Domain Restrictions in Concealed Questions

Diti Bhadra and Jon Ander Mendia
Harvard University and Heinrich-Heine University

January 6th, LSA 2019
what is a concealed question?

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

(1) a. They revealed the winner of the contest. \hspace{1cm} \textbf{CQ}
   b. They revealed who the winner of the contest is.

(2) a. Mary knows the capital of Italy. \hspace{1cm} \textbf{CQ}
   b. Mary knows what the capital of Italy is.

(3) a. John remembers the exact amount of his debt. \hspace{1cm} \textbf{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.

---

Bengali

source: wikipedia/bengali language
Bangla\textsuperscript{1} shows intriguing restrictions in forming CQs: most bare nouns cannot form CQs.

(4) a. *Ami protijogita-r \textit{bijoyi} \textit{jaan-i}.
   I contest-GEN winner know-1P
   Intended: ‘I know the winner of the contest.’

b. *Amar Bihar-er \textit{raajdhaani} \textit{mone por-lo}.
   my Bihar-GEN capital mind fall-3P.PRES
   Intended: ‘I remembered the capital of Bihar.’

c. *Ora murti-r \textit{obosthaan} \textit{ghoshona} \textit{kor-lo}.
   they statue-GEN location announcement do-3P.PRES
   Intended: ‘They revealed the location of the statue.’

\textsuperscript{1}Also known as Bengali (Indo-Aryan, India; SOV).
(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.’
(6) a. Ami protijogitar bijoiy ke jaan-i.  
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 oboostaan-ta ghoshona  
they statue-GEN location-CL announcement  
kor-lo.  
do-3P.PRES  
‘They announced/revealed the location of the statue.’
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.

\(^2\)Functions from worlds to individuals: \(\langle s, e \rangle\)
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.’
(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.’
Bare degree nouns form good CQs in Bangla.

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

<table>
<thead>
<tr>
<th></th>
<th>CL</th>
<th>No CL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree nouns</td>
<td>optional</td>
<td>✓</td>
</tr>
<tr>
<td>Non-degree nouns</td>
<td>obligatory</td>
<td>*</td>
</tr>
</tbody>
</table>
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

__________________________
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.
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
centers around:

- the degree/non-degree distinction
- the contribution of the classifier
- DP intension → CQ
Intensional nouns originate as individual concepts: functions from worlds to individuals.

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

$\llbracket$capital of Bihar$\rrbracket =$

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

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

(10) $\llbracket se \rrbracket \rightarrow \llbracket st, t \rrbracket$

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

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

-ṭa/ṭe  general classifier for count nouns
-ǰon  classifier restricted to humans
-kʰana classifier restricted to inanimate count nouns
-ṝa number-neutral classifier restricted to animate nouns
-gulo plural classifier applicable to all count and mass nouns
-kʰani classifier restricted to mass nouns

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) \textit{gari ta} \\
    car \quad \text{CL} \quad \text{NP has been raised!} \\
    ‘The car’

(12) \textit{*ta gari} \\
    CL \quad \text{car} \quad \text{CL} \quad \text{‘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) \textit{ek-ta gari} \\
    one-CL \quad \text{car} \\
    ‘One car’

(14) \textit{*gari ek-ta} \\
    car \quad \text{one-CL} \\
    Intended: ‘One car’

\hline
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: \( \text{pred} + \iota \)

Dayal’s definite reading:
\[
[DP \ [NP \ \text{DOG}] \ \emptyset \ [CL-P \ \text{CL} \ t_i]]
\]
case 1: non-degree nouns

(15) \[\text{Amar} \quad [_{\text{dp}} D_{\text{null}} \quad [\text{Bihar-er} \quad \text{raajdhaani}]_{\text{i}}; \quad [_{\text{CL}} \text{ta} \quad t_i]] \quad \text{mone}\]

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) \[\langle \text{ta} \rangle = \lambda x^k \lambda w \lambda y^o[\cup x^k(w)(y^o) \land AT(w)(y^o)]\]

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:

\[
\lambda w \lambda y [\bigcup \text{CoB}_w (y) \land AT (w)(y)]
\]

\(D_{null}\) simply contributes an iota-operator.\(^3\)

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

\(^3\)This is an intensional version of Dayal (2012)’s operator.
case 1: non-degree nouns

Result:

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


\[ S \]

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

```

D
| VP
  | Liz
  | x is the CoB in w]
  | p(w_0) \rightarrow
  | \forall w' \in Dox_z(w_0)[x is the CoB in w']]
  | λz_\forall p[∃x[p = x is the CoB in w] ∧ p(w_0) \rightarrow
  | \forall w' \in Dox_z(w_0)[x is the CoB in w']]]
```

```

V
| CQ
  | know
  | λp_∃x[p = x is the CoB in w]
  | \forall w' \in Dox x(w_0)[p(w')]]
  | λQ_{s,t}λx_\forall p[Q(p)(w_0) \rightarrow
  | \forall w' \in Dox x(w_0)[p(w')]]]
```

```

SHIFT
| DP
  | λy_{s,e}λp_{s,t}∃x[p = λw_\forall x[x \text{ is the CoB in } w]]
  | λw[y(w) = x]]
```

```
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.
2. Thus, plural and partial individuals may count as proper instances of some kind.
3. 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).
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**.
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:

$$(21) \quad \circ \lambda x \exists k [\mu_5(x) = 5 \land PART(k)(x)]$$

⁴We 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 $PART(k)$, $\cup k(y) \land AT(y)$.

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

(23) $\lambdax[\mu(x) = 5 \land PART(BOOK)(x)]$

---

5This 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:\(^{6}\)

\[
(24) \quad \text{[price]} = \lambda k \lambda d. \exists n[d = \bigcap x [\mu(x) = n \land PART(K)(x)]]
\]

\(^{6}\)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’ \textit{PART} do the same: they take a kind and return a property with contextually determined granularity restrictions on parthood/atomicity.

(25) a. $\lambda x^k \lambda w \lambda y^o \left[ \sqcup x^k(w)(y^o) \land AT(w)(y^o) \right]$

b. \textit{PART} is a function of type $\langle k, et \rangle$ such that for any $k$ and any $y$ in $\textit{PART}(k)$, $\sqcup k(y) \land AT(y)$

Adopting these semantics for degree nouns means that the no-proper-parts constraints is observed in the \textit{absence of CL}.
Next, the rest composes as before, with the null iota:

\[
[[dp \ D_{null} [boi-er daam]_i [CL \ \emptyset \ t_i]]] = \\
\lambda w.\iota x[x \text{ is the price of book in } w]
\]

→ \text{ \textit{x is the maximal (unique) individual that instantiates the}}
\textit{property price-of-book in } w

(26) a. the maximal book-price degree

\[\Leftrightarrow \ \wedge \lambda x.\mu$ = \text{\textbf{max}} \wedge PART(BOOK)(x)\]
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.
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.
   Ram I-DAT Sita that song-CL sing-3P.PRES that tell-3P.PRES
   Intended: ‘Ram told me the song that Sita sang.’

b. Ram amake Sita kon gaan-* (ta) geyeche sheta bollo.
   Ram I-DAT Sita which song-CL sing-3P.PRES that tell-3P.PRES
   ‘Ram told me which song Sita sang.’
(29) a.  *Ram ama-ke Sita jei nombor-*(ta) hariye-che*

Ram 1-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.
• 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).
References
Aloni, M. Concealed questions under cover. *Grazer Philosophische Studien*.


Harris, J. A. (2007). Revealing concealmenr—a (neuro-)logical investigation of concealed questions.


