Semantic contrasts in the four-copula system of Bangla

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Multi-copula systems and contrasts in predication

- Predication: attributing a property to a subject: *Mini <u>is</u> tall*: Tall(Mini)
- Formal analyses often treat copular expressions as semantically empty (is=$\lambda P.P$)
- Languages with multiple copulas challenge this: choice of copula is conditioned by, and influences, the interpretation of the clause
- Reveals linguistically-relevant contrasts in predication
- Many South Asian languages have multi-copula systems with contrasts that are not well-studied (Deo, 2024; Mahapatra, 2002)
- This talk: ongoing work on the 4-copula system of Bangla addressing two questions:
  - Q1: What semantic contrasts are encoded by the distribution?
  - Q2: How (what meaning do the copulas contribute; how does this interact with the rest of the tense-aspect-mood system)?

Scope of data

- 3 overt copulas (*hO, thak, ach*), one null strategy (ϕ)
- Predicational clauses (non-verbal predicates, e.g. *tall, a teacher, on the table*),
- with subject NPs that lack overt quantifiers (*Mini, the worker*; but not *some giraffes*), and
- two predicate types: typically individual-level (ILP; *tall/smart*) vs typically stage-level (SLP; *busy/sick*)

Contrasts encoded

hO	ϕ
thak	ach

Focusing on three broad contrasts:

1. Individual subject: episodic vs characterizing claim about individual. Mirrors two-copula system (*ahe* vs *asto*) of Marathi (Deo, 2024).
   - ϕ/*ach* (episodic) : *The child is tired (today)*
   - *hO*/*thak* (characterizing): *The child is tired (in the evenings)*
2. Kind subject: Accidental vs law-like generalization about members of kind:
   - ϕ (accidental): *LLMs are popular* ($\not\approx$ # *An LLM is popular*)
   - *hO* (law-like): *Giraffes are tall* ($\approx$ *A giraffe is tall*)
3. Temporary vs permanent properties:
   - *ach* (temporary): *The child is sick (now)*
   - ϕ (permanent): *The child is sickly*

Summary of proposal

- Contrasts result from variation along two dimensions: plurality and temporal contingence, cross-cut across the four copulas.
- Plurality affects the interaction of the copular clauses with imperfective aspect. Specifically: characterizing and lawlike meanings are contributed by the imperfective, *hO* and *thak* can combine with IMPF, but *ach* and ϕ cannot. Derives the episodic-characterizing and accidental-lawlike contrasts.
- The temporary-permanent contrast results from implicated, rather than truth-conditional meaning: ach implicates that the property it instantiates does not hold beyond the reference interval; ϕ is unspecified for this.

Roadmap

Episodic vs characterizing claims about individual

Accidental vs lawlike (non-accidental) generalization about kind

Permanent vs temporary property

Proposal: how do these contrasts come about?

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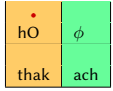
The pattern: episodic vs characterizing

hO	ϕ
thak	ach

- Data: simple present tense, individual-denoting subject (names, *N-ta/gulo*)
- Takeaway: Suppose the predicate expresses the property P. In the simple present, hO and thak express generalizations related to P; ϕ and ach express that P holds in the actual world at UT. Mirrors 2-copula system (*ahe* vs *asto*) of Marathi (Deo, 2024).

Data: individual-denoting subject + hO



Inference: generalization over 'become-P' (inchoative) episodes.

(1) SLP

mini osustho hOye
mini sick *hO*.IPFV.PRS.3

Mini becomes sick (generally/regularly/often).

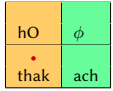
(2) ILP

mini lOmba hOye
mini tall *hO*.IPFV.PRS.3

Mini becomes tall (generally/regularly/often).

Badness due to contextual or world knowledge which treats being tall as an enduring property.
Compare: Mini is a superhero who can change her appearance at will: Mini becomes tall (every morning/while reaching for high shelves). Crucial difference: we no longer treat 'tall' as an individual-level predicate in this context.

Data: individual-denoting subject + thak



Inference: generalization over 'remain P'-states

(3) SLP

mini byasto thake
mini busy *thak*.IPFV.PRS.3

Mini remains busy (generally/regularly/often/on Mondays).

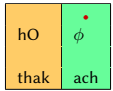
(4) ILP

mini lOmba thake
mini tall *thak*.IPFV.PRS.3

Mini remains tall (generally/regularly).

The badness is due to contextual or world knowledge which treats being tall as an enduring and permanent property. Asserting that Mini remains tall implicates that it is possible for her to not be tall sometimes.

Data: individual-denoting subject + ϕ



Inference: P-state in actual world

(5) SLP: single P-state in actual world at UT

mini byasto ϕ
mini busy ϕ

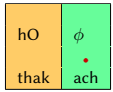
Mini is busy.

(6) ILP: property in actual world

mini lOmba ϕ
mini tall ϕ

Mini is tall.

Data: individual-denoting subject + ach



Inference: P-state in actual world; temporary

(7) SLP: single P-state in actual world at UT: temporary

mini byasto ache
mini busy *ach*.PRS.3

Mini is busy (now).

(8) ILP: property in actual world; inference: relevant to current discourse context
Context: we are trying to get something from a high shelf. *I can't reach it, but why don't we ask Mini..*

mini lOmba ache
mini tall *ach*.PRS.3

Mini is tall.

ach with ILPs requires contextual support; discussed later.
Summary: in the simple present, hO and thak express characterizing meanings; ϕ and ach express episodic meanings.

Summary of patterns

hO[x Q]	*Φ[x Q]*
Inference: *Generalization over 'x become Q'* E.g. *Mini becomes sick (regularly)*	Inference: *x is Q* E.g. *Mini is tall/busy*
thak[x Q]	***ach[x Q]***
Inference: *Generalization over 'x remain Q'* E.g. *Mini remains busy (regularly/ on Mondays)*	Inference: *x is Q* E.g. *Mini is busy (now)*

Figure: Inferences with copulas

Roadmap

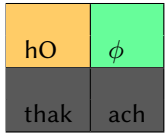
Episodic vs characterizing claims about individual

Accidental vs lawlike (non-accidental) generalization about kind

Permanent vs temporary property

Proposal: how do these contrasts come about?

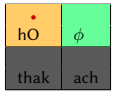
The pattern: accidental vs lawlike



- Data: simple present, individual-level predicate (ILP), kind subject (*N-ra*; Saha (2023)).
- Takeaway: let subject involve kind K, and predicate express property P. In the simple present, hO expresses a lawlike claim: to be a member of K is to have property P; ϕ expresses an accidental claim: all current members of K happen to have property P.
  To guide intuitions: In English and Italian, the former can be expressed with an indefinite subject, the latter cannot (Guerrini, 2025):
  - lawlike: *Giraffes are tall* $\approx$ *A giraffe is tall*
  - accidental: *LLMs are popular* $\not\approx$ *# An LLM is popular*

  In Bangla, this contrast is grammatically encoded by the copula system.

Data: kind subject + ILP + hO



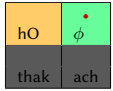
Inference: P is a non-accidental property of any individuals who are members of K

(9) giraffe-ra lOmba hOye
giraffes tall *hO*.IPFV.PRS.3
Giraffes are tall.

Odd with predicates that are understood to express accidental claims:

(10) # giraffe-ra jonopriyo hOye
giraffes popular *hO*.IPFV.PRS.3
Intended: giraffes are popular.

Data: kind subject + ILP + ϕ



Inference: phi: P holds of the individuals who are members of K in the evaluation world (w0) and reference time. Contingent claim, regardless of whether P is usually understood to be accidental or non-accidental.

(11) ILP: property of members of the kind in the actual world at UT

giraffe-ra lOmba ϕ
giraffes tall ϕ

Giraffes are tall.

(12) ILP: property of members of the kind in the actual world at UT

giraffe-ra jonopriyo ϕ
giraffes popular ϕ

Giraffes are popular.

Summary: in the simple present, hO expresses a lawlike claim about the members of a kind, but ϕ expresses a contingent claim about the current members of the kind at w0.

Summary of patterns

hO[x Q]	*Φ[x Q]*
Inference: *Generalization over 'x become Q'* E.g. *Mini becomes sick (regularly)*	Inference: *x is Q* E.g. *Mini is tall/busy*
Inference with kind subject + ILP *Any x belonging to K is (non-accidentally) Q* E.g. *A giraffe is tall.*	Inference with kind subject + ILP *The x's belonging to K in w0 are Q* E.g. *LLMs are popular.*
thak[x Q]	*ach[x Q]*
Inference: *Generalization over 'x remain Q'* E.g. *Mini remains busy (regularly/ on Mondays)*	Inferences: *x is Q* E.g. *Mini is busy (now)*

Figure: Inferences with copulas

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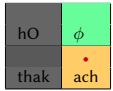
The pattern: permanent vs temporary

hO	ϕ
thak	ach

- Data: simple present tense, ϕ and ach-clauses, two predicate types: individual-level (ILP), stage-level (SLP)
- Takeaway: suppose the subject is x and predicate expresses property P. In the simple present, *ach* produces inferences that P is a temporary property of x; ϕ is neutral in this respect.

Data: ach vs ϕ with locative predicates



Locative predicates: understood as temporary or permanent depending on the object whose location they express. ach is acceptable when the locative is understood as temporary:

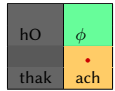
(13) boi-ta table-er opore ache
book-CLF table-GEN on *ach*.PRS.3
The book is on the table.

But odd with a predicate that cannot be construed as temporary in a neutral context:

(14) # ghOr-ta pahaR-er opore ache
house-CLF hill-GEN on *ach*.PRS.3
The house is on the hill.

ϕ is equally acceptable in both clauses.

Data: ach vs ϕ with individual-level predicates



ILPs (unambiguously permanent properties): *ach* is odd in neutral contexts:

(15) Context: I am describing my friend Mini, who you have never met:

mini lOmba ache
mini tall *ach*.PRS.3

Intended: Mini is tall.

ach acceptable only if the context provides a salient way in which the property is relevant to the immediate discourse context:

(16) Context: we are trying to get something from a high shelf. *I can't reach it, but why don't we ask Mini..*

mini lOmba ache
mini tall *ach*.PRS.3

Mini is tall.

ϕ is equally acceptable in both contexts.

Summary: in the simple present, ach produces inferences that the predicate expresses a temporary property; ϕ is neutral in this respect.

Data: temporariness with *ach* is an implicature

Cancelable:

(17) mini ekhon byasto ache...(in fact, sara din byasto thakbe)
mini busy *ach*.PRS.3
Mini is busy (now)...(in fact, she will be busy the whole day).

Reinforcable:

(18) mini ekhon byasto ache...(kintu ektu pOre byasto thakbe na)
mini busy *ach*.PRS.3
Mini is busy (now)...(but she won't be busy after some time).

Proposal: *ach*-clauses claim that the property P holds of subject x throughout the relevant interval, implicating that it does not hold beyond.

Summary of patterns

hO[x Q]	*Φ[x Q]*
Inference: *Generalization over 'x become Q'* E.g. *Mini becomes sick (regularly)*	Inference: *x is Q* E.g. *Mini is tall/busy*
Inference with kind subject + ILP *Any x belonging to K is (non-accidentally) Q* E.g. *A giraffe is tall.*	Inference with kind subject + ILP *The x's belonging to K in w0 are Q* E.g. *LLMs are popular.*
thak[x Q]	*ach[x Q]*
Inference: *Generalization over 'x remain Q'* E.g. *Mini remains busy (regularly/ on Mondays)*	Inferences: *x is Q* *Q is temporary* E.g. *Mini is busy (now)*

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Background: verbal system of Bangla

- Simple present clauses express habitual-generic meanings: *Mini smokes*; I assume this involves an imperfective aspect operator IMPF (Deo, 2009; Ferreira, 2016).
- Present tense morphologically null. Two past-markers: perfective -l- and imperfective -t-.
- In predicational clauses, the copula (just like any other verb) can be inflected with tense-aspect markers.
- Assumption about LF of copular clauses: TENSE(ASP(COP([$_{SC}$ *mini tall*])))

Characterizing-episodic and lawlike-accidental contrasts: interaction with aspect system

- The characterizing-episodic and lawlike-accidental contrasts suggest that in the simple present, *hO* and *thak* express generalizations (over events, over individuals).
- Q: Should we take 'generalization' to be part of the lexical meaning of *hO* and *thak*?
- Proposal: no; this meaning-component is contributed by sentence-level grammatical aspect.
- Evidence:
  - *hO* and *thak*-clauses can be inflected with viewpoint aspect markers: imperfective, perfective, progressive, perfect.
  - Generalizing meanings are available only when sentential aspect is imperfective (not perfective, progressive, perfect).
  - Other meaning components (inchoative with *hO*, 'remain' with *thak*) are retained regardless of grammatical aspect.

Generalizing meanings with *hO, thak* arise from IMPF

Data: Past tense has two separate markers: perfective-past (*-l-*), imperfective past (*-t-*). With imperfective-past marking, *hO/thak*-clauses have generalizing meanings (parallel to simple present clauses):

(19) a. *hO* + imperfective-past: generalization over become-P (inchoative) episodes in the past

mini osustho ho-t-o
mini sick *hO*-IPFV.PST-3

Mini used to fall sick (generally/regularly).

b. *thak* + imperfective past: generalization over become-P (inchoative) episodes in the past

mini byasto thak-t-o
mini busy *thak*-IPFV.PST-3

Mini used to remain busy (generally/regularly/when she worked as a teacher).

Generalizing meanings with *hO, thak* arise from IMPF

With perfective-past marking, *hO/thak*-clauses do not retain generalizing meanings:

(20) a. *hO* + perfective-past: single become-P (inchoative) episode in the past

mini osustho ho-l-o
mini sick *hO*-PFV.PST-3
Mini fell sick.

b. *thak* + perfective-past: single remain-P episode in the past

mini byasto thak-l-o
mini busy *thak*-PFV.PST-3
Mini remained busy (all of last week).

Conclusion: *hO* contributes inchoative meaning, *thak* contributes 'remain' meaning. Where 'generalizing' meanings are present, they are contributed by IMPF.

Lack of generalizing meanings with ϕ and *ach*

- Q: If generalizing meanings are contributed by IMPF, why do ϕ and *ach*-clauses lack these meanings?
- Proposal: ϕ and *ach*-clauses cannot combine with the IMPF operator.
- Evidence: In the past paradigm, *ach*-clauses can be inflected with the perfective-past *-l-*, but not with the imperfective-past *-t-*. (The null strategy is not retained in the past).

phi/ach cannot combine with IMPF

ach-clauses can be inflected with the perfective-past *-l-*:

(21) ach + perfective past

mini byasto chil-o
mini busy *ach*.PFV.PST-3

Mini was busy (yesterday).

but not with the imperfective-past *-t-*:

(22) ach + imperfective past

?? mini byasto ach-t-o
?? mini busy *ach*-IPFV.PST-3

Intended: Mini used to be busy (when she worked as a teacher).

Proposal: ϕ and *ach*-clauses never combine with IMPF. In the present tense:

- *mini byasto* ϕ: PRES(ϕ (*mini byasto*)); *mini byasto ache*: PRES(ach(*mini byasto*))
- *mini byasto hOye*: PRES(IMPF(hO(*mini byasto*))); *mini byasto thake*: PRES(IMPF(thak(*mini byasto*)))

Summary of patterns

hO[x Q]		*Φ[x Q]*	
Inference: *x become Q* E.g. *Mini becomes sick (regularly)* *Mini became sick (last year)* *Mini used to become sick (regularly, when she was younger)* Inference with kind subject + ILP *Any x belonging to K is (non-accidentally) Q* E.g. *A giraffe is tall.*	Other properties: Can combine with IMPF (∴generalized meanings possible)	Inference: *x is Q* E.g. *Mini is tall/busy* *Mini was tall/busy* Inference with kind subject + ILP *The x's belonging to K in w0 are Q* E.g. *LLMs are popular.*	Other properties: Cannot combine wth IMPF (∴generalized meanings not possible)
thak[x Q]		*ach[x Q]*	
Inference: *x remain Q* E.g. *Mini remains busy (regularly/ on Mondays)* *Mini remained busy (last week)* *Mini used to remain busy (regularly, when she was a teacher)*	Other properties: Can combine with IMPF (∴generalized meanings possible)	Inferences: *x is Q* *Q is temporary* E.g. *Mini is busy (now)* *Mini was busy (yesterday)*	Other properties: Cannot combine with IMPF (∴generalized meanings not possible) Incorporated into inflectional paradigm for progressive aspect: *-ch-*

Figure: Inferences with copulas

Sketch of formal analysis

- Predicate denotations have singular and plural eventualities (Kratzer, 2007):
  - $[\![\textit{John smoke}]\!]^c = \{e1, e2, e3, e1 \oplus e2, e2 \oplus e3, e1 \oplus e3, e1 \oplus e2 \oplus e3\}$
- Semantics for the imperfective based on Ferreira (2016): IMPF only operates over the plural or mass eventualities in the predicate denotation:

$$[\![IMPF(P)]\!]^c = \lambda t.\lambda w.\ \forall w' \in BEST(\mathscr{P}, M, O, w, t), \exists e \text{ s.t. } t \subseteq \tau(e) \text{ and } \underline{PL(\mathscr{P}(w'))(e)}$$

PL is a function that maps a predicate P to the set of homogeneous sums in its denotation. Let P be the extension of $\mathscr{P}$ in w'. $PL(\mathscr{P}(w')) = PL(P) = \lambda e.SUM(e, P)$, where $SUM(e, P) \Leftrightarrow P(e)$ and $\exists e_1, e_2, ..., e_n < e : P(e_1)\&P(e_2)\&...\&P(e_n)$ and $\otimes(e_1, e_2, ...e_n)$ and $e = e_1 \oplus e_2 \oplus ... \oplus e_n$.

The progressive operator PROG swaps PL for the function SG, which instead extracts the minimal (singular) elements from the predicate denotation.

- *hO/thak* vs *ϕ/ach*:
  - $[\![\textit{thak}(\textit{mini byasto})]\!]^c = \{e1, e2, e3, e1 \oplus e2, e2 \oplus e3, e1 \oplus e3, e1 \oplus e2 \oplus e3\}$
  - $[\![\textit{ach}(\textit{mini byasto})]\!]^c = \{e1, e2, e3\}$

Thank you!

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Appendix: Kind-property reading with *hO* depends on imperfective aspect

a. hO + IMPF: non-accidental property of the kind in the past

   giraffe-ra lOmba ho-t-o
   giraffes tall *hO*-IPFV.PST-3

   Giraffes used to be tall.

b. hO + PFV: become-P (inchoative) episode in the past involving the kind

   giraffe-ra lOmba ho-l-o
   giraffes tall *hO*-PFV.PST-3

   Giraffes became tall (within this 1000-year period of prehsitory).

Appendix: Mereology of copular clauses

Mereological properties of copular clauses:

- *hO*[x Q]: denotation has both singular and plural 'x become Q' eventualities; PL(*hO*[x Q]) $\neq \emptyset$
- *thak*[x Q]: denotation has both singular and plural 'x remain Q' eventualities; PL(*thak*[x Q]) $\neq \emptyset$
- ϕ[x Q]: denotation only has singular 'x is Q' eventualities; PL(ϕ[x Q]) $= \emptyset$
- *ach*[x Q]: denotation only has singular 'x is Q' eventualities; PL(*ach*[x Q]) $= \emptyset$