A sign-based analysis of differential object marking

Klaus von Heusinger and Udo Klein

October 8, 2007

1 Semantic factors for DOM

Differential object marking: some but not all direct objects are overtly marked (either by a preposition or a case affix).
This phenomenon is part of a more general phenomenon of differential encoding of patient-like arguments.

1.1 Properties of the direct object

Animacy:

(1) Romanian

a. L-am văzut ***(pe) Mihai**.
ACC.3.SG-have seen DOM Michael
I've seen Michael.

b. Am văzut **(*pe) filmul acesta**.
have seen DOM film.DEF.MASG.SG this.
I've seen this film.

Referentiality:

(2) Hebrew (Aissen (2003))

a. Ha-seret hera **et-ha-milxama**.
the movie showed ACC-the-war
The movie showed the war.

b. Ha-seret hera **(* et-) milxama**.
the movie showed (ACC-)war
The movie showed a war.

1.2 Properties of the verb

The overt marking of the P argument depends on semantic properties of the verb.

(3) Finnish (Lazard (1984, 274), quoted from Cennamo (2003))

a. juo-n maito-a
drink-1SG milk-PART
I drink (some) milk.

b. juo-n maito-a
drink-1SG milk-ACC
I drink the milk.

1.3 Properties of the subject

In some languages the overt marking of P arguments depends on the properties of the A argument. For example, in Chepang (Tibeto-Burman, Nepal), the object case-marker `-kay` appears only when the object is "intentionally affected", in other words when the agent is acting volitionally. Examples (4) are from , examples (5) are from **?**.

(4) Chepang (**?**, quoted from Næss (2006))

a. **həw-kay** puʔ-nis-ʔi
young brother-DAT old brother-DUAL.AGENT
sat-ʔa-theəy
kill.PAST.DUAL.AGENT
The two older brothers killed the younger brother (volitional).

b. puʔ-nis-ʔi **həw**
old brother-DUAL.AGENT young brother
sat-ʔaka-c-u
kill.PAST.DUAL.AGENT
The two older brothers killed the younger brother (non-volitional).

(5) Chepang (**?**, quoted from **?**)

a. ngaa-ˀi **waaˀ-kaayˀ** saayˀ-naa-ng
I-ERG bird-DAT hear-PRES-1st
I listen to a bird. (volitional)

b. ngaa-ˀi **waaˀ** saayˀ-naa-ng
I-ERG bird hear-PRES-1st
I hear a bird. (non-volitional)

1.4 Requirements on an analysis of DOM

DOM is a phenomenon which involves a complex relation between formal and semantic properties.

The first challenge posed by DOM is therefore to model this complex relation between formal and semantic structure.

Secondly, DOM is subject to an interesting cross-linguistic generalization: If a language overtly marks a P (patient-like) argument then it also marks all P arguments which are higher on the relevant prominence scale(s) (see e.g. Bossong (1985)).

The second challenge is therefore to account for this generalization.

2 A sign-based analysis

2.1 Basic assumptions

We make the following assumptions:

1. Languages are not sets of expressions, but sets of signs (consisting of an expression and its meaning).
2. The grammar of a language is a characterisation of the set of signs of a language.
3. The set of signs of a language can be characterised by specifying basic signs and rules for combining less complex (component) signs into a more complex (composite) sign.
4. A basic sign is a sign which cannot be analysed into component signs (if it can be analysed into component forms, it cannot be analysed into component meanings, and vice versa).
5. A rule for combining signs specifies:
    - a formal operation, the categories of the expressions to which this operation applies, and the category of the resulting expression. Categories are modelled as sets of feature-value pairs. The relevant features are 'cat' for syntactic category, 'case', etc..
    - a semantic operation, the categories of the meanings to which this semantic operation applies, and the category of the resulting meaning. Examples of semantic categories are 'ARG' (for

argument or entity) and 'PRED' (for a predicate or unsaturated proposition).

The specification of a formal operation plus the categories of the component and composite expressions could be called a formal rule. Thus we make the same distinction between formal rule and formal operation as in Montague (1970).

2.2 Illustration

The following grammatical rule (or mode of combination) combines a nominal sign in the nominative case with a verbal sign.

$$R_{16}(\left[\begin{array}{rcl} \mathtt{e}_1 & : & \text{[cat:N, case:NOM]} \\ \mathbf{m}_1 & : & \text{[cat:ARG]} \end{array}\right], \left[\begin{array}{rcl} \mathtt{e}_2 & : & \text{[cat:V]} \\ \mathbf{m}_2 & : & \text{[cat:PRED]} \end{array}\right]) =$$

$$\left[\begin{array}{rcl} O_2^{\epsilon}(\mathtt{e}_1, \mathtt{e}_2) & : & \text{[cat:S]} \\ O_5^{\mu}\ (\mathbf{m}_1, \mathbf{m}_2) & : & \text{[cat:PROP]} \end{array}\right]$$

Note that this grammatical rule specifies:

- a formal operation, namely O_2^{ϵ}
- the categories of the component and composite expressions
- a semantic operation, namely O_5^{μ}
- the categories of the component and composite meanings

If, for example, the formal operation O_2^{ϵ} is concatenation, and the semantic operation O_5^{μ} is functional application, then the combination of the sign `John` and `sleeps` results in:

$$R_{16}(\left[\begin{array}{rcl} \mathtt{John} & : & \text{[cat:N, case:NOM]} \\ \mathbf{j} & : & \text{[cat:}e\text{]} \end{array}\right], \left[\begin{array}{rcl} \mathtt{sleeps} & : & \text{[cat:V]} \\ \boldsymbol{\lambda}\mathbf{x}.\mathbf{sleep(x)} & : & \text{[cat:}\langle e,t\rangle\text{]} \end{array}\right]) =$$

$$= \left[\begin{array}{rcl} O_2^{\epsilon}(\mathtt{John}, \mathtt{sleeps}) & : & \text{[cat:S]} \\ O_5^{\mu}\ (\mathbf{j}, \boldsymbol{\lambda}\mathbf{x}.\mathbf{sleep(x)}\ ) & : & \text{[cat:}t\text{]} \end{array}\right] =$$

$$= \left[\begin{array}{rcl} \mathtt{John\_sleeps} & : & \text{[cat:S]} \\ \mathbf{sleep(j)} & : & \text{[cat:}t\text{]} \end{array}\right]$$

2.3 Case study: Analysis of DOM in Romanian

Simplified conditions for DOM in Romanian ('+' means that the argument is overtly marked with `pe`, '-' means that the argument is not overtly marked for case, and 'N/A' means that the rule is not applicable).

	Pers.Pro	Prop.Name	Def. NP	Indef. spec. NP	Indef. non-spec. NP
animate	+	+	±	±	-
inanimate	-	-	-	-	-

This table shows that DOM in Romanian can be characterised by two correlations between form and meaning: (i) an argument is overtly marked with `pe` if it is animate and its type of reference is "indefinite non-specific" or higher on the referentiality scale, and (ii) an argument is not overtly marked if it is inanimate or if it is definite or lower on the referentiality scale. These two correlations will be captured by two rules for combining nominal signs with verbal signs.

Hypothesis 1: In Romanian direct objects are combined with the verb by means of two different rules R_1 and R_2.

The first rule R_1 applies to nominal signs which are animate and which are indefinite specific or higher on the referentiality scale. This rule requires the nominal sign to be overtly marked with `pe`. These conditions of application are illustrated below:

R_1	Pers.Pro	Prop.Name	Def. NP	Indef. spec. NP	Indef. non-spec. NP
animate	+	+	+	+	N/A
inanimate	N/A	N/A	N/A	N/A	N/A

The second direct object rule R_2 applies to nominal signs which are either inanimate or indefinite non-specific. This rule requires the nominal sign to be unmarked for case. These conditions are illustrated below:

R_2	Pers.Pro	Prop.Name	Def. NP	Indef. spec. NP	Indef. non-spec. NP
animate	N/A	N/A	-	-	-
inanimate	-	-	-	-	-

Note that both rules can apply to definite and indefinite specific arguments referring to animate entities (but only one of the rules can apply to the other types of arguments). This accounts for the optional marking of these two types of arguments.

Hypothesis:2: Discourse referents (DRs) have varying degrees of identifiability (cf. the notion of 'dynamic referential stability' in von Heusinger and Farkas (2003)):

- DRs identifiable only by means of contextual information have the highest degree of identifiability (ident:1). These DRs are (usually) expressed by pronouns).
- DRs identifiable by means of proper names have second highest degree of identifiability (ident:2). These DRs are expressed by proper names.
- DRs identifiable by both speaker and hearer by means of a property (other than a name) have third highest degree of idenntifiability (ident:3). These DRs are expressed by definite NPs.
- DRs identifiable only by the speaker have fourth highest degree of identifiability (ident:4). These DRs are expressed by indefinite NPs.
- DRs which are not identifiable have lowest degree of identifiability (ident:5). These DRs are expressed by indefinite NPs or by means of incorporation.

Rule R_1 is:

$$R_1(\begin{bmatrix} \mathtt{e}_1 & : & \text{[cat:N, case:ACC]} \\ \mathbf{m}_1 & : & \text{X} \end{bmatrix}, \begin{bmatrix} \mathtt{e}_2 & : & \text{[cat:V]} \\ \mathbf{m}_2 & : & \text{[cat:PRED]} \end{bmatrix}) =$$

$$\begin{bmatrix} O_1^{\epsilon}(\mathtt{e}_1, \mathtt{e}_2) & : & \text{[cat:V']} \\ O_1^{\mu}(\mathbf{m}_1, \mathbf{m}_2) & : & \text{[cat:PRED]} \end{bmatrix}$$

where (i) X = [cat: ARG, anim:+, ident:$\leq$ 4] and (ii) O_1^{μ} saturates the placeholder for the P argument of $\mathbf{m}_2$ with $\mathbf{m}_1$.

Rule R_2 is:

$$R_2(\begin{bmatrix} \mathtt{e}_1 & : & \text{[cat:N, case:}\star^1\text{]} \\ \mathbf{m}_1 & : & \text{X} \end{bmatrix}, \begin{bmatrix} \mathtt{e}_2 & : & \text{[cat:V]} \\ \mathbf{m}_2 & : & \text{[cat:PRED]} \end{bmatrix}) =$$

$$\begin{bmatrix} O_1^{\epsilon}(\mathtt{e}_1, \mathtt{e}_2) & : & \text{[cat:V']} \\ O_1^{\mu}(\mathbf{m}_1, \mathbf{m}_2) & : & \text{[cat:PRED]} \end{bmatrix}$$

where (i) X = [cat: ARG, anim:-] or [cat:ARG, anim:+, ident:$\geq$ 3], and (ii) O_1^{μ} saturates the placeholder for the P argument of $\mathbf{m}_2$ with $\mathbf{m}_1$.

The rule R_{ACC} combines the preposition sign `pe` with a nominal sign, and

specifies the value of the case feature of the nominal sign as ACC. The direct object rules R_1 and R_2 then checks the presence/absence of this value. Example of the second rule combining the nominal sign `dulapul` with a verbal sign:

$$R_2(\begin{bmatrix} \texttt{dulapul} & : & \text{[cat: N, case:}\star\text{]} \\ \textbf{WARDROBE} & : & \text{[cat: ARG, anim:-]} \end{bmatrix}, \begin{bmatrix} \texttt{vede} & : & \text{[cat: V]} \\ \textbf{SEE}(_{-A}, _{-P}) & : & \text{[cat: PRED]} \end{bmatrix}) =$$

$$\begin{bmatrix} \texttt{vede\_dulapul} & : & \text{[cat: V]} \\ \textbf{SEE}(_{-A}, \textbf{WARDROBE}_P) & : & \text{[cat: PRED]} \end{bmatrix}$$

3 Properties of the analysis

3.1 Form-meaning interface

- The postulated sign-combining rules relate formal structure to context-invariant (linguistic, encoded) meaning (as opposed to fully specified truth-conditions).
- The form-meaning interface is defined by the rules associating formal and semantic structure. Therefore this interface is language-particular: two languages L and L' have the same form-meaning interface iff their grammar contains the same set of sign-combining rules.
- The mapping between semantic and formal relations is many-to-many: The same semantic relation may be expressed by different formal relations (no UTAH), and the same formal relation may encode (express) different semantic relations.

3.2 Case assignment

- If a nominal sign combines with the preposition `pe` by means of rule R_{ACC}, then the case value of the nominal sign is specified as ACC. If a nominal sign combines with the preposition `pe` by means of rule R_{PREP}, then the case value of the nominal sign is left unspecified. Note that the sign `pe` does `not` require the nominal sign to be ACC marked.
- The rules R_1 and R_2 check that the case value of the nominal sign is ACC and $\star$ respectively. Note that the verb itself does not require the case value of the nominal sign to be ACC or $\star$. So the ACC case is structural (determined by the grammatical rules) as opposed to inherent (determined by the lexical entries).

3.3 Competence and performance

Neither the grammar nor the grammar framework contains a principle which accounts for the typological generalization:

If a language overtly marks a P argument then it also marks all P arguments which are higher on the relevant prominence scale(s).

Typological generalizations characterize the range of grammars of NLs, which is restricted among other things by:

- innate linguistic predisposition (logically possible grammars are not attested because they are in conflict with innate linguistic predispositions)
- language learning (logically possible grammars are not attested because they cannot be learned).
- language processing (logically possible grammars are not attested because they cannot be processed efficiently).
- cognitive architecture
- etc.

Therefore, a particular typological generalization may in principle be explained by any (combination) of these factors.

Principles of language processing restrict the range of grammars (grammars conventionalize processing preferences, see Hawkins (2004) and Newmeyer (2005)), but are not part of individual grammars (see e.g. Newmeyer (2002) and Haspelmath (2006)).

In order to account for this typological generalization, it is necessary to answer:

1. Why should the overt marking of direct objects start with arguments which are highest on the two prominence scales?
2. Why should the overt marking of direct objects "spread" down this scale continuously?

There seems to be a consensus on what types of principles are responsible for why e.g. DOM starts with arguments which are highest on the prominence scales (cf. the analysis in terms of markeness reversal, iconicity, economy in Aissen (2003)), but what is debatable is whether these principles are part of the theory of competence or not.

We claim that these principles are not part of the (theory of) grammar, but part of the theory of processing.

1. In answer to the first question one could postulate two **extragrammatical** principles:

   P1 Distinguish first where it matters most.

   P2 Resist overt marking of most frequent argument types.

   The distinction between two arguments which have highest prominence matters most. Therefore arguments which are most prominent are distinguished (e.g. by overt marking) first. Subjects (in the case of languages with NOM/ACC alignment) are more frequent than objects. Therefore overt marking of subjects is resisted more than overt marking of objects. Therefore objects which have highest prominence are overtly marked first.

2. Spreading results from the reanalysis of the conditions for the applications of the rules. At different stages, the reanalysis may depend on different semantic properties, as argued in **?**.

3.4 Optionality

Note that the combined effect of both rules R_1 and R_2 yields the (simplified) conditions for DOM in Romanian, and in particular that the overt marking of definite and indefinite NPs referring to animate individuals appears optional.

3.5 Diachronic change

The spread of differential object marking involves three steps:

1. The rule R_1 starts applying also to **similar** arguments (i.e. to arguments one step lower on the scale). This is modelled by changing the conditions for the application of R_1. At this stage the condition for rule R_2 is still the same.

2. Language users develop a preference for using R_1 instead of R_2 to combine the arguments to which the rule R_1 has extended. This is explained by by theory of learning/processing.

3. In time, the preference for using R_1 is grammaticalized. This step involves a second change in the grammar: the conditions for the application of the rule R_2 change).

References

Judith Aissen. Differential object marking: Iconicity vs. Economy. *Natural language and linguistic theory*, 21:435–483, 2003.

Georg Bossong. *Differentielle Objektmarkierung in den neuiranischen Sprachen*. Gunter Narr Verlag, Tübingen, 1985.

Michela Cennamo. (in)transitivity and object marking: some current issues. In Giuliana Fiorentino, editor, *Romance Objects: Transitivity in Romance Languages*, Empirical approaches to Language Typology. Mouton de Gruyter, Berlin, 2003.

Martin Haspelmath. Against markedness (and what to replace it with). *Journal of linguistics*, 42(1):25–70, 2006.

John A. Hawkins. *Efficiency and Complexity in Grammars*. Oxford University Press, Oxford, 2004.

Gilbert Lazard. Actance variations and categories of the object. In Frans Plank, editor, *Objects, Towards a Theory of Grammatical Relations*, pages 269–292. Academic Press, New York, 1984.

Richard Montague. Universal Grammar. *Theoria*, 36:373–398, 1970.

Åshild Næss. Case semantics and the agent-patient opposition. In *Case, Valency and Transitivity*, Studies in Language Companion Series 77, pages 309–327. John Benjamins, 2006.

Frederick J. Newmeyer. Optimality and Funcitonality: a Critique of functionally-based Optimality-Theoretic Syntax. *Natural Language and Linguistic Theory*, 20:43–80, 2002.

Frederick J. Newmeyer. *Possible and Probable Languages: A Generative Perspective on Linguistic Typology*. Oxford University Press, Oxford, 2005.

Klaus von Heusinger and Donka Farkas. Stability of reference and object marking in romanian. 2003.