


Diathesis alternations and NP semantics *

Barbara H. Partee

University of Massachusetts, Amherst;
Russian State Humanitarian University;
and Moscow State University
partee@linguist.umass.edu

In this paper we examine the relationships among diathesis alternations, the semantics of verbs, and the referential status of NPs. Some diathesis shifts are argued to involve changes in the semantic type of NP arguments, including possible alternations between ‘referential’ NPs and ‘property-type’ NPs. We explore applications of this approach to alternations of Genitive and Accusative, both with intensional verbs like *ždat* ‘wait’ and  the Genitive of Negation.

Диатезные чередования и семантика именных групп. Аннотация.
В работе исследуются связи между диатезными чередованиями, семантикой глаголов и референциальным статусом именных групп. Показано, что некоторые диатетические сдвиги влекут за собой изменения в семантических типах именных групп, являющихся аргументами данных предикатов, в том числе возможные флуктуации между референциальными именными группами и именными группами, обозначающими свойства. Мы исследуем возможности применения этого подхода к чередованиям родительного и винительного падежей при интенциональных глаголах типа *ждать* и к родительному падежу при отрицании.

1. Examples and issues

For the purposes of this paper, I take the notion of diathesis alternation in a broad sense, including both familiar alternations of syntactic patterns

* This material is based upon work supported by the National Science Foundation under Grant No. BCS-0418311 to Barbara H. Partee and Vladimir Borschev for a project entitled, “The Russian Genitive of Negation: Integration of Lexical and Compositional Semantics.” I thank Vladimir Borschev, Elena Paducheva, Ekaterina Rakhilina, Yakov Testelets, and the students in my classes at RGGU and MGU during my Fulbright fellowship in Spring semester 2005 for valuable discussion. All inadequacies are my own.

as in examples (1a-b) and alternations of case assignment, as in examples (2a-b) and (3a-b).

- (1) a. The farmers loaded the truck with (*?the/*?some) hay.
 b. The farmers loaded (the/some) hay on the truck.
- (2) 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.’
- (3) a. *On ne polučil pis’mo.*
 he NEG received letter-ACC.N.SG
 ‘He didn’t receive the letter.’
 b. *On ne polučil pis’ma.*
 he NEG received letter-GEN.N.SG
 ‘He didn’t receive any letter.’

In all these cases, my interest is in the interaction between the lexical semantic interpretation of the verb in its various diathesis frames and the semantic interpretation of noun phrase (NP) arguments that appear in those frames. I see this question as part of the larger issue of the interaction of lexical semantics with compositional semantics, a concern that has been at the heart of my joint work with Vladimir Borschev (Borschev and Partee 1999, 2002, Partee and Borschev 2003).

In (1a-b) we see a preference for the direct object in either diathesis frame to be definite, but the difference is most pronounced for the role which is ‘Means’ in (1a) (*sredstvo* in Apresjan (1974, 126–127) and ‘Patient’ in (1b), which is almost obligatorily non-referential in (1a) but may be indefinite or definite in (1b). In (2a–b) there is a clear difference in referential status of the direct object argument in the two cases, and a correlated difference in the sense of the verb. The difference in referential status of the object in the two sentences (3a–b) is similar to the difference in (2a–b); in this case the verb itself does not seem different in the two sentences, but we can raise the question of whether and how the negation together with the verb might have a semantic effect analogous to the effect of the ‘intensional’ reading of the verb in (2a–b), a possibility that was raised by Neidle (1988) and by Partee and Borschev (2004). The questions of concern in this paper are to what extent the semantic interpretation of the NP is part of, or is affected by, the semantics connected with the diathesis alternations seen in such pairs, and how the semantics of the diatheses are connected with the lexical semantics of the verb.

There is not a sharp line between diathesis alternation and instances of a correlation between different senses of a verb and different interpretations of an NP argument, as in (4a—b), where the verb in (4a) denotes a relation between two entities and in (4b) a relation between an entity (the agent) and some intensional object, perhaps an intensional generalized quantifier as proposed by Montague (1973), perhaps a property as argued by Zimmermann (1993), but in either case not simply an entity.

- (4) John is looking for a blue Volkswagen.
 a. ... He can't remember where he parked it.
 b. ... If he finds one, he will buy it for his wife.

While examples like (4a—b) in English are not normally classed as diathesis alternation, the interaction of different interpretations of the verb and of the direct object argument is similar in that case to the interaction seen in (2a—b), where the difference is overtly marked in a choice of case on the object.

Filip has explored in (Filip In press) some cases that were first discussed in Partee (1991, 1995), in which verbal affixes together with diathesis shifts can be used to express various kinds of quantificational and closely related meanings like measure, distributivity, totality, exclusivity or exhaustiveness. One illustration is the use of the Czech prefix *po-*, discussed in Partee (1991, 1995) and illustrated here by examples (5a—b) from Filip (In press):

- (5) a. Maloval hesla (na stěnu). Czech
 paint.PAST.IMPF.3SG slogan.PL.ACC (on wall)
 'He painted (the/some) slogans (on the wall).'
- b. PO-maloval stěnu hesly.
 TOT-paint.PAST.PF.3SG wall.SG slogan.PL.INST
 'He covered the wall with slogans.'
- c. *PO-malovalP hesla na stěnu.
 TOT-paint.PAST.PF.3SG slogan.PL.ACC on wall.SG.ACC
 *'He covered (the/some) slogans on the wall.'

When the prefix *po-* is applied to an imperfective verb with a meaning like 'write', 'draw', etc., which takes an object of creation (5a), the resulting perfective verb in (5b) takes as its direct object the optional locative complement of the base verb, and the direct object of the base verb is demoted to an optional instrumental complement of the prefixed verb. The meaning of the perfective verb *pomaloval* in (5b) is 'he painted all over X' or 'he covered X with painting'. Hence, the prefix *po-* is in a certain sense quantificational but at a lexical rather than a syntactic level.

Of particular relevance to the issues in this paper is the fact that while the bare NP *hesla* ‘the/some slogans’ can be interpreted as either definite or indefinite when it occurs as direct object of the imperfective verb in (5a), the same NP in its instrumental form in (5b) can only be indefinite, and in a sense is even more indefinite than the indefinite interpretation it may have in (5a).

In most studies by formal semanticists of connections between verb semantics and the semantics of NP arguments of verbs, the emphasis has been on quantificational properties, especially on the relation between aspectual properties of verbs (particularly the telic/atelic distinction) and the count/mass distinction, or more accurately a “quantized/non-quantized” distinction (Krifka), as studied in the work of Bach (1986), Dowty (1991), Krifka (1992), Filip (1999), and Partee (1997, 1999). Other kinds of connections have been made in the work of Padučeva, who has drawn correlations between decreased assertiveness (*snjataja utverditel’nost’*) in sentences, decreased referential status in NPs (Padučeva 2004, 328–329), and possibilities of diatheses in non-assertive moods that are not possible for a given verb in assertive mood. Yanko (2001) has studied a number of cases in which diathesis alternations correlate with differences in Theme-Rheme structure, a point of view which has recently gained some prominence in the work of Levin and Rappaport Hovav (2002, In press). Formal semanticists have recently begun seeking arguments to distinguish between diathesis alternations that carry genuine semantic distinctions and those that may carry only Theme-Rheme structure distinctions (Krifka 2004).

More generally, as formal semanticists try to formulate more adequate theories integrating lexical meaning and compositional meaning, one of the problems we face, undoubtedly already well known among those who have studied lexical semantics for longer than I have, is the difficulty of sorting out the contributions of specific lexical meanings, of specific syntactic configurations, and of general principles such as the preference for subjects to be topics and for topics to be definite. It is noteworthy that the properties of subjects tend to cluster together more strongly than the properties of direct objects and other arguments. Subjects tend to be topic, given, definite, referential, and well individuated (quantized); there is probably no other identifiable argument position that has such strongly clustered properties, perhaps because there is no other argument or adjunct which nearly obligatorily appears in every sentence. Direct objects are less uniform in their clustering of properties, probably because in some respects they are very similar to subjects — those are the two “structural arguments”, higher ranking in significant respects than all of the oblique arguments, which in turn are higher ranking than adjuncts.

A good example of the difficulty of sorting out such factors can be seen in recent debates concerning the semantics and pragmatics of the Dative Alternation in English (6a—b). Just as the choice of passive is often motivated by an intention to make the underlying direct object the Theme or Topic of the sentence, the choice of the double object construction as in (6b) has been argued by Levin and Rappaport Hovav (2002) and by Bresnan (In press) to be motivated in large part by an intention to make the Experiencer (the “dative” argument) the Theme.



- (6) a. Ann sold the car to Beth
 NP₀ V NP₂ to NP₁
 b. Ann sold Beth the car
 NP₀ V NP₁ NP₂

Krifka (1999) originally argued for a semantic account of the Dative Alternation in (6a-b). In his most recent work (Krifka 2004), he still argues that there is a basic semantic difference between the two diatheses, but acknowledges that pragmatic factors can sometimes override the semantic factors. Bresnan’s account (Bresnan et al. In press), in an Optimality Theoretic framework, is in some ways similar, allowing for a number of different factors with ranked weights to play a role in the choice between the two diatheses. The claim that the semantic difference between the two constructions is weak or non-existent may find support in the fact that in the Slavic languages there are not two diatheses with these double-object verbs but simply a choice of word order presumably reflecting a difference in Theme-Rheme structure.

Krifka’s analysis provides an interesting attempt to factor apart the contributions of the lexical item and of its diathesis frame. Omitting many important details, we can say that on Krifka’s analysis, the lexical semantics of many of the verbs that occur in both frames of (6a-b) is a manner of action; the construction in (6a) contributes an entailment that NP₀ caused NP₂ to go to NP₁, while the construction in (6b) contributes an entailment that NP₀ caused NP₁ to have NP₂. Some verbs, like *give* and *sell*, have so much information in their lexical semantics that the constructions contribute nothing new, and the sentences in the two frames end up truth-conditionally equivalent; in this case, it is especially likely that differences in Theme-Rheme structure will be the most salient differences. But in other cases, as with different sorts of verbs of causation of motion, like *throw* vs. *push*, the semantic difference between the two frames may be quite noticeable. And most relevant to the topic of this paper, we can see the grounds for a prediction of a difference in referential status to arise in certain cases. Consider the two subparts of the interpre-

tations, “NP₂ to go to NP₁” vs. “NP₁ (to) h NP₂”. In the first of these, NP₂ must evidently exist throughout the action; but in the second, NP₂ could in principle come into existence as a result of the action. And Krifka indeed discovers some cases where this difference results in only one of the two diatheses being possible with some NPs.

- (7) a. The explanation gave Susan a headache.
 b. #The explanation gave a headache to Susan.

The NP *a headache* is not referential and may have a “property interpretation” as discussed in the next section. (The referential status of NPs whose referents come into existence as a result of a stated action is a difficult question that has not received enough study so far.) In the case of the Dative Alternation, we see the situation that the semantics of the two diatheses permits cases in which the referential status of NP₂ differs, but does not require them to differ; fully referential NP₂ is possible in both frames, while non-referential NP₂ is possible only in construction (6b).

In the second half of the paper, we look more closely at the semantics of indefiniteness before returning to its interaction with diathesis alternations and verbal semantics.

2. Definiteness, indefiniteness, and referentiality.

Within formal semantics there has been a great deal of work on NP interpretations, including much work on quantification, on definiteness and indefiniteness, on kind-denoting NPs, on property-denoting NPs, on type-shifting among different possible interpretations of NPs, and recently on semantic typology and different kinds of indefinite and quantificational NPs.

Classic formal semantics adopted Montague’s proposal (Montague 1973) for the semantics of Noun Phrases (NPs). Every NP was interpreted as denoting a Generalized Quantifier, i.e. a set of sets, type $\langle\langle e, t \rangle, t \rangle$ (strictly, a set of properties, type $\langle\langle\langle s, \langle e, t \rangle \rangle, t \rangle\rangle$.) Some NP interpretations on Montague’s analysis are as shown in (8).

- (8) *John* $\lambda P[P(j)]$ (the set of all of John’s properties)
every student $\lambda P \forall x[\text{student}(x) \rightarrow P(x)]$ (the set of all of properties that every student has)
a student $\lambda P \exists x[\text{student}(x) \ \& \ P(x)]$ (the set of all of properties that at least student has)

the king $\lambda P [\exists x[\mathbf{king}(x) \ \& \ \forall y (\mathbf{king}(y) \rightarrow y = x) \ \& \ P(x)]]$
 (the set of properties which the one and only king has)



What could “indefinite” mean in such a framework? The need for such a distinction first arose in discussions of the prohibition of “definite” NPs in English existential *there*-sentences: see the contrast between the acceptable sentences in (9) and the sentences in (10), which are anomalous without special contexts.

- (9) a. There is a new problem.
 b. There are three/many/several/few/no semantics textbooks.
 (10) a. #There is every/neither/the linguistics student.
 b. #There are most/both/the three democratic governments.

No intuitive notion of “definite” vs. “indefinite” explains why some quantifiers, like *three* and *many*, pattern with indefinites while others, like *every*, *most*, and *both*, pattern with definites. Milsark (1974, 1977) provided the kernel of a semantic explanation, dividing determiners into “weak” and “strong”, which was further developed by Barwise and Cooper (1981) and by Keenan (1987).

Definition (Keenan 1987): A determiner *D* is a *basic existential determiner* if for all models *M* and all $A, B \subseteq E$, $D(A)(B) = D(A \cap B)(E)$.

The corresponding natural language test is as follows: “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*). By this definition, it turns out that the existential, or weak, determiners are exactly the symmetric determiners. The determiners *three*, *a*, *some*, *no*, *at least three*, *exactly three*, *at most three* are all weak. The determiners *the*, *the three*, *every*, *both*, *most*, *neither* are all strong. These semantic definitions laid a successful groundwork for a great deal of further research on the semantics of weak and strong NPs and their distribution (Büring 1996, de Hoop 1995, Partee in press, Rullmann 1989).

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” (Montague’s type $\langle s, \langle e, t \rangle \rangle$, functions from possible situations to sets of entities), rather than generalized quantifiers. Property-type analyses of various “weak NPs” are becoming increasingly common in Western formal semantics, and they may have an important role to play in ac-

counting for non-referential readings of NPs in various diatheses, possibly including the Russian Genitive of Negation.

Zimmermann (1993) argued that Montague's analysis of verbs like *seek* ("intensional transitive verbs", or "opaque verbs") as taking arguments of type "intension of Generalized Quantifier", or $\langle s, \langle s, \langle e, t \rangle \rangle, t \rangle$ is incorrect. He argues that the NP objects of opaque verbs should be semantically interpreted as *properties* (or type $\langle s, \langle e, t \rangle \rangle$.) He starts by comparing the sentences in (11) and (12).

- (11) Caroline found a unicorn. (extensional, unambiguous)
 (12) Caroline sought a unicorn. (intensional, ambiguous)

He notes that sentences with *seek* are ambiguous between a specific and a non-specific reading (or transparent vs. opaque reading). Sentence (11) is unambiguous, (12) is ambiguous. Furthermore, on the opaque reading of (12), the existence of a unicorn is not entailed. And a most important property is that 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 (11) preserves truth-value. The same substitution in (12) might not. Other intensional verbs like *seek* are *owe*, *need*, *lack*, *prevent*, *resemble*, *want*, *look for*, *request*, *demand*.

Quine (1960) had argued that *seek* should be decomposed into *try to find*. He argued that intensionality is (in general) the result of embedding under an attitude verb like *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) achieved the same semantic effect with a simpler syntax, letting NPs express Generalized Quantifiers and functions apply to the *intensions* of their arguments. Then the transitive verb *seek* can apply directly to its NP argument without decomposition. 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 Zimmermann (1993) points out problems with Quine's and Montague's classical analyses, including an *overgeneration* problem, in that true quantifier phrases are unambiguously "transparent" after intensional



transitive verbs like *seek*, although they are ambiguous in constructions like *try to find*. Simple indefinites with *a*, on the other hand, are ambiguous with intensional verbs. Compare:

- (13) 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).

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 (14)

- (14) $\text{seek}' (\hat{\text{unicorn}}')$ (where $\hat{\text{}}$ is Montague's 'intension operator')

This is a case of NP type-shifting by coercion: *seek* on its intensional reading demands a property-type argument. There is independent evidence that indefinite NPs easily shift into predicative property readings of this type, 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, and to other problems which he raises in his article.



3. NP interpretations and diatheses

If both Generalized Quantifier readings of indefinites and property-type readings are available in principle, how can we identify which is the right analysis in a given instance? Following Zimmermann's lead, one criterion should be whether true quantifiers like *each student*, *most students* can occur in the given construction: if so, then we are dealing with an e-type argument position into which we can quantify; if not, then probably with a *property-type* argument.



On this criterion, the existential construction has a property-type NP position, as independently argued by McNally (1998). And following Chvany (1975), Freeze (1992), and others, we can argue that there is a diathesis shift for *be* and other 'existential' verbs, which can occur both in

ordinary predicational sentences with a referential, type e subject (15a), and in existential sentences, where the NP is in a non-referential property-type argument position (15b).

- (15) a. The cat is in the kitchen.
b. There is a cat in the kitchen.

As for the other constructions we have looked at, there is not perfect consensus about whether they permit quantifier arguments or not. In the case of the *load* construction in English (1a-b), in English they seem to allow quantifiers to occur in either argument position (but the Russian near-equivalent *zagruzit'*, discussed in Padučeva (2004, p. 59, p. 65) apparently does not (E. V. Padučeva, p. c.)) But on closer examination, even English may allow only 'measure' quantifiers with the *sredstvo* argument when it is oblique, suggesting that that argument in that construction may have a property reading. The demoted object argument of *po-malovat* in (5b), which also becomes something like *sredstvo*, also strongly resists quantificational objects.¹

In the case of the potentially intensional verb *ždat'* in (2a-b), we see that its intensional genitive-taking variant in (2b) has all the properties of English *seek*. Its extensional accusative-taking variant, (2a), allows referential NPs and quantificational NPs. We predict that genitive should be disallowed with essentially quantificational NPs such as those formed with *každyj*; the question is open.

If the Genitive of Negation on objects is associated with a difference in semantic interpretation as discussed in Borschev and Partee (2002), we would predict that it should also exclude essentially quantificational NPs; but this prediction is false, as shown by (16).

- (16) On ne rešil vsech zadač. 'He didn't solve all the problems-GEN.'

This result does not by itself eliminate the hypothesis that Genitive of Negation induces property-type readings on affected NPs, because of the notorious multiplicity of factors affecting its distribution. But it does sug-

¹ One must exercise caution in testing for the possibility of 'essentially quantificational' arguments; many determiners have both quantificational and non-quantificational interpretations, and even unambiguously quantificational determiners like *each* may give 'false positives' if combined with kind-denoting nouns. Thus the possibility of (i) is not a real counterexample to the claim that the *sredstvo* argument in (i) cannot be quantificational.

- (i) John covered the wall with each color of paint. (OK if he painted it many times.)

gest that the decreased referentiality often remarked with Genitive of Negation is not as extreme as that observed with intensional verbs like *ždat'*, and casts some doubt on the hypothesis.

In conclusion, it seems clear that certain diathetic alternations are naturally associated with changes in the referential status of certain NP arguments or adjuncts. Further investigation is needed to find clearer criteria to distinguish among different hypotheses about the exact nature of “NP weakening” as a result of different kinds of diathetic alternations. We have some slight progress in examining the domain of “property-type NPs”, but much more needs to be done.

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