Temporal-modal links and the interpretation of tense-aspect in Bangla *if*-conditionals

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Background + scope

- Modal environments affect temporal interpretation: 'If she falls sick tomorrow, she won't be able to come' ≠ 'She falls sick tomorrow'
- 2 questions in the literature: (i) what determines temporal interpretation in modal expressions? (ii) how does the resulting temporal interpretation relate to the type of modality that can be expressed?
- 2 approaches: (i) non-uniform: modal expressions contribute additional temporal meaning/shifts, and/or temporal expressions have a different semantics in modal environments; (ii) uniform: patterns of temporal interpretation rely on this general mechanism: fixed semantics for tense-aspect + structure of possibilities (asymmetry between fixed past and open future) + felicity condition on modal language (e.g. 'diversity' [3]) [3, 4, 5, 7]
- uniform approach: compositional, conceptually attractive
- Question: are these mechanisms linguistically 'real'?
- This project: data from Standard Colloquial Bangla (SCB; [2]) suggests that these mechanisms can be encoded into conditional meaning as grammatical constraints

The puzzle

- Restrictions on temporal *expressions* in the antecedent of conditionals: an episodic predicate directly embedded under *jodi* 'if' cannot have habitual-generic readings with the simple present, is incompatible with canonical progressive, perfect, past(perfective) and future-tense morphology
- past-oriented and in-progress meanings can be expressed using a specific set of alternative strategies
- What explains this specific set of restrictions + systematic 'workarounds'?

Proposal summary

- restrictions on tense-aspect morphology are temporal reflexes of a single modal constraint: the conditional is constrained to quantify over metaphysical/historical alternatives
- general felicity conditions on quantification require the antecedent to be metaphysically open
- past-future asymmetry: non-future-oriented eventualities are metaphysically settled – correlates with disallowwed tense-aspect morphology
- aktsionsart and extra-linguistic knowledge allow us to infer certain 'past-oriented' meanings from configurations that are structurally future-oriented, accounting for the 'alternative' strategies
- suggests that restrictions are linguistic, not merely interpretative

References

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Data

(1) Unembedded clauses

mini phOl kha-ϕ-e/ khe-l-o/ kha-ch-e/ kh-ech-e/ kha-b-e
mini fruit eat-PRS-3/ eat-PST-3/ eat-PROG-3/ eat-PRF-3/ eat-FUT-3
Mini eats/ ate/ is eating/ has eaten/ will eat the fruit

(2) simple present has future-shifted, but not habitual-generic reading

a. future-compatible context
jodi ekhane khub brishti pORe, rasta-gulo kharap hoye jabe
if here much rain fall-PRS-3, road-COP bad happen go.FUT.3
If it rains a lot here, the roads will wear out

b. generic-preferring context
jodi ekhane khub brishti pORe, tahole (nishchoi) sobar
if here much rain fall-PRS-3, then (likely) everyone-GEN many-CLF
onek-gulo kore chhata ache
umbrella COP
Intended: If it rains a lot here, then (I bet) everyone owns multiple umbrellas

(3) Progressive, perfect, and past(perfective) morphology not acceptable:

jodi mini phOl kha-ch-ϕ-e/ khe-ech-ϕ-e/ khe-lo, tahole ami khuSi
if mini fruit eat-PROG-PRS-3/ eat-PRF-PRS-3/ eat-PST.3, then I happy
hObo
be.FUT
Intended: If Mini is eating/ has eaten/ ate the fruit, then I will be happy

Alternative strategies

(4) Habitual-generic readings, progressive, perfect, and past morphology are allowed when the antecedent is embedded under *hO* 'be':

jodi emon-Ta hOye je [mini phOl kha-ϕ-e/ kha-ch-ϕ-e/
if like.this-CLF happen that [mini fruit eat-PRS-3/ eat-PROG-PRS-3/
kh-ech-ϕ-e], tahole ami khuSi hObo
eat-PRF-PRS-3], then I happy be.FUT
If it so happens that Mini eats (in general)/ is eating/ has eaten fruit, then I will be happy

Perfect-like meanings can be expressed using the auxiliary *thak*, which has an iterative, non-volitional reading in unembedded clauses: V+*thak* = being in the state of having done V

(5) a. *thak* in unembedded clauses
o praye-i neche thake
she frequently-emph dance thak
she often dances (ends up dancing)
b. *thak* in conditional antecedent
jodi mini phOl kheye thake, tahole ami khuSi hObo
if mini fruit eat thak-3, then I happy be.FUT
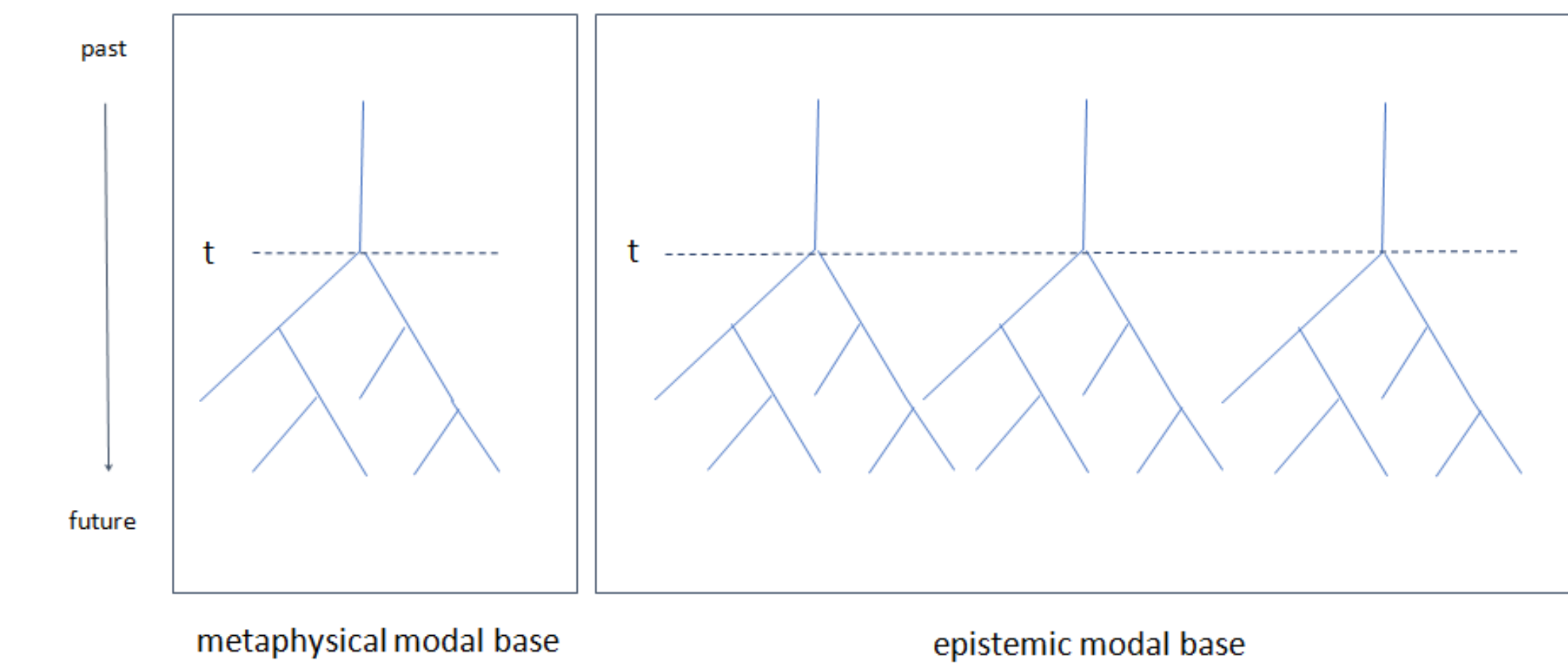If Mini has eaten fruit, then I will be happy

In-progress meanings can be expressed using simple present morphology with some (but not all) predicates

(6) 'in-progress' meanings using simple present

mini jodi Ekhon kaj kor-ϕ-e, tahole ashbe na
mini if now work do-PRS-3, then come.FUT.3 NEG
If Mini is working/is about to work right now, she won't come

Does not work with accomplishment verbs (draw-a-circle), temporrally 'compressed' events (fall-off-the-cliff).

Analysis

- Branching time framework [1]: tree-like frame of moments with backwards-linear partial order (causal precedence); a complete linear subset is a history. Truth is evaluated at m/h pairs
- Metaphysical necessity (necessity wrt all historical alternatives): $\Box$pm/h = 1 iff ∀ h' passing through m, pm/h'
- Modal sentences are evaluated against a modal base [6], formalized as a set of trees, branching after the evaluation time t:

metaphysical modal base — epistemic modal base

- In MB(t), position of t wrt utterance time (UT): temporal perspective. Position of event time wrt t: temporal orientation
- Settledness in a modal base:
  - **M.S.** Metaphysical settledness: p is metaphysically settled at MB(t) iff ∀h∈MB(t): p →$\Box$pμ(t,h)/h
    iff for each tree, the truth value of p at the moment contemporaneous with t is identical on all histories passing through m: epistemic state where the truth/falsity of p is knowable/decided at t, although it may not be known
  - **E.S.** Epistemic settledness: p is epistemically settled at MB(t) iff ∀h∈MB(t):$\Box$pμ(t,h)/h or ∀h:$\Box$¬pμ(t,h)/h
    iff for each tree, p is metaphysically settled *in the same way*: epistemic state where truth/falsity of p is known at t
  - Openness: negation of settledness— metaphysical openness entails epistemic openness, but not vice-versa
  - Conditionals: *if A, then B*m/h = 1 iff A→B is settled true in the modal base at t; iff ∀h∈MB(t): $\Box$(A →B)μ(t,h)/h = 1

Proposal: when the antecedent quantifies over epistemic alternatives (trees), a minimal felicity condition is epistemic openness of A in MB(t) (truth of A is not known at t) [8]. A subset of conditionals require quantification over metaphysical alternatives (histories), leading to the stricter requirement for metaphysical openness. Metaphysical openness can only obtain when the temporal orientation of the antecedent is future.

Lexical entries for tense-aspect operators:
(R_i^c: contextually-determined regular partition on i; Hist$_{inr}$(m,h): 'inertial' histories)

(7) PRES(p)m/h = 1 iff pm/h = 1
(8) PAST(p)m/h = 1 iff ∃ m': [m' < m & pm'/h = 1]
(9) PERF(p)m/h = 1 iff ∃i:[τ(m)⊆$_{fin}$i & pμ(i,h)/h = 1]
(10) PROG(p)m/h = 1 iff ∀k∈ $R_{\tau(m)}^c$: [∀h'∈Hist$_{inr}$(m,h): pμ(k,h')/h'=1]
(11) IMPF(p)m/h = 1 iff ∃j:[τ(m)⊆$_{ini}$j & ∀k∈ R_j^c: [∀h'∈Hist$_{inr}$(m,h): pμ(k,h')/h'=1]]

Assuming standard lexical entries, PAST, PERF, PROG, IMPF (habitual-generic readings) do not implicate future moments on h; the corresponding forms are correctly predicted to be deviant in the antecedent.

Alternative strategies:

- 'past' readings with *thak*: the relevant eventuality time (of state-of-having-done-V) is still forward-shifted wrt t, making the form acceptable. From this, world knowledge allows us to infer the (past) V event
- 'in-progress' readings with simple present: actually future-shifted; in-progress interpretation only possible for predicates where a near-future V-event allows us to *infer* the existence of the V-event now
- embedding under *hO* removes restrictions on embedded clause: the relevant eventuality is 'turn-out-to-be-A', which is forward-shifted wrt t, making the form acceptable

Outstanding puzzle: mechanism for future-shift of simple present antecedent? Ongoing debate in the literature. This data predicts: future-shift cannot be tied to the semantics of the present-tense operator, or the conditional – wrongly predicts that present progressive and perfect antecedents can get future-shifted readings.