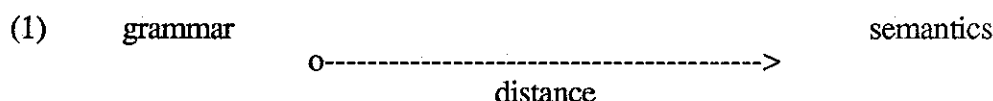


ON THE CORRESPONDENCE BETWEEN SEMANTICS AND SYNTAX*

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1. Introduction

One way of classifying semantic theories and descriptions is according to the distance that exists between them and the system of grammar. On the one hand we encounter theories and descriptions that use primitives that are very close to the system of grammar. On the other hand there are theories and descriptions that do not allow a well-defined relationship between their primitives and the grammar. These two cases are the extremes of a line expressing the distance between grammar and semantic primitives.



The diagram in (1) basically reflects a distinction made in Hjelmslev's *Prolegomenes*. The line expresses the difference between sense and contents. Contents is that aspect of linguistic semantics that plays a role in an area very close to the grammar, which is on the left end of our line; sense is the aspect of semantics that is less close to the grammar and the term can be used to describe the semantics on the right hand side of the line in (1).

Analyses of anaphora binding and quantifier scope can be placed on the left end. Many researchers active in these domains of research use the system of grammar to structure their analyses. One only has to think of the structural conditions on the semantic interpretation of anaphors and quantifiers such as those formulated in the Government and Binding framework.

Studies done on argument structures in lexical frameworks such as Grimshaw (1990) can be placed at the right end of this line. Also studies done in conceptual semantics such as the theories proposed in the work of Jackendoff can be placed here. These studies do not use data pertinent to the system of grammar as rigidly as studies on anaphora or quantifiers.

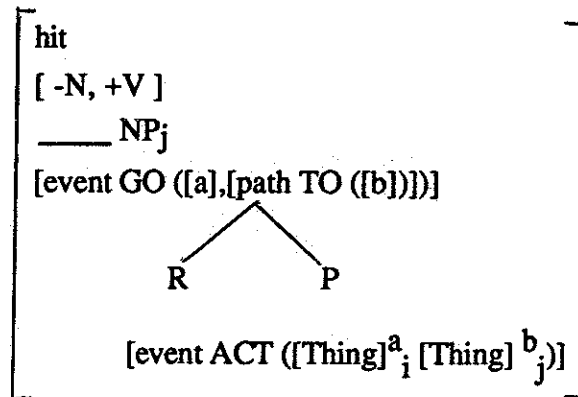
The purpose of this presentation is to explain the difference between the two kinds of relationships between grammar and semantics and to show why analyses that attempt to use data from the system of grammar in order to formulate their primitives are to be preferred.

2. On Correspondence

The relation between semantics and grammar is established through correspondence. This relationship has very different forms in various linguistic theories. Two extremes can be distinguished. First there is a correspondence that merely consists of indexation of semantic primitives with primitives figuring in syntax or morphology. Secondly, there is a form of correspondence that establishes well-defined semantic relationships. The latter creates a stricter relationship than the former. The example in (2) demonstrates how correspondence through indexation can be realized in a theoretical model. The example is the conceptual structure of the verb *hit*, from Jackendoff (1987).

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(2)



Jackendoff states explicitly that correspondence relations are created by indices in his theory. The letters *i* and *j* express the correspondence between syntactic and conceptual positions. The letters *a* and *b* express the binding of conceptual positions. The entity with index *i* becomes the subject and the one with index *j* becomes the direct object in the syntax. Another form of correspondence that can possibly exist between this conceptual structure and the grammar is the one between primitives like GO and TO and the grammar. For instance one could imagine that GO and TO characterize a verb class that exhibits some properties at the level of the grammar. Unfortunately, although such a relation may exist in case of certain primitives, the theory itself does not imply it. There is a Grammatical Constraint in Jackendoff's theory that states that one has to prefer a semantic theory that explains generalizations in syntax and semantics. However, Verkuyl, in his 1986 review of *Semantics and Cognition*, shows that this constraint has not materialized in the analyses. Consequently the correspondence between primitives like GO and TO and the grammar is comparable to a correspondence through indexation.

Correspondence relations can also be found in many lexical approaches to the study of grammar. These approaches use argument structures to account for phenomena such as psych-verbs, unaccusativity, the middle and many others. In a study like Grimshaw (1990) the thematic level is ordered according to certain semantic criteria, thereby creating a strict correspondence between semantics and argument structures. The primitives used are similar to thematic roles. The processes that use lexical structures do not make reference to semantics.

- | | | |
|-----|------------------------------|---|
| (3) | a. transitive agentive | (x (y))
Agent Theme
He ate an apple turnover |
| | b. bi-transitive | (x (y (z)))
Agent Goal Theme
He gave me a copy of his article |
| | c. unergative | (x)
Agent
He is working |
| | d. fear | (x (y))
Experiencer Theme
I love sunny days |
| | e. frighten
psychological | ((x (y)))
Experiencer Theme
These murders frighten me |

- f. frighten (x (y))
 agentive Agent Experiencer
- g. unaccusative ((x))
 Theme
 The bridge collapsed

According to Grimshaw, the thematic roles do not have any explanatory value in this theory. Instead various operations on argument structures explain lexical phenomena. Unfortunately the argument structures in this model are ordered according to thematic roles.

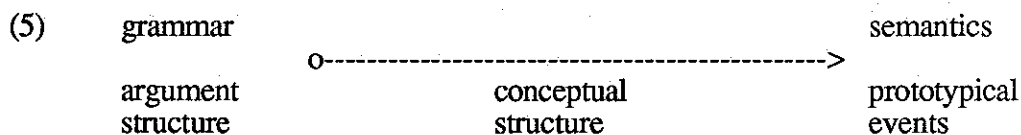
The idea that there is a strict correspondence between thematic roles and argument structure is also present in Relational Grammar and studies such as Belletti and Rizzi (1988) on psych-verbs. The basic assumption is that there are roles that are more typical for certain grammatical functions than others. Relational Grammar has proposed derivations that are partially given by this assumption and partially by various phenomena that one encounters in the grammar. These ideas have been reproduced in the Government and Binding Framework in studies such as Burzio (1986) and, more recently, in Belletti and Rizzi (1988) and Larson (1988) and in many other places. Grimshaw (1990) is a lexical variation of these assumptions. Perlmutter's (1978) unaccusative verbs are a well-known example. The subject in (4b) is derived. It originates in the direct object position, which is assumed to be the only position able to bear the patient role, as in (4a).

- (4) a. He broke the vase
 b. The vase broke

Perlmutter gives a list of unaccusative verbs. The main semantic category to distinguish unaccusatives from unergatives is the opposition between non-activity and activity. These notions can be grouped with the notions of agent and patient. Grimshaw uses primitives from the same domain to express the alternation in (4). This is done in (3a), (3c) and (3h).

Dowty (1988) denies that thematic roles can establish a correspondence between semantics and the grammar. He argues that it has never been demonstrated that these roles are able to express syntactic or semantic generalizations. According to Dowty, grammatical processes are determined by arbitrary aspects of meaning. The roles are not part of the grammar and only function to identify prototypical events in reality. In other words this implies that there is no strict correspondence between these roles and the grammar. An example that illustrates Dowty's position is Perlmutter's unaccusativity. It has been shown in Van Valin (1987) and in my own work that the primitives Perlmutter uses do not lead to the right generalizations. For observational and explanatory reasons it is necessary to replace the agent-patient or activity-nonactivity distinction by a distinction based on aspect. This way a relation of strict correspondence can be established between the phenomenon of unaccusativity and the grammatical system. The generalization is simple and states that unaccusatives like (4b) are accomplishments.

The approaches discussed so far can be situated on our line in (1). Dowty's prototypical events are to be placed at the right end of the line. Jackendoff's conceptual semantics could be placed in the middle of the line or more towards the right. Grimshaw's analyses and those of Relational Grammar have to be placed on the left end of the line, contrary to what I said at the outset, but in doing this we are only following the assumptions made in these frameworks.



All three approaches in (5) make reference to thematic roles. Thematic roles are the basis of

Grimshaw's argument structures and Dowty's prototypical events. Jackendoff (1987) places thematic roles in his conceptual structures not as primitives but as notions derived from these structures. What is interesting is that the three approaches make different assumptions as to the correspondence between thematic roles and the system of grammar. This situation clearly illustrates the uncertainty surrounding the status of thematic roles in today's linguistics.

In studies proposing derivations for various lexical phenomena, questions concerning the status of thematic roles are seldom raised. The existence of a strict correspondence relation between these roles and the system of grammar is not debated. A typical example of this type of treatment of thematic roles is Belletti and Rizzi's recent article of psych-verbs. The authors stipulate that important distinctions between thematic roles help determine the level of D-structure. Alternations as in (6) are described with the the roles of theme and experiencer.

- (6)
- a. Gianni teme questo
Gianni is afraid of that
experiencer theme
 - b. Questo preoccupa Gianni
That worries Gianni
theme experiencer

The theme role is directly assigned by the verb to a post-verbal noun phrase. This implies that the subject in (6b) is derived. The authors do not give arguments for the thematic roles they use. Neither do they give reasons for why a certain thematic role is connected to a certain position rather than to another.

3. Methodology

There are two important issues that should be considered when making a proposal that stipulates a correspondence between semantic primitives and the grammar. First it needs to be established whether there *IS* a correspondence between the primitives used and the grammar. Secondly, the question of how this correspondence is realized must be considered. For example: first we have to establish whether the primitive of patient can figure in a correspondence relation at all; secondly we need to establish what this relation is. An answer to the latter problem is for instance that a patient is a role typical for the direct object.

Regarding thematic roles, both issues are quite troublesome. If we believe Dowty's rather extreme position, then the roles do not figure in the grammar at all and, consequently, there is no good reason to base D-structures or lexical structures on them. In addition, the serious studies that have been undertaken to explain phenomena relating to argument structures often come up with notions very different from thematic roles. This should be disconcerting to anybody still using these notions. For example semantic analyses of unaccusative verbs such as Tenny (1987), Van Valin (1987) and Van Voorst (1988) conclude that aspectual rather than thematic notions are good candidates to describe the phenomenon at hand.

If Dowty is on the right track then thematic roles only figure in a relationship of correspondence through indexation. In Hjelmslev's terms this means that they are part of the sense, which is the aspect of semantics that is relatively far removed from the grammar. They do not figure in the contents, the aspect of semantics relatively close to the grammar. The contents contains the linguistically relevant semantic primitives. But now, we are faced with a contradiction when considering thematic roles. If they belong to the sense and are non-linguistic entities, why are they used to make linguistic claims regarding the nature of D-structures or lexical structures? Shouldn't we use primitives that are close to the linguistic system to make such claims?

It follows from the above that Grimshaw's (1990), as well as Belletti and Rizzi's (1988) assumptions cannot be maintained. The strict correspondence they assume is based on notions that can be considered non-linguistic and can only figure in a correspondence relation that is much looser and is established through indexation like in models such as Jackendoff's.

The choice for or against a strict correspondence or for or against Hjelmslev's contents has some important methodological implications. If one does not accept the idea of strict correspondence or contents, it will be difficult to determine the exact nature of primitives. Correspondence through indexation does not give us any criteria for choosing a primitive which follow from the grammar. Everything can be coindexed with everything else, which means that we can formulate any semantic or conceptual primitive and relate it to a position in an argument structure or in the syntax. We only have criteria that follow from the semantic or conceptual theory used and, in the worst case, we only have criteria that relate to our own interpretation of the meaning of an argument structure. If we do accept the idea of strict correspondence or contents in the study of argument structures, this problem will disappear. We then will use what other areas of linguistic research have used for a long time, that is, the grammar, to help determine our primitives.

4. An Example

There are many ways to create a strict correspondence in the study of the semantics of argument structures. A semantic analysis can use structural or morphological data just as studies of anaphora and quantifier binding have done. Using data from other levels of grammar will help us to delimit the scope of the primitive and, at the same time, to formulate a primitive that characterizes a well-defined subpart of the grammar.

In order to create a strict correspondence for argument structure semantics, it is sensible to widen the scope of correspondence relationships. Correspondence has often been interpreted as correspondence between a noun or prepositional phrase and a semantic primitive or primitives. For instance, Fillmore's (1968) subject selection hierarchy maps various thematic roles onto the subject position. A subject can be an agent, patient, instrument, and so on. Another way of looking at correspondence is to include other phenomena of grammar, such as rules or paradigmatic relations. Then one does not create a correspondence category such as subject, but rather categories such as passivizable subject, subject of a reflexive construction, etc. In doing this one must be careful not to repeat the problems of Fillmore's analysis, giving a check-list of notions to describe the subject of, for instance, a passivizable construction. The challenge is to create a notion that can cover all cases of a certain grammatically relevant class.

The above is easier said than done, as I will demonstrate with respect to the English middle. Please note that this example is used for demonstration purposes only. My discussion will be tentative and I do not mean to give an in-depth analysis.

Keyser and Roeper (1984) and Fagan (1988) propose an analysis of middle data that is structured in terms of current models of grammar. Keyser and Roeper's proposal derives the subject of the middle syntactically. The subject of the middle originates in direct object position and is moved to the subject position as in (7). Fagan's proposal is a semantic account of the middle in terms of thematic role assignment features. The subject of the middle gets the direct object role assigned through (8).

(7) NP verb t(race) Adv

(8) a. assign arb to the external theta-role
b. externalize the direct theta-role

Both analyses assume a correspondence relation between a thematic role and a syntactic or lexical position. For Fagan, this is the direct theta-role, which is probably the patient-role. Middles quite clearly have a patient-like subject. What this correspondence relation cannot do is explain when a middle is possible and when it is not. In that sense the mechanisms in (7) and (8) lack explanatory power. Driven to the extreme, one has to say that the mechanisms apply when a particular argument structure specifies that they may apply, which removes any explanatory power they may have had.

The rules in (7) and (8) overgenerate middles. Although we have (9a), (9b) is ungrammatical despite the fact that its subject is like a direct object or a patient in the corresponding transitive construction.

- (9) a. These pills swallow easily
- b. *This pudding eats easily

As is well-known in the literature on middles (Jespersen (1927), Poldauf (1960), etc.), the constraints on middle formation are considerable. One analysis of the middle (Van Oosten, 1977) implies that these constraints can be explained if the semantic relation between subject and predicate is taken into account. Van Oosten proposes that the subject of the middle bears responsibility for the action of the predicate in a way that properties of the agent-subject normally do. The important issue here is that (9a) expresses that properties of the pills, such as their form, are responsible for the ease of swallowing them. (9b) is not possible because *eating*, in Van Oosten's terms, does not permit that properties of the substance eaten be responsible for the eating event. *Swallowing* more strongly depends on properties of its object than *eating*. Although this analysis is far from perfect and remains vague in many respects, let us assume that it is on the right track. Now, we can push Van Oosten's ideas a bit further and say that the subject of the middle is not unlike the subject of transitive or intransitive non-stative constructions. For instance, the subject of *sleeping* also bears responsibility for the sleeping event, ie. its physical properties induce and sustain the sleeping event. The middle then can be considered non-stative, a statement that sheds some light on other properties of this construction.

The relation between the subject of statives and the verb is far less restricted than in middles. Saying that a dog stinks (10a) does not imply anything about the responsibility of the dog itself for the stinking. The smell may be generated by any substance left on the dog after his visit to the park. The same goes for (10b) and (10c). There is nothing in the essay or the car that is responsible for the absence of a few paragraphs or an exhaust pipe. Both entities do not "make" themselves miss or not have something.

- (10) a. This dog stinks because he has been playing in the park.
- b. This essay is missing a few paragraphs because the copier broke down.
- c. This car does not have an exhaust pipe because I do not like them.

The middle does not allow this loose relationship. (11) shows that if properties of the subject cannot be responsible, or if we are not speaking about properties of the subject per se, the sentences sound odd. This makes middles similar to non-stative action verbs like *sleep*, that also have a close semantic relationship between subject and predicate. Judgements here may vary depending on what one can accept as something the subject NP can be responsible for.

- (11) a. ?*This meat does not cook very well because the pan is badly damaged.
- b. ?*These books do not sell very well because they are not very visible on that shelf.
- c. ?*This book does not read easily because there is mud on almost every page.

There is another difference between statives and middles that groups middles with non-statives. Middles allow particles that can be considered to have an aspectual function, as is argued in Tenny (1987) and (1989). Statives do not allow these. These particles turn a construction into an accomplishment in Vendler's (1967) terms. Accomplishments are non-stative. (12a) and (12b) are middles with a particle; (12c) and (12d) are statives with a particle.

- (12) a. The cap screws off if you twist the neck.
- b. That jacket zips up close to the neck.
- c. *John is missing out from the group.
- d. *That book is lying down on the floor.

The above observations contradict Fagan's findings that the middle is stative. They also contradict each other. The fact that the middle allows particles groups them with intransitive accomplishment verbs, which is the well-known class of unaccusatives. These verbs have subjects with patient-like properties as in the alternation in (13).

- (13) a. He broke the vase. (transitive accomplishment)
 b. The vase broke. (intransitive accomplishment)

This is in contradiction to the analysis of middles as having a subject with properties like that of intransitive action verbs like *sleep*. The latter phenomenon groups them with activities in Vendler's classification. Activities do not imply accomplishment at all. Correspondence-wise there are several ways out of this dilemma. We can distinguish a grammatically relevant subclass of middles, namely those allowing a particle, and show that these are different from other middles. We could also try to show that unaccusative subjects have certain semantic properties that make them similar to middle subjects, that is, certain properties that also explain the semantic constraints imposed on the middle construction. I will not explore this further here. The point I wish to make is that by adhering to the idea of a correspondence between semantic notions and phenomena in the grammar, we create easily identifiable domains in which we can try to make semantic generalizations.

Whatever the solution for our dilemma may be, it is clear that both sets of data indicate that middles are non-stative, as they behave either like activities or like accomplishments. Out of the four verb classes in Vendler's classification, activities, accomplishments, and achievements are the non-stative ones. This finding is further corroborated when we look at a number of the tests used by Keyser and Roeper and by Fagan to prove that middles are stative. The assumptions underlying these tests are not well-founded and they cannot be used to show the stative nature of a construction.

According to Keyser and Roeper, middles do not allow the progressive form which makes them similar to stative verbs that also do not allow this form. The difficulty here is that some middles and some statives do appear in the progressive form without losing their "middle" or stative nature. The two verbs in (14a) and (14b) are good examples of statives that take the progressive. Two middles that take the progressive are given in (14c) and (14d), which describe single events rather than a series of successive changes.

- (14) a. This table is missing a leg.
 b. The statue is standing on the corner of Peel and Sherbrooke.
 c. These books are selling well today.
 d. This pencil mark is erasing well.

Finally there are non-statives like the perception verbs that can occur with a non-generic reading without the progressive in the present tense.

- (15) a. I hear the fire-alarm.
 b. I feel the cold wind.

The problem of the relation between the progressive form and notions like stativity has been discussed extensively in Mufwene (1984). It is clear from this study and the above data that the correspondence relation between the use and non-use of the progressive form and the stative/non-stative distinction is far more complicated than is normally assumed. What one can say at this point is that this relation is not as clear-cut as is often believed and, therefore cannot be used to prove that a certain construction is stative.

According to Fagan middles are typically restricted to the present tense. This groups them with other constructions that express a property, such as statives, and is used to argue that they are stative. However, it is easy to show that statives, as well as generic sentences and middles, can occur in tenses other than the present tense just like non-statives. This is demonstrated in (16)-(18).

- (16) a. This dog stank of grime all day.
b. This dog will stink of grime if we leave him outside all day.
- (17) a. Canadians drank a lot of beer until the taxes went up.
b. Sparrows have always lived in the mountains, but now they also live in big cities.
- (18) a. These bureaucrats used to bribe easily, but nowadays they do not bribe as easily.
b. This bicycle has never steered well.

Another similarity between middles and statives that Fagan mentions is the inability of either to occur as a gerundive adjective. Although Fagan's examples of sufficing and mattering may be impossible, it is easy to find examples of statives that can occur as this type of adjective. One of them is the verb to stink (19a), which Fagan groups with other statives in her example (42). (19b) shows that we have to do here with a regular gerund rather than a true adjective, which would allow modification by very.

- (19) a. a badly stinking dog
b. *a very stinking dog

Correspondence relations between syntax and semantics figure as follows in the above discussion of the middle. First there is the assumption that there is a relation between thematic roles and certain syntactic or argument structure positions leading to an analysis like Keyser and Roeper's in which the patient is associated with the deep structure object. We have seen that this assumption may be wrong as the middle subject exhibits properties of ordinary agent-like subjects. Secondly, there is the assumption that there is a correspondence between Fagan's tests and stativity. I have shown that this correspondence is not well-motivated, which means that the tests do not prove the stative nature of the middle. This is in accord with the finding that the middle subject is like an agent-like subject, implying that the construction is non-stative. The analysis of the middle is obscured by misleading assumptions concerning the correspondence between semantics and syntax in the domain of argument structure. Although attractive, they are not well-founded enough to be used as the starting point for the formulation of either deep structures or argument structures.

5. Conclusion

Thematic roles allow elegant descriptions of argument structures and can also be a good motivation for a number of derivations advocated in recent studies. However, if they do not create a strict correspondence with the system of grammar, as is argued in Dowty (1988), these derivations may not be as well founded as they seem. This becomes clear in the discussion of the middle. The semantic notions used have to be fine-tuned. However, this fine-tuning may lead to the insight that the middle-subject is not similar to a direct object at all, thereby taking away the semantic grounds for the formulation of a movement-rule. This fine-tuning may also lead to the conclusion that the middle is non-stative. Fortunately the situation is not as bleak as it seems, if we accept the idea of a level of linguistically relevant semantics, or if we accept the idea of Hjelmslev's contents. Then, there must be a point at which syntax and semantics meet and where generalizations in both domains can be considered optimal. It is here, where a strict correspondence between semantic or conceptual structure and the system of grammar will be established. This will shed light on the interface between grammar and semantics, which is an issue that is regaining importance in modern analyses of argument structures à la Tenny (1987) and Pinker (1989).

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