Lecture 4. Noun Phrases and Generalized Quantifiers

1. More on function-argument structure, syntactic categories, semantic types.................................................1
2. NPs as Generalized Quantifiers. (continued) ..................................................................................................3
3. Weak Noun Phrases and Existential Sentences .........................................................................................4
3.1. Some puzzles of existential sentences ...................................................................................................4
3.2. “Weak” determiners and existential sentences in English (three-sentences) ...........................................5
3.2.1. Early classics: Milson, Barwise and Cooper, early Keenan ................................................................5
3.2.2. The importance of the “coda” in more recent proposals .................................................................8
3.3. Weak determiners in Russian. ..............................................................................................................11
3.4. Open topics for research. ....................................................................................................................12
Homework #2, due at the time of Lecture 6. ........................................................................................................12
References. ..........................................................................................................................................................13


Reminder: See file “Links to readings 2008.doc” for weekly updates of readings and supplementary online references. The “links” page URL is: https://udrive.oit.umass.edu/partee/Semantics_Readings/Links%20to%20Readings%202008.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(j)
    \[= \text{(the characteristic function of)} \text{the set of entities that walk}\]

(2) NP of type (e → t) → t, combining with VP of type e → t, to give S, of type t.
    TR(every man) = λx[man(x) → P(x)] type: (e → t) → t
    TR(walks) = Walk type: e → t
    TR(every man walks) = λx[man(x) → P(x)](walk) type: t
    = ∀x[man(x) → walk(x)]

Relations and functions. What about transitive verbs and object NPs?

In first-order predicate logic: First, suppose we just had simple NPs 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.: \[\text{\{John, Mary\}, \{Mary, Bill\}, \{Bill, Bill\}\}]. The characteristic function of this set is a function of type \((e \times e) \rightarrow t\). (The verb simply combines with two NPs to form an S.)
2. NPs as Generalized Quantifiers. (continued)

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

- John \(\lambda P[P[j]]\) (the set of all of John’s properties)
- John walks \(\lambda P[P[j]](\text{walk}) = \text{walk}(j)\)
- every student \(\lambda PVx[\text{student}(x) \rightarrow P(x)]\)
- every student walks \(\lambda PVx[\text{student}(x) \rightarrow P(x)](\text{walk}) = \forall x[\text{student}(x) \rightarrow \text{walk}(x)]\)
- a student \(\lambda PSx[\text{student}(x) \& P(x)]\)
- the king \(\lambda P[\exists x[\text{king}(x) \& P(x)]]\)

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

Typical case:

- **NP**
- **VP**

\[ \begin{array}{c}
\text{DET} \\
\text{CNP}
\end{array} \]

\(\text{CNP: type } e \rightarrow t\)
\(\text{VP: type } e \rightarrow t\)
\(\text{DET: interpreted as a function which applies to CNP meaning to give a generalized quantifier, which is a function which applies to VP meaning to give Sentence meaning (extension: truth value). type: } (e \rightarrow t) \rightarrow ((e \rightarrow t) \rightarrow t)\)
\(\text{NP: type } (e \rightarrow t) \rightarrow t\)

Sometimes it is simpler to think about DET meanings in relational terms, as a relation between a CNP-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 \([B] A \cap B \neq \emptyset\): the set of all sets that contain \(A\) as a subset. Equivalently: \([\text{Every}](A) = [B] \forall x (x \in A \rightarrow x \in B)\)

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{Every}] = \lambda Q[\lambda P[\forall x (Q(x) \rightarrow P(x))]]\]

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

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

Examples:
- No solution is perfect = No solution is a perfect solution.
- Exactly three circles are blue = Exactly three circles are blue circles.
- Only boy is singing = every boy is a boy who is singing.
- “Non-example”: 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).

3. Weak Noun Phrases and Existential Sentences

3.1. Some puzzles of existential sentences

What makes some sentences “existential”?

Existential sentences vs. plain subject-predicate sentences:

1. a. There are / There’s two holes in my left pocket.
   - Two holes are in my left pocket. (grammatical but not ‘ordinary’)
2. a. There is / There’s a cat on the sofa. # There is / # There’s the cat on the sofa.
   - The cat is on the sofa. (?) A cat is on the sofa. (grammatical but not ‘ordinary’)

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

- Which NPs can and cannot occur in existential sentences, and why?

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

- 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 NPs 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’ NPs as subject in ‘canonical’ subject position.

The (a) sentences above: Existential sentences.

- do not have that ‘normal’ or ‘standard’ structure;
- the corresponding NP either is not a subject, or is a ‘non-canonical’ or ‘demoted’ subject.
- The subject is usually a ‘weak’ NP.

\(1\) Standard written English distinguishes singular and plural *There is/are*; colloquial spoken English often uses invariant *There’s*, though in the past tense still distinguishing *There was/were*. Some colloquial dialects also have invariant *There* way. Thanks to Pasha Rudnev for noticing that I always use invariant *There’s* and asking about it.
Some good background and contemporary references:


There is a great deal of literature concerned with the weak/strong distinction, its basis, its cross-linguistic validity, the semantics and pragmatics of the constructions that select for weak or strong NPs, and the role of factors such as presuppositionality, partivity, topic and focus structure in the interpretation of NPs in various contexts. Two interesting papers with a cross-linguistic perspective are (de Hoop 1995) and (Comorovski 1995); there are many other interesting works, before and since. Diesing’s book on indefinites (Diesing 1992) is one major study with a very syntactic point of view; Partee (1991) suggests a more systematic connection between weak-strong, Heimian tripartite structures, and topic-focus structure. See also (Partee 1989) on the weak-strong ambiguity of English many, few and (Babko-Malaya 1998) on the focus-sensitivity of English many and the distinction between weak mnogo and strong mnogie in Russian.

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

3.2.1. 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, sm, one, two, three, ..., at most/at least/exactly/more than/nearly/only one, two, three, ..., many, how many, a few, several, no.

(1) #There are most democratic governments.
(2) #There are rich governments.
(3) #There is a new problem.

(4) There are two computers.
(5) There are many unstable governments.
(6) There are no tickets.

(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.)

(8.1) #There are no tickets.
(8.2) #There are no tickets.
(8.3) #There are no tickets.

(9) #There are both computers.
(9') #There are all interesting solutions.
(9'') #There is the solution. (# with “existential” there ; OK with locative there.)

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

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.
To “exist” is to be a member of the domain E of the model. A sentence of the form “There be Det CNP exists()”, i.e. as E ∈ [Det CNP]. If D is the interpretation of Det and A is the interpretation of CNP, this is the same as D(A)(E) = 1. Because of conservativity, this is equivalent to: D(A)(A ∩ E) = 1
Since A ∩ E = A, this is equivalent to D(A)(A) = 1.

Explanation of the restriction on which determiners can occur in existential sentences (Barwise and Cooper): 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.

**Third step: an improved characterization of weak NPs** (Keenan 1987)

Two problems with Barwise and Cooper’s explanation: (i) the definitions of positive and negative strong sometimes require non-intuitive judgments, not “robust”; (ii) tautologies and contradictions are not always semantically anomalous, e.g it is uninformative but nevertheless not anomalous to say “There is either no solution or at least one solution to this problem.” And while “there is every student” is ungrammatical, “Every student exists” is equally tautologous but not ungrammatical. Keenan makes more use of the properties of intersecitivity and symmetry which weak determiners show.

**Definition:** A determiner D is a **basic existential determiner** iff for all models M and all A,B ⊆ E, D(A)(B) = D(A)−B(E). Natural language test: “Det CNP VP” is true iff “Det CNP which VP exists(”) 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 (and, or, not).

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

*Every* is 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) = D(B)(A).

Testing (sometimes caution needed with contextual effects):

**Weak (symmetric):** Three cats are in the kitchen = Three things in the kitchen are cats.
No cats are in the kitchen = Nothing in the kitchen is a cat.
More than 5 students are women = More than 5 women are students.

**Strong (non-symmetric):** Every Zhiguli is a Russian car ≠ Every Russian car is a Zhiguli.
Neither correct answer is an even number ≠ Neither even number is a correct answer.

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4 Keenan (1987, 2003) also has some additional ways to build up complex determiners, and also treats “two place” determiners like more (N1) than (N2) and others.

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**Fourth step:** Zucchi’s *coda condition*. (Zucchi 1995) offers 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. Zucchi also proposes the following constraints on the interpretation of There-sentences, combining semantic and pragmatic factors:

**Zucchi’s analysis:** (citing from Keenan 2003)

a. NPs that are unacceptable in There-sentences are those that are built from presuppositional determiners, i.e. determiners which presuppose that their CNP domain is not empty.

b. Although the coda does not form a constituent with the NP, the interpretation of there-sentences incorporates the coda property into the scope of the Det in the postverbal NP.

As a result, because every is presuppositional, the sentence #There is every student in the garden presupposes that the denotation of the whole CNP+Coda, student in the garden, is not empty.

c. The (pragmatic) Felicity Conditions of there-sentences require that the common ground should not include either the proposition that CNP+Coda is empty nor that it is non-empty.
Fifth step: An improvement on Zucchi’s analysis, and all semantic; Keenan (2003). Keenan (2003) agrees with the Coda condition, but wants to keep the Coda semantically as well as syntactically separate from the postverbal NP so as to make the analysis more compositional. And 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 languages must be conservative (Barwise and Cooper: see Section 2). Keenan gives an alternative and equivalent definition of that property, renaming it “conservative on the first argument (cons1)”, so that he can make use of the notion of being conservative on the second argument.

(12) Definition: a. A map D from domain \(D_{\text{cons1}}\) to \(D_{\text{cons1}}\) is conservative on its first argument (cons1): if:
   - For all \(A, B, B' \subseteq E\), whenever \(A \cap B = A \cap B'\), then \(DAB = DAB'\).
   - b. An equivalent (and standard) statement is:
     - For all \(A, B \subseteq E\), \(DA(A)(B) = D(A')(A)(B')\).

Then Keenan introduces a new property, conservativity on the second argument, cons2.

(13) Definition: a. A map D from domain \(D_{\text{cons2}}\) to \(D_{\text{cons2}}\) is conservative on its second argument (cons2): if:
   - For all \(A, A', B \subseteq E\), whenever \(A \cap B = A' \cap B\), then \(DAB = DAB'\).
   - b. An equivalent statement is:
     - For all \(A, B \subseteq E\), \(DA(A)(B) = D(A')(A)(B')\).

(14) NPthere condition: The set of NPs that can occur in There-sentences is the set of (logical compounds of) those NPs built from lexically cons2 Determiners.

What are some examples of cons2 Determiners?

(i) All intersective (symmetrical) Dets are both cons1 and cons2. So all of the determiners classified as weak on Keenan’s earlier criterion are cons2.
(ii) Barwise and Cooper claimed that conservativity (cons1) was a determiner universal – that all determiners are cons1. So any examples of “Dets” that are not cons1 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 cons2 but not cons1; “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. \(\text{ONLY/JUST} (A) (B) = \text{ALL} (B) (A)\)
   b. \(\text{MOSTLY} (A) (B) = \text{MOST} (B) (A)\)

We argued when we first discussed 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 ‘NP’ 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.

Some further generalizations (Keenan):

Theorem 2: If a determiner is cardinal, then it is both cons1 and cons2.

Definition of cardinal: D is cardinal if for all subsets A, B, C of the domain, it holds that if \([A \cap B] = [A' \cap B]\), then \(DAB = DAB'\). I.e., the semantic value of DAB depends only on the cardinality of the intersection of A and B.

Theorem 3: The determiners which are both cons1 and cons2 are exactly the intersective (symmetrical) determiners.

Theorem 4: The following inclusions are proper (i.e. non-equality):
- The cardinal Dets are a proper subset of the intersective Dets, which are a proper subset of the cons1 Dets. I.e. cardinal \(\Rightarrow\) intersective \(\Rightarrow\) cons1.

Illustrations: Cons2, but not intersective: every, most, both. Intersective but not cardinal: according to Keenan, all simple lexical dets which are intersective are also cardinal; the only dets which he lists as intersective but not cardinal are interrogative which plus non-simplex ones like more male than female, at least two male and not more than three female, no, ... but John, practically no.

The interpretation of There-Sentences on Keenan’s account:

Step 1: The set Initial-DetThere consists of all lexical Dets which are cons2.

Step 2: The set DetThere is the boolean closure of the set Initial-DetThere, i.e. the closure of the set Initial-DetThere under (both) and, (either) or, not, but not, neither ... nor.

Step 3: The set DPThere is the boolean closure of DPs formed from a DetThere.

Step 4: VPThere = \([BE + DPThere + \text{Coda}]\), 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, \(\| BE \|_{\text{DPThere Coda}}^M = |BE|^M \cap |\text{DPThere}^M \cap |\text{Coda}^M|\).

The interpretation of a There-Sentence is the interpretation of its VPThere (i.e. the particle there is uninterpreted.) BE denotes a general sentence level modality (affirmation, negation, possibility). The Coda determines a property which DPThere takes as argument as in simple 5s.

Remark. I mentioned above the intuition that in there-sentences the predication is somehow ‘turned around’. Zucchi goes partway toward that intuition in letting the Det combine with the NP+CODA combination and putting in the requirement that sentence not presuppose either that the Coda is empty nor that it is non-empty. Keenan gets at it in a much more indirect way, but one that appears to be quite effective. Semantically, the interpretation is (ignoring the sentence-level elements associated with BE) still just DP (Pred), just as in a normal subject-predicate sentence. But whereas in a normal sentence, the Det must be cons1, which means that the only entities you need to take into account to evaluate the sentence are entities in the set denoted by the CNDP, in an existential sentence, the Det must be cons2, 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. And furthermore, it may be no accident that mostly, only, just really look much more like

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\(^1\) 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.

\(^2\) By separating the definition of basic There-Dets defined in terms of cons1 from the full set obtained by boolean closure, Keenan can account for the difference between the following two sentences, whose DPs are logically equivalent:
- (i) There are either zero or else more than zero students in the garden. (Tautological but acceptable)
- (ii) ?? There are either all or else not all students in the garden. (Equally tautological but not fully acceptable.)
adverbs than like Dets: more work on these elements and on the structure of There-sentences would be welcome.

Note on other recent research: Other interesting work includes (McNally 1998, Landman 2004). The problems and alternative proposals they raise are interesting and important, but we will not discuss them in this lecture, possibly later if there is time and interest.

3.3. Weak determiners in Russian.

With the help of students in previous years’ semantics classes in Moscow, we finally found a context which selects for just weak NPs as clearly as "there-sentences" do in English, i.e. without a lot of extra complications about distinguishing readings, topic-focus structure, etc. (Those problems plague the attempts I had previously made to use existential sentences with the verbs est’ or ime’tja, and previous attempts to use u nego est’... with ordinary nouns.) Here it is.

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

This context is modeled on the English weak-NP context involving have with relational nouns, which I’ve discussed in print (Partee 1999). It’s important that the noun is relational, and that it is ‘numerically unconstrained’, in the sense that a person may easily 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 sestra, ni odnoj sestra, nikakix sester (the negative ones require replacement of est’ by net, of course), neskak’o, mnogo, nemnogo. And it clearly rejects strong Dets vse, mnogie, eti, nekotorye, each.

It took me 3 years and 4 classes of students to find such a clear context that elicits unequivocal and unanimous judgments without a lot of caveats. (There are of course some marginal problems, analogous to English John has the rich sister in the sense of John is the one who has a rich sister; but the caveats are actually fewer than with English there-sentences.)

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

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

Caution: as noted by Milisark (1974, 1977), many English determiners seem to have both weak and strong readings, and the same is undoubtedly 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, they?), which are unambiguously (or almost unambiguously) strong.

\[1\] use sm for the completely unstressed pronunciation of some; sm is unambiguously weak, whereas stressed some may be strong.

3.4. Open topics for research:

For some recent observations on the interaction of strong and weak Russian determiners with scope of negation and with Genitive of Negation, see (Borschev et al. in press). The notions of weak and strong determiners are also closely related to notions of “referential status” in the work of Paducheva (1985, 2006).

Another good research topic, related to this issue, would be on the range of interpretations of Russian NPs with no article (singular and/or plural); if we think of those NPs as 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.

Do 3 or 4 or 5 problems that are of a suitably challenging level for you but not impossible.

1. 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.

2. Fill in all the steps to show why TR(is a prophet) = man. (Lecture 3)

3. Write the translations of the in each of its three types. (Lecture 3)

4. Translate the following two sentences into first-order logic. You don’t have to do this compositionally – just write down the formulas.

- Every candidate voted for every candidate.
- Every candidate voted for himself.
5. Translate the following sentences into first-order logic. Again, 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 admires every woman except herself.

b. Every woman admired every woman except herself.

6. Translate the following two sentences into first-order logic – again, just the formulas.

a. Every professor knows a student who admires him. (where the antecedent of him is every professor)

b. Every professor knows a student who admires himself. (where the antecedent of himself is a student)

7. (Optional) Making use of the rules in the fragment in Lecture 3, work out the translation of the sentence in $6a$ compositionally. The problem is a combination of Exercise 5 from Homework 1 and the way variable bound anaphora is introduced in the Quantifying In rule.

8. Which Russian determiners/quantifiers can and cannot be used in the following contexts?

- *La cunca* ___ *koški.* (Adjust the morphology on *koški* as necessary.)
- *La cunca est' ___* *koški.* (Adjust morphology on *koški*, substitute net if necessary.)
- *U menja est' ___* *koški.* (Adjust morphology as necessary.)
- *Na kuxne est' ___* *koški.* (Adjust morphology as necessary.)

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

References.

For links to some of these in downloadable form, see “Links to Readings”:
https://udrive.oit.umass.edu/partee/Semantics_Readings/Links%20to%20Readings.doc


http://people.umass.edu/partee/docs/GenNegTravaux.pdf

Borshev, Vladimir et al. in press. Russian genitives, non-referentiality, and the property-type hypothesis. In Formal Approaches to Slavic Linguistics: The Stony Brook Meeting 2007 (FASL 16),


