Implicit Restrictors of Quantifiers and Definites

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Note: This handout can be downloaded (so that links to references can be clicked) from the course website, http://people.umass.edu/partee/720_09/materials/index.html.

Readings
(Elbourne 2005) Situations and Individuals – Chapters 1-4 and 7
(Kratzer 2004) Covert quantifier restrictions in Natural Languages (handout, plus separate file of references.)

Additional readings
(Heim and Kratzer 1998) Chapter 11 on E-Type Anaphora (pp. 277-298)
(Elbourne In Press) Implicit content and the argument from binding
(Elbourne 2008b) Implicit content and sloppy identity
(von Fintel 1999) Quantifier domain selection and Pseudo-scope
(Stanley 2000) Context and logical form
(Stanley and Szabó 2000) On quantifier domain restriction

1. Background 1: Pronouns and definite articles
The central topic for today is implicit domain restriction on quantifiers and in definite descriptions. Key examples include:

(1)  Every subject was asleep.

(2)  The dog was fighting with another dog. (McCawley – Lewis examples)

(3)  a. Every time I looked in on an experiment, every subject was asleep.
    b. Only one class was so bad that no student passed the exam.

In example (1), the overt restrictor for the quantifier every is subject; but the sentence is not understood as quantifying over every subject in the world. Somehow the domain is implicitly restricted. The issue is how.
In example (2), the issue is how the uniqueness presupposition of the definite description gets satisfied. The fact that a second dog is mentioned in the same sentence makes it harder and eliminates some otherwise reasonable-seeming solutions, like just limiting the universe of discourse for the whole sentence to a situation containing just one dog.

Examples (3a-b) show that the same issues arise in quantified contexts, suggesting that something more or less overt, at least in the semantic structure, will be needed; we can conclude pretty quickly from such examples plus arguments we’ve seen in related cases that a ‘pure pragmatic enrichment’ approach won’t work.

Suzi and Masashi will present some of Angelika’s recent work that argues that the best way to handle implicit domain restriction is with the help of situation variables. I will lead up to that with some background.

First I want to draw some connections among several topics that we are looking at this semester: donkey pronouns (and other ‘difficult’ pronouns), definite descriptions, and quantifier restrictions.

Postal (1966) argued that pronouns are underlingly the same thing as definite articles, and his arguments were supported and extended in (Stockwell et al. 1973). Elbourne (2005) has some of the most recent arguments for the same conclusion.

One of Postal’s arguments concerned complementary distribution in expressions such as those in (4) below.

(4) we linguists, you philosophers, *they physicists, the physicists

Another concerned the following sorts of examples in various contexts:

(5) the blue one(s), the one(s) with covers, *the one(s) > it, them.

Elbourne (2005) has a related version of the latter argument for unifying definite articles and pronouns, involving NP-deletion, discussed by Perlmutter, Jackendoff, and others, also discussed in detail in (Stockwell et al. 1973). The main idea is that many determiners and some adjectives permit deletion of a following NP (common noun phrase) under conditions of identity (the same conditions that allow common-noun-phrase anaphora with one, so the rule was called “one(s)-deletion” by Stockwell et al). Apart from the quantifier every, just about the only determiners that don’t permit one(s)-deletion are the and a. Perlmutter argued that *a one is a source of pronominal one, and several people argued that *the one(s) is the source of he, she, it, they, etc. Elbourne accepts the theory of Stockwell, Schachter and Partee that a is realized as one under the same conditions under which your surfaces as yours, my as mine: when there is no NP following.

Elbourne (2005) therefore proposes unifying the treatment of donkey pronouns and definite descriptions by assuming that the definite article and the pronoun are different surface manifestations of the same thing, differing in a way similar to my and mine.
By identifying pronouns and definite articles, Elbourne sets the stage for a theory of donkey pronouns that treats them as a species of definite descriptions, much as Condoravdi and Gawron (1996) did for the implicit arguments of nouns like \textit{enemy}.

2. Background 2: Domain restrictors for quantifiers, added implicit restrictors in definite descriptions, and descriptive content for D-type pronouns: closely overlapping issues. Elbourne’s \textit{the/she}.

With pronouns and definite articles unified, I think we can see the potential for unifying three problem areas under the umbrella of “implicit restrictors”: the problem of implicit domain restrictors for quantifiers, as in (1), the problem of implicit restrictors for definite descriptions to satisfy their uniqueness presuppositions, as in (2), and the problem of donkey pronouns.

Heim and Kratzer (290-293) propose the analysis in (7) for the donkey pronoun in (6), following Cooper (1979); see the summary in Elbourne (1995, 41-42)

(6) \textit{Every man who owns a donkey beats it.}

(7) a. 

\begin{align*}
\text{DP} & \quad \text{NP} \\
\text{the} & \quad \text{N} \\
& \quad \text{DP} \\
& \quad \text{R}_7 \\
& \quad \text{pro}_1
\end{align*}

b. types: 

\begin{align*}
\langle\langle e, t\rangle, e\rangle & \quad \langle e, t\rangle \\
\langle e, \langle e, t\rangle\rangle & \quad e \\
\langle e, \langle e, t\rangle\rangle & \quad e
\end{align*}

c. represented linearly as in Elbourne: \[
\text{[the} [R_{\langle\langle e, t\rangle, e\rangle} \quad \text{pro}_{\langle e, t\rangle}]\]

Heim and Kratzer call this an E-type analysis; Elbourne follows a revised terminology which groups ‘description-theoretic’ solutions to donkey anaphora into two groups, E-type and D-type, under which this analysis is reclassified as D-type.
E-type and D-type:
For Elbourne (following Sommers and Neale), on an E-type analysis (Evans 1977, 1980), a donkey pronoun is a rigidly referring expression that has its reference fixed by description, where the description is extracted (largely) from the linguistic context. (Elbourne 2005, p.5)

A D-type analysis (Cooper 1979, Heim 1990, Heim and Kratzer 1998) claims that pronouns are (or may be) interpreted as definite descriptions. (Elbourne further distinguishes analyses in which that happens only in the semantics from those like his in which it also happens in the syntax.)

Elbourne’s parallel semantics for the and she (p.44), differing only by a gender presupposition for she (using H&K’s notation, where what precedes the dot is presupposed):

(8)  a. $[[\text{the}]] = \lambda f : (f \in D_{<e,t>} \& \exists ! x f(x) = 1). \ \forall x f(x) = 1$
    a. $[[\text{she}]] = \lambda f : (f \in D_{<e,t>} \& \exists ! x f(x) = 1 \& \forall x f(x) = 1 \to \text{Fem}(x)) \cdot \forall x f(x) = 1$

Elbourne’s basic proposal is that the D-type analysis can be done in a much less stipulative and more adequate way by analyzing the donkey sentence (6) as arising by the independently motivated rule of NP-deletion from (9).

(9) Every man who owns a donkey beats the donkey.

The donkey-pronoun problem then reduces to the problem of explaining how the donkey gets interpreted appropriately. That’s an independently important topic, since “donkey-definites” occur just as freely as, probably more freely than, donkey pronouns. His solution (see Chapter 2, Section 2.3) relies crucially on situations: he does not add any implicit descriptive material to the DP, but depends on the right structure of minimal situations. See Section 2.3.2 and Appendix B2 for a full treatment of sentence (9).

By the end of Chapter 3, in the light of bound definite description examples like (3b) (I’m skipping a lot), Elbourne concludes that the definite article always takes two arguments, one of them an NP, and the other an index. The index also gets an interpretation of type $<e,t>$, using the ident type-shift of Partee (1986): if the index is 2, its interpretation will be $\lambda x. x = 2$. This property of being identical to whatever value is assigned to the index 2 is in effect conjoined with the ordinary NP property (not literally, since it’s a separate argument.) Elbourne’s revised semantics for the (p. 114) is as follows:

(10) a. $[[\text{the}]] = \lambda f_{<e,t>}. \lambda g_{<e,t>} : \exists ! x (f(x) = 1 \& g(x) = 1). \ \forall (f(x) = 1 \& g(x) = 1)$

See pp 112-114 for a working out of how this applies to an example like (11).

(11) Mary talked to no senator before the senator was lobbied.
Elbourne adds a ‘special’ index 0 which is given the trivial content in (12), which is equivalent to having no index present at all; this is needed for some examples (such as the donkey-definite in (9), which should not be treated as having either a free or a bound variable reading; he introduces situations into the analysis to deal with these), and the choice of a definite description having a real index or not provides a possible analysis of the difference between referential and attributive definites.

(12) interpretation of the special index 0: \( \lambda x: x \in D_e \cdot x \in D_e \).

Later in the book he extends his treatment to proper names, which take a null \( \text{the} \).

As noted above, Elbourne’s 2005 analysis makes crucial use of situations, in a Kratzerian situation theory, in a modification of the analysis of Heim (1990). In his later papers (see below), he goes back and forth between a situation-based analysis and an analysis that involves putting implicit descriptive restrictors into DPs.

### 3. Early work: Cooper, Evans, Westerståhl, Heim

**Cooper**

Cooper (1979) actually proposed a whole family of possible interpretations for pronouns, all of them constructed just from variables. A singular pronoun like \( \text{he}, \text{she}, \text{or it} \) could have any translation of the following form:

(13) \( \lambda K \exists x [\forall y ([^\forall \pi](y) \equiv y = x) \land K(x)] \),

where \( \pi \) is a property-denoting expression containing only free variables and parentheses.

This is a meaning of generalized quantifier type (<<e,t>,t>), with a Russellian definite determiner meaning built into it. To revise it into a Fregean e-type meaning, and to follow the notation of Heim and Kratzer, we would convert it as follows:

(14) presupposition: \( \exists! x ([^\forall \pi](x) = 1] \)

denotation: \( \iota x ([^\forall \pi](x) = 1] \)

where \( \pi \) is a property-denoting expression containing only free variables and parentheses.

The combination \( R_{<7,<<e,t>,t>}(\text{pro}_{<1,e>}) \) from example (7) would be such a \( \pi \).

This is a purely semantic version of a D-type analysis, since Cooper did not assume any corresponding decomposition in the syntax.

Even earlier in his work, Cooper argued in favor of additional free property variables inside most DPs to do the work of added implicit domain restriction. And later, working on improvements to Barwise and Perry’s situation semantics (Barwise and Perry 1981, Barwise and Perry 1983), he argued for the usefulness of their notion of “resource
situation”, a use of situations to restrict the interpretation of DPs independently of the reference situation for the whole clause in which they occur (Cooper 1993, Cooper 1996).

**Evans.** Evans (1977, 1980) brought E-type analyses into prominence with his work on donkey sentences and on sentences like (15); since Evans’s work is well-discussed in Heim’s dissertation, I will just remind you of it but not discuss it today.

(15) John owns some sheep and Harry vaccinates them.

**Westerståhl.** Westerståhl (1985) did some of the earliest serious work on quantifier restrictions, emphasizing their special importance for the interpretation of quantifiers like *many* as well as their general importance for all quantifiers. He expanded on the observation made in Bennett’s dissertation (Bennett 1974) that in a sentence like (16), each occurrence of *many* may be relativized to a different comparison class and may get a different standard for how many counts as “many”.

(16) Many men date many women. (possibly: thousands …. dozens)

**Heim.** In Heim (1990), Heim argues for an E-type (D-type in Elbourne’s terminology) analysis of donkey pronouns, and against the analysis offered in her dissertation. Elbourne (1995) gives a good exposition of her account and how his differs. His analysis is very much in the spirit of hers, but designed to be less stipulative and to solve some problems that were not solved in her account. I omit details here.

4. **Approaches to implicit content in definite descriptions and quantifiers**

Note: Parts of this section repeat material from Lecture 1, the preview lecture, parts are new. I am not repeating anything about the “pragmatic enrichment approach” (Sperber and Wilson), the “explicit approach” (Neale), or the “global approach”; I take them to have been eliminated. (Review Lecture 1 and see Elbourne (2008b, In Press).)

4.1. **The Syntactic Relation Variable Approach**

Much relevant discussion of implicit content concerns – directly or indirectly – definite noun phrases (and other quantifiers) and their implicit additional restrictors. Example (17), due to Heim (1991), is discussed by (von Fintel 1994) and (Elbourne 2008b, In Press). Elbourne notes that (17a) may be interpreted as in (17b), and follows von Fintel in advocating something like (17c) as its (simplified) syntactic structure, with unpronounced variables of two sorts and a lambda-operator to bind the individual variables. The fact that the same variable $v_2$ shows up twice, as argument to two different relational expressions, provides an argument for separating the individual variable from the relational variables $R_i$.

(17)  
  a. Only one class was so bad that no student passed the exam.  
  b. Only one class $x$ was so bad that no student in $x$ passed $x$’s exam.  
  c. [only one class] $\lambda v_2 [t_2$ was so bad that $[no R_1 v_2] student passed [the $R_3 v_2] exam]$
The analysis sketched in (17c) is an example of the approach Elbourne calls “The Syntactic Relation Variable Approach”. That approach has two variants, the one just illustrated, where the syntactic variables are associated with the determiner, (von Fintel) and one advocated by Stanley and Szabó (2000), building on Westerståhl (1985), on which the silent syntactic variables are associated with nouns rather than with determiners.

(18)  \[\lambda_2 [t_2 \text{ was so bad that no } \text{student } R_1 v_2 \text{ passed the } \text{exam } R_3 v_2]\]

**Stanley and Szabó:**

They argue that there is a need for some explicit variable(s) in the syntax (at LF), because of the existence of bound variable cases like (17a). They argue that the variable(s) should be associated with the noun rather than the determiner because of examples like (19) (I’m changing the wording of their example to try to make it a little more natural).

(19) Many children refused to cooperate. They were rebellious.

Suppose the first sentence is about children in the Marks Meadow School. The pronoun they in (19) can be understood either as referring to (all) the children in the Marks Meadow School, or to the children in the Marks Meadow School who refused to cooperate. Stanley and Szabó’s argument is that since the determiners in the two sentences are different (the second being a version of the, either already there on Elbourne’s approach, or reconstructed on other approaches), if you put an implicit restriction like “in Marks Meadow School” on the determiner, it will get “lost” in the anaphoric DP, whereas if the restriction is associated with the N, children, it will be naturally picked up in the anaphoric expression. (For the second interpretation, they appeal to Neale’s “explicit approach”, which reconstructs a description that interprets the ‘they’; but I think a similar argument would apply to Elbourne’s account.)

I believe that Elbourne’s answer to this argument would be that they failed to take account of the role of situations in an analysis like Elbourne’s. S & S might reply that a theory that needs both restrictors associated with the determiner AND situations is unattractively powerful. Elbourne might reply that both are independently needed. (I’d like to see more details on that point, but I suspect it’s so.)

For some different kinds of arguments in favor of treating domain restriction as a sort of intersective modification of the noun, see (von Fintel 1999). This paper is particularly interesting for how it relates issues of domain restriction to issues of choice functions as discussed by Kratzer (1998) and Matthewson (1999a, 1999b).

### 4.2. The Syntactic Situation Variable Approach

The other principal approach that Elbourne considers (in addition to another compromise of his own) is the **syntactic situation variable approach**. It goes back to early work of Kuroda, and has been advocated more recently in (Kratzer 2004) and (Recanati 1996, 2004). Elbourne himself argues against it in (Elbourne In Press), but then favors it in (Elbourne 2008b); he had used a similar approach in his book (Elbourne 2005), though without putting the situation variables into the syntax. On this approach, each predicate
has a situation argument in the syntax, so that different predicates in one sentence can be evaluated with respect to different situations. A sentence like (20a) would have a Logical Form (the level of syntactic representation which forms the input to the semantics) like (20b). The semantic value of the whole LF will then be as in (20c).

(20)  
   a. *Every subject is asleep.* 
   b. $\sum^8 [\text{every [subject s}_8] [\text{is [asleep s}_8]]]$ 
   c. $\lambda s_8 . \text{every subject in s}_8 \text{ is asleep in s}_8$.

Because each predicate gets its own situation argument, there can be a mixture of deictic and bound situation variables in the same sentence, allowing for an account of the non-contradictory interpretability of (21).

(21) *Everyone is asleep and is being monitored by a research assistant.*

We’ll hear more about situation variable approaches in Suzi and Masashi’s presentation.

5. Arguments for and against implicit elements in syntax.

The theories Elbourne concentrates his arguments on are of two sorts: the Syntactic Relation Variable Approach discussed in Section 4.1 and the Syntactic Situation Variable Approach discussed in Section 4.2. The first inserts elements similar to pronouns (perhaps more like definite descriptions) as implicit arguments of certain kinds of predicates. The second makes all predicates sensitive to a situation argument, but limits the points at which binders for such arguments may be introduced.

Here I will just indicate the examples Elbourne uses to argue for opposite conclusions in his two most recent papers. To argue in favor of the Relation Variable approach, Elbourne (In Press) uses the following surprising contrast.

First he gives the following pair just to be clear about the reading he is interested in.

(22)  
   a. *John fed no cat of Mary’s before it was bathed.* 
   b. *There does not exist an x such that x is a cat of Mary’s and John fed x before x was bathed.*

(23) *John fed no cat of Mary’s before the cat of Mary’s was bathed.*

Sentence (23) can have the meaning in (24); but the minimally different sentence (25) cannot.

(24) *There does not exist an x such that x is a cat of Mary’s and John fed x before the cat of Mary’s identical to x was bathed.*

(25) *John fed no cat of Mary’s before Mary’s cat was bathed.*

These facts are argued to best support von Fintel’s version of the Relation Variable approach, because the difference can be traced to the difference between *the* and *Mary’s*. Elbourne argues that *Mary’s* cannot host a domain-restriction variable, quite possibly because the internal genitive relation already occupies that slot. But Elbourne in this paper sees no way that the Situation Variable Approach could solve the problem.

In (Elbourne 2008b), he identifies a problem for the Relation Variable Approach and indicates a preference for the Situation Variable Approach.
(26)  a. In this village, if a farmer owns a donkey, he beats the donkey and the priest 
beats the donkey too. (strict, *sloppy)
    b. In this village, if a farmer owns a donkey, he beats the donkey he owns and the 
priest beats the donkey he owns too. (strict, sloppy)

(27)  a. In this village, every farmer who owns a donkey beats the donkey, and the priest 
beats the donkey too. (strict, *sloppy)
    b. In this village, every farmer who owns a donkey beats the donkey he owns, and 
the priest beats the donkey he owns too. (strict, sloppy)

The problem for most of the theories is the difficulty they will have in trying to rule out 
the “sloppy” reading of the (a) examples; what stops them from filling in some implicit 
he owns? Elbourne shows how the Situation Variable approach can do better.

How then to solve the problem he earlier identified for the Situation Variable approach? I 
asked him, and in recent correspondence (p.c., e-mail April 15, 2009) he suggests that it 
could be solved by making use of a principle first articulated by Reinhart to capture a 
variant of Chomsky’s “Principle B”. Reinhart’s “Rule I” says roughly that you can’t use a 
co-indexed plain pronoun in a context where you could have used a reflexive or other 
bound variable expression: I.e. you can’t say “John saw him” with ‘him’ co-indexed to 
‘John’, since you could have said “John saw himself” instead. I won’t try to repeat here 
the details of how that applies to (23) and (25) above, but it seems like a promising 
approach.

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