topic (CT) – Subject has some other role
   Nanapahan’i Sahondra ity hazo ity ny antsy.
   PST-CT-cut DET Sahondra DEM tree DEM DET knife
   ‘Sahondra cut this tree with the knife.’

• Clause structure for (3)a and b:

(4) a. 

```
TP
   T
   PredP i Sahondra
   DP
   Pred'
   T
   PredP
   i Sahondra
   DP
   Pred'
   i Sahondra
   Pred VP
   nanapaka ity hazo ity
```

b. 

```
TP
   T
   PredP ity hazo ity
   DP
   Pred'
   T
   PredP
   i Sahondra
   Pred VP
   notapahina ity hazo ity
```
3.0 Non-culminating accomplishments

- Mandarin (Koenig and Chief 2008), Thai (Koenig and Muansuwan 2000), several Salish languages (Bar-el et al. 2005, Jacobs 2011), Tagalog (Dell 1983).

(5) a. Ivan taught me Russian, but I did not learn anything.
   b. Marie lui enseigna les rudiments du russe en deux semaines, et pourtant il n’apprit rien du tout.
   ‘Marie taught him the basics of Russian in two weeks and yet he didn’t learn anything at all.’

3.1 Failed attempt vs. partial success


(6) a. Namoha varavarana Rabao saingy tsy voavohany.
   PST-AT-open door Rabao however NEG VOA-open-3
   ‘Rabao opened a door but it didn’t open.’
   i. The door didn’t even move.
   ii. The door opened partially, but not completely.

b. Nandrava ny tranony Rabao fa tsy voaravany.
   PST-AT-destroy DET house-3 Rabao COMP NEG VOA-destroy-3
   ‘Rabao destroyed her house but it didn’t get destroyed.’
   i. She didn’t even manage to remove a single brick.
   ii. She removed the roof and a wall, but not everything.

- Verbs with *maha-* do not allow non-culminating readings, whether failed attempt (7)a or partial success (7)b.

(7) a. Naharava ny tranony Rabe #fa tsy voaravany mihitsy.
   PST-AHA-destroy DET house-3 Rabe COMP NEG VOA-destroy-3 at.all
   ‘Rabe was able to destroy his house but it didn’t get destroyed at all.’

b. Naharava ny tranony Rabe #nafa tsy rava tanteraka.
   PST-AHA-destroy DET house-3 Rabe but NEG destroy completely
   ‘Rabe was able to destroy his house but it didn’t get completely destroyed.’

3.2 Agent control hypothesis

- Demirdache & Martin (2015): non-culminating reading correlates with agency (8).
(8) a. Marie lui expliqua le problème en une minute, et pourtant il ne le comprit pas. ‘Marie explained him the problem in one minute, and yet he didn’t understand.’

b. Ce résultat lui expliqua le problème de l’analyse, #pourtant il ne le comprit pas. ‘This result explained him the problem of the analysis, #yet he didn’t understand.’

Agent Control Hypothesis (ACH):

(9) a. S-ACH (strong version)
Zero result and partial result NC construals require the predicate’s external argument to be associated with ‘agenthood’ properties.

b. W-ACH (weak version)
Zero result NC construals only require the predicate’s external argument to be associated with ‘agenthood’ properties.

- What is agency?
- Romance, Germanic and Mandarin: correlation with animacy.
- Salish: even animate/human subjects can be understood to be non-agentive (“limited-control” and “non control” (Jacobs 2011, Davis et al. 2009)).

(10) Non-control (Thompson and Thompson 1992):
i. events which are natural, spontaneous-happening without the intervention of any agent;
ii. events which are unintentional, accidental acts;
iii. limited control, which is intentional, premeditated events which are carried out to excess, or are accomplished only with difficulty, or by means of much time, special effort, and/or patience, and perhaps a little luck.

- Malagasy Actor Topic verbs: the non-culminating reading is always available, independent of the animacy of the subject.

(11) Nandoro ny tranoko ny afo nefa tsy may tanteraka.
PST-AT-burn DET house-1SG DET fire but NEG burned completely
‘The fire burned my house but it isn’t burned completely.’

- With culminating maha- animate/human subjects are possible (1)b and (7).
  “Agenthood” cannot be fully identified with animacy.
- But maha- does impose some restrictions (Phillips 1996:45-46).

(12) a. # Mahatsara ny trano Rabe.
PRS-AHA-good DET house Rabe
b. Mahatsara ny trano ny voninkazo.  
PRS-AHA-good DET house DET flowers  
‘The flowers make the house beautiful.’

• Travis (2010): verbs with maha- are incompatible with agent-oriented adverbs.

(13) a. Nanao fanahy iniana nameno tavoahangy Rakoto.  
PST-AT-do spirit TT-do PST-AT-fill bottle Rakoto  
‘Rakoto deliberately filled bottles.’

b. # Nanao fanahy iniana nahafeno tavoahangy Rakoto.  
PST-AT-do spirit TT-do PST-AHA-fill bottle Rakoto  
‘Rakoto deliberately managed to fill bottles.’

→ The subject of a maha- sentence must be non-agentive.

• “Non control”: context makes salient “accidental” vs. “manage” readings.

(14) a. Nahasotro poizina izy  
PST-AHA-drink poison 3  
‘He managed to drink poison.’  
‘He accidentally drank poison.’

b. Nahatelina moka aho  
PST-AHA-swallow mosquito1sg  
‘I swallowed a mosquito.’

c. Nahapetraka teo ambony tsilo i Soa  
PST-AHA-sit PST-LOC on thorn DET Soa  
‘Soa sat on a thorn.’

3.3 The role of tense in triggering culmination

• maha- in past tense gives rises to an entailment of culmination.

• But present tense maha- does not entail a change of state (e.g. at least once in the past).

(15) Mahafaty osivavy ny ambodia fa izy mbola tsy hamono fotsiny.  
PRS-AHA-dead goat DET wolf COMP 3 still NEG FUT-AT-kill yet  
‘The wolf can kill a goat but it still hasn’t done so.’

(16) Mahaleha 200 km/hr ity fiara ity.  
PRS-AHA-go 200 km/hr DEM car DEM  
‘This car can go 200 km/hr.’

• maha- in the future entails culmination (17).
4.0 Maha- encodes double prevention

- **Syntax**: maha- is a morphologically complex functional predicate (Section 4.1).
- **Semantics**: ma- and ha- compose to encode double prevention in the conceptual framework of causation and enablement developed by Wolff (2007, 2014) and Wolff et al. (2010) (Section 4.2).

4.1 Syntax of maha-


(18) a. Mary had the students walk out on her.
    b. Mary had the students revise their papers twice.

- Phillips (1996:82, 92): the external argument is a stative cause.
- Apparent ambiguity: eventive roots convey ability or unintentionality, stative roots convey enablement or causation.

(19) a. Mahaongotra ravina amin’ ny tanana Rabe.
    PRS-AHA-pull.out roots with DET hand Rabe
    ‘Rabe can pull out roots with his hands.’

    b. Mahafinaritra an’ i Soa Rabe.
    PRS-AHA-happy ACC DET Soa Rabe
    ‘Rabe makes Soa happy.’
Travis (2010: 224) *maha-* exceptionally assigns a theta role in Spec of AspP.

• The theta role assigned to the DP in Spec of AspP depends on the root:
  o States don’t have argument structure, so stative roots discharge a default causative argument, which leads to the causative reading.
  o Eventive roots have argument structure and discharging the Agent role of eventive roots in Spec of AspP leads to the ability reading.
• We adopt Phillips and Travis and separate *maha-* into *ma-* and *ha-*.
• We follow Travis in having the theme argument of the root introduced low, below *ha-*.
• We follow Phillips in merging the external argument above *ma-*.
4.2 A more fine-grained theory of causation and its relevance for maha-

- Accomplishments imply a cause relation; causation requires agentivity.
- Some explanation required for inanimates in causative constructions:

(22)  a. John/The book had Mary laugh.
     b. The sidewalk was warm from the sun.

- But what about the inverse: causation with non-agentivity?

(23)  a. #Mahatsara ny trano Rabe.
      PRS-AHA-good DET house Rabe
      
      b. Mahatsara ny trano ny voninkazo.
      PRS-AHA-good DET house DET flowers
      ‘The flowers make the house beautiful.’

- More fine-grained analysis needed: maha- does not necessarily imply causation,
  but can also convey enablement or unintentionality.
- Wolff (2007, 2014) and Wolff et al. (2010): three main configurations, labeled
  CAUSE, HELP and PREVENT. Defined in terms of two-place relations between an
  affector (A) and a patient (P).
- CAUSE, HELP and PREVENT differ in the interactions between A and P, and thereby
  have an impact on the resultant vector R:
  - CAUSE: the patient P does not have a natural tendency towards the endstate
    E, the affector A opposes this tendency, and the resultant R points towards
    E.
  - PREVENT: the patient has a natural tendency towards the endstate E, the
    affector A opposes this tendency, and the resultant points away from E.
  - HELP configuration: the patient has a natural tendency towards the endstate
    E, the affector A concords with this tendency, and the resultant is towards E.
    The HELP configuration also underlies ENABLE/ALLOW.

\[
\begin{align*}
&\text{CAUSE} \\
&\text{HELP / ENABLE / ALLOW} \\
&\text{PREVENT}
\end{align*}
\]

*Figure 1.* Configurations of forces associated with CAUSE, HELP/ENABLE/ALLOW, and PREVENT: \(A\) = the affector force; \(P\) = the patient force; \(R\) = the resultant force; \(E\) = endstate vector, which is a position vector, not a force.
4.3 Zooming in on double prevention

- Wolff et al. (2010): enablement or allow relations are often complex in that they rely on the composition of two prevention relations. A enables C is then modelled as A prevents B, B prevents C.

- Doesn’t require events: the state of the plug being in the sink prevents the water from flowing down the drain, and no input of energy is needed.

- Double prevention relations are modeled in Figure 2 (from Wolff et al. 2010). Whether double prevention relations lead to enablement or causation depends on the strength of the patient tendencies in each of the prevention relations.

Figure 2: the composition of two prevent relations leads to an ALLOW (or ENABLE) conclusion (left part) or to a CAUSE conclusion (right part)

- Note: English lacks an expression specifically encoding double prevention.
- Our hypothesis: maha- encodes double prevention.
- Ambiguity: the 5 readings that have been associated with maha- in the literature are attempts to paraphrase the double prevent configuration.

(24) a. Mahafaty osivavy ny ambodia. [general ability]
   PRS-AHA-dead goat DET wolf
   ‘The wolf can kill a goat.’

b. Nahasambotra alika io zaza io. [manage to]
PST-AHA-catch dog DEM child DEM
   ‘This child managed to catch a dog.’

c. Nahapetraka teo ambony tsilo i Soa [unintentionality]
PST-AHA-sit PST-LOC on thorn DET Soa
   ‘Soa sat on a thorn.’

d. Mahatsara ny trano ny voninkazo. [enablement]
   PRS-AHA-good DET house DET flowers
   ‘The flowers make the house beautiful.’

e. Mahafinaritra an’ i Soa Rabe. [causation]
   PRS-AHA-happy ACC DET Soa Rabe
   ‘Rabe makes Soa happy.’
• Eventive roots: general ability, manage to and accidental readings.
• Stative roots: enablement and causative readings.

4.4 The syntax-semantics interface of maha- with stative roots

The conceptual structure of (24)d reads as:
- the flowers (A) prevent the absence of decoration (B);
- the absence of decoration (B) prevents the room from looking beautiful (C).

<table>
<thead>
<tr>
<th>(24)d The lack of decoration (B) has a weak tendency towards ugliness (E’), but the presence of the flowers (A) prevents lack of decoration, and the resultant is an orientation away from E’.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The room (C) has a strong tendency towards beauty (E), and the lack of decoration is the preventor B that orients C away from beauty.</td>
</tr>
<tr>
<td>The presence of the flowers (A) overcomes the tendency away from beauty (E) that was the result of the lack of decoration (B), so the flowers enable the house to look beautiful.</td>
</tr>
</tbody>
</table>

Figure 3: enablement with stative roots

• Conceptual structure of (24)e:
- Rabe (A) prevents the absence of companionship (B);
- the absence of companionship (B) prevents Soa from being happy (C).

<table>
<thead>
<tr>
<th>(24)e Lack of companionship (B) has a strong tendency towards solitude (E’), but the presence of Rabe (A) orients the resultant arrow away from E’.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soa (C) has a weak tendency towards happiness (E), where E is incompatible with E’; lack of companionship (B) orients the resultant arrow away from E.</td>
</tr>
<tr>
<td>Rabe’s companionship (A) causes the virtual force of lack of companionship leading away from happiness (E) to be overcome, so Rabe makes Soa happy.</td>
</tr>
</tbody>
</table>

Figure 4: causation with stative roots
• Syntax-semantic interface:


\[\text{PRS-AHA-happy ~ ACC ~ DET Soa Rabe} \]

\[\text{‘Rabe makes Soa happy.’} \]

b. \[\text{Stative roots denote one-place predicates over states (26)b.} \]

c. \[\text{finaritra combines with Soa to create a state of happiness with Soa as its theme (26)c.} \]

d. \[\text{Ha contributes the lower prevent relation in (26)d.} \]

e. \[\text{Application of ha to the VP leads to (26)e: some } z \text{ prevents Soa from being happy, where } z \text{ is typically construed as a virtual force.} \]

f. \[\text{ma contributes the higher prevent relation in (26)f; implies a free choice quantifier (}\text{∀}_F \text{C}) \text{ (Dayal 1998).} \]

g. \[\text{Application of ma- to the ha-predicate in (26)g and combination with the subject results in (26)h.} \]

(26) Mahafinaritra an’i Soa Rabe.

\[\text{PRS-AHA-happy ~ ACC ~ DET Soa Rabe} \]

\[\text{‘Rabe makes Soa happy.’} \]

a. \[\text{[TP [PredP ma [AspP ha [VP [DP Soa] [√happy]]]] [DP Rabe]]} \]

b. \[\text{[[finaritra ]]} : \lambda y \lambda s [\text{happy}(s) \land \text{theme}(y,s)] \]

c. \[\text{[[finaritra Soa]]}: \lambda s [\text{happy}(s) \land \text{theme}(Soa,s)] \]

d. \[\text{[[ha-]]}: \lambda P \lambda s[P(s) \land \exists z. \text{prevent}(z,s)] \]

(\text{where } P \text{ is a stative predicate})

e. \[\text{[[ha-finaritra Soa]]}: \lambda s [\text{happy}(s) \land \text{theme}(Soa,s) \land \exists z. \text{prevent}(z,s)] \]

f. \[\text{[[ma-]]}: \lambda P’ \lambda x \lambda s[P'(s) \land \forall FCZ' [\text{prevent}(z',s) \rightarrow \text{prevent}(x,z')]] \]

(\text{where } P’ \text{ is a ha-predicate, with ha- as defined in d})

g. \[\text{[[ma-ha-finaritra Soa]]}: \lambda s [\text{happy}(s) \land \text{theme}(Soa,s) \land \exists z. \text{prevent}(z,s) \land \forall FCZ' [\text{prevent}(z',s) \rightarrow \text{prevent}(x,z')]] \]

h. \[\text{[[Ma-ha-finaritra an’i Soa Rabe ]]}:\]

\[\lambda s [\text{happy}(s) \land \text{theme}(Soa,s) \land \exists z. \text{prevent}(z,s) \land \forall FCZ' [\text{prevent}(z',s) \rightarrow \text{prevent}(Rabe,z')]] \]

(26)h: Rabe prevents whatever virtual force that might prevent Soa from being happy in situation \(s\).
4.5 Syntax-semantics interface of maha- with eventive roots

• ‘Manage to’ reading:

(27) Nahasambotra alika io zaza io.
    PST-AHA-catch dog DEM child DEM
    ‘This child managed to catch a dog.’

(27) There are strong virtual forces (the dog is big and strong) (B) oriented towards escape (E’), but the child’s special action (it running faster than anyone would have predicted) (A) orients the resultant arrow away from E’.

The dog (C) has a weak tendency towards capture (E); inherent features of the dog (it is big and strong) (B) orient the resultant arrow away from E.

The child’s special action (A) causes the virtual force of the dog’s escape (B) leading away from E to be overcome, and for the dog to be oriented towards capture (E), so the child manages to catch the dog.

Figure 5: ‘manage to’ reading with eventive roots

• Malagasy lacks a verb ‘to be able to’, and uses maha- to report general ability.

(28) Mahafaty osivavy ny ambodia.
    PRS-AHA-dead goat DET wolf
    ‘The wolf can kill a goat.’

(28) Lack of strength and speed in predators (B) has a weak tendency towards leaving larger animals of prey like goats alive (E’), but the wolf’s nature as a strong and fast predator (A) prevents such lack of strength and speed, and the resultant is an orientation away from E’.

The goat (C) is an animal of prey that has a strong tendency towards death by predators (E) (E incompatible with E’), but it requires some strength and speed for a predator to kill a goat, and lack of those features (B) orients the goat away from death.

The wolf’s nature as a predator (A) overrides the lack of strength and speed that prevents other predators from killing the goat (B), so the wolf is able to kill the goat.

Figure 6: general ability with eventive roots
• Unintentionality/accidental reading:

(29) Nahapetraka teo ambony tsilo i Soa [unintentionality]
      PST-AHA-sit PST-LOC on thorn DET Soa

   ‘Soa sat on a thorn.’

(29) Soa’s common sense (B) has a strong tendency towards sensible behaviour (E’), but lack of attention, visibility or other mistakes in judgment (A) orient the resultant arrow away from E’.

Soa (C) has a weak tendency towards sitting on a thorn (E), where E is incompatible with E’; common sense (B) orients the resultant arrow away from E.

Soa’s mistake in judgment (A) causes the virtual force of common sense leading away from E to be preempted, and for Soa (C) to be oriented towards sitting on a thorn (E), so Soa accidentally sits on a thorn.

Figure 7: unintentionality with eventive roots

• Syntax-semantics interface:

(30) a. Nahasambotra alika io zaza io. [‘manage to’ reading]
      PST-AHA-catch dog DEM child DEM

      ‘This child managed to catch a dog.’

b. 

   ![Diagram](image)

   • Create one-place predicate by replacing the Agent role with an indexed pronoun heᵢ (31)c.
   • Combine predicate with object (31)d.
   • With eventive roots, ha- prevents culmination of the event (31)e.
   • Application of ha- to VP: something prevents heᵢ from catching the dog (31)f.
   • ma- introduces higher prevent relation (31)g. Lambda abstraction over heᵢ identifies the Agent of e with the external argument of maha-.

∀_{FC} over virtual forces z’ ensures culmination.
This child managed to catch a dog.

a. \[ s [ \text{predP} \text{sambotra} \text{AspP} [\text{VP} [\text{DP the dog}] [\bigvee \text{catch }]]] [\text{DP the child}]]

b. \[ [\text{sambotra}] : \lambda x' \lambda y' \lambda e [\text{catch}(e) \& \text{theme}(y',e) \& \text{agent}(x',e)]

c. \[ [\text{sambotra}_{iv}] : \lambda y' \lambda e [\text{catch}(e) \& \text{theme}(y',e) \& \text{agent}(x,e)]

d. \[ [\text{sambotra}_{iv \text{alika}}] : \lambda e [\text{catch}(e) \& \text{theme}(y,e) \& \text{dog}(y) \& \text{agent}(x,e)]

e. \[ [\text{ha}] : \lambda P \lambda e[P(e) \& \exists z \text{prevent}(z,\text{Cul}(e))]
\quad \text{(where P is intransitive counterpart of the eventive root)}

f. \[ [\text{ha-sambotra alika}] : \lambda e [\text{catch}(e) \& \text{theme}(y,e) \& \text{dog}(y) \& \text{agent}(x,e) \& \exists z \text{prevent}(z,\text{Cul}(e))]

g. \[ [\text{ma}] : \lambda P \lambda x \lambda e[P(e) \& \forall FCz'[\text{prevent}(z',e) \rightarrow \text{prevent}(x,z')]]
\quad \text{(where P is a ha-predicate, with ha- as defined in e)}

h. \[ [\text{ma-ha-sambotra alika}] : \lambda x \lambda e [\text{catch}(e) \& \text{theme}(y,e) \& \text{dog}(y) \& \text{agent}(x,e) \& \exists z \text{prevent}(z,\text{Cul}(e)) \& \forall FCz'[\text{prevent}(z',e) \rightarrow \text{prevent}(x,z')]]

i. \[ [\text{ma-ha-sambotra alika io zaza io}] : \lambda x \lambda y [\text{catch}(e) \& \text{theme}(y,e) \& \text{dog}(y) \& \text{agent}(x,e) \& \text{child}(x) \& \exists z \text{prevent}(z,\text{Cul}(e)) \& \forall FCz'[\text{prevent}(z',e) \rightarrow \text{prevent}(x,z')]]

(31)h, i: Quantifying in ensures that the child removes any virtual forces that prevent capture of the dog and achieves the catching.

• Conclusions about conceptual structure and syntax-semantics interface:
  o one morphologically complex maha- with the same syntax for maha-sentences with stative and eventive roots;
  o one conceptual semantics for ma- + ha- : double prevention;
  o PREVENT is a primitive relation, just like CAUSE;
  o different definitions of ma-, because of differences in argument structure, leading to quantifying-in for eventive roots, and identification of the external argument of maha- with the Agent of e;
  o 5 readings arise out of conceptual structures underlying double prevention, in which agent/patient vectors have variable orientation and strength;
  o readings correlate with stative/eventive nature of the root, through interaction of conceptual structure with the syntax-semantics interface;
  o eventive roots do not allow an enablement reading where the external argument of maha- enables the internal argument to be in a certain state (compare (24)d). Quantifying in explains why: enablement does not identify the affector of the higher prevent relation with the Agent of e.
4.6 Implications of double prevention for culmination

• *Maha-* is inherently modal:
  o The higher prevent relation implies a free choice universal quantifier, $\forall_{FC}$, that ranges over individuals across possible worlds ($\forall x \forall w$).
  o Free choice introduced by *maha-* relies on a circumstantial modal base: whether they report on actual or virtual forces, the two prevent relations imply possibilities that fit into the normal development of the real world.

• *Maha-* is not a modal verb.
• Just like its English counterpart, *tsy maintsy* ‘must’ varies in modal base depending on the conversational background relevant in the context (Rajaona 1972:322).

(32) a. Tsy maintsy hajaina ny ray aman-dreny. [deontic]
    must TT-respect DET father with-mother.3
    ‘One’s parents must be respected.’

    b. Tsy maintsy mianjera io trano io fa mivava. [epistemic]
    must PRS-AT-fall DEM house DEM COMP PRS-AT-crack
    ‘This house must fall down because it is cracked.’

• Claim: inherently modal nature of *maha-* explains why sentences in the past tense entail culmination:

(33) Nahasambotra alika io zaza io # nefa faingana loatra ilay alika
    PST-AHA-catch dog DEM child DEM but fast too DEF dog
    ka tsy azony.
    COMP NEG do-3
    ‘This child managed to catch a dog #but it was too fast, so it didn’t get captured by him.’

• Matthewson (2012), Martin & Schäfer (2012), Paul et al. (2015, 2016): if culmination with eventive roots holds in all possible worlds in the modal base, and the set of possible worlds quantified over includes the real world, as is the case with a circumstantial modal base, culmination is enforced by assertion of the event.

• Compositional semantics:
  o past tense operator introduces a reference interval $r$ preceding the speech time $now$ ($r < now$).
  o No grammatical aspect in Malagasy (Paul et al. 2015, 2016).
  o Lexical aspect: events are included in the reference time $r$ ($e \subseteq r$), states include the reference time ($r \subseteq s$).
Nahasambotra alika io zaza io.
PST-AHA-catch dog DEM child DEM
‘This child managed to catch the dog.’

(34) a. \[[ma-ha-sambotra alika io zaza io]\]: repeated from (31)i
\[\lambda e \exists y [\text{catch}(e) \& \text{theme}(y,e) \& \text{dog}(y) \& \text{agent}(x,e) \& \exists z.\text{prevent}(z,\text{Cul}(e)) \& \forall_{FC} z'[\text{prevent}(z',e) \rightarrow \text{prevent}(x,z')]]\]

b. \[[na-ha-sambotra alika io zaza io]\]: add past tense operator
\[\exists e \exists r [\text{catch}(e) \& \text{now} < r \& e \subseteq r \& \text{theme}(y,e) \& \text{dog}(y) \& \text{agent}(x,e) \& \exists z.\text{prevent}(z,\text{Cul}(e)) \& \forall_{FC} z'[\text{prevent}(z',e) \rightarrow \text{prevent}(x,z')]]\]

(34)b: existential closure over the event variable \(e\), and placement of \(e\) at a time before the speech time. As a circumstantial modal base ranging over realistic possibilities underlies the double prevention configuration, culmination of \(e\) in the real world is entailed.

- \textit{Maha-} sentences in future tense also entail culmination. Modulo epistemic fine-tuning, future tense leads to projection of \(r\) at a time later than the speech time.

(35) Hahatitra sakafo ho an’ny reniny i Be
FUT-AHA-send food ACC DET mother.3 DEF Be
#fa tsy ho raisiny ilay sakafo.
COMP NEG FUT receive-3 DEF food
‘Be will be able to send food to his mother but she won’t receive the food.’

a. \[[ha-ha-titra sakafo ho an’ny reniny i]\]:
\[\lambda e \exists y [\text{send}(e) \& \text{theme}(y,e) \& \text{food}(y) \& \text{agent}(Be,e) \& \exists z.\text{prevent}(z,\text{Cul}(e)) \& \forall_{FC} z'[\text{prevent}(z',e) \rightarrow \text{prevent}(Be,z')]]\]

b. \[[na-ha-sambotra alika io zaza io]\]:
\[\exists e \exists r [\text{catch}(e) \& \text{now} < r \& e \subseteq r \& \text{theme}(y,e) \& \text{dog}(y) \& \text{agent}(x,e) \& \exists z.\text{prevent}(z,\text{Cul}(e)) \& \forall_{FC} z'[\text{prevent}(z',e) \rightarrow \text{prevent}(x,z')]]\]

(36) Mahafinaritra an’i Soa Rabe.
PRS-AHA-happy ACC DET Soa Rabe
‘Rabe makes Soa happy.’

a. \[[ma-hafinaritra an’i Soa Rabe ]\]: repeated from (26)h
\[\lambda s [\text{happy}(s) \& \text{theme}(Soa,s) \& \exists z.\text{prevent}(z,s) \& \forall_{FC} z'[\text{prevent}(z',s) \rightarrow \text{prevent}(Rabe,z')]]\]
b. [[ma-hafinaritra an’i Soa Rabe ]]: add present tense operator
\[
\exists s \exists r [\text{happy}(s) \& \text{now} \subseteq r \& r \subseteq s \& \text{theme}(\text{Soa}, s) \& \\
\exists z. \text{prevent}(z, s) \& \forall FC z’[\text{prevent}(z’, s) \rightarrow \text{prevent}(\text{Rabe}, z’)]]
\]

(36)b: As \(s\) includes \(r\), and \(r\) includes \textit{now}, \(s\) holds at the speech time. \textit{Maha-} does not play a rule in inducing culmination, because states don’t culminate.

• Lack of culmination with eventive roots in present tense \textit{maha-} sentences:

(37) Mahasambotra alika io zaza io nefa
\begin{center}
PRS-AHA-catch dog DEM child DEM but
faingana loatra ity aliaka ity ka tsy azony.
fast too DEM dog DEM COMP NEG done-3
\end{center}
‘This child can catch a dog but this dog is too fast so he wasn’t able to.’

a. [[ma-ha-sambotra alika io zaza io nefa]]:
\[
\lambda e i x \exists y [\text{catch}(e) \& \text{theme}(y, e) \& \text{dog}(y) \& \text{agent}(x, e) \& \text{child}(x) \& \\
\exists z [\text{prevent}(z, \text{Cul}(e)) \& \forall FC\ z’[\text{prevent}(z’, e) \rightarrow \text{prevent}(x, z’)]]]
\]

• Present tense cannot operate on (37)a: accomplishments and achievements cannot be located at the speech time, only states and processes can (Comrie 1976).

• Infelicity of English sentences like (38)a, vs. progressive (38)b or stative (38)c:

(38) a. #This child catches a dog.

b. The child is catching a dog.

c. The child is able to catch a dog.

• In languages without a grammaticalized progressive: aspectual shift towards process reading similar to (38)b (German, French).

• Malagasy: present tense sentences in AT or TT voice describe ongoing events (what Rajaona 1972 calls “durative”):

(39) Misambotra alika io zaza io.
\begin{center}
PRS-AT-catch dog DEM child DEM
\end{center}
‘This child is catching a dog.’

• With \textit{maha-}: aspectual shift to stative reading (general ability or dispositional meaning), similar to (38)c, thanks to double prevention configuration.

• Dahl (1975), Menendez-Benito (2005): dispositional sentences imply existential quantification over possible worlds (\(\diamond\)). Circumstantial modal base takes into account inner dispositions or ‘mental programming’ of the subject rather than outside circumstances.
This child can catch a dog but this dog is too fast so he wasn’t able to.’

a. \[
\exists x \left( now \subseteq r \land r \subseteq s \land \text{child}(x) \land s: \Diamond \exists e \exists y \left( \text{catch}(e) \land \text{theme}(y,e) \land \text{dog}(y) \land \text{agent}(x,e) \land \exists z \left[ \text{prevent}(z, \text{Cul}(e)) \land \forall_{\text{FC}z'} [\text{prevent}(z', e) \rightarrow \text{prevent}(x, z')] \right] \right) \right)
\]

(40)a: there is a possible world dependent on the child’s dispositions in which she removes whatever virtual forces that prevent her from successfully catching a dog. In this possible world, the event culminates (the dog is caught), but thanks to the embedding under \(\Diamond\), culmination is not entailed in the real world.

**Conclusions about culmination:**
- Anchoring *maha-* to the time axis always leads to culmination in past and future tense sentences: the circumstantial modal base underlying double prevention ensures that the end state is reached in all worlds in the conversational background, which includes the real world.
- Present tense *maha-* sentences with stative roots assert that the state holds at the speech time;
- Present tense *maha-* sentences with eventive roots shift to a general ability or dispositional reading, asserting that there is a possible world compatible with the agent’s dispositions in which the event culminates.

### 5.0 General conclusion

- Malagasy is a language with non-culminating accomplishments by default;
- *ma-* and *ha-* each introduce a prevent relation;
- The *preven* relation is a primitive, similar to *cause*;
- Depending on the conceptual interaction of the affector and patient forces, double prevention leads to the enablement, causative, ‘manage to’, unintentional or general ability reading;
- Culmination arises from the association of the double prevention configuration with a circumstantial base;
- Many past approaches have attempted to link *maha-* to resultativity (Rajaona 1972) or telicity (Phillips 1996, 2000; Travis 2010);
- Does Malagasy provide support for the Agent Control Hypothesis of Demirdache and Martin (2015)?
  - Perhaps: culmination is so closely tied to the absence of agentivity.
- Whether agentivity is required for non-culmination remains to be determined;
• Future research: the other voice markers that entail culmination (e.g. the “passive” prefixes voa- and tafa- discussed by Travis 2010).

References


