Lecture 5. Closed-class vs open-class lexicon.

Closed-class examples: Determiners and Quantifiers

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Readings: (Links are in the references at the end.)

(1) Reread: (Larson 1995).
(2) (Partee et al. 1990): Chapter 14: Generalized Quantifiers.
(3) (von Fintel and Matthewson 2008) Universals in semantics, pp 155 – 167, on universals of
DP and NP semantics, and quantifier universals.
For more on semantics of existential sentences:
(4) (Keenan 2003): The definiteness effect: semantics or pragmatics?

Additional optional readings: The classic Barwise and Cooper (1981):
Francez (2010) Context dependence and implicit arguments in existentials

Reminder: See file “Links to readings 2011.doc” for weekly updates of readings and supplementary
online references. The “links” page URL is:
https://udrive.oit.umass.edu/partee/Semantics_Readings/Links to Readings 2011.doc

1. More on function-argument structure, syntactic categories, semantic types.

A function of type a → b applies to an argument of type a, and the result is of type b.

When an expression of semantic type a → b combines with an expression of type a by the
semantic rule of “function-argument application”, the resulting expression is of type b.

Examples:

(1) ProperN of type e, combining with VP of type e → t, to give S, of type t.
John walks: \( walk(\text{John}) \)
\[ |walk| = (\text{the characteristic function of}) \text{ the set of entities that walk}. \]

(2) DP of type (e → t) → t, combining with VP of type e → t, to give S, of type t.
\[ \text{TR}(\text{every man}) = \lambda P \forall x [\text{man}(x) \rightarrow P(x)] \] type: (e → t) → t
\[ \text{TR}(\text{walks}) = \text{walk} \ (\text{or equivalently, } \lambda x [\text{walk}(x)]) \] type: e → t
\[ \text{TR}(\text{every man walks}) = \lambda P \forall x [\text{man}(x) \rightarrow P(x)] (\text{walk}) \] type: t
\[ = \forall x [\text{man}(x) \rightarrow \text{walk}(x)] \]
Relations and functions. What about transitive verbs and object DPs?

In first-order predicate logic: First, suppose we just had simple DPs of type e, and we think of transitive verbs (TVs) as expressing relations between entities, as in 1st-order predicate logic, where the interpretation of a TV like love is a set of ordered pairs, e.g.: ||love|| = {{<j,m>}, <m,b>, <b,b>}. The characteristic function of this set is a function of type (e x e) → t. (The verb simply combines with two DPs to form an S.)

In Montague’s type system: we are not using “ordered pair” types in our type system, and that is good for mapping natural language syntactic categories onto semantic types, because in English (and Russian), the verb combines with the object DP to form a VP, which then combines with the subject DP to form an S:

\[
\begin{array}{c}
S \\
\text{DP} & \text{VP} \\
\text{TV} & \text{DP}
\end{array}
\]

It is frequently assumed in recent linguistic literature that a limitation to binary branching may be universal for all basic grammatical relations. In that case, Montague’s limitation to functions that take just one argument is linguistically appropriate.

It is a fact of logic ((Curry 1930), Schönfinkel; see (Kneale and Kneale 1962)) that any function which applies to two arguments can be equivalently replaced by a function that applies to one argument and gives as result another function which applies to the other argument, so in place of the original f(x,y) = z we can have f′(y)(x) = z. The value of f′(y) is a function that applies to x.

(Note: we want to apply the verb to its “second” argument first, because the verb combines with the object to form a VP, and it is the VP that combines with the subject.)

That means that the type of a simple TV can be e → (e → t). In the example above, the function interpreting love would be the function that applies to ||John|| to give the interpretation of ||loves John||, etc.. So it does the following when applied to the direct object argument (here we display the function in a “picture” form):

\[
\begin{align*}
\text{j} & \rightarrow (\text{the characteristic function of}) \ O \ (\text{the empty set: no one loves John}) \\
\text{m} & \rightarrow (\text{the characteristic function of}) \ \{j\} \\
\text{b} & \rightarrow (\text{the characteristic function of}) \ \{m,b\}
\end{align*}
\]

So the interpretation of VP loves Bill = ||love|| (||Bill||) = (the char. function of) {m, b}.

What if our DPs are of type (e → t) → t? Then if a TV should be interpreted as a function from DP-type meanings to VP-type meanings (e → t), the type of the TV should be ((e → t) → t) → (e → t). It is argued in Partee and Rooth (1983) that this is the correct type for intensional verbs like seek and need, but not for extensional verbs, which form the great majority, like love, eat, hit, buy. In that case, we use the rule of “Quantifying In,” which we saw in Lecture 3.

“Quantifying In”: If a DP of type (e → t) → t occurs as an argument of a verb or preposition that “wants” an argument of type e, then the semantic combination cannot
be simple function-argument application; by a general principle, the DP in that case is “quantified in”. The rules are given and illustrated in the notes of Lecture 3: See Homework 2, question #3.

In the following discussion of the semantics of DP as generalized quantifier, we will use examples where the DP is the subject; but the results apply to all uses of DP, whether the DP is acting as a function, or as an argument of some other function, or is quantified in.

2. DPs as Generalized Quantifiers. (continued)

Review: Montague’s semantics (Montague 1973) for Noun Phrases (Lectures 1-3):
Uniform type for all DP interpretations: (e → t) → t

John  \( \lambda P[P(\text{John})] \) (the set of all of John’s properties)
John walks \( \lambda P[P(\text{John})] (\text{walk}) = \text{walk} (\text{John}) \)
every student \( \lambda P \forall x [\text{student}(x) \rightarrow P(x)] \)
every student walks \( \lambda P \forall x [\text{student}(x) \rightarrow P(x)] (\text{walk}) \)
  \( = \forall x [\text{student}(x) \rightarrow \text{walk}(x)] \)
a student \( \lambda P \exists x [\text{student}(x) \& P(x)] \)
the king \( \lambda P [\exists x [\text{king}(x) \& \forall y (\text{king}(y) \rightarrow y = x) \& P(x)]] \)
  (the set of properties which the one and only king has)

Determiner meanings: Relations between sets, or functions which apply to one set (the interpretation of the NP) to give a function from sets to truth values, or equivalently, a set of sets (the interpretation of the DP).

Typical case:

\[
\begin{array}{c}
\text{S} \\
\text{DP} & \text{VP} \\
\text{DET} & \text{NP}
\end{array}
\]

NP: type e → t
VP: type e → t
DET: interpreted as a function which applies to NP meaning to give a generalized quantifier, which is a function which applies to VP meaning to give Sentence meaning (extension: truth value). type: (e→t)→((e→t)→t)
DP: type (e→t)→t

Sometimes it is simpler to think about DET meanings in relational terms, as a relation between a NP-type meaning and a VP-type meaning, using the equivalence between a function that takes a pair of arguments and a function that takes two arguments one at a time.

\( Every: \) as a relation between sets A and B (“Every A B”): \( A \subseteq B \)
\( Some, a: \) \( A \cap B \neq \emptyset \).
\( No: \) \( A \cap B = \emptyset \).
\( Most \) (not first-order expressible): \( |A \cap B| > |A - B| \).
Determiners as functions:

*Every*: takes as argument a set A and gives as result \{B| A ⊆ B\}: the set of all sets that contain A as a subset. Equivalently: \([\text{\textit{Every}}](A) = \{B| \forall x (x \in A \rightarrow x \in B)\}\)

In terms of the lambda-calculus, with the variable Q playing the role of the argument A and the variable P playing the role of B: \(\text{\textit{Every}} = \lambda Q[\lambda P[\forall x (Q(x) \rightarrow P(x))]]\) (You did this in Homework 1, question #3)

*Some, a*: takes as argument a set A and gives as result \{B| A \cap B \neq \emptyset \}.

\([a] = \lambda Q[\lambda P[\exists x (Q(x) \& P(x))]]\)

3. Function words vs. content words: some universal differences

In our little fragment from Lecture 3, we saw that the basic lexical “open class” categories N, IV, TV, ADJ have very simple types: N, IV, and ADJ are all \(e \rightarrow t\), (ADJ can also be \((e \rightarrow t) \rightarrow (e \rightarrow t)\), but let’s leave that aside for the moment), and at the beginning of today’s lecture we saw that most TVs are of type \(e \rightarrow (e \rightarrow t)\). Proper nouns may be of type e. So the basic lexical categories for open class words, or ‘content words’ may all be entity-denoting or first-order predicates, or at most second-order.

In contrast, as we saw in the previous section, a Det which builds a Generalized Quantifier is of type \((e \rightarrow t) \rightarrow ((e \rightarrow t) \rightarrow t)\), a considerably more complex type. Many other “function words” have to be analyzed as having rather “high” types in order to serve as the “semantic glue” that builds phrases from smaller phrases. Chierchia (1984) proposed some universal properties distinguishing basic content word categories like N, Adj, and V from function-word categories like Det.

**Function vs content word universal (Chierchia 1984): Three related properties of function words:**

(i) Functional categories have high semantic types, whereas content words have the simple types of entities and predicates.

(ii) Natural languages do not quantify over function words; do not have interrogative forms for function words, and do not have anaphora in the domain of function words.

(iii) Each language has only a small finite number of function words; their range of possible meanings is constrained, and some of them are very widespread cross-linguistically,

The significance of Chierchia’s universal is that language acquisition for content words and for function words is very different. The function words are of high type, but it seems that the child does not have to consider all possible meanings of those types; the function words seem to be nearly innate, or at least very highly constrained. This universal also correlates with the observation that language change is much slower for function words than for content words; new content words appear very frequently, and regular or semi-regular word formation rules are entirely in the domain of content words. **This is a domain where more research would be very welcome**: this universal is considered very plausible, but detailed documentation with a wide typological base is still needed.

DET is one of the categories where the most work has been done, and very interesting universals have been proposed. We consider here one of the most famous from Barwise and Cooper’s work. See (Partee et al. 1990): Chapter 14: Generalized Quantifiers for some more.
4 Some formal properties of determiners

4.1 Barwise and Cooper’s Conservativity Universal for Determiners

Linguistic universal: Natural language determiners are conservative functions. (Barwise and Cooper 1981)

We saw above how we could look at a DET that forms a generalized quantifier DP as a relation between two sets. We can cast Barwise and Cooper’s universal most simply if we define conservative in relational terms as follows.

**Definition:** A determiner meaning D is conservative iff for all A,B, D(A)(B) = D(A)(A \( \cap \) B).

Examples:

- No solution is perfect = No solution is a perfect solution.
- Exactly three circles are blue = Exactly three circles are blue circles.
- Every boy is singing = every boy is a boy who is singing.

“Non-example” 1: No language has a determiner meaning all non-. We can say “All non-members are excluded”, but that uses the determiner all and a prefix non-. If a language had a DET with the meaning “all non-”, that DET would not be conservative. Let’s work that out on the blackboard!

Linguistic test: ‘Allnon’ members are excluded ≠ ‘Allnon’ members are members who are excluded.

“Non-example” 2: *Only* is not conservative; but it can be argued that *only* is not a determiner.

- Only males are astronauts (false) ≠ only males are male astronauts (true).

**Consequence:** When evaluating D(A)(B), one only needs to consider A’s, never non-A’s.

**Note:** *Only* is conservative on its other argument! This is important for Keenan (2003), below.


4.2 Weak vs Strong Determiners and Existential Sentences

4.2.1 Some puzzles of existential sentences

What makes some sentences “existential”?

Existential sentences vs. plain subject-predicate sentences:

(1) a. There are /There’s\(^1\) two holes in my left pocket.
   b. Two holes are in my left pocket. (grammatical but an odd thing to say)

(2) a. There is / There’s a cat on the sofa. # There is / # There’s the cat on the sofa.
   b. The cat is on the sofa. (?) A cat is on the sofa. (grammatical but not ‘ordinary’)

Spanish: *hay*; French *il y a*; Italian *c’è*, *ci sono*; German *es gibt*; Chinese *you*, etc.

\(^1\) Standard written English distinguishes *There is/are*; colloquial spoken English often uses invariant *There’s,*
• Which DPs can and cannot occur in existential sentences, and why?

Terminology: The DPs that can occur in existential sentences are called **weak DPs**. Those that normally² cannot are called **strong DPs**.

- What is the nature of “existential sentences”?
- What notion of “existence” is the relevant one?
- Is existence always relative to a “location” (in some sense)?
- Why are definite DPs usually but not always “bad” in existential sentences?
- What verbs besides be can be used in existential sentences, and why?
- How much variation is there in the semantics and pragmatics of existential sentences?

**Generalizations:**

The (b) sentences above: ordinary Subject-Predicate sentences.
- have ‘normal’, structure, with ‘strong’ DPs as subject in ‘canonical’ subject position.
- “Categorical” sentences (Brentano, Marty, Kuroda, Ladusaw; see (von Fintel 1989)

The (a) sentences above: Existential sentences.
- do not have that ‘normal’ or ‘standard’ structure;
- the corresponding DP either is not a subject, or is a ‘non-canonical’ or ‘demoted’ subject.
- The subject is usually a ‘weak’ DP.

For good background and contemporary references: see **Lecture 4 RGGU 2010**, end of Sec 3.1.

4.2.2 “Weak” determiners and existential sentences in English (**there-sentences**).

4.2.2.1. Early classics: Milsark, Barwise and Cooper, early Keenan.

Data: OK, normal:
- (3) There is a new problem.
- (4) There are two computers.
- (5) There are many unstable governments.
- (6) There are no tickets.

Anomalous, not OK, or not OK without special interpretations:
- (7) #There is every linguistics student.
- (8) #There are most democratic governments.
- (9) #There are both computers.
- (9’) #There are all interesting solutions.
- (9’’) #There is the solution. (# with “existential” there ; OK with locative there.)

Inadequate syntactic description: “Existential sentences require indefinite determiners.” No independent syntactic basis for classifying determiners like three, many, no, most, every.

**Weak and strong determiners:**
Determiners that can occur ‘normally’ in existential sentences, called **weak** determiners (Milsark 1977): a, sm³, one, two, three, ..., at most/at least/exactly/more than/nearly/only one, two, three, ..., many, how many, a few, several, no,

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² Recent research emphasizes that the distinction is not so sharp. See (Francez 2007, 2009).
³ Linguists write sm for the weak, unstressed pronunciation of ‘some’. The fully stressed ‘some’ can be weak or strong; unstressed sm is unambiguously weak.
(Unambiguously\(^4\)) **strong** determiners, which cannot ‘normally’ occur in existential sentences: *every, each, the, all, most, both, neither, which of the two, all but two.*

Semantic explanations, with roots in informal semantic description by Milsark (Milsark 1977), formal development by Barwise and Cooper and by Keenan.

**First achievement (not formalized, but a solid achievement): Milsark (1977):** Existential sentences introduce existential quantification. Strong determiners have their own quantification, and trying to put them into an existential sentence creates impossible ‘double quantification’. On Milsark’s account, weak determiners do NOT have their own quantification; later we will see how some more recent accounts (Heim, Kamp, Landman) formalize that idea.

**Second step: formalization of the notion “weak DP” and the semantics of existential sentences (Barwise and Cooper 1981):**

**Definition:** Let \( D \) be the semantic interpretation (as a function) of a determiner, let \( E \) be the universe of entities in the model \( M \).

(i) A determiner \( D \) is **positive strong** if for every model \( M \) and every \( A \subseteq E \), if \( D(A) \) is defined, then \( D(A)(A) = 1 \). (e.g. *Every cat is a cat*. But not *Exactly one cat is a cat.*)

(ii) A determiner \( D \) is **negative strong** if for every model \( M \) and every \( A \subseteq E \), if \( D(A) \) is defined, then \( D(A)(A) = 0 \). (e.g. *Neither cat is a cat*. But not *No cat is a cat.*)

(iii) A determiner \( D \) is **weak** if it is neither positive strong nor negative strong.

For more discussion and examples, see Lecture 4 RGGU 2010. Here I am shortening.

**Semantics of existential sentences:** (Barwise and Cooper 1981)

To “exist” is to be a member of the domain \( E \) of the model. A sentence of the form “There be Det NP” is interpreted as “Det NP exist(s)”, i.e. as \( E \in ||\text{Det NP}|| \). (Question for discussion: why \( E \in ||\text{Det NP}|| \), and not \( ||\text{Det NP}|| \in E \)?)

If \( D \) is the interpretation of \( \text{Det} \) and \( A \) is the interpretation of \( \text{NP}, E \in ||\text{Det NP}|| \) is the same as \( D(A)(E) = 1 \).

Because of conservativity, this is equivalent to: \( D(A)(A \cap E) = 1 \)

Since \( A \cap E = A \), this is equivalent to \( D(A)(A) = 1 \).

Barwise and Cooper’s explanation of the restriction on which determiners can occur in existential sentences: For positive strong determiners, the formula \( D(A)(A) = 1 \) is a tautology (hence never informative), for negative strong determiners it is a contradiction. Only for weak determiners is it a contingent sentence that can give us information. So it makes sense that **only weak determiners are acceptable in existential sentences.**

**4.2.2.2. Later Keenan and others**

Keenan (1987) makes more use of weak determiners’ properties of intersectivity and symmetry.

**Definition:** A determiner \( D \) is a **basic existential determiner** iff for all models \( M \) and all \( A, B \subseteq E \), \( D(A)(B) = D(A \cap B)(E) \). Natural language test: “Det NP VP” is true iff “Det NP which VP

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\(^4\) If we define ‘strong’ simply as ‘cannot occur in a *there*-sentence’, then the two classes are mutually exclusive. But if independent tests for ‘strong’ are given, such as being able to occur as ‘topic’, then it seems that quite a few determiners can be either weak or strong, including all the cardinal numbers.
exist(s)” is true. A determiner D is existential if it is a basic existential determiner or it is built up from basic existential determiners by Boolean combinations\(^5\) (and, or, not).

Examples: *Three* is a basic existential determiner because it is true that:

Three cats are in the tree iff three cats which are in the tree exist.

*Every* is not a basic existential determiner. Suppose there are 5 cats in the model and three of them are in the tree. Then “Every cat is in the tree” is false but “Every cat which is in the tree exists” is true: they are not equivalent.

**Basic existential determiners = symmetric determiners.**

We can prove, given that all determiners are conservative, that Keenan’s basic existential determiners are exactly the symmetric determiners.

**Symmetry:** A determiner D is symmetric iff for all A, B, D(A)(B) \(\equiv\) D(B)(A).

Testing (sometimes caution needed with contextual effects):

**Weak (symmetric):** Three cats are in the kitchen \(\equiv\) Three things in the kitchen are cats.

No cats are in the kitchen \(\equiv\) Nothing in the kitchen is a cat.

More than 5 students are women \(\equiv\) More than 5 women are students.

**Strong (non-symmetric):** Every Zhiguli is a Russian car \(\neq\) Every Russian car is a Zhiguli.

Neither correct answer is an even number \(\neq\) Neither even number is a correct answer.

Note: The failure of equivalence with neither results from the presuppositional requirement that the first argument of neither be a set with exactly two members. When there is presupposition failure, we say that the sentence has no truth value, or that its semantic value is “undefined”. So it is possible that the left-hand sentence is true, while the right-hand sentence has no truth value; hence they are not equivalent. The same would hold for both.

**Condensing some history (see MGU 2011, Lecture 4):**

Further advances made by (Comorovski 1995), who noted the importance of the “coda” (the frequently locative constituent following the post-copula NP – “in the kitchen”, etc.). Then (Zucchi 1995), who offered a formal analysis of existential sentences (partly semantic and partly pragmatic) that includes a “Coda condition”.

**Zucchi’s Coda condition:** The Coda provides the domain of evaluation for There-sentences.

Then more recently,

**An improvement on Zucchi’s analysis, and all semantic: Keenan (2003).**

Keenan (2003) agrees with Zucchi’s Coda condition, but he argues that the Coda condition is part of the semantics, not just a pragmatic felicity condition. I do not repeat his arguments here, but just his conclusion, which builds on a condition that is a ‘mirror image’ of the condition that all natural language determiners must be conservative (Barwise and Cooper: see above). Keenan gives an alternative and equivalent definition of that property, renaming it “conservative on the first argument (cons)”, so that he can make use of the notion of being conservative on the second argument (as only is).

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\(^5\) Keenan (1987, 2003) also has some additional ways to build up complex determiners, and also treats “two place” determiners like more \((N_1)\) than \((N_2)\) and others.
(12) **Definition:** a. A map \( D \) from domain \( D_{<e,t>} \) to \( D_{<<e,t>,t>} \) is *conservative on its first argument* (cons\(_1\)) iff:

For all \( A, B, B' \subseteq E \), whenever \( A \cap B = A \cap B' \), then \( DAB = DAB' \).

b. Equivalently: For all \( A, B \subseteq E \), \( D(A)(B) = D(A)(A \cap B) \).

Then Keenan introduces a new property, *conservativity on the second argument, cons\(_2\).*

(13) **Definition:** a. A map \( D \) from domain \( D_{<e,t>} \) to \( D_{<<e,t>,t>} \) is *conservative on its second argument* (cons\(_2\)) iff:

For all \( A, A', B \subseteq E \), whenever \( A \cap B = A' \cap B \), then \( DAB = DA'B \).

b. Equivalently, For all \( A, B \subseteq E \), \( D(A)(B) = D(A \cap B)(A) \).

(14) **DP\(_{there}\) condition:** The set of DPs that can occur in There-sentences is the set of (Boolean compounds of) those DPs built from lexically cons\(_2\) Dets.

What are some examples of cons\(_2\) Dets?

(i) All intersective (symmetrical) Dets are both cons\(_1\) and cons\(_2\). So all of the determiners classified as weak on Keenan’s earlier criterion are cons\(_2\).

(ii) Barwise and Cooper claimed that conservativity (cons\(_1\)) was a determiner universal – that ALL determiners are cons\(_1\). So any examples of cons\(_2\) “Dets” that are not cons\(_1\) will be elements that should not count as Determiners for Barwise and Cooper. Keenan cites the following ones as the only examples he knows of which are cons\(_2\) but not cons\(_1\); “bare” *only/just*, and *mostly*. As he notes, *only/just* is a dual of *all*, and *mostly* is a dual of *most* in the following sense:

(15) a. ONLY/JUST (A)(B) = ALL (B)(A)

b. MOSTLY (A)(B) = MOST (B)(A)

To illustrate (15b): *Mostly girls attended* is equivalent to *Most who attended were girls*. We argued when we first introduced Barwise and Cooper’s universal that *only* isn’t really a determiner; the same argument could be made for *just* and *mostly*. But their distribution includes a determiner-like distribution, and this use that Keenan has made of the relation between *all and only* and between *most and mostly* fits very nicely together with the claim made in (Partee and Borschev 2004) and by others to the effect that existential sentences seem to “turn the predication around”, predicating of the location (or other ‘coda’) that it has ‘DP’ ‘in it’. Keenan has also thereby given a more satisfying basis for Zucchi’s Coda condition, which seems to be a reflection of a similar idea.

**The interpretation of there-Sentences on Keenan’s account\(^6\):**

**Step 1:** The set Initial-Det\(_{there}\) consists of all lexical Dets which are cons\(_2\).

**Step 2:** The set Det\(_{there}\) is the boolean closure of the set Initial-Det\(_{there}\), i.e. the closure of the set Initial-Det\(_{there}\) under *(both)...and, (either)... or, not, but not, neither ...nor.*\(^7\)

**Step 3:** The set DP\(_{there}\) = the boolean closure of DPs formed from a Det\(_{there}\)

\(^6\) I am simplifying slightly by ignoring 2-place Dets and other complex Dets, but otherwise the rules and the description following them are repeated exactly from Keenan (2003), pp 12-13 in the online prepublication version.

\(^7\) By separating the definition of basic There-Dets defined in terms of cons\(_2\) from the full set obtained by boolean closure, Keenan can account for the difference between the following two sentences, whose NPs are logically equivalent:

(i) There are either zero or else more than zero students in the garden. (Tautologous but acceptable)

(ii) ?? There are either all or else not all students in the garden. (Equally tautologous but not fully acceptable.)
Step 4. VP$_{\text{There}} = [\text{BE} + \text{DP}_{\text{There}} + \text{Coda}]$, where BE is any tensed/negated/modal form of be (is, shouldn’t be, ...) and Coda is an appropriate PP, Participle, Adjective Phrase, ... .

Step 5. For all models $M$, $|| \text{BE} \cdot \text{DP}_{\text{There}} \cdot \text{Coda} ||^M = ||\text{BE}||^M (||\text{DP}_{\text{There}}||^M (||\text{Coda}||^M))$.

The interpretation of a There-Sentence is the interpretation of its VP$_{\text{There}}$ (i.e. the particle there is uninterpreted.) BE denotes a general sentence level modality (affirmation, negation, possibility). The Coda determines a property which DP$_{\text{There}}$ takes as argument as in simple Ss.

Remark. I mentioned above the intuition that in there-sentences the predication is somehow ‘turned around’. Keenan gets at it in an indirect but effective way. Semantically, the interpretation is DP(Pred), just as in a normal subject-predicate sentence. But whereas in a normal sentence, the Det must be cons$_1$, which means that the only entities you need to take into account to evaluate the sentence are entities in the set denoted by the NP, in an existential sentence, the Det must be cons$_2$, which means that the only entities you need to take into account to evaluate the sentence are entities in the set denoted by the Coda.


4.3. Weak determiners in Russian.

With the help of students in previous years’ semantics classes in Moscow, we found a context which selects for weak DPs almost as clearly as "there-sentences" do in English, although there remain some interesting subtle factors.

(1) U nego est’ _____ sestra/sestry/sester

This context is modeled on the English weak-DP context involving have with relational nouns, discussed in (Partee 1999). It’s important that the noun is relational, and that it is ‘numerically unconstrained’, in the sense that a person may have no sisters, one sister, or more than one sister. It is also important that it is the kind of relational noun that cannot be easily used as a simple one-place predicate, because with ordinary nouns, it is possible to have strong determiners in such a sentence (presumably with some shifting of topic-comment structure, (and perhaps also a shift to a “different verb est”, although I’m not sure of that)).

The context in (1) clearly accepts weak Dets including cardinal numbers, nikakoj sestry, ni odnoj sestry, nikakix sester (negative ones require replacement of est’ by net), neskol’ko, mnogo, nemnogo. And it clearly rejects strong Dets vse, mnogie, eti, nekotorye, každaja.

Note: One can also ask whether there are contexts which allow only strong quantifiers. I’m not sure of any really perfect contexts, ‘topicalization’ as in (2) is one approximate “strong-only” context (but it prefers definites; not all ‘strong DPs’ are good.)

(2) a. Those movies/ most American movies/ the movie we saw yesterday I didn’t (don’t) like very much.

b. *Sm$_8$ movies, *a Russian movie I don’t like very much.

Caution: as noted by Mil’sark (1974, 1977), many English determiners seem to have both weak and strong readings, and the same may be true of Russian. There are only a few, like sm and a, that are unambiguously weak; there are a slightly larger number, including every, each, all, most, those, these, the(?) (for all), which are unambiguously (or almost unambiguously) strong.

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8 I use sm for the unstressed some; sm is unambiguously weak, whereas stressed some may be strong.
4.4. Related topics and open problems.

For recent observations on the interaction of strong and weak Russian determiners with scope of negation and Genitive of Negation, see (Borschev et al. 2008). Weak and strong determiners are also closely related to “referential status” in the work of Paducheva (2000, [1985] 2009).

Another topic related to this issue, is the range of interpretations of Russian NPs/DPs with no article (singular and/or plural); if we think of those as DPs having an “empty determiner” ØDet, then one can ask whether there is just one ØDet or more than one, and what its/their semantic properties are. In particular, if there are two different ØDet’s analogous to English a and the, we would expect one to be weak and one to be strong. And in that case we would expect some systematic differences in interpretation depending on whether we put an NP/DP like mal’čiki in an environment which allows only weak quantifiers, one which allows only strong quantifiers, or one which allows both. (See Bronnikov (2007), and also (Bittner and Hale 1995), which argues for a difference between Warlpiri, with no determiners at all, and Polish, with ØDet’s.)

There is an increasing amount of literature in recent years on the semantics of bare NPs/DPs, singular and plural, in a range of languages. You have some local experts on the syntactic debates about NP/DP status here in Moscow, including Yakov Testelets and Ekaterina Lyutikova; one good reference in Russian is (Lyutikova 2010).

Other topics of interest in the semantics of determiners and quantifiers, at least some of which we will discuss later in the semester, include

- Negative Polarity Items (which apply not only to determiners and quantifiers) and the semantic property of downward monotonicity (downward-entailingness) – see a good brief introduction in (Larson 1995).
- The semantics of mass vs. count nouns, and singular vs. plural, and the semantic properties of determiners that are sensitive to those distinctions.

Homework #2, due at the time of Lecture 6.

Do problem 1 and problem 5 and one or two others that are suitably challenging for you but not impossible.

1. Which Russian determiners/quantifiers can and cannot be used in the following contexts?
   a. Na kuxne _____ koški. (Adjust the morphology on koški as necessary; add ne if nec.)
   b. Na kuxne est’ _____ koški. (Adjust morphology on koški, substitute net if necessary.)
   c. Na kuxne imeetsja _____ koški. (Adjust morphology and/or add ne as necessary.)
   d. U menja est’ _____ sestry. (Adjust morphology, substitute net if necessary.)
   e. U menja _____ sestry. (Adjust morphology and/or add ne as necessary.)

What suggestions can you make about the differences in these five constructions that could help explain the differences in which DPs can occur in them?

2. a. Either in Russian or in some other language other than English, find two strong DETs and two weak DETs, and show that they are respectively strong and weak.
   b. Show that all four of your DETs are conservative. Give the appropriate ‘test sentences’ in ‘your’ language, and if you can, give a proof of conservativity for at least one of them. That is, give an argument to show that for one of your DETs it is true that for all A,B, D(A)(B) = D(A)(A ∩ B).
3. Fill in the missing steps in the derivation of reduced forms of translations of the example *every student reads a book*, on derivation (ii) in 3.2 of Lecture 3. Use Montague’s generalized quantifier interpretations of *every student* and *a book*, as given in Section 3 of Lecture 2, repeated under “generalized quantifier-forming DETS” in Section 1.3, of Lecture 3. This is an exercise in compositional interpretation and lambda-conversion. (We partly did it in Seminar March 3.)

4. Translate the following sentences into first-order logic. Don’t try to do it compositionally (we don’t have the rules for it) – just try to figure out a formula of first-order logic that expresses this. One important note: we have to add “equality” to first-order logic for examples like this: that is, assume that we have a ‘logically constant’ binary relation “=”. So to say that two individuals \( x \) and \( y \) are different, we write “\( x \neq y \)”.
   a. Mary admired every woman except herself.
   b. Every woman admired every woman except herself.

5. Review Lecture 4 and (Partee 1995). In past years I often gave the following adjective assignment:
   (1). Classify the following adjectives as (i) intersective; (ii) nonintersective but subsective; (iii) nonsubsective; among the nonsubsective ones, identify which ones are (iii) plain privative, and which are (iii) plain nonsubsective. There may be adjectives that have different senses which must be classified differently; in those cases, indicate the relevant senses and their classifications. (It is a good idea to test each adjective with a variety of different sorts of nouns, as a way to look for different senses.) There may be unclear cases, which you can mark by adding “?” to your classification.
   Adjectives: плотоядный, искусный, бывший, будущий, фальшивый, мнимый, предполагаемый, красный, точный, строгий, богатый, бедный, внимательный, каменный, больной, типичный.
   (2). Add two more Russian adjectives to each category.
   (3). Write a paragraph discussing one unclear case, either from list (1) or your list (2).

This time, I don’t want you to answer all of those, but to study the answers and discussion paragraphs that I compiled from 1996 to 2003 (here: https://udrive.oit.umass.edu/partee/MGU_Web_13/materials/ADJ HW results 03.pdf) and write two or three paragraphs discussing those results. For instance, you could imagine that you were going to choose a research topic related to those results – what would you see as an interesting problem to work on?

References.


