

Negation, Intensionality, and Aspect: Interaction with NP Semantics¹

NSF seminar, UMass, October 4, 2006

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Drawn from: Partee, Barbara H. In press. Negation, intensionality, and aspect: Interaction with NP semantics. In *Theoretical and Cross-linguistic Approaches to the Semantics of Aspect*, ed. Susan Rothstein. Amsterdam: John Benjamins.

Final revisions in progress, feedback most welcome. Current draft:

http://people.umass.edu/partee/docs/Neg_Intens_near-final.pdf

1. The puzzle of the relation between negation and intensionality

- **Noun phrase meanings and their interaction with various ‘operators’.** This paper is about the interaction of the meanings of NPs (Noun Phrases: *a small car, the winner of the race, the author of Waverley, peace, Superman*) and various ‘operator-like’ elements that a sentence may contain: negation, intensional verbs (*want, expect, hope for, seek*), tenses, modal verbs, aspectual operators, and other elements. Here we’ll focus mainly on negation and intensionality, with discussion of aspect-related problems at the end.
- **Negation and intensional operators: How alike, how different?**
The patterns of interaction of NPs and various operator-like elements sometimes show negation and intensional operators patterning alike, sometimes differently. Negation is not an intensional operator; so why does it sometimes pattern with the intensional operators? And why sometimes and not always?

¹ This work was supported in part by the National Science Foundation under Grant No. BCS-0418311 to Barbara Partee and Vladimir Borschev for the project, “The Russian Genitive of Negation: Integration of Lexical and Compositional Semantics”, 2004-07. I am grateful for valuable discussion and comments to audiences where earlier versions were presented, at Smith College and at the University of Canterbury, especially to Dorothy Grover, Diane Proudfoot, and Andrew Carstairs-McCarthy. I am grateful to Susan Rothstein for organizing the conference in whose proceedings this paper appears, and for her encouragement and comments and her willingness to entertain a contribution in which aspect is not central; to Vladimir Borschev, Elena Paducheva, Ekaterina Rakhilina, Yakov Testelet, and Igor Yanovich for joint work from which many of the ideas discussed here emerged, to Vladimir Borschev for checking and discussing all Russian examples, to Olga Kagan for discussion of related ideas in her work, and to Dmitry Levinson for sharing his relevant work in progress with me. None of those mentioned is responsible for the ideas expressed.

- **The plot.** First some background review of some basics of NP interpretations, the semantics of the relevant operator-like elements, and their interaction (Section 2.) Then we look at how some natural languages encode certain relations between NPs and certain operators, where we find a puzzle in the Russian “genitive of negation” construction, which seems to lump negation and some intensional verbs together (Section 3). In Section 4 we work our way through some hypotheses about what is going on, concentrating on the interactions among scope, NP interpretation, and the semantic properties of negation and intensional operators. Section 5 adds aspect to the picture, drawing especially on recent works by Paul Kiparsky and by Dmitry Levinson. In Section 5.1 I challenge some appealing but questionable claims by Kiparsky (Kiparsky 1998) about parallels between partitive case in Finnish and imperfective aspect in Russian, and in Section 5.2 I adapt some arguments from Dmitry Levinson’s work on a slightly different kind of parallel between imperfectivity and genitive case under negation, to further support the idea of similarity between NPI contexts and intensional contexts. In the concluding section I opt for a view of “family resemblance” properties that many but not all instances of negation and intensionality share, so as to allow for equally important differences that show up among the family members (Section 6).

2. Background. “Scope ambiguity,” NP interpretations, and the semantics of operators.

Let’s start with some examples.

Intensional contexts:

- (1) Mary is looking for a professor who teaches Greek.

This sentence is ambiguous. (a) *de re* (transparent):... a certain professor
(b) *de dicto* (opaque) : ... anyone who meets that description

Comment: It’s the NP interpretation which is called *de re* or *de dicto*; it’s the context which is called (referentially) transparent or opaque. As with *is looking for* ____, many opaque contexts also have an alternative construal as transparent.

Comment: The sentence could be ‘disambiguated’ by replacing “a” with “a certain” (*de re*) or “any” (*de dicto*), but these ADD something more beyond scope disambiguation, especially in the case of “any”.

On the *de dicto* reading of the NP, the context *Mary is looking for* _____ is an example of an *intensional* (more accurately, *non-extensional*) context.

The main criterion for calling something an *intensional context* is the “failure of substitutivity of co-extensional expressions.”

- Substitution of extensionally equivalent expressions in an intensional context (on the opaque reading) does not always preserve truth-value.

- (2) Susan is sitting next to a professor who teaches Greek. (unambiguous)

In (1) and (2), the difference is in the verbs: *look for* creates an opaque context (is an “intensional verb”), while *sits next to* creates a “referentially transparent” or extensional context.

Comment: It's an open issue whether *look for* has a different sense in the case of the transparent reading. See discussion of Russian *ždat* 'wait for, expect' below.

More intensional verbs: *seek, owe, need, lack, prevent, resemble, want, request, demand*.

The Fregean analysis, as developed further by Carnap, Kripke, Montague: An expression like *professor who teaches Greek* has both an **extension** in each possible state of affairs (the set of professors who teach Greek, say), and an **intension**, which we can think of as the property that determines what extension is picked out in each possible state of affairs (modeled by Montague as a function from possible worlds to sets of individuals, for instance.) In extensional contexts, an expression contributes its extension to determining the extension of the whole; in intensional contexts, it contributes its intension.

Other intensional constructions involve modal verbs (*may, must, can, should, might*, etc.), propositional attitude verbs like *believe*, some adverbs (*necessarily, possibly*, and others). On some analyses such as Dowty's, the progressive operator is also intensional.

Negation.

- (3) John didn't answer 10 questions. (ambiguous)
- (a) There are 10 questions that John didn't answer. (10 > NOT)
 - (b) It's not the case that John answered 10 questions. (NOT > 10)

The corresponding affirmative sentence has no such ambiguity. The ambiguity evidently results from the interaction between the quantifier 10 and the negation. Note that ambiguity is also removed if the NP is unambiguously referential (e.g. *this question*.)

Comment: Negation is NOT intensional, at least not when analyzed in the usual way as a truth-functional operator. That can be shown by trying out substitutions with *a professor who teaches Greek* and *a professor who teaches Latin* in simple negative contexts like "John isn't sitting next to ___" on the assumption of co-extensionality, or similar examples with co-extensional definite descriptions. If one controls for the scope ambiguity noted above, the choice of description has no effect on the truth value.

Comment: The kind of ambiguity noted in (3) arises with indefinite descriptions quite generally, but not with definite descriptions².

Other operators much studied but not discussed here: Tenses; quantifiers; *only, even, always*, and other 'focus-sensitive' operators. All of these give rise to scope ambiguities, and much of what is discussed below applies to them as well. The same questions of similarities and differences arise across different classes of operators, with different details in each case.

3. Natural language patterns – strategies of marking different interpretations differently.

3.1. Some languages mark opaque readings, e.g. Romance languages - subjunctive

The English example (1) is ambiguous. One can find unambiguous paraphrases by changing the wording in various ways (e.g. with *a certain* or *any*), but the simple sentence is ambiguous.

² There is a different ambiguity to worry about with definite descriptions, one concerning the presuppositions or assertions of existence and uniqueness ('the present king of France' examples). I am staying away from those problems here.

There are languages in which various obligatory grammatical markings split such sentences into unambiguous pairs. For instance, consider the Spanish translations³ of (1):

- (4) a. María busca a un profesor que enseña griego. (transparent)
Maria looks-for a professor who teaches-INDIC. Greek.
b. María busca (a) un profesor que enseñe griego. (opaque)
Maria looks-for a professor who teaches-SUBJUNC. Greek.

In Spanish, neither sentence is ambiguous in the way that (1) is: in many intensional contexts Spanish makes the embedded verb in the relative clause subjunctive, vs. indicative in all extensional contexts. (But with a simple NP with no relative clause, like “a tall professor”, the corresponding Spanish sentence *is* ambiguous. And conversely we note that while English has nothing as uniform as the Spanish subjunctive, some expressions like ‘any old’ or ‘any ... whatever’ do demand an intensional context.)

There are many theories of the semantics of the subjunctive, in many cases relating the subjunctive fairly directly to ‘alternative possible situations’. But no “off-the-shelf” formal tools available from logic or the philosophy of language have yielded a direct account of the semantics of the subjunctive, and it remains a lively topic of debate.

3.2. Negative Polarity Items

The distribution of Negative Polarity Items (NPIs), words like *any*, *ever*, *at all*, is semantically very interesting: these words occur [with caveats] in the scope of *monotone decreasing functions*, in a sense spelled out clearly in the work of Ladusaw (1980); see also (Larson 1995).

What the semantics of the NPI words themselves is has been the subject of much research; to a first approximation, the NPI *any* is a variant of the indefinite *some*, and is like an existential quantifier with obligatorily narrow scope – but there is much more to be said about it, and much debate about whether and how it is related to the “free choice” *any* that shows up in certain modal contexts (*You can ask any doctor*) and seems like a special kind of universal quantifier⁴.

The existence of these NPIs gives English some minimally contrasting unambiguous pairs like the following:

- (5) a. Bill didn’t answer some of the questions. ($\exists > \text{NOT}$: there are some he didn’t.)
b. Bill didn’t answer any of the questions. ($\text{NOT} > \exists$: there aren’t any that he did)

These NPIs are not signaling intensionality, since negation is not an intensional construction. But their role seems in a certain sense analogous to that of the subjunctive in marking intensionality in Spanish. We return to the question of the parallels below in Section 4.

³ Thanks to Maribel Romero and Paula Menéndez-Benito for checking my Spanish data. Paula uncovered some interesting Google data about the optionality of the preposition “a” in (4b). While both Paula and Maribel reported the “a” as simply optional in their own dialects when the verb is subjunctive, i.e. on the opaque reading, Paula’s Google data indicated that the use of “a” is relatively rare with the subjunctive.

⁴ Of equal and related interest are the open-class family of ‘arbitrarily small amount’ expressions like *the slightest sound*, *the least effort*, which can also occur in both NPI and ‘free choice’ contexts, but not in ordinary contexts (except as literal superlatives). See (Carlson 1980, 1981, Fauconnier 1979, Horn 1999, Partee 2004).

3.3. Russian Genitive of Negation and intensional verbs

The Russian “Genitive of Negation” construction involves substituting Genitive case for Accusative (on objects) or Nominative (on non-agentive subjects) of many verbs when the whole sentence is negated (Borschev and Partee 2002, Partee and Borschev 2002, 2004). Most researchers have held that a Genitive-marked NP under negation, as in (b) below, is an indication that the NP has narrow scope with respect to negation⁵, much like the choice of *any* in (5b) above.

- (6) a. *On ne polučil pis'mo.*
he NEG received letter-ACC.N.SG
'He didn't receive the (or 'a specific') letter.'
- b. *On ne polučil pis'ma.*
he NEG received letter-GEN.N.SG
'He didn't receive any letter.'

It was pointed out by Neidle (1988) that Genitive case is also used to mark opaque objects of certain intensional verbs (although not all, and there is variability in whether it is optional or obligatory.)

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

The puzzle is: why is the same construction used to mark both? Negation is not intensional, so why should negation and intensionality pattern together, as they do in a number of natural language phenomena? Is this just coincidence, or is there some generalization to be uncovered?

4. Hypotheses

4.1 Scope differences.

On the classical linguistic view, both kinds of phenomena illustrated above are simply scope phenomena: an NP, if it is not unambiguously referential (*this horse*), may have wider or narrower scope than a given operator, as illustrated in the glosses above.

Each operator has its own semantics – intensional verbs, negation, tenses, quantifiers, adverbs, etc. On this view the meaning of the operator stays fixed, the meaning of the NP stays fixed, and the only thing that varies is the relative scope of the two.

This captures part of the core of the phenomenon, a piece which needs to be captured by any account. But if one stops here, we make no predictions about which ambiguities get distinguished by some sort of morphosyntactic marking in some languages, nor about which phenomena most often pattern together across languages.

4.2 Possible non-uniform NP meanings.

On some recent approaches, it is suggested that the NP meanings may not be constant; perhaps some NPs are “licensed”, in form and/or in meaning, by certain operators governing

⁵ But the problems for this view discussed in (Partee and Borschev 2002) have yet to be resolved.

them. This hypothesis is particularly appealing for constructions involving direct objects of transitive verbs (and non-agentive subjects of some intransitive verbs), where one is most likely to find special markings analogous to the Russian genitive of negation. (“Object incorporation” in Greenlandic Eskimo, with obligatory narrow-scope interpretation (Bittner 1987, Van Geenhoven 1998), Accusative-Partitive alternation in Finnish (Kiparsky 1998), and related phenomena in Turkish (Enç 1991) and other languages .

All such proposals have in common that Accusative-marked NPs are higher on some kind of scale(s) of referentiality and topicality than object NPs that are marked with some oblique case like Genitive or Partitive or not marked at all. There appears to be a correlation between NPs that are “good, canonical subjects or objects” and have more highly “referential” interpretations, and NPs that are in some sense “demoted” from canonical subject or object position and have “weak” interpretations. But as Aissen (2003) emphasizes, different languages draw different distinctions; some languages pay attention to scales of animacy, some to scales of referentiality, some to both, and where they draw ‘cutoff lines’ varies from language to language.⁶

4.3 Property types and other “demotions” of NPs

Some formal semanticists have proposed that the actual semantic “type” of NPs changes in some of these constructions (Partee and Borschev 2004, Van Geenhoven 1998, Zimmermann 1993). On this view, “canonical” NPs are either simply referential (type e), like names, demonstratives, most personal pronouns, and some definite descriptions, or else quantificational (“generalized quantifiers” in the work of Montague (1973), Lewis (1970) and Barwise and Cooper (1981)). “Opaque” objects of intensional verbs, however, as in (1b), are interpreted as *properties*, the type normally associated with predicates rather than with argument-position NPs (Partee 1986).

Zimmermann 1993: the hypothesis that opaque objects of intensional verbs have property type rather than entity type or generalized quantifier type can explain several things:

- the obligatory narrow scope of opaque objects: they are never true quantifiers, so they can never take “optional wide scope” as true quantifiers usually can.
- the restriction on the kinds of NPs that can be interpreted opaquely; those NPs which are most obligatorily quantificational, like *each student*, *most students*, are most resistant to getting any *de dicto* or ‘opaque’ reading under an intensional verb. This is seen in example (8b), where we see it is impossible to get a ‘narrow scope’ *de dicto* reading with a quantificational object of the verb *seek*.

- (8) (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).

The fact that both readings are available in (8c), where the opaque context is created not by an intensional transitive verb but by an infinitive-embedding construction which provides a locus for a simple scope ambiguity, provides a further argument for treating verbs like *seek* as taking a non-standardly interpreted NP complement. If we assume that the embedded verb *find*

⁶ There is also a great deal of interesting current work on different kinds of indefinite pronouns across languages and the nature of the differences among them. Where English distinguishes *someone* from *anyone*, Russian has half a dozen different forms different meanings and different distributions. See (Haspelmath 1997, Kratzer and Shimoyama 2002, Yanovich 2005).

in (8c) takes normal e-type or generalized quantifier objects, then the ambiguity of (8c) is ordinary scope ambiguity⁷.

But what about negation? So far we have seen several ideas for the treatment of opaque objects of intensional verbs, but none that extend in a straightforward way to negation, which is a sentence-level operator and not an intensional one.

- Giannakidou (1994, 1998), looking especially at Greek, which also shows commonalities in the marking of NPIs under negation and of opaque objects of intensional verbs, suggested that some languages take the main semantic property of NPI-licensing constructions not to be “downward monotone” functions, but to be “non-veridicality”⁸.

The fact that some NPs can occur only in non-veridical contexts (*any student, the slightest sound*) increases the plausibility of the conjecture that some NPs (*a student*) may have a “less referential” meaning in a non-veridical context than they do in a veridical context.

The use of the notion of non-veridicality offers one promising answer to the question of what negation and the intensional verbs have in common: both are non-veridical operators. At the same time it is just one semantic property, not a unifying “category”, so it leaves open the expectation that other properties distinguish negation from intensional contexts.

4.4 Or coincidence?

Of course it is also possible that it is mere coincidence that the same morphological case is used in Russian to mark NPs to be interpreted under the scope of a negative operator and NPs to be interpreted under the scope of an intensional verb (the latter far from uniformly, at that.) Or, more likely it could be something more than coincidence but less than a very deep connection.⁹ Not all intensional contexts are in fact non-veridical, although they “typically” are. While veridical intensional operators (like *know, necessarily, debatably identify*) are less likely than non-veridical ones (like *suspect, possibly, seek, want*) to take subjunctive sentential complements or subjunctive relative clauses in NP complements in the Romance languages or to take genitive NP objects in Russian, it is certainly not the case that all and only non-veridical operators license subjunctive in Romance or genitive NPs in Russian.

Certainly one does not want to claim that the connection is too deep, or it would be surprising not to see clearer evidence of it across the world’s languages; NPIs and ‘intensional-polarity’ items may have some non-accidental degree of resemblance but as far as my limited knowledge goes, they are far from identical in general.¹⁰

⁷ This might seem to challenge Montague’s meaning postulate (Montague 1973) which says that *seek* is equivalent to *try to find*; that meaning postulate could be reformulated for Zimmermann’s version of *seek* so that it says, in effect that ‘to seek property P’ is ‘to try to find something that has property P’; then we get the same equivalence but limited to the kinds of NPs that occur as complements of *seek*, namely those that have can be given a property interpretation.

⁸ Let *Op* be a monadic propositional operator. Then:

- (i) *Op* is veridical just in case $Op\ p \rightarrow p$ is logically valid. Otherwise *Op* is nonveridical.
- (ii) A nonveridical operator *Op* is antiveridical just in case $Op\ p \rightarrow \neg p$ is logically valid.

Yesterday is a veridical operator, *perhaps* is nonveridical, and *not* is antiveridical.

⁹ Thanks to Diane Proudfoot for pushing me on these points in discussion of this work at a Philosophy Department Seminar at the University of Canterbury in May 2006, and to Andrew Carstairs-McCarthy for suggesting that a ‘family resemblance’ account might be more successful than a search for a single unifying factor.

¹⁰ A suggestive but not conclusive indication of their similarity across languages can be taken from the diagrams developed by Haspelmath in his typological study of kinds of indefinite pronouns (Haspelmath 1997). Contexts that

5. Partitivity and Aspect in relation to Negation and Intensionality

What has been said so far about the relation between negation and intensionality has been based principally on the form and interpretation of NPs under the scope of negative or intensional operators. Previous work on relationships between aspect and quantification (Bach 1986, Filip 1992, Filip 1999, Krifka 1986, Krifka 1987, Krifka 1989, Mehlig 1983, Partee 1999) suggests looking for relevant evidence in the behavior of aspect under negative or intensional operators.

Two recent lines of work suggest connections of negation and intensionality to aspect, particularly through similarities between imperfectives and partitives or genitives, including some that show up in particular under negation. One is the work of Kiparsky (1998) arguing for a close parallel in function between the Finnish partitive and the Russian imperfective, discussed in Section 5.1. The other, even more relevant, is recent work of Dmitry Levinson (Levinson 2005a, 2005b) on parallels in the history of Slavic Genitive of Negation and Slavic Imperfective in Negated Imperatives, discussed in Section 5.2. In later work in progress (Levinson 2006a, 2006b), Levinson explicitly connects irrealis contexts with negative polarity contexts.

5.1. Kiparsky (1998) on Finnish Partitive and Russian Imperfective

Kiparsky (1998, 272-3) focuses on the concept of boundedness and its role in the semantics of both partitives and imperfectives; he notes that the concept of boundedness (Russian *predel'nost'*) is standard in Slavic aspectology. He cites Dahl & Karlsson (Dahl and Karlsson 1976, Dahl 1985) as having emphasized the parallelism between the partitive vs. accusative case contrast in Finnish and the aspect contrast in Russian. "They point out that if either the verb is atelic (does not denote a completed event), or the object is an indefinite bare plural, then Russian in general requires imperfective aspect, and Finnish requires partitive case (see (9a)). Thus, in (9a) perfective aspect (in Russian) and accusative case (in Finnish) require both that the verb is telic, and that the object is plural and definite. The same sentences with imperfective aspect and partitive case, respectively, are three ways ambiguous (see (9b)):

- (9) a. On napisa-l (**Perf.**) pis'm-a (Russian)
 He write-PstM3Sg letter-PIAcc
 Hän kirjoitt-i kirjee-t (Finnish)
 He/she write-PstM3Sg letter-PIAcc
 'He wrote the letters' (... and left) (telic V, def. NP)
- b. On pisa-l (**Imperf.**) pis'm-a (Russian)
 He write-PstM3Sg letter-PIAcc
 Hän kirjoitt-i kirje-i-tä (Finnish)
 He/she write-PstM3Sg letter-PI-**Part**
- (1) 'He wrote (some) letters' (... and left) (telic V, indef. NP)
 (2) 'He was writing letters' (... when I came) (atelic V, indef NP)
 (3) 'He was writing the letters' (... when I came) (atelic V, def NP)" (pp. 272-3)

However, Russian native speakers¹¹ disagree with one crucial part of the data Kiparsky cites from Dahl and Karlsson. The corrected data indicate that the Russian imperfective has a narrower range of interpretation than the Finnish partitive: the Russian version of example (9b)

correspond approximately to NPI contexts and contexts that reflect various sorts of intensionality are relatively near one another in his diagram, indicating that they are fairly often grouped together in licensing particular forms of indefinite pronouns (like *any* in English), but far from always.

¹¹ Judgments reported in this section were agreed on by Vladimir Borschev, Elena Paducheva, Ekaterina Rakhilina, and Yakov Testelefs.

cannot have interpretation (1), but must be interpreted as atelic. If one tries to append the continuation "... and left" in the most direct way, as in (10a), the result is ungrammatical. If one expands it into "..., and after that he left" as in (10b), it becomes grammatical, but the letters are then understood as incomplete.

- (10)(a) *On pisal pis'ma i ušel.
 He write-Pst.Impf.M.3.Sg letter-Pl.Acc and leave-Pst.Pf.M.3.Sg
- (b) On pisal pis'ma, i posle ètogo, ušel.
 He write-Pst.Impf.M.3.Sg letter-Pl.Acc and after that leave-Pst.Pf.M.3.Sg
 'He was writing (the/some) letters, and after that he left.'

- This undermines one of Kiparsky's main claims, namely that Russian imperfective aspect, like the Finnish partitive, expresses an 'unboundedness' property of the whole VP level regardless of whether the unboundedness arises as a result of NP-related properties or of verbal-aspectual properties.
- Nevertheless Kiparsky shows a number of clear and interesting parallels, and argues for an interesting generalization about coercion (see below) which helps to explain some of the non-parallels.
- As Kiparsky notes, Krifka had already analyzed the semantics of partitivity and of imperfectivity in a parallel fashion, unifying the meanings of the partitive case and the progressive by analyzing both as predicate modifiers that mean 'part of':

- (11) 1. PART[ititive] = $\lambda P\lambda x' \exists x [P(x) \wedge x' \sqsubseteq x]$
 2. PROG[ressive] = $\lambda P\lambda e' \exists e [P(e) \wedge e' \sqsubseteq e]$

"Thus PART(Pred) and PROG(Pred) denote the set of entities (resp. eventualities) that are parts of entities (eventualities) that have the property Pred¹²." (Kiparsky 1998, p. 277)

Krifka, like Kiparsky after him, was interested in showing how under certain circumstances, either an unbounded NP meaning or an unbounded verbal (aspectual) meaning could lead to similar or the same result at the VP level¹³.

- For Krifka, the crucial properties that would allow either a partitive NP or an imperfective verb to have the same effect on VP interpretation were (i) that the verb be one with *divisive reference* ($P(x)$ implies $P(y)$ if y is part of x), and (ii) that the thematic relation connecting the verb with its object be the Incremental Theme relation, well-known from the work of Dowty (1982) and Krifka (1992).
- Kiparsky argues that Krifka's analysis might be right for Mordvinian, an earlier stage of Finnish, but not quite right for Finnish; the difference between his own analysis, crucially relying on his own definition of *boundedness*, and Krifka's analysis is interesting but we will ignore it here; they agree on most of the central examples.

¹² Kiparsky's interpretation of progressive, modulo the shift from 'time interval' argument to event argument, is identical to that in (Bennett and Partee 1972). This extensional interpretation of partitives and progressives will suffer from the "progressive paradox" identified by (Dowty 1977) and the analogous "partitive paradox" discussed in (Bach 1986).

¹³ The role of Finnish partitive in determining the boundedness of the predicate is discussed by Kiparsky (1998) and Kratzer (2004). The puzzling incompatibility of Russian partitive and imperfective is addressed in Paducheva (1998).

- Both offer formalizations of the same leading idea, that ‘unboundedness’ in some sense is a property both of partitive meaning and imperfective meaning, and that in some cases, the same net semantic result can arise from unboundedness expressed by either means.¹⁴
- Kiparsky’s interesting idea about similarities and differences among languages: he makes it clear that languages can differ considerably in the relevant dimensions of unboundedness that they group together, and offers an explanation for some of the differences via an interesting constraint on **coercion**. “Both partitive and imperfective morphology can mark different semantic variants of unboundedness. Although these run parallel in Finnish and Russian in many cases ... this is not always the case. **Differences in how languages interpret unboundedness result from different coercion of bounded expressions into unbounded expressions and vice versa.**” (pp. 289-90). The principle that Kiparsky offers to account for these differences is that aspect can coerce shifts in the lexical meanings of verbs, while case can coerce shifts in the lexical meanings of nouns, and not vice versa¹⁵.
- It was noted above that both negative and intensional contexts are conducive to ‘decreased referentiality’ of NPs that occur within them. Unboundedness *per se* may not be a symptom of ‘decreased referentiality’, but partitivity, which is just one kind of ‘unbounded’ interpretation, does seem to be. Kiparsky notes that negated verbs in Finnish require partitive objects. But there is no immediate parallel between Finnish partitive and Russian imperfective in that respect; in normal declarative sentences, aspectual contrasts are maintained under negation¹⁶. In the next subsection, we discuss some work by Dmitry Levinson that does uncover some relevant parallels between partitive-like interpretations of Russian imperfective and of Russian Genitive of Negation.

5.2. Levinson on Imperfective in Negated Imperatives and Genitive of Negation

- Whereas Kiparsky argues that genitive in Finnish and imperfect aspect in Russian are both used to mark a property of the whole VP, ‘unboundedness’, the Russian genitive is more closely bound up with the NP and its semantics. The Russian genitive (especially Object Gen Neg; also object partitive Gen) is not like Finnish genitive: although the lexical semantics of the verb and aspect are relevant in an indirect ‘licensing’ kind of way, what is central is the NP-semantics. The NP should be “less referential” in some sense; and there may well be more than one way for an NP to be ‘less referential’ (much as there are several different kinds of ‘imperfective’ meaning), including being ‘quantificational/partitive’, being ‘modalized/intensional’ (not necessarily actual), being property-type or kind-type or ‘abstract’ in some sense. The relevance of verbal and aspectual semantics is to license such kinds of readings.

¹⁴ This is in a sense the flip side of the observation made by Filip (1992, 1993) about the complementary difference in coerced interpretations of unmarked aspectual forms in English and article-less NPs in Czech in VPs with Incremental Theme direct objects (such as *eat soup*): with a perfective verb in Czech, a bare mass or plural object is interpreted as definite, while with a definite object in English, an aspectually unmarked verb form is interpreted as telic.

¹⁵ These constraints may seem not to allow for the kind of ‘semantic bleaching’ of verbs that is found with subject Genitive of Negation in Russian existential sentences, as discussed in (Borschev and Partee 1998, Borschev and Partee 2002). But there is probably a principled distinction between this kind of coercion, if it can be called that, and the kind Kiparsky’s constraints apply to. See the description of how such ‘bleaching’ works in the cited papers.

¹⁶ A positive, although not very strong, correlation between imperfective aspect and the choice of genitive as opposed to accusative under negation is discussed in Pereltsvaig (1999). There it is argued that decreased referentiality is supported by the use of the imperfective, not because of the unboundedness associated with a progressive interpretation of imperfective, but rather through habitual or generic interpretation of the imperfective form. This is not the use of imperfectives discussed by Kiparsky, Krifka, or Levinson.

- Dmitry Levinson (Levinson 2005a, 2005b, 2006a, 2006b) has indeed identified some interesting parallels between the Russian Genitive of Negation and Russian imperfective aspect, especially in the context of negation. Historical perspective: similarity of possible motivation of historical development of Gen Neg and Imperfective of Negated Imperative.
- Gen Neg phenomenon has already been described.
- Imperfective of Negated Imperative: in Russian and other Slavic languages, only imperfective aspect can be used in negative imperatives that express intentional actions.
- Levinson proposes that these two phenomena can be given a parallel historical explanation, one that relies on the ‘partitivity’ of the initial semantics of both genitive case and imperfective aspect and on the semantic properties of the licensing negation.
- History of Gen Neg: Levinson (2005b): he states as commonly accepted that Gen Neg developed from partitive, and supports the explanation of Kuryłowicz (1971):
 - In the initial Stage 1, Gen Neg was really the partitive, and was used only with nouns that could also take partitive in the affirmative, mainly mass nouns and plurals. What motivated it was that under negation, the partitive gives a stronger negation than the accusative, since not drinking ‘of water’ entails not drinking ‘the’ water, and not vice versa. (The direction of entailment is opposite in affirmatives.) “Due to the tendency to intensify the negation, this usage becomes more common than the non-emphatic accusative.” (p.13)
 - Then in Stage 2, “this usage of the genitive becomes associated with negation, and not the partitive meaning, and by *analogy* spreads to the nouns that are not used with partitive in positive sentences, that is, singular count nouns.”(p.13)
- History of Imperfective of Negated Imperative: Levinson argues that the explanation in Bogusławski (1985) of the restriction to imperfective aspect in negated imperatives expressing intentional action is parallel to Kuryłowicz’s explanation for Gen Neg. Bogusławski’s explanation applies most straightforwardly to accomplishment verbs, for which imperfective verbs denote activities that are not necessarily completed, while corresponding perfective verbs entail completion. As a result, in a simple affirmative sentence, the perfective will entail the imperfective, while under the negation, the direction of entailment is reversed¹⁷.

- (12) a. *On postroil dom.* ⇒ *On stroil dom.*
he built-PF house he built-IMPF house
Roughly: ‘He built the house’ ⇒ ‘He was building the house’
- b. *On ne stroil dom.* ⇒ *On ne postroil dom.*
he NEG built-IMPF house he NEG built-PF house
Roughly: ‘He wasn’t building the house’ ⇒ ‘He didn’t build the house’

The entailment in (12) provides the foundation of Bogusławski’s explanation for preferring imperfectives in negated imperatives: using the imperfective makes the command stronger. The negated imperfective command prohibits the activity and not just its completion. And here too the tendency to make negation emphatic leads to the preference for the stronger form, and frequent use then leads to grammaticization. The fact that the effect holds for intentional actions

¹⁷ Examples from Levinson (2005b), rough English translations my own.

(‘prohibitives’) and not for unintentional ones (‘preventatives’, often achievements rather than accomplishments or activities and often construed as warnings, like ‘Don’t be late for the lecture’) is explained by the absence of any ‘activity’ stage for unintentional actions, so that the imperfective cannot be used to ‘strengthen’ the negated achievement imperative.

- Levinson summarizes: “As was shown above, both constructions can be explained as grammaticalization of an emphatic alternative due to overuse of emphatic negation. In negative imperatives imperfective is stronger than perfective. Negation with partitive direct object is stronger than with accusative. The explanation given by Bogusławski (1985) for negated imperatives and the first stage of Kuryłowicz’s (1971) explanation for the genitive of negation have the same structure.” (p.16).
- Differences: As Levinson notes, there are differences in the two constructions as well: Gen Neg in its later stage of development has become dissociated from Partitive and no longer has any necessary partitive meaning, while in ‘Imperfective of Negation’, Imperfective is still imperfective and is still understood as such – it only went through Stage 1.

In his later paper, Levinson (2005a) adds some discussion of French *de* and its use in partitives and in negation, showing that it is partly parallel to Russian Gen Neg in generalizing from an original source as a partitive construction to one that can be licensed by negation alone. In this paper he is also more explicit about connections to polarity sensitivity, citing Israel (1996) as giving a motivation for the development of NPIs that is the same as those given by Kuryłowicz (1971) for Gen Neg and Bogusławski (1985) for the imperfective of negation: the statement with the emphatic NPI is stronger, i.e. entails the statement without it (as in the case of French *pas*, for instance.)

One of the interesting observations he makes here is that Gen Neg and *pas* are alike in losing their ‘emphatic Neg’ quality and becoming part of normal Neg marking, whereas imperfective of negation and most normal NPIs are alike in retaining the semantics that lets them express a ‘strengthened’ negation.

5. Conclusions and further research

Negation and intensionality are certainly not completely alike, nor are partitivity and imperfectivity, but we have made some steps toward identifying generalizations that need to be accounted for, and second, toward finding formal properties through which we can capture the similarities and differences among the phenomena we observe. As Haspelmath (1997) has shown, studying semantic typology can help us map out the semantic space within which languages distinguish different regions, lexically, morphologically, or syntactically. In the phenomena we’ve looked at here, quite informally, we’ve seen how the domains that include negation and the intensional verbs have some commonalities that are not initially obvious. English does not put those two kinds of phenomena together in any formal way; Russian and some other languages sometimes do. Task for formal semantics and pragmatics: try to identify the formal semantic/pragmatic properties that underlie these patterns of ‘family resemblances’.

What ARE the similarities and differences in this case? Giannakidou (1998) has argued that the main similarity can be captured as non-veridicality. Non-veridicality is a property of the contexts created by negation and by many (but not all) intensional operators (not *know*). Levinson (2006a) argues, using various cross-linguistic data similar to (but more extensive than) those presented in the first sections of this paper, for the thesis that Irrealis is a negative polarity item, Realis a positive polarity item. What his arguments really point to are parallels between Irrealis marking and NPIs, and hence for similarities between Irrealis-creating operators and Negation and other NPI-licensing operators. He does not give any explicit reason for calling

Irrealis an NPI rather the reverse, i.e. rather than calling Negation a species of Irrealis-marking. He does offer some reasons not to be satisfied with Giannakidou's use of nonveridicality as a unifying property (Giannakidou 1998, Giannakidou and Zwarts 1998), and we have already noted that not all intensional operators (although perhaps all irrealis-licensing operators) are nonveridical.

There are also differences between Negation and intensional operators. One important difference is extensionality as tested by the Substitutivity test discussed in Section 2 above: Intensional verbs fail it, negation passes it. A second partial difference is in monotonicity properties. Negation is 'downward-entailing'; whereas intensional verbs may be quasi-upward-entailing (Ladusaw 1996), quasi-downward-entailing, or neither.

Kratzer (2004) calls verbs of creation intensional, even though they generally pass the Substitution test for extensionality. She focuses instead on the fact that atelics don't imply culmination, so that creation verbs don't imply the existence of the created object. Note, by the way, that atelicity produces such a non-implication-of-existence 'from within' the lexical semantics; a progressive operator accomplishes a similar effect 'from without'.

There is obviously much more work to be done to further dissect the relevant phenomena and the relevant properties so as to try to end up with an explanatory account of the distribution of forms and meanings in this area. One hypothesis that appears worth further exploration is the following: Non-veridicality might naturally license decreased existential commitment. Intensionality might rather license decreased specificity. These are just pointers to the kinds of semantic properties that might be explored: the idea is to study three things together: (i) semantic properties of intensional, negative, and other operators; (ii) semantic properties of the sorts of NPs that have restricted occurrence (*any student, the slightest sound, any book whatever*, and others), and of imperfective aspect and restrictions on its occurrence; and (iii) possible coerced shifts in semantic properties of 'ordinary' NPs when occurring under various operators.

References

- Aissen, Judith. 2003. Differential object marking: Iconicity vs. economy. *Natural Language and Linguistic Theory* 21:435-483.
- Bach, Emmon. 1986. The algebra of events. *Linguistics and Philosophy* 9:5-16. Reprinted in Paul Portner and Barbara H. Partee, eds., *Formal Semantics: The Essential Readings*, Oxford: Blackwell (324-333).
- 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.
- Bennett, Michael, and Partee, Barbara. 1972. *Toward the Logic of Tense and Aspect in English*. Santa Monica, California: System Development Corporation; reprinted with an Afterword by Indiana University Linguistics Club, Bloomington, 1978. Reprinted in Partee, Barbara H. 2004. *Compositionality in Formal Semantics: Selected Papers by Barbara H. Partee*. Oxford: Blackwell Publishing, 59-109.
- Bittner, Maria. 1987. On the semantics of Greenlandic antipassive and related constructions. *International Journal of American Linguistics* 53:194-231.
- Boguslawski, Andrej. 1985. The problem of the negated imperative in perfective verbs revisited. *Russian Linguistics* 9:225-239.
- Borschev, Vladimir, and Partee, Barbara H. 1998. Formal and lexical semantics and the genitive in negated existential sentences in Russian. In *Formal Approaches to Slavic Linguistics 6: The Connecticut Meeting 1997*, eds. Željko Bošković, Steven Franks and William Snyder, 75-96. Ann Arbor: Michigan Slavic Publications.
- Borschev, Vladimir, and Partee, Barbara H. 2002. The Russian genitive of negation in existential sentences: the role of Theme-Rheme structure reconsidered. In *Travaux du Cercle Linguistique*

- de Prague (nouvelle série)*, v.4, eds. Eva Hajičová, Petr Sgall, Jirí Hana and Tomáš Hoskovec, 185-250. Amsterdam: John Benjamins Pub. Co.
- Carlson, Greg. 1980. Polarity *Any* is Existential. *Linguistic Inquiry* 11:799-804.
- Carlson, Greg. 1981. Distribution of free-choice 'any'. In *Chicago Linguistic Society 17*, 8-23. Chicago.
- Dahl, Östen, and Karlsson, Fred. 1976. Verbien aspektit ja objektin sijamerkintä. *Sananjalka* 18:28-52.
- Dahl, Östen. 1985. *Aspect*. Cambridge: Cambridge University Press.
- Dowty, David. 1977. Toward a semantic analysis of verb aspect and the English 'Imperfective' progressive. *Linguistics and Philosophy* 1:45-77. Reprinted in Portner and Partee, eds., 2002, 261-288.
- Dowty, David. 1982. Grammatical relations and Montague grammar. In *The nature of syntactic representation*, eds. Pauline Jacobson and Geoffrey Pullum, 79-130. Dordrecht: Reidel.
- Enç, Mürvet. 1991. The semantics of specificity. *Linguistic Inquiry* 22:1-25.
- Fauconnier, Giles. 1979. Implication Reversal in a Natural Language. In *Formal Semantics and Pragmatics for Natural Languages*, eds. Franz Guenther and S.J. Schmidt, 289-301. Dordrecht: Reidel.
- Filip, Hana. 1992. Aspect and interpretation of nominal arguments. In *CLS 28: Papers from the Twenty-Eighth Meeting of the Chicago Linguistic Society*, eds. C.P. Canakis, G.P. Chan and J.M. Denton, 139-158. Chicago: Chicago Linguistic Society.
- Filip, Hana. 1993. Aspect, Situation Types and Nominal Reference, University of California at Berkeley: Ph.D. dissertation.
- Filip, Hana. 1999. *Aspect, Eventuality Types and Nominal Reference*. New York: Garland.
- Giannakidou, Anastasia. 1994. The Semantic Licensing of NPIs and the Modern Greek Subjunctive. *Language and Cognition* 4:55-68.
- Giannakidou, Anastasia. 1998. *Polarity Sensitivity as (Non)Veridical Dependency*. Amsterdam: John Benjamins.
- Giannakidou, Anastasia, and Zwarts, Frans. 1998. Temporal, aspectual structure and (non)veridicality. Ms.
- Haspelmath, Martin. 1997. *Indefinite Pronouns*. Oxford: Oxford University Press.
- Horn, Laurence. 1999. Pick a theory (not just *any* theory): Indiscriminatives and the Free-Choice Indefinite. In *Studies in Negation and Polarity*, eds. Laurence Horn and Y. Kato. Oxford: Oxford University Press.
- Israel, Michael. 1996. Polarity Sensitivity as Lexical Semantics. *Linguistics and Philosophy* 19:619-666.
- Kiparsky, Paul. 1998. Partitive case and aspect. In *The projection of arguments: Lexical and compositional factors*, eds. Miriam Butt and Wilhelm Geuder, 265-307. Stanford: CSLI Publications.
- Kratzer, Angelika, and Shimoyama, Junko. 2002. Indeterminate pronouns: the view from Japanese. In *The Proceedings of the Third Tokyo Conference on Psycholinguistics*, ed. Yukio Otsu, 1-25. Tokyo: Hituzi Syobo.
- Kratzer, Angelika. 2004. Telicity and the meaning of objective case. In *The Syntax of Time*, eds. Jacqueline Guéron and Jacqueline Lecarme. Cambridge, MA: MIT Press.
- Krifka, Manfred. 1986. Nominalreferenz und Zeitkonstitution. Zur Semantik von Massentermen, Pluraltermen und Aspektklassen, Universität München: Ph.D. dissertation; published as Krifka 1989.
- Krifka, Manfred. 1987. Nominal reference and temporal constitution: towards a semantics of quantity. In *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers (= GRASS Series No. 8)*, eds. Jeroen Groenendijk, Martin Stokhof and Frank Veltman, 153-173. Dordrecht: Foris.
- Krifka, Manfred. 1989. Nominal reference, temporal constitution and quantification in event semantics. In *Semantics and Contextual Expression*, eds. Renate Bartsch, Johan van Benthem and Peter van Emde Boas, 75-115. Dordrecht: Foris.

- Krifka, Manfred. 1992. Thematic relations as links between nominal reference and temporal constitution. In *Lexical Matters*, eds. Ivan Sag and Anna Szabolcsi, 29-53. Stanford: CSLI.
- Kuryłowicz, Jerzy. 1971. Słowiański genitivus po negacii. In *Sesja naukowa międzynarodowej komisji budowy gramatycznej języków słowiańskich*, 11-14.
- Ladusaw, William. 1980. On the notion "affective" in the analysis of negative polarity items. *Journal of Linguistic Research* 1:1-16. Reprinted in Portner and Partee (2002), pp. 457-470.
- Ladusaw, William A. 1996. Negation and polarity items. In *The Handbook of Contemporary Semantic Theory*, ed. Shalom Lappin, 321-341. Oxford: Blackwell.
- Larson, Richard. 1995. Semantics. In *An Invitation to Cognitive Science. Vol 1: Language*, eds. Lila Gleitman and Mark Liberman, 361-380. Cambridge, MA: The MIT Press.
- Levinson, Dmitry. 2005a. Aspect in negative imperatives and Genitive of Negation: A unified analysis of two phenomena in Russian. Ms. Stanford.
- Levinson, Dmitry. 2005b. Imperfective of imperative and genitive of direct object: Grammaticalization of aspect and case due to emphatic negation in Russian and other Slavic languages. Ms. Stanford.
- Levinson, Dmitry. 2006a. Irrealis as polarity sensitivity. Handout for SemFest 2006, Stanford. Ms.
- Levinson, Dmitry. 2006b. Polarity sensitivity in inflectional morphology. Handout for Berkeley Linguistics Society 32. Ms. Stanford.
- Lewis, David. 1970. General semantics. *Synthese* 22:18-67. Reprinted in Davidson and Harman, eds. *Semantics of Natural Language*, 1972, Dordrecht: Reidel. 169-218. Also reprinted in Partee 1976, 1-50.
- Mehlig, Hans Robert. 1983. Nominale Reference, Zeitreferenz und Prädikatssemantik. In *Slavistische Linguistik*, ed. H.R. Mehlig, 48-75. München: Sagner.
- 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. 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. Nominal and temporal semantic structure: aspect and quantification. In *Prague Linguistics Circle Papers*, v.3, eds. E. Hajicová, T. Hoskovec, O. Les"ka, P. Sgall and Z. Skoumalová, 91-108. Amsterdam: John Benjamins Pub. Co.
- Partee, Barbara H., and Borschev, Vladimir. 2002. Genitive of negation and scope of negation in Russian existential sentences. In *Annual Workshop on Formal Approaches to Slavic Linguistics: the Second Ann Arbor Meeting 2001 (FASL 10)*, ed. Jindrich Toman, 181-200. Ann Arbor: Michigan Slavic Publications.
- Partee, Barbara H. 2004. The airport squib: *Any, almost*, and superlatives. In *Compositionality in Formal Semantics: Selected Papers by Barbara H. Partee*, 231-240. Oxford: Blackwell Publishing.
- Partee, Barbara H., and Borschev, Vladimir. 2004. The semantics of Russian Genitive of Negation: The nature and role of Perspectival Structure. In *Proceedings of Semantics and Linguistic Theory (SALT) 14*, eds. Kazuha Watanabe and Robert B. Young, 212-234. Ithaca, NY: CLC Publications.
- Pereltsvaig, Asya. 1999. The genitive of negation and aspect in Russian. In *McGill Working Papers in Linguistics 14*, eds. Yvan Rose and Jeff Steele, 111-140. Montreal: McGill University.
- Van Geenhoven, Veerle. 1998. *Semantic Incorporation and Indefinite Descriptions: Semantic and Syntactic Aspects of Noun Incorporation in West Greenlandic*: Dissertations in linguistics. Stanford, Calif.: CSLI Publications.

- Yanovich, Igor. 2005. Choice-functional Series of Indefinites and Hamblin Semantics. In *Proceedings of SALT (Semantics and Linguistic Theory) 15*. Ithaca, NY: Cornell Linguistics Publications.
- Zimmermann, Ede. 1993. On the proper treatment of opacity in certain verbs. *Natural Language Semantics* 1:149-179.
- Portner, Paul, and Partee, Barbara H. eds. 2002. *Formal Semantics: The Essential Readings*. Oxford: Blackwell Publishers.