Domain Restrictions in Concealed Questions

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what is a concealed question?

A concealed question (CQ) is a DP whose interpretation corresponds to that of an identity *wh*-question.

(1) a. They revealed the winner of the contest. **CQ**

　　 b. They revealed who the winner of the contest is.

(2) a. Mary knows the capital of Italy. **CQ**

　　 b. Mary knows what the capital of Italy is.

(3) a. John remembers the exact amount of his debt. **CQ**

　　 b. John remembers what the exact amount of his debt was.

components of a concealed question

Stable cross-linguistic patterns:

CQs are attested under certain intensional attitude predicates:
know, figure out, remember, tell, forget, ask, reveal, guess, learn, estimate, predict, etc

Relational and functional nouns serve as the best CQs:
capital, price, wife, mayor, age, sum, temperature, color, shoe size, etc

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Baker (1968), Heim (1979), Romero (2005), Nathan (2006), Frana (2010, 2017), Aloni and Roelofsen (2011),etc

today

source: wikipedia/bengali language

the view from Bangla I

Bangla[1] shows intriguing restrictions in forming CQs:
most bare nouns cannot form CQs.

(4) a. *Ami protijogita-r **bijoyi** jaan-i.*
         I   contest-GEN winner know-1P
         Intended: 'I know the winner of the contest.'

     b. *Amar Bihar-er **raajdhaani** mone por-lo.*
         my   Bihar-GEN capital   mind fall-3P.PRES
         Intended: 'I remembered the capital of Bihar.'

     c. *Ora murti-r **obosthaan** ghoshona   kor-lo.*
         they statue-GEN location   announcement do-3P.PRES
         Intended: 'They revealed the location of the statue.'

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[1]Also known as Bengali (Indo-Aryan, India; SOV).

the view from Bangla II

(5) a. *Ram-er **pochond-er mod**   sheta sposhto.*
         Ram-GEN like-GEN   alcohol that clear
         Intended: 'Ram's favorite drink is obvious.'

     b. *Ram-er **khooni** khnuje baar kor-lam.*
         Ram-GEN killer   search out do-3P.PRES
         Intended: 'I found out the murderer of Ram.'

Examples inspired by Heim (1979).

the view from Bangla III

(6) a. *Ami protijogitar bijoyi* **ke** *jaan-i.*   Not a CQ
I   contest-GEN winner who know-1P
'I know who the winner of the contest is.'

b. *Amar Bihar-er   raajdhaani-***ta*** *mone por-lo.*
my   Bihar-GEN capital-CL   mind fall-3P.PRES
'I remembered the capital of Bihar.'

c. *Ora   murti-r   obosthaan-***ta*** *ghoshona*
they statue-GEN location-CL   announcement
   kor-lo.
   do-3P.PRES
'They announced/revealed the location of the statue.'

the view from Bangla

These are all intensional nouns[2] that are attested to be good candidates for CQs cross-linguistically.

Bangla does not allow these bare intensional nouns in CQs.

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[2]Functions from worlds to individuals: $\langle s,e \rangle$

sensitivity to amounts/degrees

Intriguingly, a certain subclass of bare nouns do form perfect CQs in Bangla, without needing any classifiers.

(7) a. *Ami doodh-er* **daam** *jaani.*
         I   milk-GEN price   know-1P
         'I know the price of the book.'

     b. *Ami or* **juto-r maap** *jiggesh kor-lam.*
         I   his shoe-GEN   size   ask
         'I asked his shoe size.'

     c. *Ram Dilli-r*   **taapmatra** *bhule ge-che.*
         Ram Delhi-GEN temperature forget go-3P.PRES
         'Ram has forgotten the temperature of Delhi.'

sensitivity to amounts/degrees

(8) a. *Ram Sita-r* **fon nombor** *bhule ge-che.*
Ram Sita-GEN phone   number forget
'Ram has forgotten Sita's phone number.'

b. *Sita Ram-er* **boyesh** *andaaj kor-lo.*
Sita Ram-GEN age   guess   do-3P.PRES
'Sita guessed Ram's age.'

c. *Ram Sita-r* **ojon** *jaan-te   chai-lo.*
Ram Sita-GEN weight know-IMPV want-3P.PRES
'Ram asked Sita's weight.'

sensitivity to amounts/degrees

Crucially, classifiers do not add any extra meaning with degree nouns in CQs:

(9) *Ram Sita-r   fon   number-***(ta)***/boyesh-***(ta)***/ojon-***(ta)***/jutor*
    Ram Sita-GEN phone number-CL/age-CL/weight-CL/shoe
       *maap-***(ta)*** bhule ge-che*
       size-CL   forget go-3P.PRES
    'Ram has forgotten Sita's phone number/age/weight/shoe
    size.'

puzzle

Bare degree nouns form good CQs in Bangla.

Bare non-degree nouns cannot form CQs;
They obligatorily need a classifier.

puzzle

In CQs:	CL	No CL
Degree nouns	optional	✓
Non-degree nouns	obligatory	*

previous approaches to CQs

The CQs as Individual Concepts approach

The CQs as Properties approach

The CQs as Questions approach

The CQs as Propositions approach

Heim (1979), Romero (2005), Nathan (2006), Harris (2007), Schwager (2008), Aloni (Aloni) Frana (2010, 2017), Percus (2010, 2014), Aloni and Roelofsen (2011), a.o.

desideratum not met

All these approaches rely on the same strategy: a semantic mechanism that shifts the intension of a DP into a propositional meaning.

This is implemented as an autonomous type-shifter, or the crucial shift-operation is encoded in the lexical entry of the embedding verb.

Within the class of intensional nouns, no distinctions are made in these approaches.

this study

Concealed questions in a classifier language have not been explored before.

Doing so helps us understand how the internal structure of DPs **and** the internal structure of sub-classes of nouns restricts the phenomenon.

number neutrality, bare NPs, kinds, strategies of individuation

our proposal

centers around:

- the degree/non-degree distinction
- the contribution of the classifier
- DP intension $\rightarrow$ CQ

background: semantics of CQs

Intensional nouns originate as individual concepts: functions from worlds to individuals.

eg. *capital* is a type $\langle s, e \rangle$ object.

$[\![$capital of Bihar$]\!] =$

$$\begin{bmatrix} w_1 \rightarrow Patna & w_3 \rightarrow Calcutta \\ w_2 \rightarrow New\ Delhi & w_4 \rightarrow Bombay \end{bmatrix}$$

A type-shifter shifts this IC into an identity question:

(10) $\langle se \rangle \rightarrow \langle st, t \rangle$
$[\![SHIFT]\!] = \lambda y_{\langle s,e \rangle}.\lambda p_{\langle s,t \rangle}.\exists x_e\ [p = \lambda w\ [y(w) = x]]$

Heim (1979), Romero (2005), Nathan (2006), Frana (2010), a.o.

background: classifiers in Bangla

Bangla is a numeral classifier language;
– lacks a mass-count distinction (neither class can be counted directly without a classifier)
– the shape of the noun does not change irrespective of singular/plural numerals

–ʈa/ʈo/ʈe	general classifier for count nouns
–jɔn	classifier restricted to humans
-kʰana	classifier restricted to inanimate count nouns
–ra	number-neutral classifier restricted to animate nouns
-gulo	plural classifier applicable to all count and mass nouns
–kʰani	classifier restricted to mass nouns

Dasgupta and Bhattacharya (1993), Ghosh (2001), Biswas (2012), Dayal (2012)

a word order issue: NP Raising

A well-attested fact about the internal structure of the Bangla DP:
Without a numeral, the only possible order is NP + CL.

(11) *gari ta*   The NP   (12) **ta gari*
      car   CL   has been   CL   car
      'The car'   raised!   'The car'

The classifier needs to cliticize to an expression to its left.
With a numeral present, it cliticizes to the numeral and NP raising
is banned:

(13) *ek-ta   gari*   (14) **gari ek-ta*
      one-CL   car   car   one-CL
      'One car'   Intended: 'One car'

Bhattacharya (1999), Dayal (2012)

background: bare NPs are kinds

Chierchia (1998): tight connection between number neutrality and the ability of bare nominals to have definite readings.

Dayal (2011, 2012): Bangla challenges this view;
Dayal's findings:
- the in-situ bare NP only allows a kind reading
- for the definite reading, the NP has to be raised

Both views: **bare NPs start out as kinds**.

Chierchia's definite reading: Dayal's definite reading:
pred + ι $[_{DP} [_{NP} \text{DOG}] \varnothing_\iota [_{CL-P} \text{CL } t_i]]$

case 1: non-degree nouns

(15) *Amar* [$_{dp}$ D_{null} [*Bihar-er   raajdhaani*]$_i$ [$_{CL}$ **ta** t_i]] *mone*
       my   Bihar-GEN capital   CL   mind

  por-lo.
  fall-3P.PRES

  'I remembered the capital of Bihar.'

The role of CL is:

(i) map a kind to a property, and

(ii) ensure that there is no individual has proper parts:

(16) $\llbracket \text{ta} \rrbracket = \lambda x^k \lambda w \lambda y^o [^\cup x^k(w)(y^o) \wedge AT(w)(y^o)]$

Recall: examples like 15 are ungrammatical without the CL.

case 1: non-degree nouns

Thus, we get a set of atomic individuals that instantiate the property CAPITAL-OF-BIHAR in some world:

(17) $\lambda w \lambda y[^{\cup}\text{CoB}_w(y) \wedge AT(w)(y)]$

D_{null} simply contributes an iota-operator.[3]

(18) $[\![D_{null}]\!] = \lambda P_{\langle s,et \rangle} \lambda w \iota x[P(x)(w)]$

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[3]This is an intensional version of Dayal (2012)'s operator.

case 1: non-degree nouns

Result:

(19) $[\![[_{dp} \ D_{null} \ [\text{Bihar-er raajdhaani}]_i \ [_{CL} \ \textbf{ta} \ t_i]]]\!] =$

$\lambda w.\iota x[x \text{ is the capital of Bihar in } w]$
$\rightarrow x$ *is the maximal (unique) individual that instantiates the*
property CoB in w

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case 1: non-degree nouns

S

$\forall p[\exists x[p = x \text{ is the CoB in } w] \wedge p(w_0) \rightarrow$
$\forall w' \in Dox_{Liz}(w_0)[x \text{ is the CoB in } w']]$

D
|
Liz

VP

$\lambda z_e \forall p[\exists x[p = x \text{ is the CoB in } w] \wedge p(w_0) \rightarrow$
$\forall w' \in Dox_z(w_0)[x \text{ is the CoB in } w']]$

V
|
know
$\lambda Q_{\langle st,t\rangle} \lambda x_e \forall p[Q(p)(w_0) \rightarrow$
$\forall w' \in Dox_x(w_0)[p(w')]]$

CQ
$\lambda p_{\langle s,t\rangle} \exists x[p = x \text{ is the CoB in } w]$

SHIFT
$\lambda y_{\langle s,e\rangle} \lambda p_{\langle s,t\rangle} \exists x_e[p =$
$\lambda w[y(w) = x]]$

DP
$\lambda w \iota x[x \text{ is the CoB}$
in w]

24 / 39

case 1: non-degree nouns

In a neo-Carlsonian framework, kinds and individual concepts are of the same type ($\langle s, e \rangle$), so what goes wrong without CL?

1. without CL there is no no-proper-parts constraint on what counts as an instance of the kind.
- thus, plural and partial individuals may count as proper instances of some kind.
- this is a wrong prediction:
  - CQs are identity questions about maximal individuals.
  - allowing proper parts to count as legit instances would lead the iota-operator to be undefined.
  - For eg. a bare noun CQ would be predicted to be a good question about plurals or partial individuals: I know the books John likes ($\approx$ the 3 books he likes or paragraphs from books he likes).

case 1: non-degree nouns

In a neo-Carlsonian framework, kinds and individual concepts are of the same type ($\langle s, e \rangle$), so what goes wrong without CL?

2 without CL there is no kind-to-object mapping.

- thus, the CQ would not be about an individual books, but about a kind of books.

- this is the wrong prediction.

case 2: degree nouns

(20) *Ami boi-er   daam jaani.*
      I   book-GEN price know-1P
      'I know the price of the book.'

The main difference between non-degree and degree nouns is that CQ-forming operations may only apply to degree nouns without CL.

We suggest that this is because the lexical semantics of degree nouns is richer and renders superfluous the semantic contribution of CL (hence optionality).

Recall: in examples like 20, the CL is optional.

case 2: degree nouns

Our main assumption: degrees are kinds.[4]

Degrees are nominalized properties. The degree corresponding to *5$* is represented as the individual correlate of the property of costing five dollars:

(21) $^\cap \lambda x \exists k[\mu_\$(x) = 5 \land PART(k)(x)]$

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[4]We follow Scontras' (2017) formulation; others are possible (Rothstein (2013), Anderson and Morzycki 2015, Sudo 2016, a.o.).

case 2: degree nouns

The crucial ingredient is *PART*, a partitioning function internal to the semantics of degrees that determines how a kind is instantiated: it selects maximal instances of the kind in context.

(22)   *PART* is a function of type $\langle k, et \rangle$ such that for any k and any y in $PART(k)$, $^\cup k(y) \wedge AT(y)$[5]

Thus, no book halves/parts cost 5\$ below:

(23) $^\cap \lambda x[\mu_\$(x) = 5 \wedge PART(\text{BOOK})(x)]$

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[5]This is a simplification, the condition should be more stringent than *AT* so that it applies also to mass nouns; e.g. *maximally-self-connected* (Grimm (2012), Lima (2014), Scontras 2017).

case 2: degree nouns

Semantics of degree nouns:[6]

(24) $[\![\text{price}]\!] = \lambda k \lambda d.\ \exists n[d = {}^{\cap}\lambda x[\mu(x) = n \wedge \mathit{PART}(\kappa)(x)]]$

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[6]A version of Scontras (2017)'s semantics for *amount*.

The type of a degree is the same as that of a nominalized property, as seen before.

case 2: degree nouns

Dayal's CL and Scontras' *PART* do the same: they take a kind and return a property with contextually determined granularity restrictions on parthood/atomicity.

(25) a. $\lambda x^k \lambda w \lambda y^o [^\cup x^k(w)(y^o) \wedge AT(w)(y^o)]$

b. *PART* is a function of type $\langle k, et \rangle$ such that for any k and any y in $PART(k)$, $^\cup k(y) \wedge AT(y)$

Adopting these semantics for degree nouns means that the no-proper-parts constraints is observed in the **absence of CL**.

case 2: degree nouns

Next, the rest composes as before, with the null iota:

$[\![[_{dp} \text{ D}_{null} \text{ [boi-er daam]}_i \text{ } [_{CL} \varnothing \text{ } t_i]]]\!] =$
$\lambda w.\iota x[x \text{ is the price of book in } w]$
$\rightarrow x$ *is the maximal (unique) individual that instantiates the*
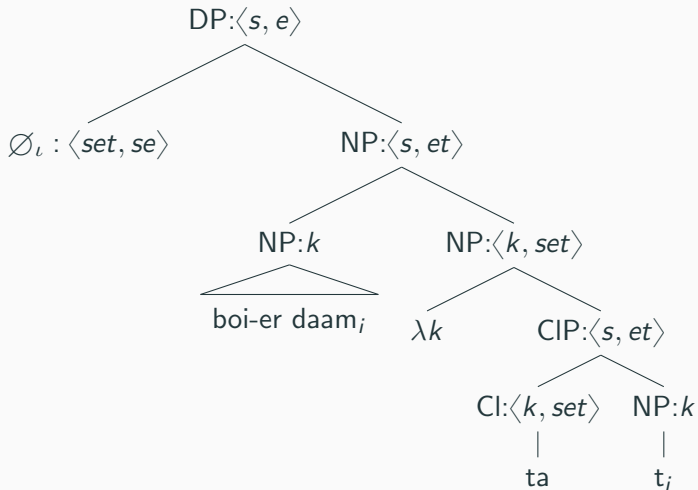*property price-of-book in w*

(26) a. the maximal book-price degree

   b. $\Leftrightarrow {}^{\cap}\lambda x.\mu_{\$} = \mathbf{max} \wedge PART(\text{BOOK})(x)$

case 2: degree nouns

If the CL is overt, it combines with the trace of the moved NP:

(27)

discussion

- One of the main claims in Dayal (2012) is that bare NPs in Bangla cannot get a definite reading.
    - Our findings, based on the degree/non-degree distinctions within intensional nouns, contradict this claim.
    - Bare degree nouns can easily get a definite reading, allowing CQ formation.
    - In addition, we showed that degree nouns do not require a CL and therefore does not require any raising; this is in line with Dayal's findings.

discussion

Relative clauses present some intriguing challenges.

- The CL on the noun is obligatory (irrespective of the degree/non-degree difference).

- Non-degree nouns as CQs are just ungrammatical (even with the CL), while degree nouns are fine.

discussion

(28) a. *Ram ama-ke Sita je   gaan-*(ta) geye-che   sheta
       Ram I-DAT Sita that song-CL   sing-3P.PRES that
         bol-lo.
         tell-3P.PRES
       Intended: 'Ram told me the song that Sita sang.'

    b. Ram amake Sita **kon**   gaan-*(ta) geyeche   sheta
       Ram I-DAT Sita which song-CL   sing-3P.PRES that
         bollo.
         tell-3P.PRES
       'Ram told me which song Sita sang.'

discussion

(29) a. *Ram ama-ke Sita jei   nombor-*(ta) hariye-che*
Ram I-DAT Sita that number-CL   lose-3P.PRES

   sheta bol-lo.
   that tell-3P.PRES

'Ram told me the number Sita has lost.'

b. *Sita sobai-ke or   chele-r   jei   boyesh-*(ta)*
Sita all-DAT her boy-GEN that age-CL

   bole-chilo   sheta bhule ge-che.
   tell-3P.PAST that   forget go-3P.PRES

'Sita has forgotten the age she had told everyone her son was.'

summary & conclusion

- **Problem**: we presented a puzzle from Bangla in which degree nouns form perfect CQs while non-degree nouns obligatorily require a classifier to do so.

- **Solution**: lexical semantics of degree *vs.* non-degree nouns and their interaction with the semantics of CL.

- CQs in a numeral classifier language with number neutral bare NPs revealed a sensitivity to degrees, further fostering **a robust link between kinds and degrees**.

summary & conclusion

- Cross-linguistic take-away: if we are correct, our semantics predicts degree-nouns should make better CQs across the board.
  (they do: cf. English, Hindi, Basque, Spanish, Italian).
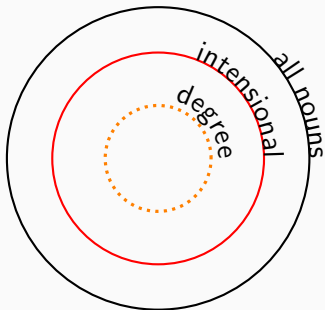
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