

Building up the meaning of problematic "verb+complements" constructions : The co-specification device

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Abstract

In this paper, we will work on some problematic verbal phrases in order to shed light on the manner in which *"the co-specification device"* takes into account different sources of information (syntactic, lexical and other sources) to generate a composite meaning. To describe the particular aspects of such a device, we will make use of perspective notions concerning the internal organization of argument structures.

1 Introduction

Relations between verbs and their argument structures are very complex. A verb can be linked to several argument structures, each of them describing one of its possible meanings. For example, in (I), the verb "run" is linked to both predicative contents "to go to a place by means of running" (Ia), and "to move by running" (Ib) :

(I)

- a. Bill ran to the store
- b. Bill ran yesterday

In the example (II), the verb "load" means, on the one hand "to transfer something to a place" (IIa), and on the other hand "to affect a place by means of loading" (IIb) :

(II)

- a. Bill loaded the sacks of potatoes in the truck
- b. Bill loaded the truck with the sacks of potatoes

In order to avoid the creation of multiple entries for a single word, Pustejovsky (91) conceives a word meaning as an operational device which builds up, when combining with other words, a possible sense. Pustejovsky calls "co-specification" the interaction between words that generate, among a set of potentialities, only one single sense.

In this paper, we will explore and bring to light the internal procedures underlying the co-specification device.

2 Global situations and viewpoints : sources of specification

In the exploration of the co-specification device, we will take into account some notions borrowed from semantic-cognitive frameworks (Langacker 87, 91; Hudson 90; Taylor 89), concerning both :

- the basic objects organizing and building up argument structures
- the way in which an argument structure is selected by means of syntactic, lexical and external specifications

As regards the basic objects of argument structures, we will borrow from traditional functional linguistics (for example, Dik 80) the assumption that *a global situation is always conceived under a particular viewpoint*. In fact, all argument structures depict a particular viewpoint from an overall situation. Langacker, who built up the Cognitive Grammar on the basis of functional notions, asserts that "the very foundation of cognitive semantics is the

recognition of our ability to construe a situation in alternate ways" (Langacker 91, page 294). So, we will distinguish both :

- the global situation conceived as the extra-linguistic state of affairs
- the conceptualisation of a state of affairs by means of a single perspective, which structures in a particular way the conceptual content carried by the global state of affairs

As regards the syntactic and lexical contribution to select an argument structure, we will take into account the assumption that words collect a bundle of data linked to very different sources : syntactic, lexical and external sources. All these data are marks pointing at the semantic space, and so, they allow us to get to a certain kind of information. We can infer from this that all kind of data related to a word or to an external source convey a certain semantic content, even though this content, as in the case of syntactic data, has a very schematic nature.

In particular, we will see that syntactic data select information concerning the viewpoints of global situations, whereas lexical and external data specify the information concerning both global situations and their viewpoints.

As far as we are concerned, external data are all sources of specifications that do not come from the current linguistic expression. Such sources can convey specifications, for example, from the particular environment of the discourse participants or the earlier linguistic discourse.

In point 3, we will describe the internal organization of argument structures. Then, in point 4, we will show several examples dealing with the way in which syntactic, lexical and external data make us select a single viewpoint from a situation, and so, a single argument structure.

3 Argument structures

3.1 The internal organization of argument structures

We conceive argument structures as complex objects constituted by at least four kinds of elementary objects :

- Global situations
- Viewpoints
- Events
- Arguments

The construction of argument structures comes into play by means of three kinds of processes :

- the event construction (by means of pairs <global situation, perspective>)
- the argument construction
- the argument structure construction

First, the *event construction* : from a global situation, s , and a viewpoint ψ , we build up a particular event, e . Thus we can associate an event to the pair constituted by a global situation and a viewpoint. We write " \rightarrow " for the link between such a pair and an event :

$$\langle s, \psi \rangle \rightarrow e$$

Second, the *argument construction* : in the same way that the Neo-Davidsonian tradition (Dowty 89), we conceive a role as a relation between an event and the entity assigned to the role. An argument, ARG, is the complex objet built up by means of this relation :

$$\text{ARG} = \text{role}(e, x)^{1}$$

Third, the *argument structure construction from an event* : an argument structure is built up when combining all the arguments that possess the same event. So, if ARG₁ et ARG₂ are all arguments linked to the same event, we can then create the argument structure :

$$\langle \text{ARG}_1, \text{ARG}_2 \rangle$$

Argument structures are abstract informational matrixes which not only organize the content of verbal constructions, but also of all kinds of syntactic constructions : particularly, modifier constructions as prepositional, adverbial or adjectival ones. In this paper, we are only going to deal with argument structures linked to valencial matrixes of verbs, i.e. with structures built up from verbal constructions. Thus we leave issues concerning non-valencial matrixes aside, i.e. structures built up from modifier constructions.

3.2 Levels of schematicity : from schematic to specific argument structures

Argument structures are organized and built up at different levels of schematicity. We distinguish the schematic level linked to syntactic data from more specific levels linked to lexical and external data.

¹ The internal organisation of arguments, which we write "role(e, x)", can be conceived as an internal argument structure constituted by an internal view-point, an internal situation, an internal event and a set of internal arguments. Sematic interpretation of modifier constructions (prepositional, adverbial and adjectival constructions) are situated at the level of such an internal argument structure.

3.2.1 A *schematic argument structure* is exclusively based on syntactic data. In English, syntactic data can only specify the (in)transitivity of verbal constructions, i.e. they can specify which are the complements marked as subject and as primary object. By means of these data, we can point at the semantic space and assign a value to the viewpoint parameter ψ . It follows that, at this level of analysis, we can only have access to perspective information, leaving any information concerning global situations unspecified.

From the two possible syntactic constructions —intransitive and transitive construction—, we can select the following perspective information :

- an intransitive construction points at two intransitive viewpoints at least : $\Psi_{\text{intr-1}}$ and $\Psi_{\text{intr-2}}$
- a transitive construction points at two transitive viewpoints at least : $\Psi_{\text{tr-2}}$ and $\Psi_{\text{tr-3}}$

On the one hand, the $\Psi_{\text{intr-1}}$ and $\Psi_{\text{intr-2}}$ viewpoints allow us to construct both intransitive *one-argument* structures, and intransitive *two-argument* structures, respectively.

And on the other hand, the $\Psi_{\text{tr-2}}$ and $\Psi_{\text{tr-3}}$ viewpoints allow us to construct both transitive *two-argument* structures, and transitive *three-argument* structures, respectively.

These four viewpoints can be specified by several informative particular viewpoints. For example, by viewpoints differentiating giving/going from receiving/coming constructions, or active from passive constructions, etc. Yet, the perspective constructions we will deal with, do not require further fine-grained specifications regarding the viewpoint parameter. So it is not worth setting out to define other specific viewpoints. We will only make use of the four viewpoints which have been introduced above.

Intransitive constructions : for the two intransitive viewpoints $\Psi_{\text{intr-1}}$ and $\Psi_{\text{intr-2}}$, and a unspecified global situation S, we have the schematic intransitive events, $E_{\text{intr-1}}$ and $E_{\text{intr-2}}$:

$$\begin{aligned} \langle S, \Psi_{\text{intr-1}} \rangle &\rightarrow E_{\text{intr-1}} \\ \langle S, \Psi_{\text{intr-2}} \rangle &\rightarrow E_{\text{intr-2}} \end{aligned}$$

On the basis of these two events, we can build up the following arguments :

SUBJECT_{intr-1} = subject ($E_{\text{intr-1}}$, x)

SUBJECT_{intr-2} = subject ($E_{\text{intr-2}}$, x)

INDIRECT-OBJECT_{intr-2} = indirect-object ($E_{\text{intr-2}}$, y)

And finally, from these arguments, we may have access to the intransitive argument structures :

<SUBJECT_{intr-1}>

<SUBJECT_{intr-2}, INDIRECT_OBJECT_{intr-2}>

Transitive constructions : for the two transitive viewpoints Ψ_{tr-2} and Ψ_{intr-3} , and a unspecified global situation S, we have the schematic intransitive events, E_{tr-2} and E_{intr-3} .

On the basis of these transitive events, we have access to the following transitive argument structures :

<SUBJECT_{tr-2}, OBJECT_{tr-2}>

<SUBJECT_{tr-3}, OBJECT_{tr-3}, INDIRECT-OBJECT_{tr-3}>

Schematic argument structures are used as scaffoldings to construct, by means of further information, specific argument structures. In spite of their schematicity and abstraction, all these syntactic dependent structures are *semantic objects*.

3.2.2 *Specific argument structures* are built up when taking into account lexical and external data.

Given a specific global situation, s_{move} , depicting the movement of an entity. By means of the viewpoints : Ψ_{intr-1} , Ψ_{intr-2} and Ψ_{tr-2} , one can produce the following events :

< s_{move} , Ψ_{intr-1} > $\rightarrow e_{move}$ (= the basic moving sense : a mover is moving)

< s_{move} , Ψ_{intr-2} > $\rightarrow e_{move_dir}$ (= the directional sense : a mover goes to a destination)

< s_{move} , Ψ_{tr-2} > $\rightarrow e_{cover}$ (= the covering sense : a mover covers a path)

From these events, the following arguments can be constructed :

MOVER_{moving} = mover (e_{moving} , x)

MOVER_{move_dir} = mover (e_{move_dir} , x)

MOVER_{cover} = mover (e_{cover} , x)

DEST_{move_dir} = destination (e_{move_dir} , y)

PATH_{cover} = path (e_{cover} , z)

We must underline that the three mover arguments represent three different perspectives from which an abstract mover can be conceptualised. So, with regard to the global situation s_{move} ,

we have an abstract mover which is not in perspective; but regarding constructional events, we have a specific mover for each viewpoint.

Finally, from these arguments, we can construct the following argument structures :

<MOVER_{moving}>

<MOVER_{move_dir}, DEST_{move_dir}>

<MOVER_{cover}, PATH_{cover}>

4 Building up a single argument structure by means of syntactic, lexical and external data : the co-specification device

In this part, we will analyse 4 problematic verbal constructions in order to show the way in which the different sources of specifications *co-operate* to select a single event, and thus a single argument structure. Such a co-operative device starts by building up a schematic structure which will be elaborated by further co-specifications. Such a co-specification device follows at least three different steps :

- (a) first, specifications from syntactic data
- (b) second, specifications from lexical data linked to the verb
- (c) and third (if necessary), specifications from lexical data linked to either prepositional and nominal complements or to external data

4.1 Interpretation of "to climb (up) the stairs"

From both syntactic data (a), and lexical data linked to the verb "to climb" (b), we will select the transitive argument structure depicting a mover covering a path.

(a) From syntactic data, we can have access to both transitive viewpoints Ψ_{tr-2} and Ψ_{tr-3} , by means of which we construct the schematic transitive events:

$$\langle S, \Psi_{tr-2} \rangle \rightarrow E_{tr-2}$$
$$\langle S, \Psi_{tr-3} \rangle \rightarrow E_{tr-3}$$

From such events, we may construct the transitive argument structures :

<SUBJECT_{tr-2}, OBJECT_{tr-2}>

<SUBJECT_{tr-3}, OBJECT_{tr-3}, INDIRECT_OBJECT_{tr-3}>

where both the $OBJECT_{tr-2}$ and $OBJECT_{tr-3}$ arguments consist in the assignment of the $z_{the-stairs}$ entity to the object role.

(b) The verbal lexical entry "to climb" has access to the specific global situation, s_{move} , concerning the movement of an entity. So, the schematic global situation S is specified by s_{move} . We have then two possibilities :

First, the particular pair $\langle s_{move}, \Psi_{tr-3} \rangle$, does not correspond to any event. On the basis of the s_{move} global situation, we can not build up any event of this kind.

Second, the particular pair $\langle s_{move}, \Psi_{tr-2} \rangle$, corresponds to the only transitive event that is associated to the global situation s_{move} : the e_{cover} event. From this event, we can build up the transitive two-argument structure :

$\langle MOVER_{cover}, PATH_{cover} \rangle$

which is a particular occurrence of $\langle SUBJECT_{tr-2}, OBJECT_{tr-2} \rangle$. Therefore, the entity $z_{the-stairs}$ would not only be assigned to the object role, but also to the path role.

4.2 Interpretation of "to climb (up) onto the roof"

From syntactic data (a), lexical data linked to the verb "to climb" (b), and lexical data linked to the preposition "onto" (c), we will select the argument structure conceived as being a directional-intransitive structure depicting a mover going to a destination.

(a) From syntactic data, we can have access to both intransitive viewpoints Ψ_{intr-1} and Ψ_{intr-2} , by means of which we construct the schematic intransitive events :

$\langle S, \Psi_{intr-1} \rangle \rightarrow E_{intr-1}$

$\langle S, \Psi_{intr-2} \rangle \rightarrow E_{intr-2}$

and consequently, the intransitive argument structures :

$\langle SUBJECT_{intr-1} \rangle$

$\langle SUBJECT_{intr-2}, INDIRECT_OBJECT_{intr-2} \rangle$

(b) The verbal lexical entry "to climb" has access to the specific global situation, s_{move} , concerning the movement of an entity. So, from the two intransitive viewpoints, we can produce the particular events :

$$\begin{aligned} \langle s_{\text{move}}, \Psi_{\text{int-1}} \rangle &\rightarrow e_{\text{move}} \\ \langle s_{\text{move}}, \Psi_{\text{int-2}} \rangle &\rightarrow e_{\text{move_dir}} \end{aligned}$$

which correspond to the intransitive events built up from s_{move} . In order to have access to a single intransitive viewpoint, we have to make use of the lexical specifications related to the preposition "onto" :

(c) The lexical data linked to the preposition "onto" allow us to build up all arguments which possess the destination role, i.e. all the DEST_2^2 arguments. A particular case of this kind of arguments is the $\text{DEST}_{\text{move_dir}}$ one, which is built up from the $\Psi_{\text{int-2}}$ viewpoint.

Consequently, the pair $\langle s_{\text{move}}, \Psi_{\text{int-2}} \rangle$ corresponds to the $e_{\text{move_dir}}$ directional event, by means of which we can select the intransitive two-argument structure :

$$\langle \text{MOVER}_{\text{move_dir}}, \text{DEST}_{\text{move_dir}} \rangle$$

where the $\text{DEST}_{\text{move_dir}}$ argument consists of the assignment in the entity $y_{\text{the-roof}}$ to the destination role. Such a specific intransitive structure is a particular case of the schematic $\langle \text{SUBJECT}_{\text{intr-2}}, \text{INDIRECT_OBJECT}_{\text{intr-2}} \rangle$ one.

4.3 Interpretation of "to load potatoes"

From syntactic data (a), lexical data linked to the verb "to load" (b), and lexical data linked to the nominal complement "potatoes" (c), we will have access to the argument structure conceived as being a directional-transitive structure depicting an agent transferring something to a place.

(a) From syntactic data, we can select both transitive viewpoints $\Psi_{\text{tr-2}}$ and $\Psi_{\text{tr-3}}$, by means of which we construct the schematic transitive events :

$$\begin{aligned} \langle S, \Psi_{\text{tr-2}} \rangle &\rightarrow E_{\text{tr-2}} \\ \langle S, \Psi_{\text{tr-3}} \rangle &\rightarrow E_{\text{tr-3}} \end{aligned}$$

²² Prepositional constructions build up arguments —conceived as argument structures at a deeper level of constituency— in the same way in which verbal constructions build up valencial matrix —conceived as argument structures at the highest level of constituency.

and consequently, the transitive argument structures :

<SUBJECT_{tr-2}, OBJECT_{tr-2}>

<SUBJECT_{tr-3}, OBJECT_{tr-3}, INDIRECT_OBJECT_{tr-3}>

where the OBJECT_{tr-2} OBJECT_{tr-3} arguments consist in the assignment of *y*_{potatoes} to the object role.

(b) The verbal lexical entry "to load" has access to the specific global situation, *s*_{transf}, concerning the transfer of an entity. So, the global situation *S* is specified by *s*_{transf}.

We can produce at least two transitive events from *s*_{transf} :

<*s*_{transf}, Ψ_{tr-3} > \rightarrow *e*_{transf_dir}

(= a directional-transitive sense : to transfer something to a place)

<*s*_{transf}, Ψ_{tr-2} > \rightarrow *e*_{transf_affect}

(= an affected-transitive sense : (to affect a place by means of a transfer)

On the basis of these events, we can construct the following transitive structures :

<AGENT_{transf_dir}, TRANSFERRED_{transf_dir}, DEST_{transf_dir}>

<AGENT_{transf_affect}, TRANSF_AFFECTED_{transf_affect}>

So, the pairs <*s*_{transf}, Ψ_{tr-3} > and <*s*_{transf}, Ψ_{tr-2} >, created by the co-specifications coming from syntactic data and verbal lexical data, correspond to both the *e*_{transf_dir} directional-transitive event , and the *e*_{transf_affect} affected-transitive event.

In order to select a single transitive viewpoint, either Ψ_{tr-3} or Ψ_{tr-2} , we have to make use of the lexical specifications related to the entry "potatoes" :

(c) The lexical data linked to the complement "potatoes" convey information concerning a set of material conditions. We must verify whether these material conditions allow us to select both/either the following arguments :

— the TRANSFERRED_{transf_dir} argument built on the basis of the directional-transitive event : *e*_{transf-dir}

— the $\text{TRANSF_AFFECTED}_{\text{transf-affect}}$ argument built on the basis of the affected-transitive event : $e_{\text{transf_affect}}$

On the one hand, it is obvious that the physical conditions concerning the weight and size of potatoes allow us to have access to the $\text{TRANSFERRED}_{\text{transf_dir}}$ argument, built up from the $e_{\text{transf_dir}}$ event.

On the other hand, with regard to the access to the $\text{TRANSF_AFFECTED}_{\text{transf_affect}}$ argument, built up from the $e_{\text{transf_affect}}$ event, we must consider that the transf-affected role can only be assigned to entities which require as a material condition an internal space where other objects can be placed. Yet, such a physical condition is not related to the entry "potatoes", i.e. potatoes are physical entities which do not have an internal space. It follows that such an entry cuts off the access to the $\text{TRANSF_AFFECTED}_{\text{transf_affect}}$ argument, and consequently, we can not select the affected-transitive event : $e_{\text{transf_affect}}$. (In Gamallo Otero 95, we explain how the relation between material conditions and functional information can be established. In fact, we try to go deeper into the notion of "Qualia Structure").

Therefore, the relation between material conditions of potatoes and the $\text{TRANSFERRED}_{\text{transf_dir}}$ argument allows us to select the transitive three-argument viewpoint, $\psi_{\text{tr-3}}$, and so, the transitive directional event, $e_{\text{transf_affect}}$, from which we may build up the transitive three-argument structure :

$\langle \text{AGENT}_{\text{transf_dir}}, \text{TRANSFERRED}_{\text{transf_dir}}, \text{DEST}_{\text{transf_dir}} \rangle$

where the $\text{TRANSFERRED}_{\text{transf_dir}}$ argument consists in the assignment of y_{potatoes} to the transferred role.

4.4 Interpretation of "to load the sacks"

In this case, neither the syntactic nor the lexical data are sufficient to select a single viewpoint.

Concerning the syntactic data (a) and the lexical data linked to the verb "to load" (b), we follow the same analysis that the one used for the "to load potatoes" construction; consequently, we have access to both transitive events $e_{\text{transf_dir}}$, $e_{\text{transf_affect}}$.

In addition to that, the lexical data linked to the complement "the sacks" are also insufficient to select one of these events. Material conditions of the lexical entry "sack" allow us to construct the $\text{TRANSFERRED}_{\text{transf_dir}}$ argument, as well as the $\text{TRANSF_AFFECTED}_{\text{transf_affect}}$ one. Sacks can not only be transferred, they can also be filled (with potatoes, for example).

It follows that we have to take into account data from external sources, in order to make the choice of a specific viewpoint. Indeed, the information extracted from the earlier discourse or from the particular environment may clarify whether we are faced with a particular spatial place into which the sacks are transferred (a truck, for example), or with physical objects which are transferred into the sacks (like potatoes, for example). In the latter case, we must build up the TRANSF-AFFECTED_{transf_affect} argument, consisting in the assignment of z_{sacks} to the transf-affected role. In such a case, we have the transitive two-argument structure :

<AGENT_{transf_affect} TRANSF_AFFECTED_{transf_affect}>

According to this description, external data work in the same way as syntactic and lexical data, i.e. they are taken into account in order to co-specify the viewpoint of the global situation. For example, they are required to select either $\Psi_{\text{tr-2}}$ or $\Psi_{\text{tr-3}}$ viewpoints, when analysing the "to load the sacks" construction.

5 Further remarks

We conceive the "co-specification device" as a mechanism which brings into play a set of different data constraining the access to an argument structure. For a verbal construction, we can distinguish at least 4 kinds of data co-specifying the choice of a viewpoint, and so, of an argument structure :

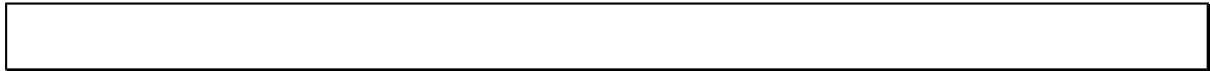
- syntactic specifications
- lexical specifications linked to the verb
- lexical specifications linked to prepositional and nominal complements
- external specifications linked to information either processed by the earlier discourse or extracted from the particular environment of the discourse situation

These data "co-operate" (according to Ramsay 94) in order to select a single sense of the verbal construction. By means of this co-operation, it is possible to reach a particular viewpoint conceptualising a particular global situation.

Yet, what is the nature of viewpoints ? How many kinds of viewpoints exist ? Is it possible to create a typology ? Since twenty years, functional and cognitive tradition in linguistics have tried to get answers to these questions. According to with this tradition, perspective issues are the central aspects of semantics. Meaning is linked to abstract and formal linguistic structures constraining the way in which situations are conceptualised. Therefore, this tradition is situated on the opposite side from logical approaches, which put

the stress on extra linguistic denotations, i.e. on the ontological structure of the world regardless of linguistic systems.

In this paper, with the introduction of the basic parameter ψ for viewpoints, we intend to add a perspectival dimension to the ontological structure of the conceptual space. Particularly, combinations between global situations and viewpoints allow us to reach a fine-grained level of description, which can be appropriate to analyse more closely the co-specification device. At this level of description, "predicates" become too coarse-grained semantic objects mixing perspective issues with situational content; i.e. when situated at this level, predicates become confused and non operational objects.



Bibliography

- Devlin K. (1991) *Logic and information*. Cambridge : Cambridge University Press.
- Dik S.C. (1980) *Studies in Functional Grammar*. New York & London : Academic Press.
- Dowty (1989) "On the semantic content of the notion of 'Thematic Role' ". In *Properties, Types and Meaning*. Volume II. Kluwer Academic Publishers, (69-130).
- Gamallo Otero P. (1995) "léxico e inferencia : una semántica de acceso a la información". In *Revista por el Procesamiento del Lenguaje Natural*, n° 17, (195-209).
- Hudson R. (1990) *English Word Grammar*. Basil Blackell.
- Langacker R. (1987) *An introduction to Cognitive Grammar*. Vol I. Standford : Standford University Press.
- Langacker R. (1991) *An introduction to Cognitive Grammar*. Vol II. Standford : Standford University Press.
- Levin B. & Rappaport M. (1996) "Lexical semantics and syntactic structure". In *Contemporary Semantic Theory*. Edited by Shalom Lappin. Blackwell Publishers. (487-508).
- Pustejovsky J. (1991) "The generative lexicon". In *Computational Linguistics* , Vol. 17. N°4. (409-441).
- Pustejovsky J. (1993) "Type coercion and lexical selection". In *Kluwer Academic Publishers*, Pustejovsky (ed.). (73-94).
- Ramsay A. (1994) "The Co-opertative Lexicon". In *proceedings of International Workshop on Computational Semantics*. Harry Bunt, Reinhard Muskens, Gerrit Rentier, eds. (171-180).
- Taylor J. R. (1989) *Linguistic categorization*. Clarendon Press. Oxford.