

Lecture 9. Intensionality, Referential Opacity, Property-Type NPs

1. Intensionality	1
2. “Weak” determiners and existential sentences.	5
3. Property-type NP interpretations	7
3.1. Zimmermann 1993 on intensional verbs.	7
3.1.1. The fundamental properties of intensional contexts.	7
3.1.2. The classical analysis and its problems.	7
3.1.3. Zimmermann’s alternative account	8
3.2. McNally 1995. “Bare plurals in Spanish are interpreted as properties.”	8
4. Russian Genitive of Negation	9
References.....	12

Suggested Readings:

- (i) Zimmermann, Ede. 1993. On the proper treatment of opacity in certain verbs. *Natural Language Semantics* 1:149-179. (Zimmermann 1993)
- (ii) Kratzer, Angelika. 1981. The notional category of modality. In *Words, Worlds, and Contexts. New Approaches to Word Semantics*, eds. H.-J. Eikmeyer and H. Rieser, 38-74. Berlin: de Gruyter. Reprinted in Portner and Partee, eds., 2002, 289-323. (available on your CD) (Kratzer 1981)
- (iii) Portner, Paul. 1997. The Semantics of Mood, Complementation, and Conversational Force. *Natural Language Semantics* 5:167-212. (Portner 1997)
<http://people.umass.edu/partee/docs/portnerNLS1997.pdf>
- (iv) Partee, Barbara H. (in press) Weak noun phrases: semantics and syntax. To appear in the proceedings of Dialog 2005, Moscow. (Partee in press)
http://people.umass.edu/partee/docs/Partee_Dialog2005.pdf

Additional Recommended Readings

- Maribel Romero, course handout April 5, 2005: “Intensionality”:
<http://babel.ling.upenn.edu/courses/ling255/Intensionality.pdf>
- (Kiparsky and Kiparsky 1970)
- (Partee 1974) (available on your CD)
- (von Fintel 2001) (preprint available at <http://mit.edu/fintel/www/conditional.pdf>)
- von Fintel, Kai and Irene Heim (in progress). Draft chapters of a new textbook on Intensionality. Chapters 1-3. (on your CD)
- (Lewis 1978) Translated into Russian by A.D. Šmelev. (on your CD)
- (Dayal 2004) (on your CD)
- (Larson 2002) <http://semanticsarchive.net/Archive/WVhMGRhN/larson.intens.pdf>

1. Intensionality

Montague’s Intensional Logic (IL) was presented in Lecture 2, but we have not made any use of its intensional aspects; we have been working with extensional parts of it. Today we very quickly introduce the big topic of intensionality, and after a brief general introduction, we will concentrate on the question of whether “non-referential” NPs should sometimes be given “property-type” interpretations.

Intensions and extensions. This distinction goes back to Frege (Frege 1892) , who distinguished *Sinn* and *Bedeutung*: variously translated as “sense and reference”, “sense and denotation”, “meaning and denotation”. Carnap (Carnap 1956) formalized Frege’s distinction and introduced the terminology “intension and extension”, which has become standard in logic and formal semantics.

The need for distinguishing intensions and extensions. The principle of compositionality requires that the meaning of an expression is a function of the meanings of its parts and of the way they are syntactically combined. This requirement gives rise to *substitutivity tests*.

Example 1: non-intersective adjective + common noun phrase

What is the semantic type of the meaning of *violinist*? We have analyzed it as a common noun, type $\langle e, t \rangle$, which means that it denotes a set of individuals: the set of violinists. Similarly for *surgeon*. But when we discussed the meaning of non-intersective adjectives like *skillful*, we showed, in effect, that substitution of one noun for another noun picking out the same set does NOT always preserve truth-value:

- (1) a. John is a skillful surgeon.
- b. John is a skillful violinist.

In a possible state of affairs in which the set of surgeons is identical to the set of violinists, it is possible for (1a) to be true and (1b) false, and vice versa.

Frege’s solution, in the version in which it was adapted by Carnap and then Montague, is to say that a noun like *surgeon* has both an *intension* and, in each possible state of affairs, an *extension*. The *intension* is closer to what we intuitively think of as the meaning of the expression: Montague formalized it as a function which applies to possible worlds, or possible states of affairs, and picks out in each possible state of affairs the set of surgeons in that state of affairs.

And in the expression *skillful surgeon*, Montague (following Kamp, Parsons, and Clark) argued that the adjective denotes a function that applies to the *intension* of the common noun phrase. And since the intensions of *violinist* and *surgeon* are clearly different, it is not surprising that (1a) and (1b) can have different truth values even in a situation in which the *extensions* of *violinist* and *surgeon* are the same.

In the case of expressions of type $\langle e, t \rangle$, the extension at each possible world is a set of individuals; the intension is a *property* of individuals, formalized (in Montague’s IL) as a function from possible worlds to sets of individuals.

Example 2: Definite NPs with predicates of ‘change’.

- (2) The U.S. President is gaining power.

The predicate “is gaining power” can apparently be applied to either the intension or the extension of the subject term; similar effects are found with verb phrases like *is changing*, *is becoming less popular in many parts of the world*. These examples illustrate a ‘temporal’ dimension; Montague treated possible worlds and times in a parallel way. On one interpretation, those predicates apply to George W. Bush; on the other interpretation, (2) applies to the “president-function”, asserting that each president has more power than the previous one.

For expressions of type e , the extension is an entity; the intension is an *individual concept*, formalized in IL as a function from possible worlds to individuals.

Example 3: ‘Intensional transitive verbs’ with NP objects

- (3) John is looking for the owner of the Mercedes
 The owner of the Mercedes is the president of the bank

 Therefore ? John is looking for the president of the bank

The *failure of substitutivity* of coreferential terms in the context *John is looking for* _____ is the principal diagnostic for calling that context *non-extensional*. [Also called *referentially opaque* (Quine).] It contrasts with an *extensional context* such as *John is standing next to* _____. [also called *referentially transparent* (Quine).]

The idea for a compositional semantics for constructions involving opaque or non-extensional contexts traces back to Frege and was further developed by Carnap, Kripke, Montague. It involves Frege's distinction between *Sinn* and *Bedeutung*, developed by Carnap as *intension* vs. *extension*.

We typically refer to verbs like *seek*, *look for*, *want* as “intensional verbs”, but really we mean verbs whose object must be interpreted intensionally: to account for the failure of substitutivity, we argue that the verb combines semantically not with the extension of its direct object, but with its intension. If the type of the object is taken to be type *e*, then this is another case of an *individual concept*; if it is taken to be a generalized quantifier, then the intension has no special name, it is just “the intension of a generalized quantifier”, i.e. a function from possible worlds to generalized quantifier denotations (sets of sets of individuals).

Example 4: Propositional attitude verbs and embedded clauses.

- (4) a. John believes that March 15, 2005, was a Wednesday.
b. John believes that January 25, 2005, was a Wednesday.

Suppose that (4a) is true. Now, in fact, both of those days were Tuesdays, so both embedded clauses are false. And suppose we say that the extension of a sentence is its truth value. Well, obviously we don't want to use the extension of the embedded sentence in computing the truth-conditions of the whole sentence – otherwise we would be predicting that if John believes one false sentence, he believes “the false”, i.e. he believes any false sentence. We would predict that if (4a) is true, (4b) must be true, too. Instead, we want (at least) the *intension* of the embedded sentence to contribute to the extension of the whole sentence. This helps account for two facts: first, that substituting a sentence with the same truth value does not always preserve the truth of the whole sentence, and second, that in fact the truth value of the embedded sentence may be quite irrelevant to the truth value of the whole sentence.

For expressions of type *t*, the extension is a truth value, and the intension is a *proposition*, formalized in IL as a function from possible worlds to truth values, or equivalently, as a set of possible worlds. If you know the intension of a sentence, then in principle, you know how to divide the set of possible worlds into the ones where the sentence is true and the ones where it's false. (“In principle”, because it requires being “given” the possible worlds as arguments, which is hard to do in any direct way, and may sometimes be hard to do at all. But sometimes it's clear enough.)

Possible worlds. There is lots of philosophical discussion of possible worlds; and if we want to enrich them with various aspects of contexts like time and place and point of view, it may be better to work with “parts” of possible worlds, what Kratzer takes as *possible situations* (Kratzer 1989). (This is different from the situation theory of Barwise and Perry (Barwise and Perry 1983), which is not intensional, and therefore many of us consider it inadequate.) While there may be very real philosophical debates about the ontological

status of alternative possible worlds or alternative possible situations, there can hardly be any doubt that they are cognitively fundamental. I would argue that even dogs and prelinguistic infants have conceptions of alternative possible states of affairs, and that any indication of “surprise” is good evidence of this: surprise is a reaction to a mismatch between an *expected* state of affairs and a *perceived* state of affairs, and without the possibility of conceiving of things as being different from how they actually are, we couldn't be surprised. (Remind me to tell my anecdote about Robin Cooper's dog and how I came to realize that dogs conceptualize alternative states of affairs and can be surprised.)

Modal logic.

For this, I refer you to Maribel Romero's class handout from April 5, 2005: <http://babel.ling.upenn.edu/courses/ling255/Intensionality.pdf> . (Thank you, Maribel!)

Intensional type theory.

Maribel introduced the fundamentals of intensionality without involving the full type theory; her intensional operators were all operators that apply to a sentence, and make use of the distinction between *truth value* and *proposition*. Some philosophers and some linguists (see Larson 2002) believe that all intensional contexts in natural language are proposition-embedding contexts. That is a very interesting debate, and some of the arguments pro and con are discussed in Larson (2002); his conclusion is ‘pro’; I would continue to argue ‘con’. Before Montague introduced his higher-order typed intensional logic, it was difficult to see how to avoid decomposing all intensionality into proposition-embedding constructions, often at considerable violence to the syntax. But Montague designed his type theory so that for *every* extensional type there is a corresponding intensional type. Recall his type theory from Lecture 2:

The types of Montague's IL are as follows:

Basic types: *e* (entities), *t* (truth values)

Functional types: If *a, b* are types, then *<a, b>* is a type (the type of functions from *a*-type things to *b*-type things.)

Intensional types: If *a* is a type, then *<s, a>* is a type (the type of functions from possible worlds to things (extensions) of type *a*.)

Montague's IL also includes two rules specifically relating to intensions and extensions.

Syntactic Rule 4: (“up”-operator.) If $\alpha \in ME_a$, then $[\wedge\alpha] \in ME_{<s,a>}$.

Semantic Rule 4: $\|[\wedge\alpha]\|^{M,w,g}$ is that function *h* of type *<s, a>* such that for any *w'* in *W*, $h(w') = \|\alpha\|^{M,w',g}$.

Syntactic Rule 5: (“down”-operator.) If $\alpha \in ME_{<s,a>}$, then $[\vee\alpha] \in ME_a$.

Semantic Rule 5: $\|[\vee\alpha]\|^{M,w,g}$ is $\|\alpha\|^{M,w,g}(w)$

And there is also the necessity operator of modal logic, and a “PAST” operator:

Semantic Rule 2:

(a) $\neg\phi$, $\phi \& \psi$, $\phi \vee \psi$, $\phi \rightarrow \psi$, $\phi \leftrightarrow \psi$, $\exists u\phi$, $\forall u\phi$ as in predicate logic.

(b) $\|\Box\phi\|^{M,w,g} = 1$ iff $\|\phi\|^{M,w',g} = 1$ for all *w'* in *W*.

(c) $\parallel \text{PAST } \varphi \parallel^{M,w,g} = 1$ iff $\parallel \varphi \parallel^{M,w',g} = 1$ for some $w' \leq w$. (This is a simplification; here we are treating each w as a combined “world/time index”, possibly a situation index; $w' \leq w$ if w' is a temporally earlier slice of the same world as w .)

Examples of expressions of IL and their types:

Type e: $\lambda x(\text{president}(x))$ (“the president” in type e: review Lecture 2)

Type $\langle s, e \rangle$: $\lambda \langle s, e \rangle (\text{president}(x))$

Type $\langle e, t \rangle$: **surgeon**; **violinist**; $\lambda x[\text{love}(x)(\text{Mary})]$; $\lambda x \lambda y \text{surgeon}$

Type $\langle s, \langle e, t \rangle \rangle$: $\lambda \langle s, e \rangle (\text{surgeon}; \lambda x[\text{love}(x)(\text{Mary})])$

Type t: **love(John)(Mary)** ‘Mary loves John’

Type $\langle s, t \rangle$: $\lambda \langle s, e \rangle (\text{love}(\text{John})(\text{Mary}))$ ‘that Mary loves John’

Generalized quantifiers, type $\langle \langle e, t \rangle, t \rangle$: $\lambda P \exists x[\text{unicorn}(x) \ \& \ P(x)]$ ‘a unicorn’

Intension of gen. quantifier, type¹ $\langle s, \langle \langle e, t \rangle, t \rangle \rangle$: $\lambda P \exists x[\text{unicorn}(x) \ \& \ P(x)]$

Montague’s type for *seek*: a function from intensions of generalized quantifiers, i.e. $\langle s, \langle \langle e, t \rangle, t \rangle \rangle$, to VP-type, i.e. $\langle e, t \rangle$. Altogether: $\langle \langle s, \langle \langle e, t \rangle, t \rangle \rangle, \langle e, t \rangle \rangle$.

2. “Weak” determiners and existential sentences.

(This section is a review from Lecture 3; we will probably skip over it today.)

Data: OK, normal:

- (1) There is a new problem.
- (2) There are three semantics textbooks.
- (3) There are many unstable governments.

Anomalous, not OK, or not OK without special interpretations:

- (5) #There is every linguistics student.
- (6) #There are most democratic governments.
- (7) #There are both computers.
- (9) #There is the solution. (# With “existential” *there* ; OK with locative *there*.)

Semantic explanation, with roots in (Milsark 1974, 1977), formal development by (Barwise and Cooper 1981) and by Keenan.

Definition (Keenan 1987): A determiner D is a *basic existential determiner* if for all models M and all $A, B \subseteq E$, $D(A)(B) = D(A \cap B)(E)$. Natural language test: “Det CN VP” is true iff “Det CN which VP 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 (and, or, not).

¹ Actually, since Montague built intensionality into his types more systematically, the type for a plain generalized quantifier would be a set of properties rather than a set of sets, so $\langle \langle s, \langle e, t \rangle, t \rangle \rangle$, and then the intension of a generalized quantifier would be $\langle s, \langle \langle s, \langle e, t \rangle, t \rangle \rangle \rangle$. (Even here I have simplified, following arguments presented by Michael Bennett (Bennett 1976, Bennett 1974), in keeping the type of extensions of common nouns as $\langle e, t \rangle$, sets of entities, rather than $\langle \langle s, e \rangle, t \rangle$, sets of individual concepts.

Examples:

- (i) *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.
- (ii) *Every* is not a basic existential determiner. If there are 5 cats, of which 3 are in the tree, “Every cat is in the tree” is false but “Every cat which is in the tree exists” is true.

Basic existential determiners = symmetric determiners.

We can prove, given that all determiners are *conservative* (Barwise and Cooper 1981), 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:

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

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.

Many factors make it difficult to apply to Russian the test we used for English. A better, but provably equivalent, semantic test comes from symmetry:

- (a) *Na kuxne tri černye koški* \equiv *Tri koški na kuxne černye*.
In kitchen 3 black cats 3 cats in kitchen black
- (b) *Na kuxne vse černye koški* \neq *Vse koški na kuxne černye*.
In kitchen all black cats all cats in kitchen black

It is also harder to find constructions in Russian which allow only weak determiners, for a variety of reasons. There do seem to be at least two:

(i)

- (1) *U nego est' _____ sestra* /sestry /sester
at him.GENis _____ sister.NOM.SG / sister.GEN.SG / sister.GEN.PL
‘He has _____ sister(s).’

This context² 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 have no sisters, one sister, or more than one.

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

(ii) Another context which allows only weak determiners, in at least English, Polish, and Russian is the following (Joanna Blaszczak, p.c.):

- (2) *a house with _____ window(s)* *dom s _____ oknom/oknami*

Caution: as noted by Milsark (1974, 1977), many English determiners seem to have both weak and strong readings, and the same is undoubtedly true of Russian.

² Yury Lander (p.c.) has informed me that I am mis-remembering the results of class discussion and should be using examples with zero copula rather than *est'*. I need to look into that and consult with more native speakers. Feedback welcome.

3. Property-type NP interpretations

While some differences in the possible occurrence of ‘weak’ and ‘strong’ NPs can be accounted for by drawing semantic distinctions within the theory of generalized quantifiers, as in the account above, it has been argued that in some cases, weak NPs are really of “property type” (an intensional variant of type $e \rightarrow t$), rather than generalized quantifiers. Property-type analyses of various “weak NPs” are becoming increasingly common in Western formal semantics, and may have application to some problems in Russian semantics, including the Russian Genitive of Negation (section 4.)

3.1. Zimmermann 1993 on intensional verbs.

Zimmermann (1993) argues that Montague’s analysis of verbs like *seek* (“intensional transitive verbs”, or “opaque verbs”) as taking arguments of type “intension of Generalized Quantifier”, or $\langle s, \langle \langle s, \langle e, t \rangle \rangle, t \rangle \rangle$ is incorrect. He argues that the NP objects of opaque verbs should be semantically interpreted as *properties* (or type $\langle s, \langle e, t \rangle \rangle$.)

3.1.1. The fundamental properties of intensional contexts.

- (1) Caroline found a unicorn. (extensional, unambiguous)
 - (2) Caroline sought a unicorn. (intensional, ambiguous)
- Sentences with *seek* are ambiguous between a specific and a non-specific reading (or transparent vs. opaque reading). (1) is unambiguous, (2) is ambiguous.
 - On the opaque reading of (2), the existence of a unicorn is not entailed.
 - Substitution of extensionally equivalent expressions in an intensional context (on the opaque reading) does not always preserve truth-value. E.g., the extension of *unicorn* is the same as the extension of *13-leaf clover* (both are the empty set in the actual world). Substituting *a thirteen-leaf clover* for *a unicorn* in (1) preserves truth-value. The same substitution in (2) might not.

Examples: *seek, owe, need, lack, prevent, resemble, want, look for, request, demand.*

3.1.2. The classical analysis and its problems.

Quine (1960) argued that *seek* should be decomposed into *try to find*. He argued that intensionality is (in general) the result of embedding under an intensional operator, such as the verb *try*. Within *Caroline try [Caroline find x]*, there are then two places a quantifier phrase could take its scope: the higher clause, giving the transparent reading, and the lower clause, giving the opaque reading.

Montague (1973) argued that the same semantic effect can be achieved with a simpler syntax, if NPs as express Generalized Quantifiers. In argument position, every category gets an intensional operator “ \wedge ” applied to it (i.e. functions apply to the *intensions* of their arguments).

For Montague, the relation between *seek* and *try to find* is captured not by decomposition but by a meaning postulate.

- (3) Meaning postulate: $seek'(x, \wedge Q) \rightarrow try'(x, \wedge [Q(\lambda y find'(x, y))])$.

So Montague treats a verb like *seek* as denoting a relation between an individual and an intensional generalized quantifier. The transparent reading results from “quantifying in”.

But there are problems with Quine’s and Montague’s classical analyses. Among other problems, Zimmermann (1993) points out an *overgeneration* problem with Montague’s (and Quine’s) account, in that true quantifier phrases are normally unambiguously “transparent” after intensional transitive verbs like *compare, seek*, although they are ambiguous in constructions like *try to find*. Simple indefinites with *a*, on the other hand, are indeed ambiguous with intensional verbs. Compare:

- (4) (a) Arnim compares himself to a pig. (ambiguous)
(b) Arnim compares himself to each pig. (unambiguously transparent)
- (5) (a) Alain is seeking a comic book. (ambiguous)
(b) Alain is seeking each comic book. (unambiguous; lacks ambiguity of
- (c)) (c) Alain is trying to find each comic book. (ambiguous).

3.1.3. Zimmermann’s alternative account.

Zimmermann argues that we can capture the relevant generalizations once we note that definites and indefinites, which do receive opaque readings with intensional verbs, correspond, in a way he makes precise, to *properties*, type $\langle s, \langle e, t \rangle \rangle$. Zimmermann’s proposal is that a verb like *seek* denotes a relation between an individual and a property. So *seek a unicorn* would be interpreted as (8):

- (6) $seek'(\wedge unicorn')$ (where \wedge is Montague’s ‘intension operator’)

This would be a case of NP type-shifting by coercion: *seek* demands a property-type argument, and we know that indefinite NPs easily shift into $\langle s, \langle e, t \rangle \rangle$ readings, as was shown for predicate nominals and the PRED-argument of *consider* in Partee (1986).

For the transparent, or specific, or *de re*, reading, Zimmermann gives an analysis (details omitted here) involving “quantifying in”, similar to the analysis in Partee (1986) for Edwin Williams’ example “*This house has been every color*”. Zimmermann thus has a solution to the overgeneration problem.

3.2. McNally 1995. “Bare plurals in Spanish are interpreted as properties.”

Bare plurals in Spanish differ from bare plurals in English in several ways; and their distribution and interpretation is not the same as that of overtly indefinite Spanish NPs. McNally (1995) proposes that Spanish bare plurals are uniformly interpreted as *properties*.

It is interesting to compare McNally’s analysis of the Spanish bare plurals as properties with Zimmermann’s analysis of the objects of opaque verbs as properties. In the bare plural analysis, it is the NPs that are specified as being of property type; they combine with ordinary verbs that take ordinary e-type arguments, and the verbs shift to accommodate these arguments, building in an existential quantifier to bind the e-type argument the verb was looking for: this is a case of *incorporation*. In Zimmermann’s analysis of the opaque verbs, it is the verbs that are semantically special: they demand a property-type argument rather than an e-type argument; so the NPs have to shift to get a property-type meaning in order to occur there, and those that can’t don’t get opaque readings.

It is also interesting to compare McNally's and other similar analyses along the dimension of independence/non-independence of the NP interpretation, where maximal non-independence means some kind of incorporation. On McNally's analysis, bare plurals have obligatorily narrowest scope, since the existential quantifier is packed into the shifted meaning of the verb. And the bare plural has no "discourse referent", which accounts for much of its 'decreased referentiality' and non-independence.

Note: there is now quite a lot of literature concerning the possible interpretation of some NPs, especially bare NPs, as denoting properties, or alternatively 'kinds'; see the following and the references cited in them: (Chierchia 1982, Chierchia 1995, Chierchia 1998, Dayal 2004, Krifka 1995, McNally 1998, Van Geenhoven 1998a); and some of you may have heard the related presentation by Olav Müller-Reichau at FSIM in April.

4. Russian Genitive of Negation

Hypothesis: Wherever we see Nom/Gen and Acc/Gen alternation (both under negation and under intensional verbs), Nom or Acc represents an ordinary e-type argument position ('referential'; of course it may be quantified, etc.), whereas a Gen NP is always interpreted as property-type: $\langle s, \langle e, t \rangle \rangle$.

A related hypothesis is that with the transitive analog of the existential sentence, and with verbs that have intensional objects ('*ždat*' 'expect, wait for', mentioned earlier), the 'genitive variant' of the verb has a (possibly implicit) situation argument which is higher ranked in some sense than the direct object, causing the direct object to be demoted, although it doesn't necessarily stop being object.

When the direct object is 'demoted', the structure does not provide a (situation-relative) existence presupposition, and the Genitive object may get a non-specific or a 'property' reading. In the Acc-taking structure, the (Acc) object is in canonical position, and the argument carries a (situation-relative) existence presupposition. In a Diesing-style (Diesing 1992a) approach (Babyonyshev 1996, Brown 1999), the Gen-object version might be the default, with the option of raising the object out of the VP (for Acc). On the lexical perspective this correlates with a change in verbal valency: When the verb is negated, it takes a 'weaker' kind of object, marked by Genitive.

In the case of the intensional verbs like *ždat* 'expect, wait for' in (34), one can argue that there is a shift in verb sense correlated with the shift in the interpretation of the object. So part of the hypothesis should be that the verb selects for the type of its object.

- (34) a. *On ždet podругu.* (Neidle 1988, p.31)
He waits girlfriend-Acc
'He's waiting for his girlfriend.'
- b. *On ždet otveta na vopros.*
He waits answer-Gen to question
'He's waiting for an answer to the question.'

Neidle (1988, p.31) notes that verbs that lexically govern the genitive in Russian, optionally or obligatorily, "tend to be verbs of desire, aim, request, or achievement." When there is a choice, Accusative is used for a specific or generic object, indicating that the object is outside the scope of the semantic action of the verb. The Genitive is normally used when object is indefinite (existentially quantified) and within the scope of the verbal "operator".

As Neidle notes, there can be different ways of characterizing the difference: in terms of relative specificity of the NP object, or in terms of "the specification of the NP either within or outside of the scope of the action of the verb" (Neidle). She would like to say that in either case we are looking at differences in interpretation "associated with differences in the scope of the operation that I will refer to as 'specification'." (p.31)

The idea that such differences may reflect type differences relates closely to the work of Zimmermann (1993), discussed above. We resisted that idea for some time because of sentences like "The police were looking for every witness to the crime", which does allow an intensional reading for its clearly quantificational object, but overall Zimmermann's position is strong and we expect that our counterarguments could be explained away with a little work.

Another clear connection is to the work of Helen de Hoop (de Hoop 1989, de Hoop 1990, de Hoop 1992, de Hoop 1995). She argued for a distinction between "weak case" and "strong case" for direct objects in Germanic languages, with both syntactic and semantic properties. Objects with "strong case" can move to topic position, can escape the scope of various operators, and are interpreted as e-type (or as generalized quantifiers if they are quantified). Objects with "weak case" cannot move far from the verb; they have to stay inside the VP, and consequently they fall under the scope of any operators that affect the VP. And they are interpreted quasi-adverbially: they are of a type to take a transitive verb as argument and give an intransitive verb (phrase) meaning as result. This part of the proposal is slightly weak, because their adverb-like meaning appears to be just a type-lifted version of an existentially quantified argument-type meaning. But at least they are thereby restricted to having narrow scope indefinite meanings. This last point relates also to Diesing's work (Diesing 1992a, Diesing 1992b, Diesing and Jelinek 1993).

There is a similar connection to the work of van Geenhoven (van Geenhoven 1995, van Geenhoven 1996, Van Geenhoven 1998a, van Geenhoven 1998b), who treats 'weak' object NPs in West Greenlandic as "incorporated to the verb": they are not fully independent objects, but get an existential quantifier from the verb.

Yet another connection, and part of our immediate inspiration, is to the work of Ackerman and Moore (Ackerman and Moore 2001): variation in the semantic type of the object could be a species of diathesis, even if they are considered direct objects in both cases. Ackerman and Moore argue that "diathesis" should not be restricted only to cases where the actual grammatical relation changes, as in shifts from object to oblique, but also extended to cases where a subject or object remains subject or object but is 'weakened', and they cite alternations such as the well-known Accusative/Partitive alternations in Baltic languages among their case studies.

We need to look more closely at all the actual arguments invoked in these various analyses and see which of them have resonance with Russian Gen Neg and Russian objects of intensional verbs.

Returning to the issue of Subject Gen Neg and Object Gen Neg

Now, to connect the speculations above, which have mainly concerned Acc/Gen alternations, with Subject Gen Neg: this line of thinking may be helpful in connecting the two.

Given that we have analyzed Subject Gen Neg as always involving existential sentences, we had been having trouble seeing how we could extend a comparable treatment to Object Gen Neg, since only in a small subset of cases does Object Gen Neg involve anything like "existential meanings": it seems to in (32a), but not in (33a), for instance. But if we study

the arguments of McNally (1992, 1997, 1998) and some recent work of Landman (2003), and ongoing work by Kamp and Bende Farkas, they all have argued that the NP in an existential sentence does not have normal type e (nor generalized quantifier) meaning, but rather a property type meaning $\langle s, \langle e, t \rangle \rangle$. We have resisted that so far, because BHP has argued that that's the type for the predicate of copular sentences and NOT the type for the NP in existential sentences. But we could be wrong. Or this distinction in semantic types could be too rough to capture all the semantic distinctions that really need to be made.

If we could find more support for the arguments that the NP in an existential sentence is interpreted as property type $\langle s, \langle e, t \rangle \rangle$, whereas the subject position of a Locative or other ordinary sentence is type e , then the parallel between Subject Gen Neg and Object Gen Neg would be at a structural level: in each case the relevant argument is “demoted” from e -type to $\langle s, \langle e, t \rangle \rangle$ -type, with syntactic and semantic consequences. The extent of the syntactic consequences apparently varies from language to language, and may vary within a language for Subjects vs. Objects; on many views, the Russian Gen Neg subject is no longer subject, but the Gen Neg object is still an object, although a ‘weakened’ one.

Potential gains if this idea proves fruitful:

This would let us connect traditional claims that Gen NPs are “less referential, less individuated” than Nom/Acc NPs, together with diathesis ideas we’ve been working on, together with existing work on Partitive/Accusative alternations in Finnish and existing work on ‘weak/strong’ NP objects in a number of languages, and – especially important if it works – together with existing work on existential sentences. What would be new, we think, is an explicit connection between semantics of existential sentences and semantics of weak/strong objects in transitive sentences, and some account of how the verbal diathesis plays a role in both cases.

Problems:

Can we find any good solid parallels in behavior between objects of intensional verbs and Gen Neg objects other than Genitive Case? So far we³ have failed. One possible connection, data not clear: What kinds of things permit/ prevent the use of a relative clause with *by* (*kotoraja by* ..., etc.) on an NP direct object? Check with verbs like *ždat'* with Acc or Gen, check with negation and Acc or Gen Neg.

I'm unsure about the data and need help here.

- (36) a. # My ždem avtobus (Acc), kotorij by ...
b. OK: My ždem avtobusa (Gen), kotorij by ...
- (37) a. ?? On ne znal otvet, kotorij by ...
b. ?? On ne znal otveta, kotorij by ...

But that is an example of the kind of data that would be very useful to help establish whether the “NPs as properties” idea could really help capture some deep unity between Genitive with objects of intensional verbs and Gen Neg – and even to help establish whether there is some deep unity to be captured.

³ “We” refers to NSF-project seminars involving B. Partee, V. Borshev, E. Paducheva, E. Rakhilina, and Y. Testelefs.

References

- Ackerman, Farrell, and Moore, John C. 2001. *Proto-properties and grammatical encoding: a correspondence theory of argument selection*. Stanford monographs in linguistics. Stanford, Calif: CSLI Publications.
- Babyonyshev, Maria A. 1996. Structural Connections in Syntax and Processing: Studies in Russian and Japanese, MIT: Ph.D. dissertation.
- Barwise, Jon, and Cooper, Robin. 1981. Generalized quantifiers and natural language. *Linguistics and Philosophy* 4:159-219. Reprinted in Portner and Partee, eds., 2002, 75-126.
- Barwise, Jon, and Perry, John. 1983. *Situations and Attitudes*. Cambridge, MA: MIT Press.
- Bennett, M. 1976. A variation and extension of a Montague fragment of English. In *Montague Grammar*, ed. B. Partee, 119-163. New York: Academic Press.
- Bennett, Michael. 1974. Some Extensions of a Montague Fragment of English, University of California at Los Angeles: PhD. dissertation; distributed by Indiana University Linguistics Club.
- Brown, Sue. 1999. *The Syntax of Negation in Russian: A Minimalist Approach*. Stanford: CSLI Publications.
- Carnap, R. 1956. *Meaning and Necessity: A Study in Semantics and Modal Logic*. 2nd edition with supplements. Chicago: University of Chicago Press.
- Chierchia, Gennaro. 1982. Bare plurals, mass nouns, and nominalization. In *Proceedings of the First West Coast Conference on Formal Linguistics*. Stanford: Stanford Linguistics Association, Stanford University.
- Chierchia, Gennaro. 1995. Individual-Level Predicates as Inherent Generics. In *The Generic Book*, eds. Greg Carlson and Jeff Pelletier, 176-223. Chicago: Chicago University Press.
- Chierchia, Gennaro. 1998. Reference to kinds across languages. *Natural Language Semantics*:339-405.
- Dayal, Veneeta. 2004. Number marking and (in)definiteness in kind terms. *Linguistics and Philosophy* 27:393-450.
- de Hoop, Helen. 1989. Case assignment and generalized quantifiers. In *Proceedings of NELS 19*, 176-190. Amherst, MA: GLSA.
- de Hoop, Helen. 1990. Restrictions on existential sentences and object-scrambling: Some facts from Dutch. In *The Proceedings of WCCFL 9*, ed. Aaron L. Halpern, 277-288. Stanford, Calif.
- de Hoop, Helen. 1992. Case configuration and noun phrase interpretation, University of Groningen: Ph. D. Dissertation.
- de Hoop, Helen. 1995. On the characterization of the weak-strong distinction. In *Quantification in Natural Languages*, eds. Emmon Bach, Eloise Jelinek, Angelika Kratzer and Barbara H. Partee, 421-450. Dordrecht: Kluwer.
- Diesing, Molly. 1992a. *Indefinites*. Cambridge, MA: MIT Press.
- Diesing, Molly. 1992b. Bare Plural Subjects and the Derivation of Logical Representations. *Linguistic Inquiry* 22:353-380.
- Diesing, Molly, and Jelinek, Eloise. 1993. The Syntax and Semantics of Object Shift. *Working Papers in Scandinavian Syntax* 51.
- Frege, Gottlob. 1892. Über Sinn und Bedeutung. *Zeitschrift für Philosophie und philosophische Kritik*:22-50. English translation (On Sense and Nominatum) in P. Geach and M. Black (eds.) (1980) *Translations from the Philosophical Writings of*

- Gottlob Frege. Blackwell, Oxford. Reprinted in A. P. Martinich (ed.) (2000). Also reprinted in Ludlow (ed. 1997).
- Keenan, Edward. 1987. A Semantic Definition of "Indefinite NP". In *The Representation of (In)definiteness*, eds. Eric Reuland and Alice ter Meulen, 286-317. Cambridge, MA: MIT Press.
- Kiparsky, Paul, and Kiparsky, Carol. 1970. Fact. In *Progress in Linguistics*, eds. Manfred Bierwisch and K. Heidolph, 143-173. The Hague: Mouton.
- Kratzer, Angelika. 1981. The notional category of modality. In *Words, Worlds, and Contexts. New Approaches to Word Semantics*, eds. H.-J. Eikmeyer and H. Rieser, 38-74. Berlin: de Gruyter. Reprinted in Portner and Partee, eds., 2002, 289-323.
- Kratzer, Angelika. 1989. An investigation of the lumps of thought. *Linguistics and Philosophy* 12:607-653.
- Krifka, Manfred. 1995. Common nouns: a contrastive analysis of Chinese and English. In *The Generic Book*, eds. Gregory N. Carlson and Francis Jeffry Pelletier, 383-411. Chicago: The University of Chicago Press.
- Landman, Fred. 2003. *Indefinites and the Type of Sets*: Explorations in Semantics. Oxford: Blackwell Publishing.
- Larson, Richard K. 2002. The grammar of intensionality. In *Logical Form and Language*, eds. G. Preyer and G. Peter. Oxford: Clarendon Press.
- Lewis, David. 1978. Truth in Fiction. *American Philosophical Quarterly* 15:37-46.
- McNally, Louise. 1992. An interpretation for the English Existential Construction, University of California at Santa Cruz: Ph.D. dissertation.
- McNally, Louise. 1995. Bare plurals in Spanish are interpreted as properties. In *Formal Grammar*, eds. G. Morrill and R. Oehrle, 197-222. Barcelona: Universitat Politècnica de Catalunya.
- McNally, Louise. 1997. *A semantics for the English existential construction*: Outstanding Dissertations in Linguistics. New York: Garland.
- McNally, Louise. 1998. Existential sentences without existential quantification. *Linguistics and Philosophy* 21:353-392.
- Milsark, Gary. 1974. Existential sentences in English, MIT: Ph.D. dissertation.
- Milsark, Gary. 1977. Toward an explanation of certain peculiarities of the existential construction in English. *Linguistic Analysis* 3:1-29.
- Montague, Richard. 1973. The proper treatment of quantification in ordinary English. In *Approaches to Natural Language*, eds. K.J.J. Hintikka, J.M.E. Moravcsik and P. Suppes, 221-242. Dordrecht: Reidel. Reprinted in Montague 1974, 247-270; Reprinted in Portner and Partee, eds., 2002, 17-34.
- Neidle, Carol. 1988. *The Role of Case in Russian Syntax*: Studies in Natural Language and Linguistic Theory 10. Dordrecht: Kluwer.
- Partee, Barbara H. 1974. Opacity and scope. In *Semantics and Philosophy*, eds. M. Munitz and P. Unger, 81-101. New York: New York University Press. Reprinted in Peter Ludlow, ed., *Readings in the Philosophy of Language*, Cambridge, MA: The MIT Press, 1997, pp. 833-853.
- Partee, Barbara H. 1986. Noun phrase interpretation and type-shifting principles. In *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*, eds. J. Groenendijk, D. de Jongh and M. Stokhof, 115-143. Dordrecht: Foris. Reprinted in Portner and Partee, eds., 2002, 357-381. Reprinted in Partee, Barbara H. 2004. *Compositionality in Formal Semantics: Selected Papers by Barbara H. Partee*. Oxford: Blackwell Publishing, 203-230.
- Partee, Barbara H. 1999. Weak NP's in HAVE sentences. In *JFAK [a Liber Amicorum for Johan van Benthem on the occasion of his 50th Birthday; CD-ROM]*, eds. J.

- Gerbrandy, M. Marx, M. de Rijke and Y. Venema. Amsterdam: University of Amsterdam. Reprinted in Partee, Barbara H. 2004. *Compositionality in Formal Semantics: Selected Papers by Barbara H. Partee*. Oxford: Blackwell Publishing, 282-291.
- Partee, Barbara H. in press. Weak noun phrases: semantics and syntax. In *Proceedings of Dialog 2005*. Moscow.
- Portner, Paul. 1997. The Semantics of Mood, Complementation, and Conversational Force. *Natural Language Semantics* 5:167-212.
- Quine, Willard van Orman. 1960. *Word and Object*. Cambridge: MIT Press.
- van Geenhoven, Veerle. 1995. Semantic incorporation: a uniform semantics for West Greenlandic noun incorporation and West Germanic bare plural configurations. In *CLS 31: Papers from the Thirty First Meeting of the Chicago Linguistic Society*. Chicago: Chicago Linguistic Society.
- van Geenhoven, Veerle. 1996. Semantic Incorporation and Indefinite Descriptions: Semantic and Syntactic Aspects of Noun Incorporation in West Greenlandic, University of Tübingen: Ph.D. Dissertation.
- Van Geenhoven, Veerle. 1998a. *Semantic Incorporation and Indefinite Descriptions: Semantic and Syntactic Aspects of Noun Incorporation in West Greenlandic*: Dissertations in linguistics. Stanford, Calif.: CSLI Publications.
- van Geenhoven, Veerle. 1998b. On the argument structure of some noun incorporating verbs in West Greenlandic. In *The projection of arguments: Lexical and compositional factors*, eds. Miriam Butt and Wilhelm Geuder, 225-263. Stanford: CSLI Publications.
- von Stechow, Kai. 2001. Counterfactuals in a Dynamic Context. In *Ken Hale: A Life in Language*, ed. Michael Kenstowicz, 123-152. Cambridge, MA: MIT Press.
- Zimmermann, Ede. 1993. On the proper treatment of opacity in certain verbs. *Natural Language Semantics* 1:149-179.