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CASE ASSIGNMENT AND GENERALIZED QUANTIFIERS

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1. Introduction

In this article I will examine the possible connection that exists between Case assignment and the semantic status of NPs. Subsequently, I will do research within two different frameworks: on the one hand a theory of Government and Binding (Chomsky 1981, 1986b) and on the other hand model-theoretic semantics (cf. Barwise and Cooper 1981).

The basic assumption of Case theory is that all languages are subject to a system of Case assignment, though only some languages contain morphological realizations of it. Chomsky (1986a) distinguishes two Cases: structural (nominative and objective) and inherent Case. Inherent Case is associated with θ -marking, whereas structural Case is assigned independently of θ -marking.

The hypothesis in this article will be that an NP is interpreted as a generalized quantifier only if it is assigned structural Case. This hypothesis will turn out to have remarkable consequences for the relational perspective in which both transitive verbs and determiners are often analysed in model-theoretic semantics.

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2. Belletti's proposal

Belletti (1988) claims that the definiteness effect in existential sentences results from Case theory. The ergative verbs in existential sentences cannot assign structural Case to their thematic subjects, but they do assign inherent partitive Case. According to Belletti, partitive Case is only compatible with an indefinite interpretation, the reason being that this Case always has a meaning such as "some of", "part of a larger set". Transitive verbs have the option of either assigning structural or partitive Case to their objects, with a concomitant difference in interpretation.

However, this point of view about the relation between the meaning of the partitive and indefiniteness cannot possibly be correct. I will present two arguments in order to clarify this.

Firstly, it is not true that there is an incompatibility between partitive Case and a definite NP in Finnish¹. In traditional grammar (Karlsson 1983)², the alternation between a partitive object and an accusative object is attributed to two semantic distinctions, namely indefiniteness vs. definiteness and irresultativity vs. resultativity. An example of the latter is found in (1).

- (1) a. Tuula rakensi taloa.
 Tuula built house-PART
 "Tuula was building a/the house."
 b. Tuula rakensi talon.
 Tuula built house-ACC
 "Tuula built a/the house."

Note that the partitive object need not necessarily express indefiniteness, when the sentence is interpreted irresultatively.

We will go further into the Case and interpretation of object NPs in section 4.

Secondly, determiners such as *many*, which may occur in existential sentences, vary between a cardinal ("weak") and a proportional ("strong") interpretation (cf. Milsark 1977).

- (2) a. There are many cats in the garden.
 b. Many cats are in the garden.

In the preferred reading of (2a) the interpretation of *many cats* is independent of the total number of cats, whereas in (2b) the unmarked reading of the subject NP can be paraphrased as *many of the cats*. In (2a) it is possible that

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the many cats in the garden are in fact all the cats there are. However, this can never be the case in (2b). Thus, only the latter can be construed as true partitive. Obviously, this is in contrast with Belletti's proposal. According to her, the NP in (2a) should get the partitive reading.

Apparently, it is necessary to distinguish between a syntactic phenomenon like 'partitive Case' and a semantic notion 'partitivity' which implies 'part of a larger set'.

3. Partitivity

The notion 'partitivity' has turned out to be rather confusing. The semantic notion is often paraphrased as 'part of a larger set'. A clear example is given in (3).

(3) two of my friends

In languages like English partitives are usually analysed as NPs within NPs. However, not every construction of that form is a partitive construction, witness (4).

(4) two friends of my cousin

Furthermore, one can argue about the semantic partitivity of constructions like (5).

(5) a glass of red wine

Clearly, the wine in the glass might be the only wine in the whole domain of discourse, in which case there is no larger set of wine available. Compare the Finnish, French, and Dutch translations of (5).

(6) a. lasi punaviiniä-PART
b. un verre de vin rouge
c. een glas rode wijn

The occurrence of the partitive particle *de* in French and the partitive Case in Finnish cannot be coincidental. However, in Dutch there is no partitivity marker at all.

The Finnish partitive Case appears after all words of quantity, and so does the French particle *de*, but English behaves inconsistently by using no partitivity marker after *much*, for example.

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- (7) a. paljon olutta-PART
 b. beaucoup de bière
 c. much beer

The salient correspondence between the partitive Case in Finnish and the particle *de* in French holds in many other environments where semantic partitivity has certainly disappeared. In these cases we should use the notion 'syntactic partitivity'.

For instance, indefinite plurals or mass nouns in existential sentences are marked by the partitive Case in Finnish, and translated by the partitive particle *de* and a definite article in French.

- (8) a. Kadulla on autoja.
 In-the-street is cars-PART
 b. Il y a des voitures dans la rue.
 There are of-the cars in the street
 c. There are cars in the street.
- (9) a. Pullossa on maitoa.
 In-the-bottle is milk-PART
 b. Il y a du lait dans la bouteille.
 There is of-the milk in the bottle
 c. There is milk in the bottle.

The same striking correspondence is witnessed in negative sentences; the object of a negative sentence in Finnish is in the partitive Case, whereas in French *de* occurs.

- (10) a. Minulla ei ole autoa.
 To-me not is car-PART
 b. Je n'ai pas de voiture.
 I have not of car
 c. I don't have a car.

We conclude by stating that syntactic partitivity can be expressed in several ways:

- (11) - by Case (e.g. partitive Case in Finnish)
 - by a preposition (e.g. *de* in French, *of* in English)
 - by \emptyset

The question remains whether a correspondence can be found between the syntactic environments in which partitivity occurs and a semantic interpretation that must include indefiniteness and other phenomena.

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Evidently, the facts are too complex to deal with all of them in this article. In the next section we will focus on one construction in which the partitive Case may alternate with the accusative Case in Finnish, namely the object of a transitive verb.

4. Interpretation of object NPs

4.1 NP INTERPRETATIONS

Partee (1987) argues that NPs can have different types, namely type e (referring NPs), type $\langle e, t \rangle$ (predicative NPs) and type $\langle \langle e, t \rangle, t \rangle$ (quantificational NPs). According to Partee, all NPs can have type $\langle \langle e, t \rangle, t \rangle$, whereas the other types are restricted to some NPs.

Partee describes several type-shifting operations in order to get from one type to another. She suggests that the grammar specifies certain positions as e , $\langle e, t \rangle$, or $\langle \langle e, t \rangle, t \rangle$, but does not elaborate on this idea.

The assumption that there are different types of NPs is unmistakably correct. NPs can have the same type as common nouns (CNs), APs or even PPs. A systematic one-to-one correspondence between syntactic categories and semantic types, as proposed by Montague (1974), is therefore untenable.

The difference between the denotation of CNs and NPs is of utmost importance to the theory of generalized quantifiers. The denotation of a CN is a set of individuals (type $\langle e, t \rangle$), while the denotation of an NP is a family of sets of individuals (type $\langle \langle e, t \rangle, t \rangle$). Still, undoubtedly, in English a CN sometimes has to be interpreted as a full NP, for instance in case of generic bare plurals.

- (12) a. Fishes are vertebrates.
b. The fish is a vertebrate.

In existential sentences, bare CNs can also alternate with full NPs, witness:

- (13) a. There is wine in the bottle.
b. There is some wine in the bottle.

Moreover, we saw that in French the CN is translated by the partitive particle *de* and a definite article, which could even be argued to be a PP.

Furthermore, as Partee pointed out, the selection of a

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CN or an NP in the predicative position of a copular sentence varies in different languages. Consider successively the English, French, and Dutch sentences.

- (14) a. John is *teacher/a teacher.
 b. Jean est professeur/*un professeur.
 c. Jan is leraar/een leraar.

Inasmuch as the meanings of these NPs do not differ from each other, it would be unlikely to suppose that the types do. There are also languages (like Finnish) which lack these articles, witness the Finnish example:

- (15) Mies osti kirjan.
 Man bought book
 "A/the man bought a/the book."

Again, the distinction between CNs and NPs is not very clear and therefore such languages inevitably constitute a problem for type theory. Presumably, in order to solve the problem, a type-shifting operator would be needed or else the existence of a zero article should be assumed. In both cases, one would need independent criteria as to when such an operator or zero article has to be assumed.

At this point, I would like to claim that the type of an NP is connected with its Case. Only NPs which are structurally assigned Case, will get type $\langle\langle e, t \rangle, t \rangle$. Notice that I suppose there is a direct interaction between Case assignment and semantic type instead of a type-shifting operator.

4.2 NPs AS PREDICATE MODIFIERS

In this subsection I will examine the difference in interpretation that exists between an object with structural Case and one with inherent Case. I will assume that transitive verbs can vary between assigning structural Case and inherent Case. That implies that there may be a difference in Case assigning between the following sentences.

- (16) a. Paul read the book.
 b. Paul was reading a book.

In (16a) the verb structurally assigns Case to its object, while in (16b) the Case assignment is inherent. Obviously, there is a connection with the (in)definiteness of the NP, but also with the (ir)resultativity of the action.

I am aware of the fact that this necessarily implies

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two different types as far as the verb is concerned, but I will argue that such a distinction is not as unlikely as it may appear to be. I will therefore present some evidence from different languages in order to clarify the hypothesis that transitive verbs can vary between assigning structural Case and inherent Case.

In Turkish direct objects optionally get an accusative Case marker. For example:

- (17) a. Ali kitabı okudu
 Ali book-ACC read
 "Ali read the book."
 b. Ali kitap okudu
 Ali book read
 "Ali read a book."

In (17a) the NP *kitab* gets an accusative Case marker and consequently a definite meaning. In (17b) the object bears no morphological Case marker and the NP has no definite meaning.

In Dutch the difference between inherently and structurally assigned Case can be observed indirectly when the object and an adverb in a subordinate clause are scrambled.

- (18) a. ...dat de politie gisteren een kraker
 gearresteerd heeft.
 that the police yesterday a squatter
 arrested has
 b. ...*dat de politie een kraker gisteren
 gearresteerd heeft.
 that the police a squatter yesterday
 arrested has
 "...that the police arrested a squatter
 yesterday."
 (19) a. ...dat de politie gisteren alle krakers
 gearresteerd heeft.
 b. ...dat de politie alle krakers gisteren
 gearresteerd heeft.
 "...that the police arrested all squatters
 yesterday."

In (19) the object bears structural Case and therefore can freely move to a position before the adverb. The object in (18) however may not move there for it has to be adjacent to the verb from which it inherently receives its Case. According to Reuland (1988), this restriction is due to the nature of the NP: due to the fact that an inherent Case

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bearing NP is not a generalized quantifier, it cannot bind its trace (variable).

In German, verbs happen to exist which take two accusative objects, only one of which bears structural Case. Den Besten (1982) supplies the following example:

- (20) a. ...dass er mich Deutsch gelehrt hat.
 that he me-ACC German-ACC taught has
 "...that he taught me German."
 b. ...dass ich von ihm Deutsch gelehrt worden
 bin.
 that I by him German-ACC taught been
 have
 "...that I was taught German by him."

The passive in (20b) shows that *mich* in (20a) must be taken as the structural accusative, whereas *Deutsch* must be an inherent accusative. The other possibility will result in an ungrammatical sentence: *Deutsch* cannot be the subject of a passive sentence.

In Finnish transitive verbs can interchange accusative Case assignment and partitive Case assignment. It was on this observation that Belletti (1988) based her proposal about transitive verbs assigning either structural or inherent Case, while assuming that the partitive Case in Finnish is inherent. In section 2 we already witnessed that the alternation between a partitive object and a structural object is attributed to two semantic distinctions, that is to say indefiniteness vs. definiteness and irresultativity vs. resultativity. Consider the following examples.

- (21) a. Ostin leipää.
 I-bought bread-PART
 "I bought some bread."
 b. Ostin leivän.
 I-bought bread-ACC
 "I bought the bread."

 (22) a. Presidentti ampui lintua.
 president shot bird-PART
 "The president shot at a/the bird."
 b. Presidentti ampui linnun.
 president shot bird-ACC
 "The president shot a/the bird."

The partitive Case in (22a) expresses irresultativity independent of whether the object must be interpreted as indefinite or definite. This becomes even more clear in the following example, where the partitive Case bearing object

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contains the strong quantifier *kaikki* (=all).

- (23) *Presidentti ampui kaikkia lintuja.*
 president shot all-PART birds-PART
 "The president shot at all birds."

So, obviously, there is not only a connection between Case assignment and the (in)definiteness of the NP, but also between Case and the (ir)resultativity of the action.

I would like to reduce both distinctions to an essential difference between a predicate modifier and a real, completely involved object (a generalized quantifier).

In (21a) the verb denotes a relation between I and the bread, meaning that both objects are affected. In (21b) bread is only part of the predicate and I is the only involved object.

The difference between (22a) and (b) will be perfectly clear when reading the English translations. A PP such as *at NP* (22a) indeed functions as a predicate modifier, while the object in (22b) is entirely affected.

Thus, a partitive object in Finnish must be regarded primarily as part of a predicate rather than as an independent argument. In fact, verbs with an intrinsic irresultative meaning do occur as well. These particular verbs are subcategorized for a partitive object, e.g. the verb *think* in (24).

- (24) *Ajattelen sinua.*
 I-think you-PART
 "I think of you."³

This analysis also holds for the other examples in this section. For instance, in (16a) there are two generalized quantifiers involved, *Paul* and the *book*, whereas in (16b) a *book* functions as a predicate modifier; *was reading a book* is the predicate of *John*. This difference can be illustrated in the following way:

- | | | |
|------|-----------|---------------------|
| (25) | a. R(p,b) | R = read |
| | b. R'(p) | R' = reading a book |

In model-theoretic semantics transitive verbs are interpreted as two-place relations between families of sets of individuals. I claim that a transitive verb is only to be taken as a two-place relation if the object bears accusative Case. Then the subject and the object are of the same type, they are both generalized quantifiers (type $\langle\langle e, t \rangle, t \rangle$). But

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if the object is assigned inherent Case, it will not be interpreted as a generalized quantifier but as a predicate modifier instead (type $\langle\langle e, t \rangle, \langle e, t \rangle\rangle$).

5. A determiner system

In the previous section we argued that an NP is interpreted as a generalized quantifier only if it is assigned structural Case. Unfortunately, the theory of generalized quantifiers is often based on NPs in structural Case positions.

For instance, determiners are interpreted as two-place relations between sets of individuals, i.e. between the common noun and the verb.

- (26) DAB D = Determiner
 A, B \subseteq E, E = Universe
 (27) Three fishes are swimming.
 (28) $|A \cap B| \geq 3$ $|X|$ = the cardinality of X

Sentence (27) shows that the cardinality of the intersection of A and B is 3 or more, i.e. at least three members of the set of fishes (A) are also members of the set of swimming individuals (B), which is stated in (28). This manner of interpreting determiners turned out to be a very fruitful one (cf. Zwarts 1983), but it appears to be untenable for determiners which are embedded somewhere else in a sentence, as in (29).

- (29) I saw a lovely film in Paris that was based on the life of three tramps.

In this example, one can hardly find two appropriate sets of which the intersection must be 3.

Therefore, just as transitive verbs in model-theoretic semantics are interpreted as two-place relations between families of sets of individuals, determiners are interpreted as two-place relations between sets of individuals. Again, I claim that the interpretation interacts with Case assignment: determiners can only be interpreted as two-place relations if they bear structural Case. Reconsider (2a) and (b).

- (2) a. There are many cats in the garden.
 b. Many cats are in the garden.

In (2b) there is a dependency relation between the structural subject and the total number of cats. The set of cats is divided into two parts: cats that are in the garden

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and cats that are not.

In (2a) the interpretation of the subject NP does not concern the total number of cats, the NP is interpreted independent of other information. Thus, in (2b) the cardinality of (A-B) is of major importance, whereas in (2a) it is of no importance at all.

Enç (1987) provides a similar example in Turkish:

- (30) a. İki kız daha önce görmüştüm.
two girl-ACC more before I-had-seen
"I had seen two (of the) girls before."
b. Daha önce iki kız görmüştüm.
more before two girl I-had-seen
"I had seen two girls before."

Thus, the structurally Case assigned object in (30a) can have a partitive interpretation, whereas in (30b) the object does not bear any relation to the total number of girls.

A similar phenomenon can also be observed in Dutch. The following sentences are both well-formed:

- (31) a. ...dat de politie gisteren drie krakers
gearresteerd heeft.
b. ...dat de politie drie krakers gisteren
gearresteerd heeft.
"...that the police arrested three squatters
yesterday."

In section 4 it was made clear that the object may move to a position before the adverb (as in (31b)) if it bears structural Case. Clearly, the interpretation of (31b) differs from the interpretation of (31a). In (31b) we again encounter the partitive reading, which can be paraphrased as *three of the squatters*.

In all cases we observed that the interpretation of a structurally Case marked determiner involves other information about the sets the determiner connects. But if the determiner does not bear structural Case, it only appears to specify the set which is denoted by the CN and therefore it behaves more or less like an adjective.

Evidence to support this analysis can be obtained from languages with a non-homogeneous Case distribution in NPs, such as Russian and Finnish. Babby (1987) shows that in Russian the internal Case distribution of an NP bearing structural Case is heterogeneous, but in case of an NP being

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assigned oblique Case, its internal Case distribution is homogeneous (and so is the Case distribution in unquantified NPs).

The same holds for Finnish NPs containing a numeral. If such an NP bears structural (nominative or accusative) Case, the noun bears partitive Case, so the internal Case distribution is heterogeneous. But when the NP bears oblique Case, the noun will bear the same Case, and consequently the Case distribution is homogeneous. This is illustrated in (32)-(34).

(32) Kaksi tyttöä asuu tässä talossa.
Two-NOM girl-PART live in this house
"Two girls are living in this house."

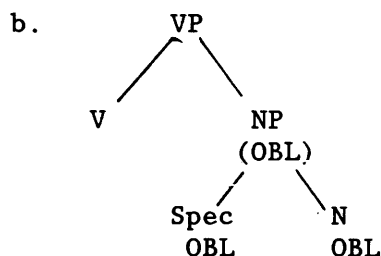
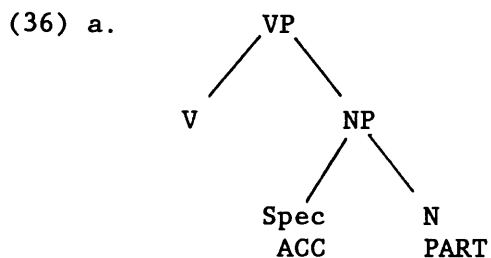
(33) Otan kaksi voileipää.
I-take two-ACC sandwich -PART
"I take two sandwiches."

(34) Asumme kahdessa huoneessa.
We-live two-INESS room-INESS
"We live in two rooms."

In (32) and (33) the numeral bears structural Case and occurs in its uninflected form. In (34) the determiner bears the inflection of the same Case as the noun.

Hence, we get the following picture:

- (35) a. [Num-STRUCT N-PART]
b. [Num-OBL N-OBL]⁴



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In (36a) the verb assigns accusative Case directly to the Spec-position, while the partitive Case of the object NP is licensed by the determiner in that Spec-position⁵. In (36b) there is no Case assigned structurally to the Spec-position. The determiner inherits its Case from the N, so there does in fact exist Spec-head agreement.

Summarizing, we argued that determiners must be interpreted as two-place relations if they are assigned structural Case. If they are not assigned structural Case, they inherit their Case from the CN they are restricting in an adjectival manner.

6. Conclusion

In this article an attempt was made to connect Case assignment with model-theoretic semantics. The hypothesis was made that an NP is always interpreted as a generalized quantifier if it is assigned structural (nominative or accusative) Case.

Different languages appeared to provide evidence for the assumption that transitive verbs have the option of either assigning structural or inherent Case to their objects. Structurally Case bearing objects are interpreted as generalized quantifiers, whereas inherently Case bearing objects function as predicate modifiers. Thus, transitive verbs are two-place relations only if they assign structural Case to their object.

Structural Case also essentially involves the determiner system. In fact, determiners are taken as two-place relations only if they are assigned structural Case. Evidence for such an analysis was obtained from languages with a non-homogeneous Case distribution in NPs, such as Russian and Finnish.

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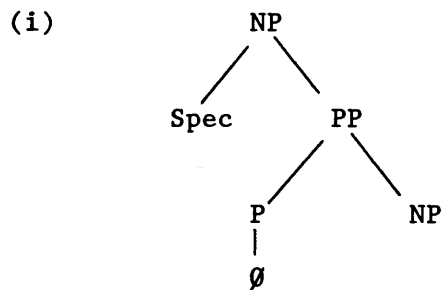
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Notes

1. Vainikka (1988) independently put forward this conclusion.
2. Almost all Finnish sentences in this paper are copied from Karlsson (1983).
3. Is the occurrence of of coincidental or not?
4. Notice that the decision whether the partitive is a structural or an oblique Case cannot be based on these facts, because the partitive fits in with both schedules.
5. Another possibility is to assume the existence of a zero preposition, which assigns partitive Case to N.

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