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 Atittudes.

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:

  $(\exists x)(real - estate - agent(x) \ \& \ see(husb(m), x))$

- 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

Specificity distinctions: Farkas (1996).
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 *two of the missing students*

b.   János megtalált   *két eltévedt   diákot*
     John MEG-found two away-lost-PART student-ACC
     'John found two of the lost students'
           (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.

<u>*De Re*</u>: There is some real estate agent of which Mary believes that Mary's husband is seeing her.

<u>*De Dicto*</u>: 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.

(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)   a.   János megtalált   *két eltévedt*   *diákot*
            John MEG-found two away-lost-PART student-ACC
            'John found two of the students who had lost their way'

        b.   Attila megírt   *két 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. $(\exists y)(donkey(y)$ & $own(b, y)$ & $beat(b, y))$
       b. $own(b, d)$ & $beat(b, d)$

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

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

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

(17)

$$\left\{ \begin{array}{l} \left\langle BEL, \boxed{\begin{array}{c} x \; s_1 \; s_2 \\[4pt] n \subseteq s_1 \quad n \subseteq s_2 \\ s_1 \colon gold \; coin(x) \\ s_2 \colon x \; be \; lying \; in \; front \; of \; i \end{array}} \right\rangle \\[40pt] \left\langle DES, \boxed{\begin{array}{c} s_3 \\[4pt] n \subseteq s_3 \\ s_3 \colon i \; have \; x \end{array}} \right\rangle \\[40pt] \left\langle INT, \boxed{\begin{array}{c} t_4 \; e \\[4pt] n < t_4 \quad e \subseteq t_4 \\ e \colon i \; pick \; up \; x \end{array}} \right\rangle \end{array} \right\}$$

Singular Thought; Anchored Representations

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

(19)　　$\left\langle\ [ANCH, x]\ ,\ \boxed{\begin{array}{c} x\ s\ s'\ s'' \\[4pt] n \subseteq s \quad s: i\ see\ x \\ n \subseteq s' \quad s': coin(x) \\ n \subseteq s'' \\ s'': 1.5cm < diameter(x) < 2.5cm \end{array}}\ \right\rangle$

(20)

$$
\left\{
\begin{array}{l}
\left\langle [ANCH, x], \begin{array}{|c|}
\hline
x \ s_1 \ s_2 \\
n \subseteq s_1 \quad n \subseteq s_2 \\
s_1 : \ i \ see \ x \\
s_2 : \ x \ be \ lying \ ifo \ i \\
\hline
\end{array} \right\rangle \\[6mm]
\left\langle BEL, \begin{array}{|c|}
\hline
s_3 \\
s_3 : \ gold \ coin(x) \\
\hline
\end{array} \right\rangle \\[6mm]
\left\langle DES, \begin{array}{|c|}
\hline
s_4 \\
n \subseteq s_4 \\
s_4 : \ i \ have \ x \\
\hline
\end{array} \right\rangle \\[6mm]
\left\langle INT, \begin{array}{|c|}
\hline
t_5 \ e \\
n < t_5 \ e \subseteq t_5 \\
e : \ i \ pick \ up \ x \\
\hline
\end{array} \right\rangle
\end{array}
\right\}
$$

(21)

$$\left\{
\begin{array}{l}
\left\langle BEL, \begin{array}{|c|}
\hline
x \ s_1 \ s_2 \\[4pt]
n \subseteq s_1 \quad n \subseteq s_2 \\
s_1: \ i \ see \ x \\
s_2: \ x \ be \ lying \ ifo \ i \\
\hline
\end{array} \right\rangle \\[30pt]

\left\langle BEL, \begin{array}{|c|}
\hline
s_3 \\[4pt]
s_3: \ gold \ coin(x) \\
\hline
\end{array} \right\rangle \\[24pt]

\left\langle DES, \begin{array}{|c|}
\hline
s_4 \\[4pt]
n \subseteq s_4 \\
s_4: \ i \ have \ x \\
\hline
\end{array} \right\rangle \\[28pt]

\left\langle INT, \begin{array}{|c|}
\hline
t_5 \ e \\[4pt]
n < t_5 \ e \subseteq t_5 \\
e: \ i \ pick \ up \ x \\
\hline
\end{array} \right\rangle
\end{array}
\right\}$$
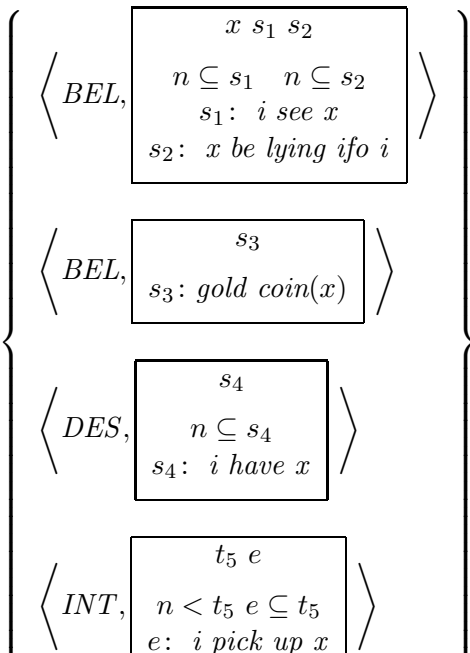
Representing Attitude Reports

- 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) $s\colon Att(\xi, K, EA)$, where
  - (i) ξ is a discourse referent (representing the attributee);
  - (ii) K is a structure of the kind exemplified by (17) and (20);
  - (iii) EA 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)

$$s_0 : Att\left(r, \left\{ \begin{array}{l} \left\langle [ANCH, x], \begin{array}{|c|} \hline x \quad s_1 \quad s_2 \\ n \subseteq s_1 \quad n \subseteq s_2 \\ \hline s_1 : \ i \ see \ x \\ s_2 : \ x \ be \ lying \ ifo \ i \\ \hline \end{array} \right\rangle \\[3em] \left\langle BEL, \begin{array}{|c|} \hline s_3 \\ n \subseteq s_3 \\ \hline s_3 : \ gold \ \ coin(x) \\ \hline \end{array} \right\rangle \\[2em] \left\langle DES, \begin{array}{|c|} \hline s_4 \\ n \subseteq s_4 \\ \hline s_4 : \ i \ have \ x \\ \hline \end{array} \right\rangle \\[2em] \left\langle INT, \begin{array}{|c|} \hline t_5 \ e \\ n < t_5 \quad e \subseteq t_5 \\ \hline e : \ i \ pick \ up \ x \\ \hline \end{array} \right\rangle \end{array} \right\}, \{\langle x, x' \rangle\} \right)$$

with outer box header:

$$\begin{array}{|l|} \hline t_0 \quad s_0 \quad \quad r \quad \quad x' \\ t_0 < n \quad t_0 \subseteq s_0 \quad Rachel(r) \\ \hline \end{array}$$

Representing Attitude Reports

(5) Bernhard:

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

(25)

$$
\boxed{
\begin{array}{c}
s_0 \quad m \\[4pt]
n \subseteq s_0 \quad Mary(m) \\[10pt]
s_0 \colon Att\Big(m, \left\{ \left\langle BEL, \boxed{
\begin{array}{c}
x \; s_1 \; s_2 \\[4pt]
n \subseteq s_1 \quad n \subseteq s_2 \\
s_1 \colon rea(x) \\
s_2 \colon see(husb(i), x)
\end{array}
} \right\rangle \right\}, \emptyset \Big)
\end{array}
}
$$

$$(26) \quad \boxed{\begin{array}{c} s_0 \quad s_1 \quad m \quad x' \\[4pt] n \subseteq s_0 \quad n \subseteq s_1 \quad Mary(m) \quad s_1\colon rea(x') \\[8pt] s_0\colon Att\Big(m, \left\{ \begin{array}{c} \left\langle [ANCH,x]\,, \boxed{\begin{array}{c} x \\ \\ \end{array}} \right\rangle \\[18pt] \left\langle BEL, \boxed{\begin{array}{c} s_2 \\ n \subseteq s_2 \\ s_2\colon see(husb(i),x) \end{array}} \right\rangle \end{array} \right\}, \{\langle x, x'\rangle\} \Big) \end{array}}$$
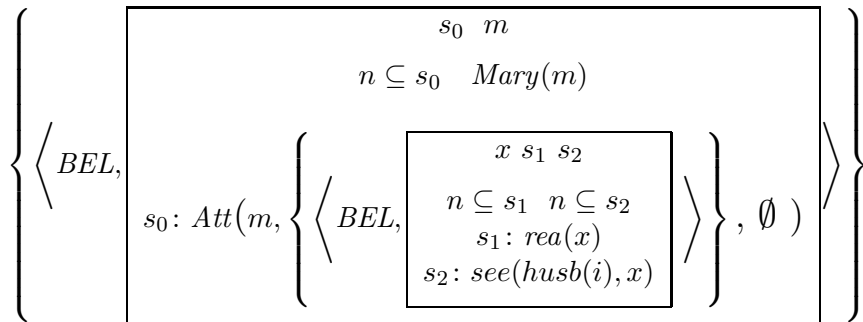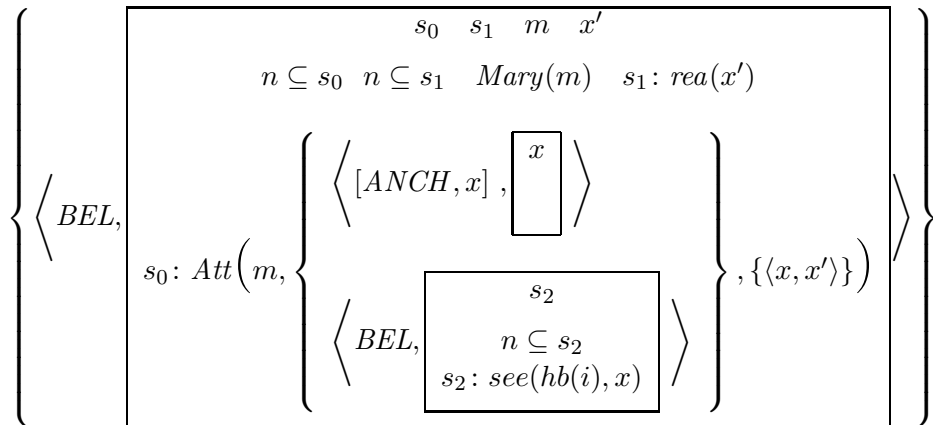
(27)

$$\left\{ \left\langle BEL, \begin{array}{|c|} \hline \begin{array}{cc} s_0 & m \end{array} \\ n \subseteq s_0 \quad Mary(m) \\[4pt] s_0 \colon Att\Big(m, \left\{ \left\langle BEL, \begin{array}{|c|} \hline \begin{array}{ccc} x & s_1 & s_2 \end{array} \\ n \subseteq s_1 \quad n \subseteq s_2 \\ s_1 \colon rea(x) \\ s_2 \colon see(husb(i), x) \\ \hline \end{array} \right\rangle \right\}, \; \emptyset \; \Big) \\ \hline \end{array} \right\rangle \right\}$$

(28)

$$\left\{ \left\langle BEL, \begin{array}{c} s_0 \quad s_1 \quad m \quad x' \\ n \subseteq s_0 \quad n \subseteq s_1 \quad Mary(m) \quad s_1 \colon rea(x') \\ s_0 \colon Att\Big(m, \left\{ \begin{array}{c} \left\langle [ANCH, x], \boxed{\begin{array}{c} x \\ \end{array}} \right\rangle \\ \\ \left\langle BEL, \boxed{\begin{array}{c} s_2 \\ n \subseteq s_2 \\ s_2 \colon see(hb(i), x) \end{array}} \right\rangle \end{array} \right\}, \{\langle x, x' \rangle\} \Big) \end{array} \right\rangle \right\}$$

$$\left\{\begin{array}{l} \left\langle [ANCH, x'], \boxed{\begin{array}{c} x' \\ \\ \end{array}} \right\rangle \\[3em] \left\langle BEL, \boxed{\begin{array}{c} \\ real\ est.ag.(x') \\ \end{array}} \right\rangle \\[3em] \left\langle BEL, \boxed{\begin{array}{c} s_0 \quad s_1 \quad m \quad x' \\ n \subseteq s_0 \ \ n \subseteq s_1 \quad Mary(m) \quad s_1 : rea(x') \\ s_0 : Att\Big(m, \left\{\begin{array}{l} \left\langle [ANCH, x], \boxed{\begin{array}{c} x \\ \\ \end{array}} \right\rangle \\[2em] \left\langle BEL, \boxed{\begin{array}{c} s_2 \\ n \subseteq s_2 \\ s_2 : see(hb(i), x) \end{array}} \right\rangle \end{array}\right\}, \{\langle x, x' \rangle\}\Big) \end{array}} \right\rangle \end{array}\right\}$$

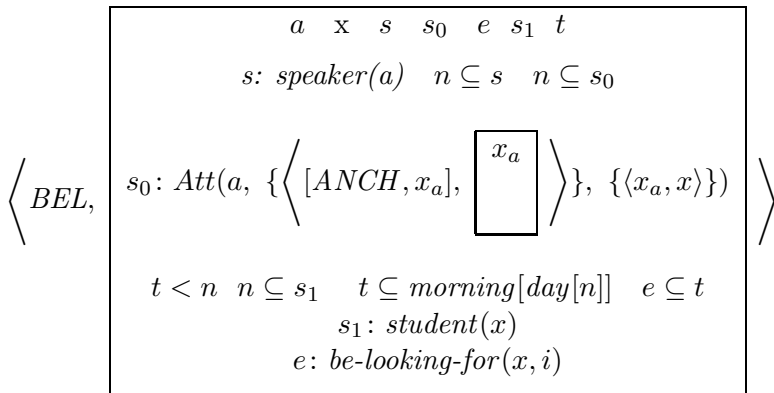(29)   Last night I got a call from my old friend Andrea Alfieri.

(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.

$$
\left\{
\begin{array}{c}
\left\langle [ANCH, a], \begin{array}{|c|} \hline a \quad s \\ n \subseteq s \\ s\colon speaker(a) \\ \hline \end{array} \right\rangle \\[3em]
\left\langle [ANCH, x], \begin{array}{|c|} \hline x \quad s_0 \\ n \subseteq s_0 \\ s_0\colon Att(a, \left\{ \left\langle [ANCH, x_a], \begin{array}{|c|} \hline x_a \\ \hline \end{array} \right\rangle \right\}, \{\langle x_a, x \rangle\}) \\ \hline \end{array} \right\rangle \\[4em]
\left\langle BEL, \begin{array}{|c|} \hline e \ s_1 \ t \\ t < n \quad n \subseteq s_1 \\ t \subseteq morning[day[n]] \quad e \subseteq t \\ s_1\colon student(x) \\ e\colon be\text{-}looking\text{-}for(x, i) \\ \hline \end{array} \right\rangle
\end{array}
\right\}
$$
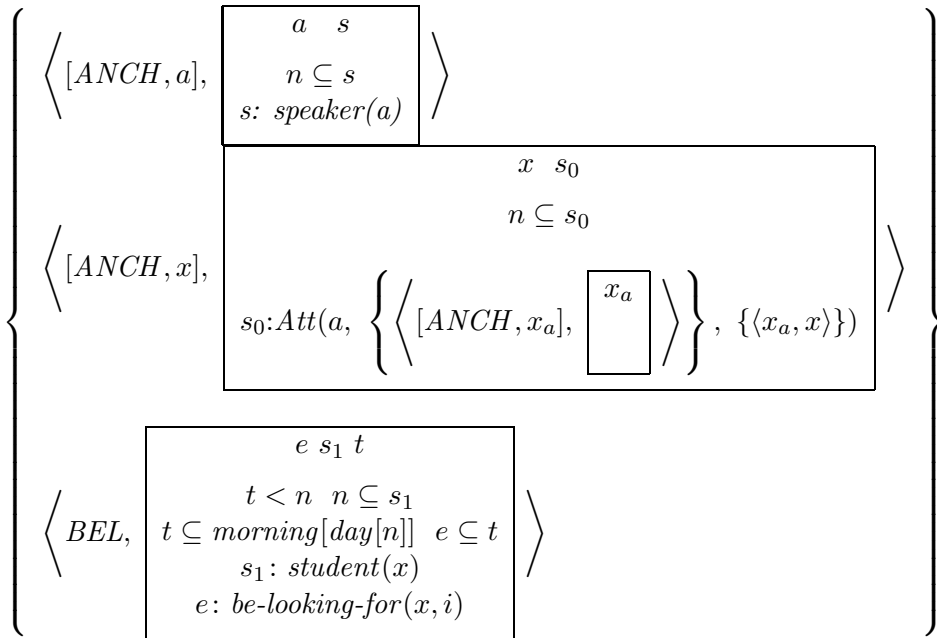
(31)   (Doxastic reduction of B's representation)

$$\left\langle BEL, \begin{array}{c} a \quad \text{x} \quad s \quad s_0 \quad e \quad s_1 \quad t \\ s\colon speaker(a) \quad n \subseteq s \quad n \subseteq s_0 \\[2mm] s_0\colon Att(a, \ \{\left\langle [ANCH, x_a], \boxed{x_a} \right\rangle\}, \ \{\langle x_a, x\rangle\}) \\[4mm] t < n \quad n \subseteq s_1 \quad t \subseteq morning[day[n]] \quad e \subseteq t \\ s_1\colon student(x) \\ e\colon be\text{-}looking\text{-}for(x, i) \end{array} \right\rangle$$

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A user-neutral representation of "A student was looking for you this morning." (constructed according to the construction rules of DRT):

(32)

$$\begin{array}{c} x\ \ s_1\ \ e\ \ b\ \ t \\ \hline t < n \quad n \subseteq s_1 \quad t \subseteq \textit{morning}[\textit{day}[n]] \quad e \subseteq t \\ s_1 \colon \textit{student}(x) \\ e \colon \textit{be-looking-for}(x, i) \end{array}$$

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

(33) $\left\langle\ BEL\ ,\ \begin{array}{|c|} \hline x\ \ s_1\ \ e\ \ t \\ \hline t < n \quad n \subseteq s_1 \quad t \subseteq \textit{morning}[\textit{day}[n]] \quad e \subseteq t \\ s_1 \colon \textit{student}(x) \\ e \colon \textit{be-looking-for}(x, i) \\ \hline \end{array}\ \right\rangle$

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
comnucation-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.

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   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)

(36)   a.   Ion iubeşte 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 iubeşte **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:** Ştii,   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) toţi
ACC.MASC.PL-perf-1SG seen PE all-PL.MASC
"I have seen them all" (all from a familiar group)

c. Am cumpărat rochia roşie şi ∗(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!

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