Epistemic Specificity: An Example of, and a Guide towards, a Communication-based Theory of Linguistic Meaning

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Plan

1. Indefinites.
2. Notions of Specificity.
3. Representing and Attributing Attitudes.
4. Analysis: Specific Use and Specific Interpretation.
5. Architectural Issues; Conclusion.
What are Indefinites?

- Two characterizations:
  - Indefinites are devices of existential quantification.
    Mary’s husband is seeing a real estate agent.
    Logical form in Predicate Logic:
    \[(\exists x)(\text{real} - \text{estate} - \text{agent}(x) \& \text{see}(\text{husb}(m), x))\]
  - Indefinites signal to the recipient that he is not expected to be able to identify who or what they are talking about.
What kinds of (uses of) Indefinites are there?

- Specific
- Non-Specific, Non-Incorporating
- Incorporating
Notions of Specificity

Epistemic specificity: The speaker has a particular individual in mind.

(1)  (You see smoke rings rising behind the woodshed.)
    There is a student of mine smoking behind the woodshed.
Notions of Specificity

Scopal specificity: roughly, the ability to ‘escape’ scope islands.

(2) Every colleague of mine heard the rumour that a student of mine had been called before the dean.

(Fodor and Sag (1982))
Notions of Specificity

Partitive specificity (the indefinite denotes an arbitrary member of a familiar set, Enç (1991)):

(3)  a. John found \textit{two of the missing students}

b. János megtalált \textit{két eltévedt diákot}

\hspace{1cm} \text{John MEG-found two away-lost PART student-ACC}

\hspace{1cm} \text{‘John found two of the lost students’}

\hspace{1cm} \text{(Perrot (1966), Kiefer (1983), É.Kiss, Kálmán)
Epistemic Specificity and *De Re* Belief

(4) Mary:
My husband is seeing a real estate agent.

(5) Bernhard:
Mary believes that her husband is seeing a real estate agent.
Epistemic Specificity and *De Re* Belief

(4) Mary:

My husband is seeing a real estate agent.

**Specific:**

The speaker Mary knows who this real estate agent is.
(She has some kind of mental representation of this particular real estate agent.)

**Non-specific:**

Mary does not know who the real estate agent is.
Epistemic Specificity and *De Re* Belief

(5) Bernhard:

Mary believes that her husband is seeing a real estate agent.

*De Re*: There is some real estate agent of which Mary believes that Mary’s husband is seeing her.

*De Dicto*: Mary believes that her husband is seeing some real estate agent or other, but that is all she knows about who this person is.

Note well: The *de re* interpretation of (5) can be either specific or non-specific.
Scopal Specificity

(6) a. Three colleagues contributed exam questions that every student of mine/no student of mine/most students of mine answered.

b. Three colleagues contributed exam questions that a student of mine answered.

(7) Every linguist has looked at all solutions that have been proposed in the literature for some linguistic problem.

(Farkas (1981), Abusch (1994), Chierchia (2002),...
Partitive Specificity

(8) One/some/three of the girls

(9) A small crowd had gathered in front of the church. *Two women* were crying.

- Partitive indefinites can be either epistemically specific or epistemically non-specific.

(10) One of the children has/must have left. But we do not know which one it is.

(11) One of the children has left. I sent her home.
Partitive Specificity: Hungarian

The Specificity Effect:

(12)  

\[ \text{a. János megtalált } két \text{ eltévedt } \text{ diákot} \]

John MEG-found two away-lost-PART student-ACC

‘John found two of the students who had lost their way’

\[ \text{b. Attila megírt } két \text{ verset} \]

Attila MEG-wrote two poem-ACC

‘Attila wrote two of the poems he had in mind/he had a contract for...’
Partitive Specificity

Partitivity is orthogonal to scopal specificity:

(13) The results indicate that for every exam one of the students must have got hold of the questions beforehand and passed them on to the others.
Indefinites in Dynamic Semantics

(14)  a. If Bill owns a donkey, then he beats it.
b. Bill owns a donkey. He beats it.
c. Bill owns a donkey which he beats.
d. Bill owns a donkey. (In fact,) he owns a donkey which he beats.

(15)  a. $(\exists y)(\text{donkey}(y) \land \text{own}(b, y) \land \text{beat}(b, y))$
b. $\text{own}(b, d) \land \text{beat}(b, d)$

(16)  a. There is a donkey Bill owns. He beats it.
b. There is a doctor in London. He is Welsh. (Evans (1980))
The two Sides of Epistemic Specificity

• An indefinite $\alpha$ is *used specifically* by a speaker $A$ iff $A$ uses $\alpha$ to speak about an entity $d$ for which she has an identifying representation (a so-called *Entity Representation*).

• An indefinite $\alpha$ is *taken as specifically used* by an interpreter $B$ iff $B$ assumes that the speaker $A$ has used $\alpha$ specifically and interprets $\alpha$ accordingly (by forming a *vicariously anchored Entity Representation* for the entity $d$ that $A$ is talking about by using $\alpha$).
MSDRT

- For a formal analysis of the two sides of epistemic specificity we need a formal framework.

The framework we use is MSDRT (for ‘Mental State DRT’).

- MSDRT is an extension of DRT (‘Discourse representation Theory’).

- MSDRT assumes that mental states can be represented as sets of referentially connected propositional attitudes and entity representations.

- MSDRT makes use of the semantic representations of DRT (its DRSs) to represent the contents of the propositional attitudes and entity representations in those sets.
MSDRT representation of connected Belief, Desire and Intention

\[ \langle \text{BEL}, x s_1 s_2 \rangle \]
\[ n \subseteq s_1 \quad n \subseteq s_2 \]
\[ s_1: \text{gold coin}(x) \]
\[ s_2: x \text{ be lying in front of } i \]

\[ \langle \text{DES}, s_3 \rangle \]
\[ n \subseteq s_3 \]
\[ s_3: i \text{ have } x \]

\[ \langle \text{INT}, t_4 e \rangle \]
\[ n < t_4 \quad e \subseteq t_4 \]
\[ e: i \text{ pick up } x \]
Singular Thought; Anchored Representations

(18) \( \langle [\text{ANCH}, x], K \rangle \)

(19) \( \langle [\text{ANCH}, x], \begin{array}{l}
\quad x \quad s \quad s' \quad s'' \\
\quad n \subseteq s \quad s: \text{i see } x \\
\quad n \subseteq s' \quad s': \text{coin}(x) \\
\quad n \subseteq s'' \\
\quad s'': 1.5cm < \text{diameter}(x) < 2.5cm
\end{array} \rangle \)
\[ \langle [ANCH, x], \begin{array}{l}
{x \ s_1 \ s_2} \\
{\ n \subseteq s_1 \quad n \subseteq s_2} \\
{s_1: \ i \ see \ x} \\
{s_2: \ x \ be \ lying \ ifo \ i}
\end{array} \rangle \]

\[ \langle \ B E L \ , \ s_3 \rangle \]

\[ s_3: \ \text{gold \ coin}(x) \]

\[ \langle \ D E S \ , \ s_4 \rangle \]

\[ s_4: \ i \ have \ x \]

\[ \langle \ I N T \ , \ t_5 \ e \rangle \]

\[ n < t_5 \quad e \subseteq t_5 \]

\[ e: \ i \ pick \ up \ x \]
\( \langle \text{BEL,} \rangle \)

\[ x \in s_1 \ \subseteq s_2 \\
 n \subseteq s_1 \ \subseteq s_2 \\
 s_1: \ i \ see \ x \\
 s_2: \ x \ be \ lying \ ifo \ i \]

\( \langle \text{BEL,} \rangle \)

\[ s_3 \]

\[ s_3: \ gold \ coin(x) \]

\( \langle \text{DES,} \rangle \)

\[ s_4 \]

\[ n \subseteq s_4 \]

\[ s_4: \ i \ have \ x \]

\( \langle \text{INT,} \rangle \)

\[ t_5 \ e \]

\[ n < t_5 \ e \subseteq t_5 \]

\[ e: \ i \ pick \ up \ x \]
Representing Attitude Reports

- MSDRT can also be used to represent the semantics of *attitude reports.*

  Representations of attitude reports make use of the predicate *Att.*

- The Predicate *Att* occurs in predications of the following form:

  \[(22) \quad s: \text{Att}(\xi, K, EA), \text{ where} \]
  \[(i) \quad \xi \text{ is a discourse referent (representing the attributee);} \]
  \[(ii) \quad K \text{ is a structure of the kind exemplified by (17) and (20);} \]
  \[(iii) \quad EA \text{ is a set of external anchors for Entity Representations in } K.\]

(23) Rachel thought a gold coin was lying in the middle of the road. She wanted to have it and intended to go and pick it up.
(24)

\[
\begin{align*}
&\quad t_0 < n \quad t_0 \subseteq s_0 \quad \text{Rachel}(r) \\
&\quad \langle [\text{ANCH}, x], \quad \begin{cases}
  x \subseteq s_1 \\
  n \subseteq s_1 \\
  n \subseteq s_2 \\
  s_1 : \ i \ see \ x \\
  s_2 : \ x \ be \ lying \ ifo \ i
\end{cases} \rangle \\
&\quad \langle \text{BEL}, \quad n \subseteq s_3 \quad s_3 : \ \text{gold coin}(x) \rangle \\
&\quad \langle \text{DES}, \quad n \subseteq s_4 \quad s_4 : \ i \ have \ x \rangle \\
&\quad \langle \text{INT}, \quad t_5 \ e \quad n < t_5 \quad e \subseteq t_5 \quad e : \ i \ pick \ up \ x \rangle \\
\end{align*}
\]
Representing Attitude Reports

(5) Bernhard:

“Mary believes that her husband is seeing a real estate agent.”

\[
\begin{align*}
\text{(25) } & s_0: \text{Att}(m, \left\langle \text{BEL,} \begin{array}{c} 
  x \hspace{5pt} s_1 \hspace{5pt} s_2 \\
  n \subseteq s_1 \hspace{5pt} n \subseteq s_2 \\
  s_1: \text{rea}(x) \\
  s_2: \text{see}(\text{husb}(i), x)
\end{array} \right\rangle), \emptyset
\end{align*}
\]
\[ (26) \]
\[
\begin{align*}
 & s_0 \quad s_1 \quad m \quad x' \\
 & n \subseteq s_0 \quad n \subseteq s_1 \quad Mary(m) \quad s_1: \text{rea}(x') \\
 & s_0: \text{Att}(m, \{ \langle \text{ANCH}, x \rangle, \langle \text{BEL}, s_2 \rangle \}) \\
 & \quad \quad \quad \langle [\text{ANCH}, x], x \rangle \\
 & \quad \quad \quad \langle \text{BEL}, n \subseteq s_2 \rangle \\
 & \quad \quad \quad \quad s_2: \text{see}(\text{husb}(i), x) \\
 & \quad \quad \quad , \{ \langle x, x' \rangle \} 
\end{align*}
\]
(27)

$$\langle \text{BEL}, s_0 : \text{Att}(m, \{ \langle \text{BEL}, n \subseteq s_0 \text{ Mary}(m) \rangle, \emptyset \rangle \} \{ \langle x, s_1, s_2 \rangle \text{ s}_1 : \text{rea}(x) \text{ s}_2 : \text{see}(\text{husb}(i), x) \} \rangle \} \}$$
\[
\begin{aligned}
&\langle \text{BEL}, n \subseteq s_0 \rangle, \{\langle x, x' \rangle\} \\
&\langle \text{BEL}, s_0 : \text{Att}(m) \rangle, \{\langle x, x' \rangle\} \\
&\langle [\text{ANCH}, x], x \rangle, \{\langle x, x' \rangle\} \\
&\langle \text{BEL}, s_0 \subseteq s_1, \text{Mary}(m) \rangle, s_1 : \text{rea}(x') \\
&\langle s_0, s_1 \rangle, m, x' \\
&n \subseteq s_0 \quad n \subseteq s_1 \quad \text{Mary}(m) \quad s_1 : \text{rea}(x') \\
&n \subseteq s_2 \quad s_2 : \text{see}(\text{hb}(i), x) \\
\end{aligned}
\]
\[ \langle \text{ANCH}, x' \rangle \]

\[ \langle \text{BEL}, \text{real est.ag.}(x') \rangle \]

\[ \langle \text{BEL}, \{n \subseteq s_0, n \subseteq s_1, \text{Mary}(m), s_1 : \text{rea}(x')\} \rangle \]

\[ \langle \text{BEL}, \text{Att}(m, \{x\}) \rangle \]

\[ \langle \text{BEL}, \{n \subseteq s_2, s_2 : \text{see}(hb(i), x)\} \rangle \]
(29) Last night I got a call from my old friend Andrea Alfieri.

(30) A student was looking for you this morning.

Next slide:

The relevant part of the attitudinal state of an interpreter $B$ who takes the speaker $A$ to have used the NP *a student* specifically.
\[ \langle [\text{ANCH}, a], n \subseteq s, s: \text{speaker}(a) \rangle \]

\[ \langle [\text{ANCH}, x], x s_0, n \subseteq s_0 \rangle \]

\[ s_0: \text{Att}(a, \{ \langle [\text{ANCH}, x_a], x_a \rangle \}), \{ \langle x_a, x \rangle \} \]
(31) (Doxastic reduction of $B$’s representation)

\[ \langle \text{BEL,} \begin{array}{c}
  a \ x \ s \ s_0 \ e \ s_1 \ t \\
  s: \text{speaker}(a) \ n \subseteq s \ n \subseteq s_0 \\
  s_0: \text{Att}(a, \{\langle \text{ANCH}, x_a \rangle, \{x_a, x\}\})
  \\
  t < n \ n \subseteq s_1 \ t \subseteq \text{morning}[\text{day}[n]] \ e \subseteq t \\
  s_1: \text{student}(x) \\
  e: \text{be-looking-for}(x, i)
\end{array} \rangle \]
A user-neutral representation of “A student was looking for you this morning.” (constructed according to the construction rules of DRT):

\[
\begin{align*}
&x \ s_1 \ e \ b \ t \\
&t < n \ n \subseteq s_1 \ t \subseteq morning[day[n]] \ e \subseteq t \\
&s_1: \ student(x) \\
&e: \ be-looking-for(x, i)
\end{align*}
\]

The belief that this content is true, represented in (33), is entailed by the belief in (31).

\[
\begin{align*}
\langle \ BEL, \ x \ s_1 \ e \ t \\
&t < n \ n \subseteq s_1 \ t \subseteq morning[day[n]] \ e \subseteq t \\
&s_1: \ student(x) \\
&e: \ be-looking-for(x, i)
\end{align*}
\]
Moral: the Need for a Communication-theoretic Framework

Our proposal points towards the need for a communication-theoretic framework to deal with certain aspects of utterance interpretation.

Question 1: Can the theory of meaning be cast entirely in such communication-theoretic terms?

Question 2: Should the theory of meaning be cast entirely in such communication-theoretic terms?
(34) There was a student who was looking for you this morning.

Observation: the variable/discourse referent introduced by the complement of *there is* serves as binder to the *there be* operator. (Milsark (1977), Rullmann (1989))

So binding by an anchored entity representation will be possible only as *rebinding* at a ‘post-semantic’, pragmatic level of discourse processing.
Semantics/Pragmatics 2: Romanian DOM

Many languages have ways of marking indefinites overtly as specific.

An example is Romanian *pe*. (35): Indefinites with or without *pe*, and verbs of result (Moltmann (1997)).

(35)  

a. Ion a angajat-o *pe* Lucia.  
Ion perf-3sg hired-ACC.3SG.FEM PE Lucia.  
“Ion has hired Lucia.”

b. Ion a angajat-o secretară.  
Ion perf-3sg hired o a(FEM) secretary-FEM  
“Ion has hired a secretary.”  
(= he has hired someone in the capacity of secretary.)

c. Ion a angajat-o *pe* o secretară.  
Ion perf-3sg hired-ACC.3SG.FEM PE a(FEM) secretary-FEM  
“Ion has hired someone who was a secretary.”  
(= he has hired someone who was a secretary in some capacity or other)
Semantics/Pragmatics 2: Romanian

(36) a. Ion iubește un agent imobiliar.
Ion loves a(MASC) agent(MASC) estate(ADJ)
“Ion loves a real estate agent.”
(The speaker doesn’t have any particular real estate agent in mind.)
b. Ion iubește pe un agent imobiliar.
Ion loves PE (aMASC) agent(MASC) estate(ADJ)
“Ion loves a real estate agent.”
(There is some particular real estate agent that Ion loves.)
(37)  a.  A: Știi, Ion a văzut pe o vrăjitoare.  
   A: Know-2SG, Ion perf-3SG seen PE a-FEM witch-FEM  
   “You know, John has seen a (certain) witch”

   b.  B: Ion nu a văzut pe o vrăjitoare. Vrăjitoare  
   B: Ion not perf-3SG seen PE a-FEM witch-FEM Witch-PL.FEM  
   nu există!  
   not exist-3PL!  
   “John hasn’t seen a (certain) witch. Witches do not exist!”
(38)  

a. Q. (L-)Ai văzut pe un profesor?  
   Q. (ACC.3SG.MASC-)perf-2SG seen PE a-MASC professor-MASC  
   “Have you seen a certain professor?”

b. A₁. Nu l-am văzut, este plecat în concediu  
   A₁. Not ACC.3SG.MASC-perf-1SG seen, is left in holiday.  
   “I haven’t seen him, he’s on holiday.”

c. A₂. Pe el nu l-am văzut,  
   A₂. PE he not ACC.3SG.MASC-perf-1SG seen,  
   l-am văzut însă pe ACC.3SG.MASC-perf-1SG seen though PE  
   profesorul lui Petre  
   professor-DFTART.MASC.SG GEN-MASC Peter  
   “I haven’t seen him, but I have seen Peter’s professor”
(39) a. Am văzut profesor-ul/L-am văzut pe profesor
perf-1SG seen
professor-DFTART.MASC.SG/ACC.MASC.SG-perf-1SG seen PE
professor
With article: “I have seen the unique salient professor”
With pe: “I have seen the professor we talked about”

b. I-am văzut *(pe) toți
ACC.MASC.PL-perf-1SG seen PE all-PL.MASC
“I have seen them all” (all from a familiar group)

c. Am cumpărat rochia roșie și *(pe) cea albă
perf-1SG bought dress-FEM red-FEM and *(PE) that-SG.FEM
white-FEM
“I have bought the red dress and the white one”
(40) $B$: Have you seen a student who was looking for me?

It is possible to take this question either as about any of $B$’s students or about some specific student of $B$.

But there is a difference with Romanian questions with *pe*.

In English (41)a is fully felicitous, (41)b is marked.

(41) a. $A$: John just left, if it is him you mean?
    b. $A$: Yes, but he just left?
Epistemic Specificity: Semantics or Pragmatics?

A general question:

When specificity is overtly marked, it seems natural to assume that specificity interpretation is part of the semantics.

When specificity is not overtly marked, specificity interpretation seems more natural at a pragmatic level.

And in some cases (e.g. *there*-insertion contexts) this seems to be necessary.
THANK YOU!


Perrot, J.: 1966, Adalékok a *meg* ige kőtő funckiójának vizsgálatához a mai magyar nyelvben. [Addenda to the Study of the Prefix *meg* in Contemporary Hungarian; in Hungarian], *Nyelvtudományi Értekezések* 52.


NSF Grant Report on Quantification, UMass Amherst.