Mário A. Perini

Describing Verb Valency

Practical and Theoretical Issues

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Special Terms, Conventions, and Abbreviations Used in This Book

I have made every effort to avoid the introduction of new terms; I hope the following list is short enough not to prove a reading difficulty. This list is to be used only as a reference; all special terms and conventions are explained in the text. Where necessary, references in brackets refer to the relevant sections.

+	Used to connect two or more semantic roles assigned to the same constituent, e.g., *Theme* + *Agent* [10.3]
>	"Has the semantic role," e.g., **NP** > ***Patient*** is read "NP has the semantic role *Patient*"
{ }	A semantic role between curly brackets { } is "internal" to the verb, that is, it is understood although it corresponds to no overt complement [6.6]
a<>*b*	Linking rule, to be read: "formal configuration ***a*** prototypically receives semantic role ***b***" [8.2.1]
affected	Elaborate semantic relations, assigned by default directly from the schema, are given in lower-case *italics* (Chap. 9)
Agent	Semantic roles are given with capitalized initial and in *italics*
Agent (Linking) Rule	[8.2.1]
byD	Assignment by default (Chap. 9)
core CSR	[5.1]
CSR	Cognitive semantic relation [3.1]
diathesis	[1.2]
ergative construction	[1.3.1]
Ev.	"Event" (used in cases of complex constructions involving more than one event) [6.5]
EvSpec	"Event specification" (a semantic role used with a constituent occurring with a light verb) [6.4.3]
Experiencer (Linking) Rule	[8.2.2]

GIVE	Schemata are given in capitals
intransitive construction	[1.3.1]
lexico-grammatical filter	[12.4.4.2]
LR	Linking rule [8.2]
object	[2.5]
peripheral CSR	[5.1]
Refl	Reflexive pronoun
schematic filter	[8.3]
Subject First Rule	[8.4]
transitive construction	[1.3.1]
valency	[1.2]
VSubj	"Valential subject": a subject NP, or a person-noun suffix in the verb, or both [1.3.3]
X	"Any syntactic unit" (used when the syntax is free, and only the semantic role is specified) [1.6.2]

A Note on Terminology

One of the nightmares troubling the sleep of the modern linguist is the variety of labels attached to each unit, relation, or process used in the analysis; there is no universally recognized terminology, and this has proven to be one of the most irritating barriers to discussion and communication among researchers. We are constantly running into pitfalls represented by terminological differences that hinder the eventual establishment of a fruitful dialogue between workers in our field. As a result, the discussion is not always as productive as it could be. One gets mired in misunderstandings, and by the time these have been identified, comes lunch break, and a lot of time and effort has been wasted.

Take, for instance, the semantic relation between the subject and the verb in

[1] Andy killed a mosquito.

Everyone agrees that this sentence states that Andy performed an action, and most people call this relation Agent (or Actor). Yet the kind of relation the Agent represents may be called a *semantic role*; a *thematic role*; a *theta-role*; a *frame element*; a *participant role*; a *variable*, etc. Not all of these are perfect synonyms—for instance, a *frame element* (as used in FrameNet) seems to be primarily a cognitive, not a grammatical, relation. In other cases, the difference is purely terminological; and the general confusion is compounded by the use of inadequate definitions, often based on insufficient examination of the data, so that one can hear assertions like that "only NPs have thematic roles," which seems to reflect some hidden definition, not explicitly found anywhere. The term *subcategorization* is also a source of confusion. It is used in some areas as a synonym for *subclassification*, but sometimes it is taken in a more restricted meaning. And so on.

This work makes use of some fundamental grammatical notions, recognized by all modern linguists, and I frequently had to choose between the current terms for each of these units, processes, and relations. In every case, I made an effort to follow the most widespread and least theory-associated label, but this has not been possible in all cases. I have given above a list of the most important terms, as used here (they are defined in the text). In a few cases, I had to change the choice made in

previous works; I hope the new set of terms will be more acceptable, thus releasing energy for the more substantive issues.

I use **semantic role** instead of **thematic role**, which tends to be restricted to some theories. This has its drawbacks, like substituting the very general *semantic potential*, *semantically transparent*, etc. for the more specific *thematic potential*, *thematically transparent*, which, although more clear, were too often interpreted in strictly generative terms. A *thematic relation* has a reasonably clear meaning, and refers to the semantic relation between a governing word and its complements, whereas a *semantic relation* can be taken in a much more general sense, and is therefore less informative. After some hesitation, though, I felt forced to follow the most common usage and use the term *semantic* throughout, even while recognizing its inconveniences. For similar reasons, I avoid (**sub)categorization** and use (**sub)classification** instead.

Subject and **object** are defined in Chap. 2. Here I keep the traditional terms, because I feel they deserve to get a real definition, instead of the general mess found in traditional grammar, or narrowly theory-specific definitions such as we find in certain varieties of generative grammar. I have made my definitions as clear as I could, but of course the effect of traditional concepts will have to be overcome by the reader. The alternative would be to devise entirely new terms; I tried "**H**" for the (valential) subject in a previous work, with poor results. Here, I must ask for the reader's goodwill in learning these notions again.

The use of the term **valency**[1] follows the normal European terminology; the term is less common in American linguistics, but when it appears it seems to mean about the same. In any case, it is defined in Chap. 1. The less widespread term **diathesis** is equally defined in Chap. 1.

Instead of the (very comfortable) term **semantic role assignment**, I had to prefer **argument realization** (in spite of the less than coherent use of *argument* in the literature), or **semantic role coding**. This terminology forced me to some textual contortions, like saying that a semantic role is attached to a complement; or that it is coded as a complement; or that a complement is associated with a semantic role. The use of **assign(ment)** met with frequent misunderstanding, as if by using it I were committed to a standard generative posture. For instance, people sometimes objected to the assertion that the verb *be* assigns semantic roles to its complements, as in

[1] Sally is short.

The objection is that the adjective, *short*, would assign the semantic role Quality directly to the subject, the verb being neutral in that respect. However, this does not generalize to

[2] Sally is that woman with dark hair.

because we cannot say that *that woman with dark hair* assigns the semantic role that I note as αRef (i.e., identity of reference, read "alpha-referential") by virtue of its

[1] In English, the forms **valency** and **valence** are in competition. Even within the same system (FrameNet), we find **valence** in Ruppenhofer et al. (2006), but in Fillmore (2007) we find **valency**.

intrinsic meaning; and there are some advantages in analyzing [1] and [2] in a parallel way.

What is to be expressed here is that the verb *be* systematically occurs with a complement with the semantic role Quality (or αRef); this is a descriptive, observational statement. It makes sense for effects of valency description, and I still think the term **assign(ment)** would be appropriate here; but to avoid useless discussion, I have substituted **coding** (of a semantic role into a syntactic configuration), and I attribute this property to each verb according to its valency. **Assign(ment)** was only used in contexts where (I hope) no confusion is likely to arise.

Among the several available terms, I use **schema** and not **frame** partly because it provides useful derivatives (in particular, **schematic**). As far as our descriptive aims are concerned, a schema and a frame refer to the same thing.

Finally, I had to introduce some new notions (not many), and these had to receive new labels. I did this only when some distinction is found to be relevant, yet is not generally recognized in the literature, and I tried to name them as transparently as possible (a complete list is given above); I hope the final result is still a readable text.

Preface

It is universally admitted that the elaboration of linguistic theories depends on the existence of "particular descriptively adequate grammars" (Chomsky 1965, p. 46); unless this observation is taken seriously, theories will be poorly grounded on empirical data. It is the purpose of this book to take it *very* seriously. This work does not propose a new theory, nor does it endorse any of the current theories—which does not mean that it adopts a nontheoretical approach, which is simply not a possibility. It means only that it relies on theoretical points of wide acceptance among linguists, and that, when some theoretical concept has to be introduced, it is defined as concretely as possible.

Unlike theories, the system here developed does not intend to **predict** the facts of the language—it only observes, describes, and gives a preliminary analysis, largely based on widely accepted theoretical notions. On the basis of the description, it may be possible to build theories, but description is, as observed by Chomsky, a necessary preliminary.

The present proposal has then a different purpose from the ones pursued by linguistic theories: it presents a descriptive language able to express the facts of verb valency, to be used in the *Valency dictionary of Brazilian Portuguese verbs*, currently under construction at UFMG. To express it in simple words, my ultimate aim in elaborating the *Dictionary* is to list all valency patterns occurring in the language—an account of the facts, so presented as to be useful to researchers. But this is easier said than done, and a language (a notational system) must be devised to express the facts. The elaboration of this language is the main purpose of this book, and in the measure that I offer an analysis, it is data-driven analysis. On the other hand, while constructing the notational system, I came across a number of important theoretical questions, which I felt should not be ignored: both for their intrinsic interest, and because they are part of the justification for the way the system was built. This is why I include, for instance, a discussion of linking rules, which do not have to be necessarily taken into account in the *Dictionary*, but which are a very important aspect of valency. The result, as said in the title, is a set of "practical and theoretical issues," directed both at linguists involved in the task of building

valency dictionaries and at those interested in the still incipient task of theory-building.

I am aware that my book is full of loose ends. But this comes from its character as an invitation to research, not as a bearer of the ultimate truth. I firmly believe there is no way to write a book (or a 4-page article, for that matter) without risking being mistaken—in fact, without *being* mistaken in many points. This is a decurrence of the current state of linguistics, and of our very imperfect (to say the least) knowledge of the structure of language and the way language functions. The analysis proposed here contains innovations, but they are relatively few and not very important, applying mostly to questions of detail. Almost all basic points are found in the literature, often as noncontroversial, consensual notions: for instance, the existence of thematic hierarchies and/or linking rules; the distinction between grammatically relevant semantic roles on the one hand and, on the other hand, cognitive relations which are ingredients of the **schemata** (or **frames**), and largely language independent; and the opposition between core and peripheral elements in the schema, which is present in many analyses, if not always explicitly acknowledged.

For instance, when studying so-called thematic hierarchies, I do not use Kratzer's (1996) and other authors' views on the order of composition of verb plus semantic role. As seen in the text, I have replaced thematic hierarchies by a nonstructured (or less structured) set of linking rules, which I believe is a more flexible and adequate way to represent observed facts. We are thus freed from having to search for more and less prominent syntactic and semantic functions, as far as description is concerned. Prominence and thematic hierarchy may be relevant notions, but to my mind their identification depends on sufficient evidence, which is still not available. In a first moment, then, I choose the more neutral notion of linking rules, and state them independently of each other. Once we have a large set of examples we may proceed to investigate the interactions between the different linking rules, which will probably lead us to establish thematic hierarchies. I try to avoid proceeding to the formulation of higher order hypotheses, and keep the analysis "close to the ground," so to speak. Of course, this does not exhaust linguistic analysis, but I believe (and repeat along the text) that fact finding and systematization comes first in the order of importance, although not necessarily in temporal succession in the research.

This is the position found in other comparable projects, such as ADESSE, the Erlangen Patternbank, and FrameNet—they do not incorporate an attempt to build a theory, but concentrate on applying what is already known about the phenomenon to describe a large amount of data. This book is in the spirit of FrameNet's handbook (Ruppenhofer et al. 2006) and Herbst and Schüller (2008), which offer a descriptive view without going into advanced questions of formalism or theory-building beyond what is strictly necessary for the descriptive aims of the project. This does not entail denying that theoretical work is essential; but it does entail that theory-building depends on the accumulation of data, conveniently systematized and described according to a coherent system.

The language proposed in this book can also be understood as a tool for researchers working with corpora, showing them what to look for and how to express it when found, as well as providing a basis for the labeling of occurrences. The eventual result is a list of verbs and their valencies, that is, a valency dictionary, drawn from the observation of a wide array of data, eventually covering every verb in the language. The list contains a set of constructions (diatheses), each associated with a set of verbs, none of them being valid for all verbs of the language. That is, each diathesis defines two subclasses of verbs: those that can, and those that cannot, occur in it. For example, some verbs can occur with a subject Agent[2] and an object Patient, as in

[1] Jim killed the mosquito.[3]

while other verbs, like *be*, or *receive*, do not occur in this diathesis because they cannot have a subject Agent. Obviously, every verb in the language must occur in at least one diathesis, and many occur in several; the list of all diatheses, together with the verbs that occur in each of them, provides a very detailed subclassification of verbs in terms of their grammatical properties. Besides being a partial image of the structure of the language, the list can also work as a controlling mechanism in the elaboration of theories: a theory must be compatible with the data presented in the list, and with their preliminary analysis as a set of diatheses.

When we try to devise a way of describing the constructions in a language, we are faced with two major problems: first, how to express the syntactic structure of each construction, and, second, how much, and which, semantic information to include in their formulation. Both of these problems receive detailed treatment in the pages that follow. To summarize, each construction is defined in terms of a syntactic analysis, plus the semantic role of each of the complements present in the syntactic chain. The syntactic representation needed for purposes of construction definition is, as will be seen, very simple, consisting of little more than an ordered sequence of form-class symbols (NP, V, AdjP, etc.) plus individual prepositions and at least one syntactic function (subject). The semantic information included in the constructions is composed entirely of semantic roles: admittedly a very partial representation of the meaning of the sentence, which nonetheless presents difficult problems regarding delimitation of semantic roles and association with their respective complements.

There are of course many other problems to be considered. One of these is how to generate syntactic structures in a generalized way—that is, through the use of syntactic phrase structure rules or some equivalent device. This is obviously important, but there is no room for it in this book. We will simply assume that the language includes a list of well-formed syntactic structures; from this list, once it is complete, a system of generating rules can be eventually derived.

[2] Sometimes called Actor; here I will always use the term Agent.

[3] Whenever possible, that is, whenever the two languages are parallel in their behavior, I give English examples, to ease the task of the non-Portuguese-speaking reader.

Most of this book is dedicated to the discussion of problems having to do with the definition, delimitation, degree of schematicity, and morphosyntactic coding of semantic roles. To give a simple and comparatively noncontroversial example, the sentence given above as [1] is analyzed as an elaboration of the following construction[4]:

[2] VSubj > *Agent* V NP > *Patient*

As seen, the notation is not particularly complex or sophisticated.[5] Nevertheless, the definition of its components presents many problems, all discussed in this book; as will be seen, the most important problems have to do with the definition and delimitation of semantic roles. The discussion does not reach a proper solution in every case; in many cases I had to be content with asking the relevant questions. But, after all, asking questions is a necessary step in finding answers, and I do not feel guilty by leaving loose threads in what is, no doubt, a highly important and poorly understood aspect of lexico-grammar.

The two initial chapters of the book deal with some preliminary definitions and the syntactic analysis to be used in the notation of constructions. Chapters 3–6 are dedicated to the discussion of semantic roles and how they can be defined and mapped onto constituents of the sentence. Chapters 7–11 take up another question: the possibility that the morphosyntactic coding of semantic roles is in many cases the result of general rules or principles. There I examine the effect of semantic hierarchies, linking rules, semantic transparency of certain constituents, and the possibility of associating complements with relations taken directly from the schema evoked by the verb, without the intermediation of grammatically relevant semantic roles. The result, summarized in Chap. 12, and exemplified in Appendix A, is a system significantly more complex and heterogeneous than the ones ordinarily found in the literature; yet I believe it is sufficiently well supported by the data and argumentation presented in Chaps. 1–11. The reader will find a certain amount of repetition in the text—in particular, certain key notions are explained more than once. I opted for this strategy to make the text more readable, sometimes sacrificing elegance to clarity. Reading linguistics is a difficult task as it is, and we should do what we can to ease it.

The central characteristic of the book is that it aims at presenting an instrument of description, and all theoretical discussion (of which there is a good deal) is subordinate to that. Therefore, I have not spent a lot of time discussing alternative theories or reviewing previous theoretical proposals that may be related to the issues expounded here. Doing this would take the book constantly into digressions far from its main line. Note that parallel proposals with similar purposes (FrameNet, ADESSE, DICOVALENCE) are discussed in some detail, and constantly referred

[4] 'VSubj' is the valential subject (see Sect. 1.3.3).

[5] In Chaps. 8–11, it will have to be partially reformulated, becoming even simpler, and perhaps a little more sophisticated. In the notation I represent syntactic categories and functions in **roman**, and semantic roles in ***italics***; the symbol '>' connects each constituent with its semantic role.

to; that is, they are treated differently from purely theoretical works. I do not want to come to someone and say: "Your theory is right (or wrong) for these and these reasons"; rather, I would like to say: "This is the way to survey the language in order to get systematic data that may confirm (or disconfirm) your theory."

The research on which this book is based is limited in two important points. First, it only considers simplex sentences, leaving aside the rich and complex system of complementation, with its complementizer types, governed mood in subordinate clauses, anaphoric relations, etc. These are legitimate aspects of valency, but had to be disregarded for practical reasons. And, second, some of the definitions used in the analysis were devised having in mind only the interests of valency description. One example among several is the definition of **prototype** found in Chap. 7: the notion of prototype is certainly much more comprehensive and complex, but I had to limit it to a partial definition, which is nevertheless important in what respects the analysis of valencies. Another example is the notion of **construction**, also defined in a somewhat simplified form in order to attend to the aims of this work (Sect. 1.1). Also, the reader may find that the important question of constituent order is treated in a somewhat informal way; this is due to the fact that the problem has not been studied in depth from the perspective of valency description.[6]

The analysis found in this book refers mainly to Brazilian Portuguese data, and most of the examples are in Portuguese. But, despite appearances, this book is not *about* Portuguese: the main theme of the book is the analysis of verb valencies and the definition and delimitation of semantic roles—something that is essential to the analysis of languages in general. Portuguese appears as the main source of data because the ideas proposed in this book arose from an attempt to construct a valency dictionary of Brazilian Portuguese; inevitably, then, most examples come from the language studied. To ease the task of the English-speaking reader, I have substituted English examples whenever possible, that is, whenever I felt that the two languages are parallel in what respects the point in discussion. Fortunately, this happens often, but there are points where I had to keep the original examples, and in these cases I provide a translation and, when necessary, a literal glossing of the elements. As Portuguese and English are not, after all, too different grammatically, I trust that the presence of such examples will not prove a stumbling block for the reader.

The definition of semantic roles and the mechanisms that realize them syntactically found in this book are part of a project of description of verb valencies in Brazilian Portuguese, titled Project VVP (*Projeto Valências Verbais do Português*).[7] The principles of valency notation were explained and argued for in

[6] This does not mean that no studies on Portuguese constituent order exist, of course (one recent example is Silva 2001). But from the ones I could examine little can be put to work for purposes of valency description.

[7] Currently, under way at Universidade Federal de Minas Gerais (UFMG), and financed in part by CNPq, a branch of the Ministry of Science and Technology.

a previous book (Perini 2008); the main points are summarized in Chaps. 1 and 2 of this volume.

During the elaboration of this book, I had many useful discussions with several colleagues. Gabriel de Ávila Othero and Lúcia Fulgêncio read early versions of the text carefully and critically, thus helping me improve it in many important points. I want also to acknowledge the contribution of Adriana Tenuta Azevedo, Antônio Martinez Resende, Bruno Lima, Elizabeth Saraiva, Janayna de Carvalho, Lívia Pimenta, Luana Amaral, Luísa Ramos, Madalena Loredo Neta, Márcia Cançado, and Rui Rothe Neves, as well as of my students in Linguistics 888 and 961. Maria Luiza Cunha Lima and Vanessa Pinha did the testing of core CSRs reported in Chap. 5. Larissa Ciríaco worked with me on the review of FrameNet given in Appendix C, besides providing many useful comments on the rest of the text. I also thank two anonymous reviewers for Springer for their detailed and perceptive comments, which helped me to improve the text in many significant points. All conclusions, however, are of my responsibility, and none of the listed persons necessarily agrees with them (I hope they do, since they are also colleagues I have in high esteem; but a hope is not a fact).

Finally, I would like to add a personal note: this book is an attempt to examine some problems of analysis that have been worrying researchers, and to suggest solutions whenever possible. It is not an exhaustive review of the topic, for one thing because the current literature on semantic roles is well beyond the possibilities of reading and assimilation of any normal person. This text has its aims and is constantly directed towards them; it only deviates from its path when the examination of other works is relevant to the achieving of the stated aims, and to give previous authors due credit. I did not attempt more than that, nor would I be able to without detriment to the main line of the discussion. I end this preface with a quote from an author whose work provides one of the guiding lines in my research:

> Life is short, you can't do everything, read everything, make everyone happy with your work.
>
> (Jackendoff 1996, p. 94)

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Contents

Chapter 1
Constructions, Diatheses, Valency

1.1 Defining Constructions

The notion of construction is necessary in linguistic description, and has been present, in some form, in every grammar ever written.[1] It is only natural, then, that it appear in different disguises, admitting different definitions. Here I make use of this notion, defined in as concrete and direct a way as I find possible. This is not to say that more complex definitions are necessarily inadequate; as a matter of fact, the way a construction is defined here leaves out many important features. And, furthermore, in this work I only consider sentence-sized constructions, although NPs and the like are also constructions: constructions embed within one another in the usual way in syntax. The reason for the limited view of constructions adopted here is that it is tailor-made in order to allow the description of verb valencies, and all features found irrelevant to that particular aim, important as they may be, are left out; some of them must be included as soon as the descriptive focus is shifted to another grammatical phenomenon.

This may sound a bit strange at first; but some reflection will show that we have little choice in the matter. To study verb valencies is to subclassify the verbs of a language from a particular point of view. But some features are not useful for that: for instance, the property of expressing tense and mood through specific suffixes, while a very conspicuous mark of all verbs (and only verbs), has nothing to do with their subclassification, because it applies to all and every verb of the language. On the other hand, the property of co-occurring with a direct object does subclassify the verbs: *eat* can have a direct object, *fall* cannot. It is the latter kind of difference that will be of interest to us in this book; correspondingly, our constructions include the presence or absence of a direct object, but make no mention of tense suffixes.

[1] As pointed out by Goldberg on page 1 of her 1995 book.

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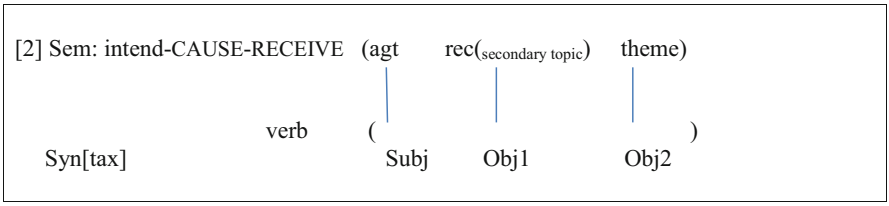
To take an example, the ditransitive construction exemplified in

[1] Bill sent his girlfriend a cake.

is defined in Goldberg (2006) as



(Goldberg 2006, p. 20)

Some of this information is not relevant for valency purposes: in particular, a feature of verb meaning like *intend-CAUSE-RECEIVE* does not have to be expressed in the construction because it has no direct connection with the complements that co-occur with the verb.[2] And some information is missing, in particular the classes the objects belong to (both NPs). Apart from this, Goldberg's formulation is very close to the one I adopt here, which is

[3] VSubj > *Agent* V NP > *Recipient* NP > *Theme*

with possibly Goal substituted for Goldberg's Rec[ipient].[3] Formula [3] is read as follows: "the subject receives the semantic role Agent; then comes the verb; then an NP, which receives the role Recipient; then another NP, which receives the role Theme". This formula is typical, and represents (a) one syntactic function (subject); (b) some form-class symbols (here V, NP); (c) the semantic roles associated with the relevant constituents; and (d) the order in which they appear. Goldberg's distinction between 'Obj1' and 'Obj2' is accounted for by constituent order, since Obj1 always occurs before Obj2; we may add that order is a concrete feature, freeing us from the necessity to posit two kinds of objects. Thus, [3] is basically sufficient as a means for the description of diatheses.[4]

Another difference is that I do not mark all constituents for their syntactic function: we have the subject, and then just NPs, where Goldberg puts Obj[ect], and in other cases Obl[ique]. The reasons for this reduced syntactic component are explained in Chap. 2, and have to do with the fact that some traditional functional distinctions are not relevant for valency purposes.

[2] Or, perhaps more correctly, it partly replicates information already present in the semantic roles associated with the verb: Agent, Recipient, Theme. In fact, things are more complicated; I return to the role of the "internal" meaning of the verb in Chap. 12.

[3] The symbol 'VSubj' can be understood, for the moment, as the subject; see full explanation in Sect. 1.3.3.

[4] With some complications, to be seen in Chaps. 6–11.

Any notational system for constructions has to select some features while disregarding others. The meaning of verbs and sentences is too rich to be entirely represented, making such selection mandatory. What I do (and what other people do, I believe) is to select those features that prove relevant for immediate descriptive purposes. The selective use of the details in a description is sometimes explicitly recognized, as for example

> Which word classes one identifies in the description of a particular language [. . .] not only depends on the language itself, but also on the purpose of the description, i.e. the type of generalization one wishes to make.
> (Herbst and Schüller 2008, p. 31)

In the present case, selection is partly guided by the decision to make representation as concrete as possible, at the cost of including some redundancy. There certainly are generalizations to be expressed, many of them unknown, or insufficiently known, at present. A concrete notation has the virtue of providing data for eventual generalizations, and is the most prudent road to follow in the present circumstances. Nevertheless, some generalizations are tolerably well known, and will be studied in Chaps. 7–11, with a view towards including them in the system, so that the valencies themselves can be stated in a simpler and more revealing form.

For instance, it is well known that there is a tendency—in Portuguese as in English—for the Agent to be codified as the subject of the sentence. Once stated, this generalization frees us from specifying the semantic role of the subject in formula [3] in all regular cases. Cases in which the Agent is coded as some other syntactic function are understood as idiosyncratic, lexically-conditioned, information, and are correspondingly recorded in the verb's valency in the way shown in later chapters. This modification in the notation of construction [3] will be postponed until we have time to discuss it properly (which will happen in Chap. 8).

The very notion of "subject" is defined according to the immediate needs of the description. Thus, Pontes (1986) argues for a prototypical notion of subject which does not include the (traditional) postposed subject we find in

[4] Chegaram os pacotes. 'the packets arrived'
arrived the packets

According to her,

> what matters for the recognition of an NP as a subject is the presence of certain features, like agent and topic, and [. . .] the more these features are present the easier is the task of [subject] identification.
> (Pontes 1986, pp. 275–276)[5]

Since *os pacotes* in [4] is not the topic, nor is it the Agent, it is not easily identified as the subject. This makes sense in terms of an internalized notion of 'subject', and perhaps for the description of some grammatical phenomena. But for

[5] My translation—here and in all quotations of works not in English.

purposes of valency description, *os pacotes* is the subject of the sentence both in [4] and in

[5] Os pacotes chegaram. 'the packets arrived'
the packets arrived

since it holds an agreement relation with the verb, and ends up receiving the same semantic role (Theme) in both cases. For us, therefore, both [4] and [5] have a subject.[6]

Finally, some databases include information about the internal semantics of each component: besides identifying the verb as being of action, state, and so on, they include information such as "animate" or "human" as a mark of some constituents. It is my view that such information is superfluous, perhaps even misleading, when included in the diatheses. First, the semantic type of the verb correlates with the semantic roles it associates with—for instance, the role Agent co-occurs with all, and only, verbs of action. Second, a feature like "human" in the subject of *read* is derivable from the meaning of the verb itself: the action described by *read* is normally performed by persons. Furthermore, this is one of the details which most readily change under the pressure of necessity, as when we say that the computer is *reading* the information contained in a disc. Language users are very skilled in making such adaptations in order to express new situations with old words; while being no doubt a fascinating topic of research, it does not qualify as a valency phenomenon. Valency is a much more permanent feature of verbs; it also changes, but as a result of diachronic processes, not according to the speaker's whim and immediate needs.

1.2 Diatheses, Valency

Occurrence in *some* grammatical constructions entails subclassifying the verbs. This is a property of some, but not all, constructions. For instance, some verbs occur in a construction defined as

[6] VSubj > *Agent* V NP > *Patient*

An example is *melt*:

[7] The cook melted the cheese.

But many verbs do not fit here: *receive* (which occurs with a subject plus another NP, but the subject is not Agent), *fall*, *die*, *be*, etc. This means that occurrence in [6] subclassifies the verbs into two groups. Constructions that have this property

[6] It might perhaps be more rigorous to name it differently, since after all the syntactic relation we are dealing here is not exactly the same as Pontes studied. This, however, would lead to such a proliferation of new terms as to render the text hard to decipher.

will be called **diatheses**[7]; we will say that [6] is one of the diatheses of the verb *melt*. And the set of all diatheses of a verb is its **valency**. The valency of *melt* includes [6] and also

[8] VSubj > *Patient* V

Diathesis [8], as seen, has a subject Patient, and no object. An example is

[9] The cheese melted.

Some verbs, like *melt*, occur in both diatheses; some, like *kill*, occur in [6] but not in [8]; some, like *faint*, occur in [8] but not in [6]; finally, a verb like *be* occurs in neither of them.

Now, other constructions do not subclassify the verbs; either they apply to all verbs, or they are syntactically conditioned so that the individual verb of the sentence has only indirect participation. An example of the first case is the negative construction, as in

[10] Jim did not kill the mosquito.

Of course one cannot attribute the possibility of occurrence of the negative markers (*did, not*) to the verb of the sentence; every verb of the language can be negated, and there is no lexical conditioning here.[8]

In other cases it is some feature of the grammatical structure that conditions the possibility of occurrence in a construction. Turning to Portuguese, an example is the topicalized object construction, as in

[11] A nova edição eu ainda não li.
the new edition I have not yet read.
Patient *Agent*

In Portuguese, this construction is possible whenever there is an object NP, regardless of the verb. Verbs that do not accept an object NP do not participate in this construction, but this has to do with the acceptance of an object, not with the possibility of topicalizing a constituent. What we conclude is that the negative and the topicalized object constructions are not diatheses of any verb, and are therefore irrelevant to valency description, being disregarded in the present study. The same conclusion applies to other sentence elements that do not depend on the individual verb, such as auxiliaries and interrogative markers, which occur equally with all verbs.

[7] ADESSE calls diatheses 'syntactic-semantic schemata' (*esquemas sintático-semânticos*), which is more informative but too clumsy for frequent use. The Erlangen Patternbank calls them *valency patterns*.

[8] Rigorously speaking, this is more true for Portuguese than for English, because of the existence of verbs that are negated without the aid of the auxiliary (*she is not my neighbor*). But the general principle is clear.

1.3 Representation of Diatheses in a Dictionary

1.3.1 Structure of the Entries

Summarizing, the **valency** of a verb is the set of **diatheses** in which it occurs; and a verb can also occur in other constructions, which are not diatheses, and do not belong to its valency, because they do not individualize this verb as against other verbs of the language. A **list of verbs and valencies** (also called a **valency dictionary**) is a list of all verbs of the language, each with the diatheses in which it occurs. Project VVP has the objective of elaborating the list of verbs and valencies of Brazilian Portuguese.

The language used to express the list is exemplified in [6] and [8] above, and is comparatively simple. Each diathesis includes:

Syntactic Component

(a) an ordered sequence of form-class symbols: NP, AdjP, AdvP, V;
(b) one syntactic function: Subject (which is also an NP, of course);
(c) prepositions, individually identified: *de, com, por* etc.

Semantic Component

Semantic roles of all NPs, AdjP, AdvPs, and prepositional phrases.

And that is all. As seen, is it a very simple system in that it makes use of few elements. But when we try to define the details with some precision we are faced with a number of serious theoretical questions: how to define the subject; whether we need any other syntactic functions besides the subject; which constituents must be included in the diathesis, and which can be left out, to be added freely, without reference to the main verb and its valency; and, mainly: how to define semantic roles, delimit them, and code them syntactically. The remainder of this book will be largely concerned with these theoretical questions.

Let us examine a few examples. The diathesis

[6] VSubj > *Agent* V NP > *Patient*

can be elaborated as the sentence

[12] Jim killed the mosquito.

Let us call this the **transitive** construction. Many verbs that fit into the transitive construction also occur in the **ergative,**[9] defined as

[9] Sometimes called **inchoative** (Levin 1993; Cançado *et al*. 2013); it corresponds (extensionally) to the **unaccusative** of the generative tradition. None of these labels is really adequate, etymologically speaking; but I keep here to my decision of avoiding new terms whenever possible, and **ergative** seems to be the most common designation.

[8] VSubj > *Patient* V

An example is *break*, which occurs in the transitive in

[13] The boy broke the glass.

and in the ergative in

[14] The glass broke.

The **intransitive** construction is syntactically identical to the ergative, but has a subject Agent:

[15] VSubj > *Agent* V

An example is

[16] My father laughed.

A construction involving a prepositional phrase is the following:

[17] VSubj > *Experiencer* V *de* NP > *Stimulus*

realized as

[18] Regina gostava de alface.
Regina liked (of) lettuce

The preposition *de* is obligatory with the verb *gostar* 'like', and must be mentioned individually in the diathesis. Just putting a 'PrepP' is not sufficient, because the preposition depends on the verb: *gostar* 'like' and *desconfiar* 'mistrust' require *de*, but *confiar* 'trust' requires *em*:

[19] Regina confia em você.
Regina trusts (in) you

[19] realizes another diathesis, similar but not identical with [18], since the preposition is different.

There are numerous diatheses in Portuguese, well over a hundred, and the correct way to refer to them is by mentioning their definition, like [6], [8], and [17]. For the most frequent ones, using a name (**transitive**, **ergative**, and the like) may facilitate the discussion; but these names are only mnemonic devices, and most diatheses lack them. Each diathesis is given an arbitrary number: thus, the transitive is C1; the intransitive is C2; the ergative is C4; the one defined in [17] is C14. This is useful in the enumeration of all constructions in the completed list, so that we may say simply that *melt* occurs in C1 and C4, referring to an initial list where all diatheses are defined and numbered. These numbers are used in the *Dictionary* to refer to diatheses.

1.3.2 Diatheses and Construction Grammar

The notation summarized above is in agreement with the principles of Construction Grammar. Thus, we read that

> [. . .] the VP's complement structure is not determined by the verb alone, as is assumed in most of mainstream generative grammar as well as in many functionalist traditions [. . .]. On our view, argument structure is determined by the composite effects of the verb and the construction.
>
> (Goldberg and Jackendoff 2004, p. 534)

The effect of the construction is here represented by the associations expressed in the diathesis: in [6], the subject is Agent, the nonsubject NP is Patient. On the other hand, the role of the verb is also essential, because in order to analyze sentence [13] as an elaboration of [6] we must know that *break* has [6] in its valency. Goldberg and Jackendoff go on to note that

> The approach we are suggesting comes at the following cost: (i) we need to admit meaningful constructions as items stored in the lexicon, and (ii) we need to abandon the rigid view that the verb alone determines the complement structure of its VP.
>
> (Goldberg and Jackendoff 2004, p. 534)

The "meaningful constructions" are here represented as diatheses (e.g., [6]), and they are necessarily stored in the language users' long term memory as part of their knowledge of the language. They may, as said before, be summarized by structure rules, but for the moment being all we have is a list of constructions, stored (directly or by means of rules) in memory. As for (ii), I agree that the verb "alone" cannot be responsible for the complement structure of a sentence—instead, we have something like "verb V can occur in construction C", that is, I presume, the composite effect mentioned by Goldberg and Jackendoff. In any case, I will show (in Chaps. 7–7–9) that there is no way we can analyze all valency phenomena as merely the effect of the properties of verbs.

The "constructional view" of grammar has as one of its principles that

> There is a cline of grammatical phenomena from the totally general to the totally idiosyncratic.
>
> (Goldberg and Jackendoff 2004, p. 532)

This is a pretty common view among linguists nowadays. In the specific case of valencies it is represented by several mechanisms. For instance, as will be seen later in this book (8.2; 12.6.2), there are linking rules that define certain assignments as prototypical, and therefore part of the grammar: for instance, Agents are prototypically coded as subjects. This contrasts with cases in which the Agent is coded, say, as a prepositional phrase with *de*—which occurs only with the verbs *apanhar* 'to take a beating' and *perder* 'lose (in a game)'. There is a whole crowd of such mechanisms, which compose a very complex "cline" from general to idiosyncratic ways of coding semantic roles. Several aspects of this phenomenon will be studied in the following chapters; they show that, indeed, "grammar" and "lexicon" are not

to be understood as separate components of a language, but rather as two ends of a continuum of generality, which remains to be charted in detail.

1.3.3 The 'VSubj' Convention

Before proceeding, I must explain a detail of the notation. The symbol 'VSubj' (spelled out as **valential subject**) in the diatheses stands for three morphosyntactic configurations: (a) a subject NP and a person-number suffix; (b) a person-number suffix, without subject NP; or (c) a subject NP, without the suffix. These are respectively exemplified in

[20] Nós saímos.
we left
[21] Saímos.
(we) left
[22] Nós saindo (vocês podem ir dormir).
we leaving (you can go to sleep) 'when we leave, you can go to sleep'

The form *saímos* incorporates a person-number suffix, *-mos*; the presence of the subject NP (here, *nós* 'we') is optional. And *saindo* is a gerund, therefore has no person-number suffix. In all three examples there is a VSubj, although one of them does not have a *subject* NP.[10] The subject-only situation occurs when the verb is in a noninflected form, such as the gerund: this situation only occurs in subordinate clauses. In English the suffix does not occur without the subject, except in anaphoric context; but Portuguese is a *pro*-drop language, and in certain situations we can have just the verb, as in [21].

The reason for not distinguishing these three configurations is that there is no verb that accepts one of them without accepting all of them—that is, the difference between the three is irrelevant for valency purposes.[11] This does not mean that the presence of the subject NP and/or the suffix is free; but it depends on grammatical or discourse factors, not lexical ones. Therefore, all three sentences above elaborate the single diathesis[12]

[10] I tried for a time to use an arbitrary symbol for VSubj, that is, 'H', as found in Perini (2008); this was not well received, though, and I now prefer VSubj. This symbol is always used in the formulas; in the text, where there is no danger of ambiguity, I may occasionally use 'subject' where 'VSubj' would be more appropriate.

[11] There is some doubt concerning the existential verbs *ter* and *haver* 'there to be'. But, if they are an exception, it is the only one (*ter* occurs in the spoken language, *haver* is confined to written texts).

[12] **Theme** is the semantic role of the element undergoing motion. It is often identified with the "located thing", and this may be right; but here I keep them apart, until further notice.

[23] VSubj > *Theme* V

If we did make the distinction, we would have, for *all* verbs, three versions of every construction, one with the subject NP and the suffix, another with the suffix only, a third one with the subject NP only—and identical in everything else. The difference between these three constructions would, of course, fail to subclassify the verbs, since all verbs would occur in all three. This is the reason for the abbreviation 'VSubj', covering all three situations.

1.3.4 Subjectless Sentences and the Person-Number Suffix

I end this section with a note on the analysis of sentence [21],

[21] Saímos.
(we) left

As we saw above, this sentence is to be analyzed as subjectless; consequently, the fact that we understand the Theme as "we" must be attributed to the presence of the person-number suffix, *-mos*. More specifically, the reference ("we") comes from the suffix proper; and the semantic role derives from the valency of the verb, *sair* 'go out', which stipulates that whatever is denoted by the suffix (and/or by the subject, if any) is the Theme.

This analysis results from the option for a strictly surface analysis, without hidden levels or abstract constituents. The subject is defined (in Chap. 2) as an overt constituent of the sentence, and no such constituent is present in [21]; and yet there is no doubt about the identity of the Theme. This evidently comes from the presence of the suffix, which is unambiguous in that respect. In a previous version of this text I spoke of the suffix "being assigned" the semantic role Theme, which caused some unfavorable reactions. I will now say[13] that the Theme is **coded** as the suffix. There is no valid reason to reconstruct an abstract subject, then have it be assigned the semantic role, and then delete it again: this only complicates the syntactic component, without any gain for the simplicity of the analysis, and besides making it less grounded on observable facts.[14]

We can then say that sentence [20]

[20] Nós saímos.
we left

is redundant in what respects the expression of the Theme: it is expressed by the subject (*nós* 'we') and, redundantly, by the suffix (*-mos*). No such redundancy is found in [21].

[13] Synonymously!

[14] This is not a novel position, of course; see Culicover and Jackendoff (2005, Chaps. 1 and 2) for a more complete discussion.

This analysis is to be understood in the context of a surface description of observed facts; it has no commitment with more abstract analyses including a phonetically null "subject" in [21], which would be assigned the semantic role Theme. This position derives directly from acceptance of Culicover and Jackendoff's (2005) rejection of the Interface Uniformity principle; and also from the recognition that the main task of linguistic description is to state the interface between perceptible formal structure and the concepts it is used to code. This was already stated very clearly by Saussure (1916), and often afterwards, in passages such as the following

> In order to work out the interface between syntax and C[onceptual] S[tructure], we need to know what sorts of structures the interface is connecting.
> (Culicover and Jackendoff 2005, p. 153)

This means that we should carry our analysis all the way to the "real" surface structure.

1.4 Alternations

The approach used here does not make use of the "alternations" often found in the literature (as in Levin 1993, for instance). Alternations are privileged relations between (surface) structures, so that one is said to be in alternation with the other. An example is the pair of constructions seen above with verbs like *melt*:

[7] The cook melted the cheese.
[9] The cheese melted.

These are described as members of the causative/inchoative (or transitive/ergative) alternation (Levin 1993, p. 27). This notion, as often used, is basically transformational; for instance, Levin says that alternations "involve a change in a verb's transitivity" (Levin 1993, p. 25).[15]

Here I adopt a different view, taking each construction as an independent unit, following Goldberg's idea that

> it is profitable to look beyond alternations and to consider each surface pattern on its own terms.
> (Goldberg 2006, p. 19)

This is consistent with the descriptive point of view adopted in the present work, since it avoids positing abstract relationships between different surface structures. But it does not entail total rejection of such relationships, which may be

[15] And, as seen by Gross (1975, p. 9), "[t]he theoretical status of the notion of transformation is [. . .] far from clear. [. . .] it is possible to consider the notion of transformation as having a purely experimental status." That is, transformations are a heuristic resource, rather than part of the theory.

grammatically relevant. For instance, there surely are entailments of existence, of the form "if a verb occurs in construction A, then it necessarily/prototypically occurs in construction B." There are also systematic semantic relations between certain pairs of constructions, as for instance the relation P/CAUSE P holding between ergatives and transitives (as shown by Dowty 2001), and these semantic relations are part of the language user's competence. Such implications may be sufficiently strong to form the base for learning strategies, and as such deserve to be stated in a complete description. But they must be stated in terms of observed occurrences, not as the result of theoretical principles; if so, alternations, properly defined, will eventually be part of a complete description of the grammar of a language.

But in the first stage of the description it is more prudent to avoid postulating alternations, because they depend on descriptive observations which are not yet available. That is, before stating that two constructions are in alternation we must study the symbolic characteristics of each of them, as well as eventual entailments of existence. Only then can we risk more ambitious statements, as for instance that the constructions in [7] and [9] are in an "alternation" relation. For the moment being, our analysis will dispense with the notion of "alternation", or any other relationship between surface structures.

1.5 Counting Verbs

1.5.1 One Verb or Many Verbs?

Verbs like *get*, which can have several meanings (*she got the prize*; *Jim got arrested by the police*; *I don't get your point*; *she got home very late*) present a problem: are we to analyze them as one verb with several meanings or as several homonymous lexical items? I will argue that we must define only one verb *get*, with the property of evoking several schemata.

First of all, if we define several verbs *get*, a methodological problem arises: as is well known, the difference between readings of a verb (and of a word in general) is not always neat, but frequently shows a gradation which comes to very minute distinctions; at the limit, one can argue that *eating* a biscuit is different from *eating* some porridge. Also, we are usually able to create new readings as needed; for instance, an airplane "flies" in quite a different way than a bird, yet the same verb *fly* was used for both when the first airplanes were built; and we can say that *she flew out of the room* to express speed, not actual flight, and so on. This means, at the very least, that we are often unable to draw the semantic boundaries between the readings of a verb: how many verbs *fly* are there in English?

To take a concrete example, Busse's (1994) dictionary splits the very complex verb *passar* in the following way: *passar*[1] includes 'drop by' (*passe cá por casa hoje à noite* 'drop by tonight') + 'undergo' (*os chips passam por um teste final* 'the

chips undergo a final test') + 'begin' (*passei a levantar-me todos os dias às oito horas* 'I began to wake up every day at eight') + 'pass (a test)' + 'go over' (*passo-me para França* 'I go over to France') + (with negation) 'to be but' (*ele não passa de um charlatão* 'he is but a charlatan') etc. *Passar*[2] includes 'spend' (*ele passou bem o dia* 'he spent his day well') + 'pass (time)' (*quinze anos se passaram* '15 years passed') + 'fly (time)' (*como o tempo passa!* 'how time flies!') etc. *Passar*[3] means 'be (in health)' (*como passas?* 'how are you?') + 'pass for' (*ele passa por maluco* 'he passes for a madman') + 'happen' (*passa-se cada coisa!* 'so many weird things happen!'). The criteria for analyzing each reading as *passar*[1], *passar*[2] or *passar*[3] seem arbitrary: we would actually need many other verbs *passar* in order to do justice to the semantic complexity of this verb. And that is exactly the point: the complexity of *passar* is semantic, not formal, and must be described in the semantic component—one verb (formal item) corresponds to many readings (and schemata).

But the main argument against analyzing *get* (or *passar*) as several verbs is theoretical: it defeats the main objective of linguistic analysis, which is to relate forms and meanings. When we speak of the several verbs *get*, we are not referring to formal, sensorially perceptible units, but to theoretical constructs; we still have to state somewhere in the description that these several verbs are realized as one and the same phonological unit, with a unique phonetic realization. According to this analysis, the unit we call "verb" will not be very useful: we will have many sets of homonyms, and each set will be composed of units that have the same phonological representation—and, furthermore, the same morphological features, since all the *get*'s make their past tense *got*, gerund *getting*, and so on. If we admit many verbs *get*, we will be forced into strange statements like "all verbs of the form *get* are irregular, and make their past tense *got*."[16]

For these reasons I prefer to speak of one verb having several meanings (that is, being able to evoke several schemata), rather than speaking of several verbs, each having its own meaning, but the same pronunciation and morphology. A "verb" is defined as a unit phonologically represented in a unique way. *Get* is one verb, and one entry in the valency dictionary, although it can evoke several schemata, and occur in several diatheses.[17]

The readings of a verb are partly correlated with its different diatheses. For instance, when *get* occurs with a direct object it means 'obtain':

[24] She got the prize. [VSubj V NP: schema OBTAIN][18]

But with an adequate adverbial phrase, it means 'arrive':

[25] She got here on time. [VSubj V AdvP: schema ARRIVE]

[16] This relates to the general problem of the concept of lexical item, which I discuss in Perini (2003).

[17] *Get* is a word, and *got*, *gets*, *getting* are different **words**, all belonging to the same **lexeme** (or **lemma**), which we may call "the verb *get*".

[18] In the FrameNet, the schema is GETTING; but using this designation might be confusing in the present context.

All this can be described in a straightforward way, minimizing theory, by stating that the one verb *get* has such and such a morphology, can occur in a set of diatheses, can evoke several schemata, and shows such and such correlations between diatheses and evoked schemata.

Solutions found in the literature are not unanimous; some authors follow the same position adopted in this work, as for instance Levy in her work on Spanish verbs:

> For effects of constructing the tables I took the phonological form as a basic criterion of determination of what is a verb. This form sometimes takes on different readings in each variant of a syntactic construction, as for instance, *precisar*, which has two meanings in
>
> F. precisó que tengamos el trabajo listo
> ['F. specified that we must have the work ready']
> F. precisa dormir 10 horas para reponerse
> ['F. needs to sleep 10 hours to recover']
> (Levy 1983, p. 95; my glosses)

Anderson (1977) is of the same opinion here adopted. Starosta (1981), in his review of Anderson's book, disagrees, but his arguments do not seem convincing when we consider the task of describing verb valencies, and mainly the need to describe the processing of the sound chain by the receptor. Jackendoff (2002, p. 28) also favors the many-word solution, against which I argue here. He just says that it "make[s] more sense", without giving an argument.

Herbst and Schüller also seem to support the idea that every new reading defines a new verb, if we judge from the following passage:

> [. . .] the monovalent use of *sleep* in
> (139) [. . .] *Unlike Vic, Robyn invariably* sleeps *until woken.*
> and the divalent use in
> (140) [. . .] *However, on these occasions they invariably* slept *together.*
> clearly represent different senses of the verb *sleep*, i.e. different lexical units.
> (Herbst and Schüller 2008, pp. 142–143)[19]

I hope to have made clear that different senses of a verb are not the same as different verbs (i.e., different lexical units).

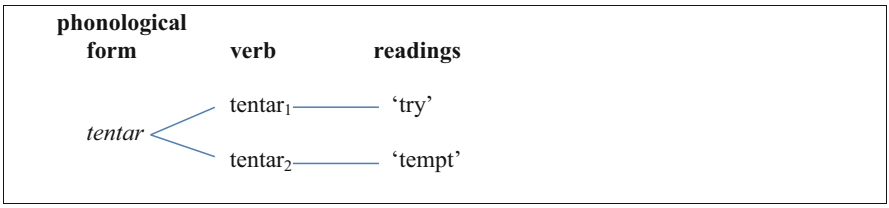
Now to quote an author working on Portuguese,

> [. . .] before all, we must distinguish the several readings of verbs [. . .] because each has its specific valency.
> (Welker 2005, p. 81)

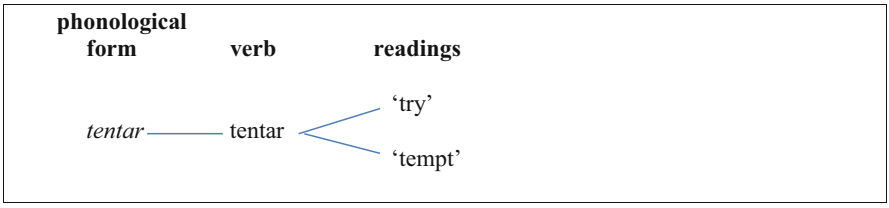
I have shown that if we follow this position (and Welker admits it would not be easy) we will run into some serious practical and theoretical problems. I agree, of course, that we must distinguish the different readings of a verb, since this is part of the speaker's knowledge, but not "before all".

If we start from verbs plus readings we will have to state the following elements: two (or more) "verbs"; two meanings; and one morphological representation for both. Taking as an example *tentar* which means 'try' or 'tempt', this means:

[19] Numbering as in the original; the underlining is in the original, and is not relevant here.



But there is an obvious redundancy in this schema: the duality of meanings is represented twice, first as two verbs, then as two readings. We can express exactly the same thing, and keep faithful to observed facts, with a simpler schema, provided that we analyze *tentar* as one verb instead of two. The schema will be reduced to



This is not only more economical, but also, I think, intuitively more satisfying.

The need to define verbs formally becomes obvious, and is well understood, when one works with computer processing of natural language, since computational systems are unable to take semantic factors into account when starting to process a text. But things are not really different with human processors, who must start with the phonetic chain before establishing lexemes.

For these reasons it is more convenient to count verbs as morphosyntactic units: *tentar* is one verb, with several meanings. A quick perusal of Appendix A shows that this is not a minor problem: for instance, if we adopt the each-reading-is-a-new-verb hypothesis, how many verbs *ficar* are there in Portuguese?[20] Or *get* in English?

1.5.2 Readings and Diatheses

We then assume that *get* is one verb, albeit with several meanings. We can now ask how to account for these several meanings for one and the same verb; and whether each meaning correlates with some formal marking.

The answer is complex. Sometimes there is a correlation between a meaning and a special diathesis: this happens with *get*, which evokes the schema OBTAIN when

[20] *Ficar*: 'stay', 'become', 'keep', 'persist', 'cost'... According to Busse (1994), there are four verbs *ficar*.

in a structure of the form VSubj V NP (*she got the prize*), and ARRIVE when in the structure VSubj V AdvP (*she got here on time*). In Spanish, as shown by Levy's (1983) examples, *precisar* means 'specify' with a clausal (finite) complement, and 'need' with an infinitive complement. On the other hand, there are cases in which a verb means the same thing (that is, evokes the same schema) in two different diatheses. One example is the Portuguese verb *pisar* 'step on', which can have an object or a phrase with *em*, without any change in meaning:

[26] Eles pisaram a grama. 'they stepped on the grass'
they stepped the grass
[27] Eles pisaram na grama. 'they stepped on the grass'[21]
they stepped on the grass

And there are also cases in which a verb has more than one meaning while occurring in the same construction; in these cases, the resulting ambiguity is usually dissolved by schematic filters or general context. Most examples seem to involve gradual, semantically related readings. For instance, *cut* (a cake/taxes); *push* (a door/a drug), *scan* (the horizon/a document), *start* (the engine/a new project) etc. Here the semantic roles involved are the same (both *a cake* and *taxes* are Patient in *the president cut–*). In other cases, only the syntax is the same, and semantic roles are different, as with Portuguese *virar*, which with an object can mean 'become' or 'rotate'; thus, the following sentence is ambiguous:

[28] Ela virou a presidente da empresa.
'she became the president of the company' or
'she turned (rotated) the president of the company'

As seen, we have here a complex situation, with a high incidence of idiosyncrasy. This is to be expected, since meaning differences are not always grammatical in nature, but broadly cognitive, like the difference between the two *eat*'s (a cracker/the porridge). Where the difference is grammatically conditioned, linking rules bring some order into the chaos, by stipulating for instance that sentences with the syntactic structure VSubj V NP most often express an Agent plus a Patient. But part of the meaning may depend on (currently) unpredictable features of the context and details of world knowledge. This shows the inadequacy of the solution that defines several verbs *get*, one for each meaning.

[21] *Na* = *em* + *a*.

1.6 Optional and Syntactically Free Constituents

1.6.1 Optionality

One particular problem is how to analyze cases of optional complements. Here we can distinguish several situations. The first is the occurrence of the subject; being a *pro*-drop language, Portuguese allows pairs of sentences like

[29] Comprei um carro novo. ~ Eu comprei um carro novo.
(I) bought a new car I bought a new car

This situation does not pose a problem for valency analysis, because the subject is optional with all verbs in the language—although not in all syntactic or discourse contexts. This means that the possibility of omitting the subject does not subclassify the verbs, and is not to be considered a valency phenomenon.[22]

Now, omission of the object is a more complex phenomenon. It is often taken as relevant to verb valency, as in the Erlangen Patternbank:

> With respect to **optionality**, valency slots will be characterized as to whether a slot must or can be realised by a complement.
> (Herbst, internet, p. 3)

But suppose optionality is correlated with the verb's degree of schematicity, e.g., more schematic verbs would show a greater facility to have their object omitted (this is suggested by Farber and Usón 1999; *apud* Wald 2001, p. 859). If this is correct, there will be no need to mark the optionality of certain complements, since it will derive automatically from the greater semantic complexity of the verb—I take this to mean its greater cognitive elaboration. However, the evidence does not seem to support this explanation, at least not in the exact form adopted by Farber and Usón; to take an example, the three verbs *fazer* 'do', *comer* 'eat' and *devorar* 'devour' are in a scale of increasing elaboration (or semantic complexity); yet the first and the third require the presence of an object, and *comer*, which is the middle one, omits the object freely. Certainly there is some still unknown factor at work here.

Rice (1988) proposes a somewhat different characterization of verbs that disallow object omission. She points out some features like the verb's semantic neutrality:

> Verbs that conflate action and manner tend to resist omission while synonymous yet more neutral verbs tend to allow it.
> (Rice 1988, p. 205)

[22] There is possibly a small residue of verbs that never occur with a subject, like *nevar* 'snow', and *ter* in the meaning of 'there to be'. These cases (less than ten verbs in the whole language) can be marked individually, and do not make it necessary to include the possibility of subject omission when notating diatheses.

One example can be *comer* 'eat' vs. *devorar* 'devour': the latter conflates action and manner,[23] and correspondingly requires the presence of the object. But Rice's principle does not explain why *fazer* 'make' requires an object, which suggests that we may be faced with a complex set of constraints. In any case, the effect of such semantic factors on object omissibility is a promising path of research, currently under study (Loredo Neta 2014). An unexpected factor found by Loredo Neta is that some semantic roles are particularly resistant to omission: one example is Theme/Located.thing, (which she analyzes as one semantic role, following Jackendoff (1990, p. 125)).

Besides, there are also lexically conditioned elaborations: the most notorious example is *beber*, or English *drink*, which when used without an object conveys a specific Patient: *her husband drinks* means that he drinks liquor, not water or orange juice. These cases are comparatively few, but sometimes (as in the case of *drink*) cannot be explained on purely semantic grounds. For *spit*, the Patient will be "saliva" because that is what normally people spits; but with *drink* this explanation does not hold. And, moreover, the privileged Patient may not appear in other contexts: compare *her husband drinks* with *many animals come here to drink*.[24]

All these problems are still poorly understood, and call for specific study. For our immediate aims, however, they are not crucial. Since we work on a list of verbs and valencies, and start with "ready-made" constructions, all we have to do is assign semantic roles to the complements that do appear. Optionality will appear in the valencies of verbs as the presence or absence of diatheses without the relevant complement: for instance, a verb may have both **VSubj V NP** and **VSubj V** in its valency, whereas another may have only **VSubj V NP**. But of course the conditions of optionality will have to be stated eventually,[25] be they cognitive in nature, lexical, or (which is more likely) sometimes cognitive, sometimes lexical, and this may lead to a partial reformulation of the list.

In our present notational system, then, optional complements are represented by simply postulating two diatheses, one with and one without the presence of the relevant constituent. For instance, if we have

[30] Sally was reading Kafka's *The Trial*.
[31] Sally was reading.

we represent the optional occurrence of the object by the diatheses

[32] VSubj > *Agent* V NP > *Patient*
[33] VSubj > *Agent* V

both of which are present in the valency of *read*.

As far as overt complements are concerned, that is all. But there is still an important fact to consider: in [31] we must understand that Sally was reading

[23] That is, *devorar* 'devour' means 'eat with some violence' or something similar.
[24] This observation is also due to Loredo Neta (2014).
[25] Loredo Neta (2014) is an important step in this direction.

something, and we have a good idea of what it may be: a book, a leaflet, a magazine, but not a dog or a piece of cake.

In Perini (2008) I tried to solve this problem by positing a zero object, meant to be assigned a semantic role but not really present syntactically—something like "please understand a schematic Patient here if no object appears". Thus, [31] was analyzed as representing the diathesis

[34] VSubj > *Agent* V Ø > *Patient*

The 'Ø' is not a syntactic element, nothing like the empty categories of early generative grammar. It is rather a way to mark the syntactic position that a complement, if present, would have in order to be assigned the semantic role Patient.

But there is a better way of expressing this. Suppose we analyze [31] as realizing the diathesis

[33] VSubj > *Agent* V

without the object, which is after all the most concrete way of representing it. The subject will be assigned its semantic role regularly; but where will the schematic Patient come from?

It is, in a sense, already there: the verb, here *read*, evokes a schema, READ, which has two variables, labeled "agent" (the reader) and "patient" (the thing that is read). The "agent" is elaborated by the subject in [31] as referring to Sally. The "patient" must also be filled in; since there is no syntactic material to serve as a base to elaborate it, it seems natural to leave it as a schematic reference, that is, the way it is in the schema. The result can be understood as: the "agent" of READ is elaborated as Sally; the "patient" is left without elaboration—so that all we know is that something was read. Of course, this "something" is further limited by our world knowledge: you can read a book, not a cat. This way of filling in the Patient gap is entirely similar to the way we fill other gaps: when we process [31], we understand that Sally was reading something, in some location, at some time etc. All this is left in a schematic state, and results from a general principle governing the evocation of schemata.

The Agent, here the subject, can also be left in its "raw" schematic state; this happens in subjectless subordinate clauses like

[35] Ler catálogos é útil. 'reading catalogues is useful'

The subordinate clause *ler catálogos* 'reading catalogues' has no subject and no person-number suffix, and consequently the Agent (which would be elaborated by the subject and/or the suffix, if present) is understood as having schematic reference.

Let us return to the case of privileged Patients—as in *her husband drinks*, where the Patient is understood with elaborate reference ("alcoholic beverage"). As we saw, this is not just a categorical property of the verb, since we have schematic

reference in *many animals come here to drink*. On the other hand, the difference is not a mere function of the context, because a privileged Patient does not appear with other verbs, say, *eat*. That is, whatever the conditions under which this phenomenon occurs, it depends on the identity of the verb: with *drink* it functions, with *eat* it does not. This means that it should appear in the valency of *drink*, as one of its idiosyncratic properties; and it must be represented in the valency dictionary as one of the marks of *drink* as against *eat*, or *leak*, which also takes a liquid as one of its arguments, but does not privilege "liquor" as the Patient.

There are many ways to represent this, and the problem calls for some reflection. In the VVP list, this difference is represented as an additional diathesis. Thus, *eat* will have [33] as one of its diatheses:

[33] VSubj > *Agent* V

The Patient (not represented syntactically) has its reference filled in by default, directly from the schema. Now, *drink* must have, besides [33], also the diathesis

[36] VSubj > *Agent* V > *Patient: alcoholic beverage*

where the empty slot before the '>' means that there is no syntactic representation, and the specification "alcoholic beverage" elaborates the expected reference, just "liquid" or the like. This distinguishes verbs like *drink* from verbs like *eat*, whose (unexpressed) Patient is more schematic. Of course, *drink* has also [33] as a diathesis, to account for cases where the Patient is schematic (*many animals come here to drink*).

Finally, we have the general fact of complement omission in anaphoric contexts. This has nothing to do with valency, being a phenomenon describable in syntactic and discursive terms, without any relation to the verb as a lexical item; that is, it occurs whenever the grammatical or discursive situation is favorable, regardless of the verb of the sentence. Consequently, it is disregarded for the purposes of valency studies.[26] Thus, 'optional' here is to be understood as 'optional in nonanaphoric contexts'.

1.6.2 Syntactically Free Constituents

A problem is raised by cases like

[37] Meu tio morava em um pequeno apartamento.
'my uncle lived in a small apartment'
[38] Meu tio morava aqui. 'my uncle lived here'

[26] And this is what most valency systems do; an exception is the Erlangen Patterbank (Herbst, internet; Herbst and Schüller 2008), reviewed in Appendix E.

Here we have a complement with the semantic role Location, formally represented by *em* + NP in [37], and by an adverb, *aqui* 'here', in [38]. How are we to represent this?

The most obvious solution would be to simply define two diatheses of *morar* 'live', one with *em* + NP, the other with an AdvP: this would solve the immediate problem by providing a simple description. But there is a theoretical difficulty: this solution implies that the identity of semantic roles between *em* + NP and *aqui* (both Location) is an idiosyncratic property of the verb, here *morar* 'live'. And we know it is not so: *em* + NP and *aqui* are semantically equivalent by themselves, being among the alternative ways of expressing Location. Besides, this solution would force us to create new diatheses for cases where the locative phrase is introduced by other prepositions, such as *perto de São Paulo* 'near São Paulo', *debaixo da ponte* 'under the bridge' etc.

What *is* an idiosyncratic property of *morar* is the fact that it requires the expression of at least one of three semantic roles, Location, Company, or Manner. How this complement is coded seems to be of no concern, and depends on the semantic potential of the phrase: for Location, we may have *aqui* 'here', *lá* 'there', or a variety of prepositional phrases—all that matters is the ability of the constituent to express Location. The same happens with Company: it is normally coded as a phrase introduced by *com* 'with', but also sometimes as adverbs like *sozinha* 'alone'. Manner, with *morar*, seems to be restricted to *bem* 'well', *mal* 'poorly' and some of their near-synonyms,[27] so that we may say

[39] Ela mora muito bem. 'she lives very well' [that is, in a very good location]

but not

[40] * Ela mora muito intensamente. 'she lives [resides] very intensely'
[41] * Ela mora horrivelmente. 'she lives [resides] horribly'

I suspect that this is due to features of the corresponding schema, RESIDE.

Returning now to the problem of how to express the diathesis underlying [37] and [38], I suggest that we use a syntactic variable, **X**. This diathesis of *morar* will then be

[42] VSubj > *Located.thing* V X > *Location*

'X' is not to be understood as an empty category. It is a syntactic variable, to be read as "any (overt) syntactic constituent". It means simply that the verb makes no demands on the form of this complement, provided that it be able to express the semantic role present in the diathesis. If we realize X as *my father*, the sentence will be filtered out, because this NP cannot express Location; thus, only phrases having Location in their semantic potential end up being acceptable as realizations of X. Of course, we need two other diatheses similar to [42], one with Company, the other with Manner, instead of Location.[28]

[27] Like *pobremente* 'like a pauper', *luxuosamente* 'luxuriously'.

[28] Also with several combinations, such as Location + Manner, Company + Location, etc.

To summarize: the syntactic form of the complement of *morar* 'reside' is irrelevant, but we cannot leave the complement totally blank, because its semantic role is not free: it must be Location (or Company, or Manner), not, say, Patient or Instrument.

This solution cannot be generalized to all cases, because the syntactic representation is generally not free: the Patient of *comer* must be an NP, never, say, *em* + NP, and the Patient of *bater* 'spank' has the form *em* + NP: *ela bateu no gato* 'she beat the cat', literally 'on the cat'. Free syntax is a special case, to be noted in the diathesis, with the syntactic variable 'X'; the more common case has a specified form for all syntactic constituents.

*1.6.3 A Note on the Use of **

The * in examples [40] and [41] may suggest an objection: is the unacceptability here grammatical, or does it derive from world knowledge? This point deserves a brief digression, since there are other possibilitites, adopted by some linguists, which I prefer not to follow. In this book the asterisk (*) is used to mark any form rejected by native speakers, regardless of the cause of the rejection—syntactic ill-formedness, semantic deviance, or pragmatic strangeness. In other words, the asterisk is part of the data, and should be understood as devoid of theoretical meaning. Accordingly, I do not use the term **ungrammatical**, but use **unacceptable** instead.

Some people use * for grammatical unacceptability (ungramaticalness) and # for pragmatic deviance. But distinguishing "linguistically" from "pragmatically" strange sentences amounts to assuming some kind of previous analysis. I prefer to use * to denote any sentence that is rejected by speakers, whatever the reason. Explaining why they are rejected is the linguist's task, of course, but is not part of the data. Distinguishing * and # **when referring to data** seems to me to be incorrect—nothing in the rejection of a sentence tells us in advance whether it is phonologically, grammatically, semantically or pragmatically bad. We must start our analysis from raw data, as produced by nonlinguists. It may be discussed whether the unacceptability of **the rock cooked dinner* is syntactic or semantic, but the basic observation is the same: this sentence *does* sound strange; why, that is our concern, not the speaker's.

1.7 Complements and Adjuncts

1.7.1 Do We Need This Dichotomy?

Consider the sentence

[43] Yesterday Jim killed a mosquito with a handkerchief.

What diathesis does this sentence represent? Here we have a subject Agent, an object Patient, and also an adverbial phrase expressing Time and a prepositional

phrase expressing Instrument. Are all of them to be included in the diathesis? Or just the subject (Agent) and object (Patient)?

One answer is that we only include **complements**, not **adjuncts**, in the diathesis. The idea behind this is that

> adjuncts are less central to the description of clause structure since they are not structurally related to either the subject or the predicate of a clause [. . .]
> (Herbst and Schüller 2008, p. 19)

But this simple dichotomy hides some difficult problems: first, how do we define these two functions, complements and adjuncts, so that we can identify them with some certainty? Second, are there only two functions or do we have to consider more than two? And third, is the opposition semantic or syntactic in nature? I find no satisfactory answers to these questions in the literature.

The most likely (and traditional) analysis is that [43] is a realization of diathesis [6],

[6] VSubj > *Agent* V NP > *Patient*

The two elements *yesterday* and *with this handkerchief* are not to appear in the diathesis, being autonomous constituents which are freely added or not as needed, independently of the valential properties of the main verb. What we need is a principled way to arrive at this conclusion, which seems to be the correct one.

This is a question still under discussion; for effects of the present analysis, a compromise will have to be reached. I tend to believe that the basic principle is to include in the diatheses *unpredictable* information, namely, (a) cases in which the semantic role assigned to a constituent does not derive from linking rules, thematic transparency of the constituent, or other general mechanisms; and (b) cases of obligatory occurrence.[29] In our sentence,

[43] Yesterday Jim killed a mosquito with a handkerchief.

the constituent *yesterday* does not have to appear in the diathesis because it is totally transparent, and can express only "time"; and *with this handkerchief* does not have to appear in the diathesis either, because it is an Instrument by virtue of a linking rule specifying the preposition *with* as a prototypical mark of that semantic role. As we know, *with* can also express Company, but this possibility is excluded by a schematic filter (a handkerchief is an unlikely Company in the killing of a mosquito). We can then analyze [43] as a realization of just **VSubj V NP**, without including the adverb or the prepositional phrase.

As for obligatory occurrences, we saw a case in

[44] Meu tio morava em Recife. 'my uncle lived in Recife'

where the occurrence of the Location phrase is required by the verb. If no independent factor can be discovered for this requirement, it will have to be included in

[29] If any. As we saw, there is some suspicion that obligatoriness may be determined by semantic or contextual factors, independent of the verb's valency.

the valency of *morar* 'live, reside'. This can be done simply by including in the valency of *morar* a diathesis with the Location complement, and no diathesis without a (nonsubject) complement.[30]

Semantically opaque complements and obligatory ones have in common their dependency on the verb: it is the verb that determines that the object of [43] is a Patient, and it is the verb that determines that [44] must have a nonsubject complement. Now, both the occurrence and the semantic role of *yesterday* in [43] are independent of the verb: this constituent is optional wherever it occurs, and always expresses the semantic relation "time". Note that optionality is not a sufficient criterion to identify adjuncts, because objects are optional and (in Portuguese) so are subjects. The opposition between complements and adjuncts, then, will have to be based on the difference between elements which depend on the verb (for their semantic role and/or obligatory occurrence) and elements which do not—in other words, thematically opaque vs. thematically transparent constituents.

If we use this kind of criterion to determine the inclusion of each constituent in the diatheses, there will be no need for the complement/adjunct dichotomy. As far as valency description is concerned, the issue will be restated as one of semantic predictability against lexical idiosyncrasy. The diatheses become much simpler, and complexity will show only in cases where general tendencies are countered.

The notion of transparency here used posits a variety of interesting questions. For instance, the semantic notion "time" is normally expressed by a transparent constituent. But transparency (in prepositional phrases) may be derived from a grammatical marker (a preposition) or from the content of the NP:

[45] Machado died after a long illness. [transparent preposition *after*]
[46] Machado died in 1908.
[opaque preposition *in*, plus NP *1908*, which refers to a point in time]

In the rare cases where both the preposition and the NP lack transparency, the result is ambiguous, as expected; for instance,

[47] Machado died in May. [*May*: (a) month; (b) town in Texas]

An interesting hypothesis to be investigated, then, is whether the relation "time" (as distinct from "location") is ever determined by diathesis.

Observe that the dichotomy complement/adjunct is inadequate to describe these facts: inclusion in the diathesis has to do with transparency, not with some abstract property of constituents.

[30] As we saw, *morar* can occur with a complement of Location, Manner, or Company, but not without a complement.

1.7.2 Adjuncts and Complements in the Literature

1.7.2.1 Formal Definition

The purely formal definition of "adjunct" often found in the literature is of no use to us. For instance, we find statements like

> [. . .] adjuncts are Predicates that take as argument an expression belonging to a category [α] and build with it an expression of the category α. Thus, informally, an adjunct-adjective takes a noun as an argument and builds a new noun. An adverb takes a verb (or a sentence) as argument and builds a new verb (or a new sentence).
> (Franchi 2003, p. 157)

or

> Adjunction of β to α creates a new instance of α which immediately dominates α and β.
> (Sells 1985, p. 46)

which says the same thing.

This looks at first sight like a very precise definition. But how are we to identify exemples of the category α? The sequence

[48] Al is reading.

is a complete sentence. If we add *a long book*, we get

[49] Al is reading a long book.

and this is again a complete sentence. Yet we do not conclude that *a long book* in [49] is an adjunct.

Turning now to syntactic (or rather symbolic) properties, one observation that seems relevant here is that when we move from verb-headed to nominal-headed constructions, some constituents must alter their form. Thus, the nominalized counterpart of *Jim killed a mosquito* is *the killing of a mosquito by Jim*: note how the Agent is now expressed with a *by*-phrase, and the Patient with an *of*-phrase. Now, other constituents do not change: we can have

[50] The killing of a mosquito by Jim [yesterday] [with a handkerchief]

The constituents between brackets appear in this NP with the same form they have in sentence [43]. This shows, once again, that these constituents are independent from the head of the construction—be it a verb, as in [43], or a noun (*killing*), as in [50].

The above remark was expressed in a quasi-transformational manner, making use of the notion of "change" (of a structure into another). To adopt a more adequate language, we can state the same phenomenon in the following way: first, the valency of *kill* is different from that of the noun *killing*; the Agent of *kill* is the subject, whereas the Agent of *killing* is expressed as *by* NP; the Patient of *kill* is the object, and the Patient of *killing* is *of* NP. Second, Time and Location are expressed in the same way with both *kill* and *killing*. This shows that the Time and Location phrases are formally independent of the governing word of the

construction, be it a verb or a noun, whereas the coding of the Agent and the Patient depends on lexical properties of the governing constituent. In other words, Time and Location are syntactically autonomous, unlike Agent and Patient.

This criterion, to be sure, is only partial, since there are cases of constituents dependent of the governing word that have identical syntax in verbal and nominal constructions. For instance, in

[51] Carol stayed in Lisbon for most of the summer.

the constituent *in Lisbon* depends on the verb because it is obligatory. Yet in the nominal version,

[52] Carol's stay in Lisbon for most of the summer (was memorable).

the syntax of the Location constituent is the same: *in Lisbon*. That is, all we can say is that if the syntax differs in the two types of constructions, we have a dependent constituent (a "complement"), but if it is the same, we may have a dependent constituent or an autonomous one (an "adjunct").

This is what we can say for the moment, and still requires some research. In any case, we have here an additional criterion showing that there are indeed two types of constituents, distinguished by their mode of dependency on the construction head. This is in some sense similar to the traditional distinction between complements and adjuncts.

On the other hand, the dependency vs. autonomy distinction cannot be attached to syntactic configurations. One cannot say simply that the (functional) preposition *in* introduces complements, and the (predicating) preposition *against* introduces adjuncts—this kind of generalization fails in too many cases. For instance, we may argue that *em Amanda* '(in) Amanda' is a complement in

[53] O assaltante bateu em Amanda. 'the mugger beat Amanda' [lit. 'in Amanda']

since is role, Patient, depends on the valency of the verb *bater* 'beat'. But in

[54] Amanda casou com Paulo em Paris. 'Amanda married Paulo in Paris'

there is no reason to call *em Paris* 'in Paris' a complement, since its role comes from properties of the preposition (*em*, prototypically a Location marker), plus features of the context (the fact that *Paris* is the name of a place).

These are the observed facts; they represent the real evidence we have in order to ground our theoretical notions. Examination of the data shows that we cannot simply ascertain whether *com* 'with' is a predicating or a functional preposition. According to the usual analysis, functional prepositions introduce phrases whose semantic role depends on the verb ("complements"), and predicating prepositions assign their own semantic role. But here the semantic role depends not on the preposition or on the verb, but on the whole prepositional phrase, being the sum of the semantic potential of the preposition plus the potential of the NP; and yet the preposition is the same.

1.7.2.2 Are Adjuncts Optional?

One often finds the assertion that adjuncts differ from complements in that they are optional in occurrence. This criterion does not work, because, first, any syntactic function is in principle optional in Portuguese: we have sentences without a subject, object or any other syntactic function, even in nonanaphoric contexts. Even the verb may be absent, as in *bonito, o seu vestido* 'pretty, your dress', which functions as a complete sentence.[31] Second, it has already been observed that constituents traditionally analyzed as adjuncts may be obligatory, as in [32]

[55] Churches in Scandinavian countries are made of wood.
[56] * Churches in countries are made of wood.

Of course, it may be argued that this restriction is pragmatic in nature—[56] is unacceptable because it leaves a phrase, *in countries*, which in that context is too little informative, and is excluded by a pragmatic constraint such as Grice's (1975) maxim of quantity. But this is not pertinent for our point here, because we are looking for a concrete criterion to distinguish adjuncts from complements, and this criterion must be empirically testable. If we settle for "obligatory unless there are pragmatic reasons to the contrary", we are putting theory before observation; at some point we must deal with raw data—and here we are not speaking of analysis, but of evidence.

Goldberg and Ackerman (2001) argue convincingly that the presence or absence of the "adjunct"

> follow[s] from general conversational pragmatics; no grammatical stipulation is necessary. (Goldberg and Ackerman 2001, p. 798)

Among their examples they give

[57] * This house was built.
[58] This house was built last year.

We can note that [57] is acceptable in a special situation—say, if someone is in doubt whether the house was built or grew naturally in place like a tree. This illustrates the fact that the presence or absence of the constituent *last year* is governed by nongrammatical factors. I take examples like these as a decisive reason not to define the adjunct—which is, after all, a grammatical function—by optionality of occurrence.

[31] As an independent sentence, to be exact; verbless sentences cannot appear as subordinates: **ele disse que bonito, o seu vestido* 'he said that pretty, your dress'.

[32] These examples come from Bosque (1989), and are here translated into English for convenience.

1.7.2.3 Herbst and Schüller

Herbst and Schüller (2008) discuss the question of distinguishing adjuncts and complements, and come up with a set of criteria and tests, as for instance:

> For English, one test that could be applied is that adjuncts can sometimes be separated off in a clause of their own [. . .]
> (Herbst and Schüller 2008, p. 114)

This criterion has some problems. First of all, it must be understood conditionally: if a constituent can be so separated, it is an adjunct; but some adjuncts cannot be separated. More rigorously, some constituents can be separated, and we call these "adjuncts"; but we also call adjuncts other constituents that cannot be separated.

Another problem with this criterion is that it is based on a paraphrase test; to use Herbst and Schüller's example (p. 114), we have

[59] I bought this hat at Heathrow this morning.
[60] I bought this hat. This happened at Heathrow this morning.

which would show that *at Heathrow* and *this morning* are adjuncts.

I suspect the difference captured by this test is more semantic than syntactic; and, in the measure that it is syntactic, it has to do primarily with the valency of the verb *buy*, which prevents the object from being omitted in the first sentence, whereas *this morning* can be freely omitted, not being part of the diathesis. In any case, the test can be applied to some objects in some contexts:

[61] The tiger finally killed. This happened to an unfortunate deer.

Of course, we are not dealing with the object proper, but rather with the Patient of *kill*. In any case, the facts in [61] can probably be described in terms of the conditions under which *kill* can appear without an object. In other cases, the paraphrase does not work, and this happens exactly when the verb precludes omission of the object:

[62] * Mom finally made. This happened to those delicious cookies.

In [61] this dismemberment of the "original" sentence is made easier by the fact that the relevant diathesis of *buy* makes no mention of the terms that end up transferred to the second sentence (the time and location phrases). If so, we do have some kind of a criterion that indicates nonvalential elements, which can be called adjuncts; but it is not safe enough, as [62] shows, because not only adjuncts can be omitted.

Another test is the following:

> many types of adjunct show more positional mobility than other constituents of a clause [. . .]
> (Herbst and Schüller 2008, p. 19)

To take one of their examples (given on their page 114),

[63] It was a bit chaotic at the University last Wednesday.
[64] Last Wednesday, it was a bit chaotic at the University.

One problem is that the criterion is vague: referring to "many types of adjunct" leaves open the possibility of the existence of other types, which may not be so mobile. If so, when we find a fixed constituent, how are we to know whether it is a complement or one of the less mobile adjuncts? In English, we may compare the subject, which does not leave its position before the verb except in very restricted circumstances, with the direct object, which can be preposed (topicalized) quite freely. On the other hand, a traditional adjunct like *a lot* in

[65] She is working a lot.

is fixed in its position, whereas *frankly*, also an adjunct according to traditional analysis, is much more free:

[66] Frankly, she is rather rude.
[67] She is, frankly, rather rude.
[68] She is rather rude, frankly.

Herbst and Schüller propose yet another criterion to mark the distinction between adjuncts and complements, based on optionality:

> from a structural point of view, adjuncts are purely optional: it is not unusual for a clause not to contain an adjunct [. . .]
> (Herbst and Schüller 2008, p. 19)

But this criterion does not work properly, since it is also usual for a sentence not to contain complements—it depends on the valency of the verb.[33] The most obvious case is the object, as we have seen in sentences like

[48] Al is reading.
[49] Al is reading a long book.

Here we have exactly the situation described in Herbst and Schüller's criterion, and yet they consider the (direct) object a complement, not an adjunct. Such cases show that optionality is an inadequate criterion, since most constituents are optional: in Portuguese, even the subject may be omitted, and this not only in anaphoric context. I must conclude that the criterion of optionality does not help establish a distinction corresponding to the traditional dichotomy complement/adjunct.

[33] Actually, Herbst and Schüller do not make use of this criterion; it is only mentioned, and they eventually arrive at a much more adequate notion of adjunct.

1.7.2.4 Pereira *et al.*

In Pereira *et al*. (1993) we find an attempt to solve the question of complements vs. adjuncts for Portuguese. In the article, the authors come close to a correct formulation of the problem:

> The question we propose to examine is: is it correct to say that a sentence constituent is a complement or an adjunct because it is more or less integrated into the conceptual structure of the verb?
>
> (Pereira *et al*. 1993, p. 929)

Nevertheless, Pereira *et al*. come to a conclusion that seems to me to be mistaken, even in the light of the data cited in their article. They deny that the complement/adjunct distinction may be stated in semantic terms, but conclude rather that "the criterion that grounds [the distinction] is based on syntactic operations" [p. 942]. To the contrary, I believe this difference is basically semantic, although with observable syntactic effects—that is, I answer positively the question asked by Pereira *et al*. in the quote given above.

Pereira *et al*. keep mentioning the integration of the complement's meaning into the conceptual structure of the verb, without making it clear what exactly is this integration. For instance, they give some examples of sentences with terms they analyze as adjuncts, and state that

> The presence of this expression is totally independent of the conceptual structure of the verb.
>
> (Pereira *et al*. 1993, p. 930)

I tend to agree that this more or less great dependency of sentence terms is a fact, perceptible (although vaguely) to speakers. But, in the absence of a convenient explicitation of the factors that entail it, statements like the one above are little more than repetitions of the traditional insight that these cases are different in some way. I think these statements by Pereira *et al*. are on the good road, but they are no more than a first step.

Curiously, though, their conclusion is that the difference between complements and adjuncts is exclusively syntactic:

> We have shown that the distinction between adjuncts and complements is necessary, but the criterion is based on syntactic operations. It does not mirror semantic structure, for although direct complements are always lexically related to the semantic structure of the verb, prepositional constituents, which behave like adjuncts, show distinct degrees of integration with the semantic structure of the verb.
>
> (Pereira *et al*. 1993, p. 942)

The arguments offered by Pereira *et al*. in their article do not, to my mind, support this conclusion.

1.7.3 A Temporary Solution

Where do we arrive, after all these opinions (a very small sample of the general literature on the theme)? I will try to give an answer which, as usual in the present book, is conditioned by our immediate aims of describing verb valencies.

I propose that we take into account, as the basic criterion, the predictability of the distribution of semantic roles among constituents. But predictability cannot be reduced to a simple dichotomy. On one hand, we have a heterogeneous set of factors influencing predictability, including: the presence or absence of an element in the diathesis; the semantic potential of a particular word (e.g., an adverb); the semantic potential of a preposition; and the meaning of the NP that follows a preposition. On the other hand, predictability, as is typical with semantic factors, may be a matter of degree: a prepositional phrase introduced by *em* 'in' is much more likely to convey the semantic role Location than Content—although the latter is possible in cases like *pensei em você* 'I thought about you'.

That is, when I answer Pereira *et al*.'s (1993) question about the greater or lesser integration of a constituent into the semantics of the verb, I refer to the degree to which the verb's meaning determines the semantic role and/or the syntactic form of that constituent. This suggests that the notion of complement vs. adjunct as a dichotomy is insufficient to account for the facts; we now have several situations, not just two possibilities. Returning to our former example,

[43] Yesterday Jim killed a mosquito with a handkerchief.

what is relevant to us here is the distinction between, on one hand, constituents whose semantic role and syntactic form are determined by the relevant diathesis of *kill*—the subject *Jim* and the object *a mosquito*—and, on the other hand, constituents whose semantic role and syntactic form are due to other factors: in the case of *yesterday*, lexically determined properties of the item (formally an adverb, semantically "time"); in the case of *with a handkerchief*, the semantics of the preposition (Instrument or Company), plus the meaning of the NP, plus details of our world knowledge, which give Instrument as the most plausible reading (contrast with *Jim killed his wife with seven accomplices*, where we have Company).

Summarizing, we have so far the following situations as regards semantic roles: given a phrase in a sentence,

1. the semantic role is unpredictable from the form of the phrase, and depends on an idiosyncratic feature of the verb (expressed in a diathesis); or
2. the semantic role is totally transparent from the form of the phrase—say, from its preposition; or
3. a linking rule assigns the phrase a semantic role, in competition with one or more other linking rules which may assign a different semantic role to the same phrase. This often results in potential ambiguity, which in most cases is solved by factors such as the semantics of the phrase (*with a handkerchief* vs. *with seven accomplices*) and general contextual information.

There is still another situation, which may perhaps be subsumed under number 3 above, namely:

4. The semantic role is assigned by a linking rule sensitive to some key features of the semantics of the verb; e.g., "prepositional phrases introduced by *em* receive the semantic role Goal **when in the scope of a verb of motion**"; and "prepositional phrases introduced by *em* receive the semantic role Location **when *not* in the scope of a verb of motion**".

These formulations are provisional, because no systematic research has been done on the subject; this is particularly true of item 4, but the available data strongly suggests that this kind of linking rule exists (see some discussion in 8.2.4).

As we can see, the mechanism is complex, and is not reducible to a simple dichotomy (complement/adjunct). As far as the dichotomy functions, we could say that situation 1 describes a complement, and situations 2–4 describe adjuncts. But it is clear that the dichotomy leaves a lot to be expressed.

Another problem arises with the analysis in complements and adjuncts: in general one attaches these labels to syntactic functions, as when one says that the direct object is a complement, and so on. This masks an important phenomenon, which certainly is at work in the coupling of phrases with semantic roles: the role of the meaning of individual phrases. Thus, we saw above that a linking rule assigns Company or Instrument to a phrase introduced by *com*, or English *with*. But the ambiguity which we expect to arise (if we consider only the syntactic form and function) is almost always dissolved by lexical semantics: in example [43], *with a handkerchief* cannot be Company because of the meaning of *handkerchief*. This is crucial in the description of what really matters, namely the connection between form and semantic role, and yet cannot be captured in the traditional model. It means, in fact, that transparency is not a structural notion, but depends on lexical meaning, plus world knowledge. In many cases this results in more than one way of identifying the semantic role of a phrase, as in *Jim ate the pizza*, where the roles of the subject and object can be obtained by applying the diathesis, or by just using world knowledge relating to the possible Agent and Patient of EAT. Language users have these two alternative paths to follow, and we have no reason to doubt that they follow one or the other, depending of the conveniences of the moment.

The above considerations show that it is impossible to fully describe valential phenomena in structural terms, and to come to such statements as "objects are complements", or "phrases with the preposition *with* are adjuncts". We must then conclude that the dichotomy complement/adjunct, as far as the description of valencies is concerned, is to be abandoned.

The situation described above is represented in the VVP descriptive system in the following way: first, unpredictable cases are included in the diatheses, and each diathesis is defined as valid for a closed list of verbs. For instance, the subject in [43], *Jim*, is the Agent because one of the diatheses associated with the verb *kill* codes the Agent as the subject. This cannot be derived from the syntactic form of the constituent itself (an NP), or from its lexical composition (*Jim*, which can have other semantic roles than Agent). Cases not subject to the action of diatheses will

receive their semantic roles by devices such as linking rules, transparency, and so on. Finally, schematic filters apply to the result, excluding ill-formed readings—this explains why [43] does not have a reading with *Jim* as Experiencer, since the verb *kill* cannot evoke a schema containing an Experiencer variable.[34]

1.8 What Is a Sentence?

A sentence, according to the view here adopted, and as far as we consider the specific aims of valency description, is a morphosyntactic form that realizes a schema, plus the elaboration of several of its variables.[35] A sentence has as one of its tasks the elaboration of variables of a schema: the verb evokes the schema, and several other elements (also schemata) elaborate (or 'bind') the variables. For instance, the verb *eat* evokes the schema EAT. This schema contains, among others, the following variables:

a moment in time (since it denotes an event);
a manner;
an eater;
an eaten thing;
etc.

All of these elements are evoked by the use of the verb *eat*. Their presence is essential for the characterization of the schema: an event of eating which does not take place in time, or which does not involve an eaten thing, is inconceivable. And an event of eating cannot involve, say, an Experiencer, a Stimulus or a Content.

Not all of the variables have to be elaborated and coded as morphosyntactic units: this depends on the verb chosen, and also on other factors of a communicational nature, such as whether or not it is felt to be important to specify the manner of eating. When variables are elaborated, this is done by using syntactic elements, traditionally called complements and adjuncts,[36] plus some morphemes included in the verb (this is the case of time and aspect); the latter may be further elaborated by syntactic constituents. Thus, in the sentence

[69] I ate a cracker.

the morphology of the verb specifies that the event occurred in the past. This can be further elaborated in

[70] I ate a cracker yesterday morning.

[34] In Chap. 8 the Experiencer is defined as the "entity whose mental event or state is asserted".
[35] I use Rumelhart and Ortony's (1976) terms.
[36] But see the previous section.

1.9 Summary: On Stating Constructions

The notion of construction as used in this book is less informative than what can be found, say, in Goldberg (1995, 2006), as can be seen in the comparison given in Sect 1.1. In fact, Goldberg's statement is still very simple, and even more can be added, for instance features relating to information packaging[37] such as topic and commentary; focus and presupposition; marks of givenness and contrastiveness, etc. All this is, at least partially, coded formally in sentences, and can appear in the statement of constructions.

One could then ask, After all, what is the correct way to represent constructions? The answer must take into account the immediate purpose of the description, as briefly explained in Sect. 1.1. Here we are concerned with the description of verb valencies, and features like verb tense, topicalization and given/new marks are not relevant: they do not depend on valential properties of the verb (or other governing words). If we took all these features into account, we would have to repeat the same information over and over, for all verbs; or we would repeat, for each verb, information that can be provided by independent grammatical features. For instance, not all constituents of a sentence can be topicalized, but the choice has nothing to do with the valency of the verb, and depends instead on syntactic function: we can topicalize object NPs, but not verbs or negative particles. Therefore, including the possibility of topicalization in the valency of verbs would force us to repeat information necessarily present in other sections of the grammar. That is why we include in our constructions just those features that are dependent on verb valency. On the other hand, if we were to study topicalization as a grammatical process, of course we would distinguish constructions including topicalized constituents from those that lack this feature. And we might disregard, for this purpose, things like semantic roles, if we find that they are not relevant as a controlling factor of topicalization.

This principle is not usually made explicit, but it is obeyed in all descriptive work. To give a simple example, we must distinguish verbs as regular (*help, close, love*) and irregular (*be, write, read*), and this distinction is fundamental to describe their morphology. But it makes no sense to study separately the valency of regular vs. irregular verbs. Here again, we have descriptive aims conditioning the way we classify and analyze the facts of the language. We may eventually want to bring all this tremendous complexity under one general analysis, and certainly this is one of the aims of linguistic analysis. But we are still very far from the stage where a comprehensive theory can be built that subsumes all the partial analyses we are forced to work with into one great general panorama of the language. I, for one, cannot imagine what this panorama will look like; but of course we must strive to work towards the day when it will be made possible.

If I may be allowed a rough comparison, there was a time when physicists had a theory for the fall of bodies on Earth and another for the movement of the planets,

[37] To use Chafe's (1976) term.

and no connection was made between these two phenomena. It took Newton to show that they **are** connected, and in fact governed by the same laws. We linguists are (in my opinion) still waiting for our Newton. Meanwhile, we must do with several complementary ways to state constructions.

Chapter 2
Syntactic Functions

2.1 Simpler Syntax

In the notation here proposed, the formal face of a diathesis is expressed in terms of an ordered sequence of form-class symbols, such as, say, V, NP, AdjP etc. In many cases a preposition must be included, as *de* NP, *com* NP; and in at least one case a more abstract syntactic function is required, namely, the **subject**, or rather the **VSubj** (which is an NP, but not *any* NP).[1] Position in the sequence may also be understood as a concretely defined syntactic function: the first or the second NP in a sequence NP + NP, for example. And that is about all we need in order to express the diatheses syntactically.

The simplicity of the syntactic representation agrees with the Simpler Syntax principle, as stated by Culicover and Jackendoff:

> **Simpler Syntax Hypothesis (SSH)**
> The most explanatory syntactic theory is one that imputes the minimum structure necessary to mediate between phonology and meaning.
> (Culicover and Jackendoff 2005, p. 5)[2]

This is one of the guiding principles in the present work; it is fully discussed and supported in Culicover and Jackendoff's book, so that I only give here a sketchy idea of its importance for grammatical analysis.

The central idea behind the principle is that features of meaning, as well as phonetic ones, are independent of linguistic argumentation and theorization, and can be considered facts, whereas the syntactic component in a grammar is largely made up of hypotheses. For instance, suppose the ordering of two elements in a sentence may be analyzed in terms of arbitrary syntactic properties, or,

[1] See distinction between **VSubj** and **subject** in Sect. 1.3.3.

[2] As seen, Culicover and Jackendoff call it a **hypothesis**. I understand the SSH as a working hypothesis, not a testable hypothesis: a guiding **principle** of a methodological, nonempirical nature (something analogous to Occam's razor).

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alternatively, through semantic features of the items involved. We should prefer the latter solution because syntactic markers must be invented *ad hoc*, for the purposes of this specific analysis, whereas semantic features are an inevitable part of the speaker's knowledge of lexical items. As an example, let us take the ordering of head and modifier in the Portuguese NP.[3] Many modifiers can appear either before or after the head:

[1] Um lindo dia 'a beautiful day'
a beautiful day
[2] Um dia lindo 'id.'
a day beautiful

However, other modifiers can appear only after the head:

[3] Um carro americano
a car American 'an American car'
[4] * Um americano carro

One way to describe this is to keep to syntax, and mark some adjectives as occurring **before or after** the noun: we may call these Type A adjectives; an example is *lindo* 'beautiful'. And some other adjectives, like *americano* 'American', will be marked as Type B, and only occur **after** the noun. This adequately describes the facts as observed, but it forces us to create two categories, A and B, for which there is no independent evidence.

Now, we may also observe that adjectives that express **provenance** (national, local or regional origin) can only appear after the noun; there is no exception in the whole language. We may then state the rule by referring to adjectives of provenance vs. other adjectives, and the result for the adequacy of the description will be the same—but we no longer have to invent arbitrary classes, since the fact that *americano* 'American' denotes provenance and *lindo* 'beautiful' does not must be, in any case, part of the speaker's knowledge. When describing the conditions that govern the anteposition of adjectives, we get a free ride in this already necessary distinction. By thus reducing the syntactic (i.e., formal) component of the analysis, we are able to reduce the degree of abstraction of the analysis, making it better grounded on facts and less dependent on theory.

A final note: I am taking the term **syntax** in a traditional sense, and leaving aside an important component of the structure, namely fixed expressions, such as idioms and stems, which impose other restrictions on the role of syntax both in description and in the use of language. These elements (which, contrary to popular belief, are not marginal to the language) deserve a separate study.[4]

[3] The example is simplified for the exposition; a full discussion may be found in Perini *et al*. (1996).

[4] For stems, see Pawley and Syder (1983); for a very comprehensive discussion and description of idioms in Portuguese, see Fulgêncio (2008).

2.2 Rethinking Syntactic Functions

Any linguistic description requires syntactic functions of some kind. At the very least, the ordering of terms in the sentence must be stated, and is sometimes crucial for interpretation, as in

[5] The dog bit Pat.
[6] Pat bit the dog.

where semantic roles are assigned by reference of what is, after all, word order.

But syntactic functions are often understood as more abstract relations between the verb and its complements; for instance, *as caixas* 'the boxes' is the subject in both sentences below:

[7] As caixas chegaram.
the boxes have arrived
[8] Chegaram as caixas.
have arrived the boxes 'id'

Here order is irrelevant as a defining factor of the syntactic function; there is, rather, an abstract relation of some sort between the phrase *as caixas* 'the boxes' and the verb, and this relation is the same in both sentences. Such cases must be discussed because, like all abstractions, it is necessary to show that they are necessary for the description. As said above, I suspect that only one abstract function is needed in the statement of diatheses, namely the subject; in this chapter I try to support this claim.

The first thing to do, though, is to ask why we use syntactic functions at all. In Portuguese, the motivation for the subject function comes from the need to describe the following phenomena:

(a) verbal agreement;
(b) the distribution of clitics like *me* 'me', as opposed to *eu* 'I'; and
(c) the assignment of semantic roles to the NPs in the sentence.

If we can account for these phenomena without positing abstract functions relating the verb to its complements, the Simpler Syntax hypothesis advises us to do so. That is, syntactic functions, in themselves, are not useful; we use them, if necessary, in order to describe observable phenomena like the above, which do have grammatical relevance. I will proceed, then, to examine the main traditionally accepted syntactic functions with a view to ascertaining their eventual importance for grammatical description.

2.3 Agreement[5]

One of the reasons for distinguishing the functions **subject** and **(direct) object** is that the subject participates in an agreement relation with the verb. One way to state this relation is the following: **One of the semantic roles in the sentence may be elaborated by an NP present in the sentence and, redundantly, by the person-number suffix of the verb**. This can be seen in

[9] Antônio chamou as meninas.
Antônio called the girls

where *Antônio* is in a position such that it is assigned the semantic role Agent; and the suffix–*ou* in the verb indicates, redundantly, that the Agent—the semantic role corresponding to the subject of *chamar*—must be third person, singular. Redundancy, in this case, is partial, because the NP *Antônio* elaborates the schematic information provided by the suffix. In other cases, redundancy is total, as in

[10] Eu chamei as meninas.
I called the girls

where both the subject and the suffix identify the Agent, unambiguously, as 'I'.

As will be seen below, some traditional syntactic functions are superfluous for the formulation of valencies. For instance, there is no need to distinguish a direct object from a predicative; or an indirect object from an adverbial complement. But in the case of the subject we cannot do that—that is, the subject is not just any NP in the sentence, and it is differentially treated by the rules that promote the coding of semantic roles into complements. Also, postposed subjects are common in Portuguese, and in certain cases are even preferred, as in

[11] De repente pulou um menino no meu colo.
suddenly jumped a boy on my lap 'suddenly a boy jumped on my lap'
[12] Aí chegaram elas.
then arrived they 'then they [fem.] arrived'

This requires the formulation of rules allowing the language user to identify the subject of a sentence, even when agreement is not evident. The reason is that the speakers have no difficulty in finding the correct role of the subject of each sentence, which shows that there are formal resources for the identification of the subject, a preliminary step in the identification of semantic roles. These formal resources will be seen below (Sect. 2.4).

The assertion that the person-number suffix is one of the elements responsible for 'I' (that is, the speaker) being understood as the Agent in [10] may raise some

[5] The account of agreement presented here is found in a more developed form in Perini (2008). A similar analysis was previously proposed by Lapointe (1980) for Slavic languages, and by Reid (1991) for English.

eyebrows. Yet, it is based on good descriptive reasons. Some linguists seem to be used to the idea that semantic roles are the exclusive property of syntactic elements, but a moment's reflection will show that it is not always so. First, let us remember that we are concerned here with observable facts, described at the most concrete level. In the case of [10], we have the fact that anyone can identify 'I' as the Agent of *chamar* 'call'. They must have a basis for this perception. In [10], this can be the presence of the subject, the pronoun *eu* 'I'; but in

[13] Chamei as meninas. 'I called the girls'
called [1st sg] the girls

the pronoun is not present, and yet the meaning of the sentence is the same.

If we are to describe the relation between sound and meaning, we have to find the element that provides the information that I am the Agent in [13]. An abstract subject will not do, because the hearer cannot detect it; even if such an abstract constituent is found to be necessary to the analysis (which I personally doubt), we still need an explanation for why the language user identifies it with 'I' and not, say, 'you' or 'my sister Angela'. The answer is immediate: hearers rely on the verb ending, which unambiguously informs them that the Agent is to be identified as 'I'.

This analysis, besides being the most concrete one, has the advantage of directly representing the fact that [10] is redundant in what respects the identification of the Agent, since it provides two elements pointing to the same individual: the subject, *eu* 'I', and the verb ending–*ei*; whereas [13] is not redundant in the same way. And it has the added advantage of avoiding the need for abstract syntactic elements, which would have to be generated, then eventually deleted, thus making syntax more complex than necessary.[6]

2.4 Finding the Subject

The NP that shares its semantic role with the person-number suffix is what we call the **subject**. But of course we cannot base the definition of subject on this: it is only one of the properties subjects have. The relevant question here is: How does the receptor, faced with a mere word chain,[7] find out which constituent of the sentence is the one that relates to the person-number suffix in the way shown in the previous section?

In a sentence like

[14] Antônio chamou a menina.
Antônio called the girl

[6] I have argued at some length for this analysis elsewhere (Perini 1995, p. 366 ff).

[7] In fact the receptor is faced with a *phonetic* chain, not yet segmented into words; but let us skip some steps in the process in order to simplify the exposition.

where both NPs are third person, singular, the basis for the identification of the subject is certainly word order: the subject is the NP that appears immediately before the verb. If we switch the two NPs (in Portuguese as in English), the semantic roles get switched as well.

This simple rule, however, does not work for all cases. The suffix can replicate the semantic role of NPs in other positions (this is far more common in Portuguese than in English); for instance,

[11] De repente pulou um menino no meu colo.
suddenly jumped a boy on my lap 'suddenly a boy jumped on my lap'

The examination of several cases yields the following rule:

[15] **Subject identification rule**
Preliminary condition: the subject is an NP compatible in person and number with the person-number suffix of the verb.

(i) **If the sentence contains only one NP that satisfies the condition, this NP is the subject.**
(ii) **If the sentence contains more than one NP, the subject is the NP that most immediately precedes the verb.**
(iii) **If the sentence contains a clitic pronoun (*me, te, nos, se*) the subject is the NP immediately preceding the clitic; that is, clitics do not count for the application of sub-rule (ii).**[8]

This rule is not complete: for one thing, it does not cover cases of subjectless sentences in the third person, where the semantic role that would be assigned to the subject has schematic reference, as in

[16] Roubaram o meu carro.
stole [3rd pl] my car 'someone stole my car/my car was stolen'

Furthermore, there is a construction where the subject is the second NP of two, which occurs with the verb *ser* 'be' in sentences like

[17] Isso são mentiras.
this are lies 'these are lies'

Here the subject is *mentiras* 'lies', and is identified regularly, since only this NP is morphologically compatible with the verb form *são* 'are'. However, what we have here is a nonsubject NP immediately preceding the verb, a situation which does not contradict the rule (because of the agreement condition), but is

[8] The clitic pronouns current in the spoken language are: *me* 'me', *te* 'you' (object), *nos* 'us', and *se*, which is the third person reflexive. Some dialects also have *lhe*, often used as an alternate form of *te*.

exceptional. In any case, this construction falls under the Subject Identification Rule, although it still requires some study.[9]

The subject identification rule given in [15] allows the receptor to relate one of the NPs in the sentence with the semantic role indicated by the person-number suffix; in other words, to find the subject. [15] is stated in purely formal terms, as must be done, since all the receptor has to start with is the formal sequence.[10] I am making a few assumptions, but they seem plausible: in particular, the language user must have ways to identify NPs and tell them apart from other classes of units. Language users can do this by reference to phrase structure rules of the traditional form.

As for the distribution of clitics like *me* 'me', as opposed to *eu* 'I', we observe that so-called accusative pronouns are never subjects, that is, they never replicate the semantic role already expressed by the person-number suffix of the verb. This can be accounted for in the traditional way, by marking accusative forms as not being allowed to be subject of simple sentences.[11]

Rule [15] covers the vast majority of cases. For instance, with the exception of the construction exemplified in [17], a (nonclitic) NP immediately preceding the verb is always the subject, without exception.[12] The rule allows for postposed subjects, as we saw in

[11] De repente pulou um menino no meu colo.
suddenly jumped a boy on my lap 'suddenly a boy jumped on my lap'

[12] Aí chegaram elas.
then arrived they 'then they [fem.] arrived'

Rigorously speaking, the postposed subject has a different syntactic function, because ordering of terms is a syntactic feature. But I keep calling it "subject" because my analysis focuses on certain properties of this term, with a view to describing the assignment of semantic roles; that is, a postposed subject is also compatible with the verb's person-number suffix, and it ultimately receives the same semantic role as if it were preposed. Functions like "subject" and "object" are defined by bunches of features, and the immediate aims of the analysis determines

[9] It is restricted to sentences containing the verb *ser* 'be' with certain pronouns, like *isso* 'this' and *tudo* 'everything', interrogatives: *o que* 'what', and quantifiers: *um pouco* 'a little', *muito* 'a lot'. In more informal language, the phenomenon does not occur: *isso é mentira* 'these are lies'.

[10] I am referring to the task of the receptor; the speaker has a different task, of course, but it is based on the same body of knowledge, which includes [15]. For our discussion, it is not necessary to make the distinction.

[11] In compound sentences there are complications, which cannot be discussed here; in particular, the accusative with infinitive ("small clause") construction may call for a special rule.

[12] Other forms, not NPs, can occur between the two, like certain adverbs and the negative particle *não*. In the written language, especially in ancient texts, one finds inverted sentences with two NPs where the second, postverbal NP is the subject; this does not occur in the spoken language, and is very exceptional in modern written texts (one example is given in Perini (2008), and comes from Varnhagen 1854).

which of these features are to be taken into account: in particular, subject-verb order is not taken to be significant for valency description. What really interests us here is how the language user identifies the NP that must have the same semantic role as the one indicated, schematically, by the person-number suffix on the verb; this is the function of the Subject Identification Rule.

This will raise no problem if we could say that any subject can be postposed—then, subject position would have no relevance for the definition of valencies, and all verbs will be identical in this respect. This is not true (not all subjects can be postposed), but the same conclusion will be adequate if we can show that subject postposition depends on grammatical factors, since here again the identity of the verb will not count. There are indications that this is the case in most examples: in particular, no postposition is possible if the sentence contains more than one NP. But this is not the whole story, as already seen by some researchers (cf. Silva 2001). In a previous work (Perini 1989) I distinguished verbs into "postpositive" and "nonpostpositive"—which, in our present terms, would mean that the possibility of subject postposition must be part of the valency of each verb. However, further examination of the details have led me to doubt this analysis, and as things stand all I can say is that there is something here to be researched, and that no satisfactory solution was proposed, to my knowledge. I then adopt the (provisional) position that subject position does not count for valency purposes, pending further examination of the question.

2.5 Other NPs in the Sentence

We have just seen that one of the NPs in the sentence has a special syntactic function, that of subject. But other NPs may occur in a sentence, and these are traditionally analyzed as **direct objects**, **predicatives**, and **appositives**. For example, we have

[5] The dog bit Pat. [direct object]
[18] Alice is the director of the school. [predicative]
[19] Jones was fired again, the poor guy. [appositive]
[20] Jane, the first student in her class, has no time for games. [appositive]

All of these terms can be characterized by not being subjects; the problem is whether we should add to this a differentiation between these nonsubject NPs, based on syntactic features—that is, assign each of them a different syntactic function. My answer is negative, and I will claim that NPs can have only two syntactic functions, subject and nonsubject (which we can informally call **object**).[13]

[13] This is not usual, but is apparently not unheard of. Anderson (1984) mentions a tradition that "accords the term [direct object] to almost any non-subject argument of a predicate" [p. 33], but does not give the source of this tradition.

Let us begin with the direct object. Linguists have had great difficulty in defining this function, which is far from being as clearly marked as the subject.[14] Some definitions are not syntactic, being based on what are in effect semantic roles. For example, in the context of characterizing the object as against the predicative, Huddleston says that

> In [*Ed shot Kim's lover*] [. . .] *Kim's lover* serves to pick out some person who is assigned a certain role in the event expressed by the clause, the role of 'patient' or 'affected participant', but in [*Ed became Kim's lover*] it denotes a property that Ed came to have [. . .]
> (Huddleston 1984, p. 181)

One of the differences pointed out by Huddleston between the object and the predicative is, as seen, their different semantic roles. In our system, we do not need syntactic functions to make this difference, which is directly marked in the respective diatheses. Huddleston's example *Ed shot Kim's lover* represents the diathesis

[21] VSubj > *Agent* V NP > *Patient*

whereas in *Ed was Kim's lover* we have rather

[22] VSubj > *αRef* V NP > *αRef*

that is, the subject and the nonsubject NP are to be understood as coreferent.[15] The semantic roles are not the same as in [21], and they are to be assigned to the same syntactic elements, which is enough to make the point here. We may observe also that defining the object in terms of its semantic role is not an easy task, because it is not always a Patient, as intimated by Huddleston—e.g. verbs like *love*, *feel*, *reach* (*they reached the mountain*), *catch* (*he caught a flu*), *have*, etc.

Turning to syntactic features, it is often claimed that the object is replaceable by pronouns in the accusative form (English *him, her, me, us*, Portuguese *o, a, me, nos*), whereas the subject and the predicative take the nominative form (English *he, she, I, we*, Portuguese *ele, ela, eu, nós*).[16] In Portuguese, this "case" opposition works satisfactorily to help distinguish the object from the subject—which is not the issue here, since we have already defined this distinction—but not to distinguish the object from the predicative. The crucial case would be pairs of sentences of the form **VSubj V NP**, where the nonsubject NP is an object in one of them, and a predicative in the other. We observe that in the case of the object the pronoun is indeed an accusative, as we see in

[23] A Corina me chamou.
Corina me called 'Corina called me'

[14] See, for instance, the articles collected in Plank (1984), which offer several definitions, none of them successful.

[15] I have substituted *was* for *became* to avoid certain details of the semantics of *become* which are not relevant for the discussion. The semantic role **αRef** marks assertions of coreference between (the referents of) two constituents. This semantic role occurs necessarily in pairs (see Sect. 10.1).

[16] This argument seems to be a literal transfer from the grammar of Latin, where in fact predicatives occur in the nominative, objects in the accusative.

But when we try to substitute a predicative—by changing the verb to, say, *ser* 'be'—the verb necessarily agrees with the pronoun, which makes it the subject:

[24] * A Corina é eu.
Corina is I
[25] A Corina sou eu
Corina am I 'I am Corina'

Granted that this is a strange phenomenon, the fact is that it prevents the test we are trying to apply. And since no other lexical items vary in case as personal pronouns do, this putative syntactic difference between objects and predicatives cannot be checked in Portuguese. There is certainly something to be investigated here: perhaps a descriptive survey of the semantic potential of pronouns may show differences between nominative, accusative and dative (the dative is represented in standard written Portuguese by *lhe* 'to him/her'), responsible for any difference in the distribution of these items. For the moment being, however, there is no reason to syntactically distinguish objects from predicatives: they are all nonsubject NPs.[17]

As for appositives, they are simply NPs that can bear some specified semantic roles, like Quality or αRef:

> [...] for units to be *appositives*, *ie* in apposition, they must normally be identical in reference or else the reference of one must be included in the reference of the other.
> (Quirk *et al*. 1972, p. 620)

Whenever an NP with this potential—usually marked by commas in writing—is added to a sentence, it must "find" its pair and semantically relate them. For instance, in

[26] Jones was fired again, the poor guy.

the NP *the poor guy* is assigned the semantic role Quality, and its Qualified.thing[18] is *Jones*, as the only available candidate. If we have two candidate NPs, as in

[27] Jones fired Smith, the poor guy.

the sentence will be ambiguous as far as its grammatical structure is concerned. Of course, we favor *Smith* as the Qualified.thing in [27] for pragmatic reasons—compare the change in effect if we substitute *the bastard* for *the poor guy*. These cases fall under the pairing of semantic roles studied in Chap. 10, where the analysis of so-called predicatives is more fully discussed. Appositives, however they may be defined, are of no particular interest to us, since they do not participate in verb

[17] A qualification is in order here: the traditional analysis may give correct results in some (slightly strange) sentences like *eu sou eu* 'I am myself', where we have two nominatives instead of a nominative and an accusative as in *ele me viu* 'he saw me'. We may have here a last trace of a syntactic distinction between object and predicative in the language.

[18] These qualifications are possibly accumulated with αRef. "Thing" is a technical term, and includes persons and animals as well. For a very elaborate definition, see Langacker (1987a, Chap. 5).

valency, being what is traditionally called adjuncts. Consequently, the statement of the diatheses never mentions appositives.

The conclusion so far must be, then, that there is no reason to distinguish nonsubject NPs in the sentence by different syntactic functions. One syntactic factor remains, viz. the order in which these NPs occur, and it may be relevant in some cases; this point has not been researched and must be disregarded for the moment. In any case, the difference between "(direct) object", "predicative" and "appositive" NPs has no place in the description, and is not taken into account here. Syntactically, they are all (nonsubject) NPs, period.

2.6 Adverbials and Prepositional Phrases

2.6.1 Adverbial Constituents

Let us now consider prepositional phrases. In the sentence

[28] My sister is in Madrid.

the phrase *in Madrid* is, formally, composed of a preposition, *in*, plus an NP; and semantically it is the Location. Traditional analysis labels it as an **adverbial complement**, presumably because the same semantic role can be conveyed by an adverb like *here*. But defining the diathesis does not call for this syntactic function either; the syntax of the diathesis can be just

VSubj V *in* NP

or

VSubj V Adv

as the case may be. Or, even better, we may use the 'X' convention introduced in Sect. 1.6.2,

VSubj V X

The semantic component will specify X as the Location, and its syntactic form is free, provided the semantic role is respected; that is,

VSubj > *Located.thing* V X > *Location*

Note that 'X' does *not* stand for an empty constituent; rather, it means that there is an overt constituent there, but its syntactic form is free. What may prevent the occurrence of a phrase in the place marked by X is its semantic potential—specifically, not being able to express Location. This formula describes the syntactic aspect of the constituent, and any eventual syntactic property of such phrases—for instance, their greater mobility as compared with NPs—can be equally described as an effect of their greater transparency and semantic independence

form the verb. What is important to us is that syntactic functions such as **adverbial complement** or **adverbial adjunct** are not needed for purposes of valency description.

We can, then, dispense with some syntactic functions, namely the predicative, the adverbial adjunct, and the adverbial complement. The latter are usually subdivided into adverbial adjunct of time, location, cause, etc., and these designations of course refer to semantic role and not to syntactic function. This is also adequately taken care of in the present notational system.

2.6.2 Indirect Object

There is another function which is usually performed by a prepositional phrase, namely the **indirect object**, found for instance in

[29] I gave the ring to Beth.

The indirect object is defined in a most incoherent fashion in traditional Portuguese grammar, so as to include (some) prepositional phrases, with (some) semantic roles, not very systematically. To give just an example, *de Beth* in [30] is analyzed as an indirect object, presumably because of the presence of the preposition, but the semantic role is Stimulus, exactly as in [31], where the NP *Beth* is a *direct* object:

[30] Ele gosta de Beth.
he likes of Beth 'he likes Beth'
[31] Ele detesta Beth.
he hates Beth

But the same preposition, *de*, can appear in cases where the function is not "indirect object", but "adverbial adjunct", as in

[32] Ele fugiu de Beth.
he ran away from Beth

and Stimulus can be expressed by other functions, as in

[33] O aspecto dele me assustou. 'his aspect frightened me'

where the subject is Stimulus, or in

[34] Eu te amo. 'I love you'

where the Stimulus is the object.

The only way out of this situation would be to define the indirect object (for these cases only!) as the complement with the preposition *de* **and** the role of Stimulus. But what definition is this? It looks rather like an attempt to save traditional analysis at all costs.

Things are not much better in English grammar, where the indirect object can have a preposition or not, provided it has the semantic role Recipient, as in Huddleston's examples[19]

[35] Ed gave Liz the key.
[36] Ed gave the key to Liz.

In both cases the underlined phrase is analyzed as an indirect object, which shows that the preposition is not a defining criterion. The criterion is apparently the semantic role, as suggested by the following remark:

> There is only one exception to the rule that the indirect object has the role of 'recipient': this is when *give* (or sometimes related verbs like *pay, owe*) has an 'effected' object as direct object and an 'affected' object as indirect object:
>
> I gave the door three kicks [. . .]
> I owe you a treat [. . .]
> (Quirk *et al*. 1972, pp. 356–357)

We cannot go into all the intricacies of the traditional position on this matter; but if these examples are typical, there is a much simpler way to account for the facts listed. We can represent the syntactic structure (whichever it may be) directly in the diathesis, mentioning the individual preposition, if any; and mark the semantic role (whichever it may be) also directly. Thus Huddleston's examples represent the following diatheses[20]:

[37] VSubj > *Agent* + *Source* V NP > *Recipient* NP > *Theme*
[38] VSubj > *Agent* + *Source* V NP > *Theme* *to* NP > *Recipient*

[35] realizes [37], and [36] realizes [38].

For the Portuguese sentences mentioned before, we have the following analyses: [30] realizes [39], [30] realizes [40], and [32] realizes [41]:

[30] Ele gosta de Beth.
he likes of Beth 'he likes Beth'
[39] VSubj > *Experiencer* V *de* NP > *Stimulus*
[31] Ele detesta Beth.
he hates Beth
[40] VSubj > *Experiencer* V NP > *Stimulus*
[32] Ele fugiu de Beth.
he ran away from Beth
[41] VSubj > *Agent* + *Theme* V *de* NP > *Source*

If we adopt this notation, all the important facts and relations pointed out as characterizing the indirect object will be represented, without the need to posit a separate syntactic function.

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[19] Huddleston (1984, p. 196); I have renumbered the examples.

[20] In these formulas I have "piled up" some semantic roles, like Agent + Source in [37] and [38]. This aspect of the notation will be justified later on (Sect. 10.3).

It has also been suggested that any constituent replaceable by the clitic pronoun *lhe(s)* be analyzed as indirect object. This is no solution, for several reasons. The first is the following: *lhe(s)* can replace a Recipient in the sentence

[42] Eu dei um anel para Beth.
I gave a ring to Beth

which, if we put a personal pronoun in the place of *para Beth*, will yield[21]

[43] Eu lhe dei um anel.
I to her gave a ring 'I gave her a ring'

But in

[30] Ele gosta de Beth.
he likes of Beth 'he likes Beth'

de Beth cannot be replaced by *lhe(s)*—all registers require *dela* '(of) her'; and yet this would be an indirect object by traditional analysis.

I am confident that the distribution of *lhe(s)*, in the varieties in which it occurs, can be accounted for in other ways. In particular, *lhe(s)* in the written language seems to be restricted to a few semantic roles, as Addressee and Recipient.[22] In the spoken language, *lhe* (singular only), when it occurs, is an alternative to *te* 'you', as in

[44] A queda lhe machucou?
the fall you hurt 'did the fall hurt you?'[23]

My main objection against the analysis based on *lhe* is the use of substitutions and paraphrases as a defining criterion. This resource is impossible to carry out while keeping a strict separation between form and meaning, which makes the resulting function neither syntactic nor semantic, and thus useless as a starting point for syntactic or semantic analysis. Establishing a connection between the occurrence of *lhe* and other syntactic or semantic phenomena can be a goal of the analysis, but cannot be a departure point in the search for symbolic connections, which is the chief aim of grammatical analysis.[24]

In any case, there is no real need for the indirect object as a separate syntactic function. All known cases can be analyzed simply as constituents made of a preposition plus an NP, or a clitic personal pronoun, with its respective semantic role.

[21] In written Portuguese; the spoken language has all but discarded *lhe(s)*.

[22] Also Possessor, in sentences like *a queda lhe quebrou o braço* 'the fall broke his arm'.

[23] This use of *lhe* is geographically restricted; in Minas Gerais it does not occur.

[24] Blanche-Benveniste *et al*. (1984) propose a pronominal approach to the identification of syntactic functions, which is open to the same objection; see Appendix E.

2.7 Summary: Syntactic Functions in the Sentence

For descriptive purposes, then, a sentence is to be analyzed syntactically in a comparatively simple way. It is composed of an ordered sequence of form-class symbols, namely, **NP**, **V**, **AdjP**, **AdvP**, and **preposition + NP**, with prepositions specified individually.[25] Some other categories may be necessary for special cases; for instance, we may need a **QP** (quantifier phrase) in sentences like *the child grew more than 10 cm*.[26]

Besides this, we need one syntactic function, the **subject**. This is necessary because the morphosyntactic coding of semantic role takes this function into account: the subject elaborates the same semantic role as the person-number suffix of the verb. The subject can be defined positionally, but not in terms of only one position: postposed subjects are common, although, in spoken Brazilian Portuguese at least, in restricted conditions (see Sect. 2.4). No other syntactic functions seem to be needed, except possibly the ordering of terms, which is already represented in the notation.

This results in a list of syntactic structures, minimally represented, which are to be related to a set of semantic roles, each associated with a constituent. A syntactic representation plus the semantic roles is what I call a **construction**[27]; and some of these constructions subclassify the verbs, and are called **diatheses**. Each verb occurs in a particular set of diatheses, and this set is its **valency**.

As already seen in Sect. 1.4, relations between structures are not represented, although they are certainly relevant for other purposes. This means that the notation makes no use of the notion of **alternation**, found in Levin (1993) and elsewhere in the literature: here, each diathesis stands for itself, true to our descriptive aims. But no objection is made in principle against the eventual statement of relations between diatheses. In particular, it will be necessary to establish implicational relations of the form "if a verb occurs in diathesis A, it always/prototypically occurs in diathesis B". Such implications are not considered in this book, which is concerned solely with the first step in the description of the grammatical behavior of verbs.

The end result of the project, then, is a list of verbs and valencies (a valency dictionary). Each diathesis, when stated in full, looks like the following:

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[25] We can safely ignore some elements such as auxiliaries (*do, will, be. . .ing* etc.), negatives (*not*) and interrogative markers (intonational). These are to be added to the list of possible constituents of the sentence, along with so-called adjuncts, but they do not participate in the valency, for reasons given in Sect. 1.2.

[26] "Quantifier" is just a mnemonic designation, of course; this class, if used, is to be defined formally, not by its quantifying meaning. In any case, I suspect that no such syntactic form is necessary. We may simply specify 'X', and selection will be taken care of by semantic factors—that is, we need a constituent, of any form, with Quantification as part of its semantic potential.

[27] As previously said, this is an impoverished notion of construction, useful for the description of verb valencies.

[45] VSubj > *Agent* V NP > *Patient*

which, as we know, may be realized as

[46] O cachorro mordeu o Fred.
the dog bit Fred

This is still a redundant notation, because the association of the subject with the semantic role Agent is, very probably, the result of a linking rule which applies to a subclass of verbs. In this case, the specification of the semantic role Agent in [45] may be omitted, which triggers a mechanism that fills it in with the semantic role determined by the linking rule. In cases where the subject is not the Agent, the semantic role will be specified in the diathesis, and this specification is considered an idiosyncrasy of the verb of the sentence. These factors will be discussed in Chaps. 8–12. For the moment being, we keep to the full notation as instanced in [45].

Chapter 3
Semantic Roles in Grammatical Description

3.1 Semantic Roles and Sentence Constituents

The notion of **semantic role**, or analogous ones, is generally admitted to be essential to grammatical description, but its precise definition varies somewhat (as does the name: semantic role, thematic role, theta-role, frame element...). Therefore, I begin this chapter with a short introduction, aimed chiefly at distinguishing the notion used here from related notions current in the literature.

A semantic role, as used here, expresses the semantic relation between the main constituents of a sentence and its verb.[1] Thus, in a sentence we may have an Agent, a Patient, an Instrument, a Location, and so on. The form of the complement bearing each of these roles is not relevant to its definition: we are speaking of perceived meaning relations, which belong to the semantic space. For example, the Patient may be expressed by an NP or by a prepositional phrase, as in

[1] O cara espancou o cachorro. 'the guy spanked the dog'
NP

[2] O cara bateu no cachorro. 'id.'[2]
PrepP: *em*+NP

In spite of the syntactic difference, the semantic relation between the underlined phrase and the verb is exactly the same in the two sentences[3]; we name this kind of relation **semantic role**. The relation cannot be defined according to the form of the syntactic element, like saying that "only NPs can have semantic roles", because this

[1] Or other governing words, as is well known. Here I limit the exposition to examples with a governing verb. In fact, the relation is with the cognitive "mental landscape" evoked by the sentence, but for our purposes it is adequate to speak of relation with the verb.

[2] *No* is the agglutination of the preposition *em* + the article *o*.

[3] They are basically synonymous; the difference in meaning is only that *espancar* seems to involve more violence than *bater* (cf. English *hit* vs. *spank*).

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amounts to defining semantic roles in partially syntactic terms, and defeats the main objective of grammatical analysis, that is, making explicit the relation between form and meaning.

By the same token, the difference between complements and adjuncts (however it is to be established) is not taken into account for purposes of identifying the semantic role. For instance, suppose we analyze *em Belém* as a complement in [3], and as an adjunct in [4]:

[3] Gomes morou em Belém. 'Gomes lived in Belém'

[4] Gomes morreu em Belém. 'Gomes died in Belém'

The semantic role is Location in both cases, since the relation perceived between the locative phrase and the verb is the same. The fact that, for many linguists, one example is a complement and the other an adjunct is irrelevant.

Finally, we shall speak of the semantic role of prepositional phrases, like *por causa de você* 'because of you'—this phrase has always the role Cause. This is not to deny that the determining element is the semantics of the preposition *por causa de* 'because of'. We speak of the semantic role of the whole phrase because we are positioning ourselves at the sentence level: we are concerned with the relations between the verb and its accompanying phrases, not with the relation between the preposition and its accompanying NP. Describing the semantic potential of *por causa de você* 'because of you' in terms of the role Cause assigned to *você* 'you' by the preposition strikes me as an unnecessary detour, and I prefer the more direct assertion that *por causa de você* 'because of you' is a phrase with the semantic role Cause. Intraphrasal relations are, of course, also worthy of attention, but they are not studied here.

This notion of semantic role is not an innovation. Although not always explicitly admitted, it is essentially what is found in the basis of valency dictionary and databases. It corresponds to FrameNet's **frame elements**: for instance, the ROBBERY frame is analyzed as including the frame element Place (here, Location), often expressed by a prepositional phrase, as in their example *they robbed a bank in North Berkeley*. Here we have a peripheral element, expressed by a phrase which would be traditionally analyzed as an adjunct; yet it bears a Place relation with the verb. The ADESSE system also admits semantic roles attached to prepositional phrases and expressed by adjuncts: the verb *llegar* 'arrive' is analyzed as including among its arguments Finalidad 'purpose', normally conveyed by a phrase introduced by the preposition *para* 'in order to': *hemos llegado a Madrid para hacer las paces* [...] 'we arrived to Madrid in order to make peace'. None of these systems has any compunction about assigning semantic roles to prepositional phrases and/or adjuncts.

This being understood, we can proceed to examine the relevance of these semantic relations within the sentence. A clause is composed of a sequence of constituents of different types, which structure themselves in different ways. Some constituent types include direct reference to things, states and events of the real world (*the cat*, *linguistics*, *the city of London*, *is too fat*, *ate the pizza*), as opposed to

constituents with structural meaning (*in, which, not, as against*). This opposition is traditionally recognized under labels such as **lexical** vs. **grammatical** items[4]:

> The meaning of a sentence depends in part on the meanings of the lexical items it contains, in part on the way they are put together grammatically: on this basis we can distinguish between **lexical semantics** and **grammatical semantics**.
> (Huddleston 1984, p. 35)

Lexical items are vehicles of lexical semantics, while grammatical items (articles, prepositions, negation particle, etc.) are among the vehicles of grammatical semantics.[5] Lexical items are usually associated with open classes, grammatical items with closed classes.

This opposition, as has been often observed (see again Huddleston 1984, pp. 35–36), represents a simplified view of the facts; but it contains more than a little truth, and accordingly refuses to go away entirely. In particular, many phrases with a lexical head express semantic roles, whereas grammatical items have nothing similar in their semantics.

For example, in the sentence

[5] The cat did not eat the fish.

we have a semantic role for *the cat* (Agent) and for *the fish* (Patient). These semantic roles identify the participants of the scene denoted by the sentence, which in its turn depends on the schema evoked by the verb *eat*, that is, EAT. This schema includes two core participants, the entity that eats and the entity that is eaten.[6] These are the **variables** of the schema,[7] and are labeled by their semantic roles: one variable is labeled Agent and the other Patient. The variables are bound by other schemata, on the basis of information provided initially by lexical items present in the sentence: the Agent is the CAT, the Patient is the FISH. On the other hand, a word like *not* does not denote a participant in the scene, and has a very different semantic function. A sentence can then be (partially) analyzed as a sequence of phrases, some of which associate with semantic roles: this is the way contrived by the language to describe events and states. An immediate problem is how language users relate phrases and semantic roles during message production or reception, and which types of knowledge allow them to perform this task.

[4] Or **notional** vs. **relational** items, or, in an older terminology, **semantemes** vs. **morphemes**.

[5] Grammatical semantics includes other factors, such as word order, affixes, and intonational contours.

[6] The notion of **core** semantic relation (as opposed to **peripheral** semantic relation) is developed in Chap. 5.

[7] To use Rumelhart and Ortony's (1976) terms.

3.2 Semantic Roles and Conceptual Semantic Relations (CSRs)

Before proceeding, let us pause for a moment to consider what it is that we are looking for, exactly. Defining and assigning semantic roles, that is, relating semantic features to morphosyntactic structures, is normally considered a grammatical question. This conception is found, for instance, in generative literature in general, and is thus stated by Levin and Hovav when they describe semantic role assignment:

> grammatically relevant facets of a verb's meaning are represented by a list of labels identifying the role that each of the verb's arguments plays in the event it denotes.
> (Levin and Hovav 2005, p. 35)

As seen, only grammatically significant facets are mentioned, and only in relation to the verb.[8] However, even if we limit ourselves to semantic relations, this view is only valid for part of the observed phenomena.[9] Semantic role assignment, it should be clear, is only one instrument towards a more general and more concrete goal: the connection between sensorially perceptible (phonetic) forms and semantic relations, which become ingredients of the mental landscape constructed by the receptor.[10] For instance, in a sentence like

[6] That boy is eating a cookie.

what we understand is not just an Agent, but rather an entity that performs a specific action, that is, puts something in the mouth and swallows it for feeding purposes—something very different from what the boy does in

[7] That boy is tearing my shirt.

These highly individual relations—**conceptual semantic relations** (**CSRs**) are part of the schema (frame) evoked by the verb, respectively EAT and TEAR, and they end up being integrated into the final mental landscape. The aim of the description, as far as we are concerned, is to establish a connection between each CSR and its formal expression—for instance, the CSR "eater" with the phrase *the boy* in a subject function. This connection is what constitutes the **sign**, the

[8] In this passage, Levin and Hovav refer only to the sentence; within other types of constituent a nominal, an adverb, etc. can be the determining element—for instance, in an NP the nominal head determines the semantic roles of the other constituents.

[9] This is not news: there are important mentions in recent works, e.g., Jackendoff (2002), Culicover and Jackendoff (2005), as well as in the cognitivist literature.

[10] The mental landscape is what Castelfranchi and Parisi (1980) call **rete di conoscenze** 'net of knowledge'. I do not use their term because it suggests reference to permanent knowledge in semantic memory, but here we deal with the interpretation of an individual utterance, and the mental landscape is stored only as part of the understanding of the current text. That is, each utterance calls for the construction of a new mental landscape. It is also sometimes called the **cognitive map**.

description of which was singled out by Saussure (1916) as the main object of linguistics. Note that when we connect the acoustic image *that boy* and the CSR "eater" (as in [6]) we are dealing with concrete entities: one is ultimately a phonetic sequence, and the other is a concept. It is held here that these concepts are entities or relations directly accessible to the language user, and as such are part of the evidence; in principle, I see no problem with the use of introspection as a source of data.[11]

The number of CSRs is naturally immense: practically every verb defines its own set, to the point of distinguishing, say, the "licker", the "biter" and the "kisser" according to which part of the mouth is brought into action. If we want to define CSRs as concrete relations, we cannot escape this fact. But how can this tremendous complexity be integrated into a lexico-grammatical description?

What we observe is that a language defines sets of CSRs to be treated as if they were the same relation (which in fact they are not), apparently by selecting some key features common to each set of CSRs. Thus, *that boy* is normally analyzed as Agent in both [6] and [7]. This analysis is certainly correct, but it is important to stress that marking *that boy* as the Agent is only a step in a longer process, namely specifying the relation that the boy (an entity of the conceptual world) has with the action of tearing the shirt or eating the cookie. The initial semantic role is eventually elaborated on the basis of the semantics of the verb, plus other factors including features of the context and world knowledge, into the highly particularized CSRs which make up the mental landscape constructed by the receptor on the basis of the sentence. But it is important to note that these elaborated CSRs are not, in themselves, grammatically relevant—they are the end product of an elaboration process.

There are therefore strong linguistic reasons to postulate generalized (schematic) semantic roles such as Agent, Patient, and the like. On the other hand, the connection between forms and schemata does not follow a unique road, with semantic roles as a necessary stopover. What we call semantic role assignment is a complex phenomenon, resorting to a variety of ways to achieve a task which is essential to comprehension, the connection between form and meaning. The whole system seems to be geared to an objective, and it does not much matter how it reaches it: it works in opportunistic fashion, and uses the most convenient among available mechanisms, syntactic, semantic, and also pragmatic. One aim of this book is to unravel some important aspects of this complex system.

[11] Without disregarding the serious methodological problems involved. Of course, not all linguists agree as to the possibility, and need, for the use of introspective data—Sampson (2001, pp. 2–5) illustrates a dissenting view. I beg to differ; see discussion in Perini and Othero (2011). See also Talmy's (2007) very interesting discussion on the use of introspection in linguistic analysis.

3.3 Semantics

The main reason semantic roles are important to grammatical description is that they determine a central ingredient in interpretation, namely certain semantic relations between sentence constituents. A purely formal description of sentence structure, without mentioning semantic roles, is possible, and was carried out, for instance, by Allerton (1982), but it leaves a lot to be desired.[12] Allerton's description provides a list of all category sequences and their syntactic functions, but it leaves untouched the question of the relation between concept and acoustic image. For instance, Allerton gives, in his list, the following construction:

SUBJECT + V Fido barked
(Allerton 1982, p. 145)

This is the only construction of the form **subject V** in his list. But this syntactic structure may correspond to different semantic structures, according to the semantic role expressed by the subject, e.g.

[8] Fido barked. [subject Agent]

[9] Fido froze. [subject Patient]

In certain cases the subject is the Agent and there is a Patient, understood as schematic:

[10] Fido has eaten.

And there are cases in which an unexpressed Patient is understood to have specific reference:

[11] Jane's husband drinks. [subject Agent; Patient: alcoholic beverage]

None of these differences can be expressed in Allerton's syntactic notation which, although not incorrect, is little informative. It is a fact that there are sentences composed only of subject and verb, but this leaves many important things to be said. His list is, correspondingly, brief: only 31 constructions. Now, if we consider semantic roles and their syntactic coding, we shall certainly have many more.[13]

That is, one important fact not expressible in Allerton's terms is illustrated by the fact that occurrence in the constructions

[9] Fido froze.

[10] Fido has eaten.

[12] A similar formal analysis is found in Emons (1978), for English. For Portuguese, see Barros (1992); Perini and Fulgêncio (1987).

[13] In the VVP list, which considers only diatheses (not all sentential constructions in the language), there are 256 as of February, 2015.

splits a large subset of all verbs into two groups, according to the semantic effect of the absence of object. With *freeze*, absence of object causes the subject to be assigned the role Patient: compare *Fido froze* with *that nasty boy froze Fido*. But with verbs like *eat* lack of object does not change the role of the subject, which is always Agent. This alternation has been often observed, and is something of a classic.[14]

The purely syntactic analysis also fails in cases of sentences of the form

SUBJECT + V + OBJECT Fido saw me.
(Allerton 1982, p. 145)

If we understand that **object** in the formula means a nonsubject NP, there is another construction of the form **subject V NP**:

SUBJECT + V + OBJOID Fido weighed 30 kilograms/resembled the sheepdog/had a long tail.
(Allerton 1982, p. 145)

The difference between an object and an objoid is defined by several syntactic criteria, such as the possibility of becoming subject of a passive sentence. But it is interesting to note that objoids have an exclusive set of semantic roles: for instance, they can never be Patient.[15]

The system recognizes, then, only two constructions of the form **subject V NP**. But if we take into account the semantic roles of the two NPs in the construction, it becomes clear that there is a significantly greater number of possibilities, as for instance[16]

[12] Fido ate the banana. [Agent—Patient]
[13] The crowd left the stadium. [Theme—Source]
[14] Everyone loved the party. [Experiencer—Stimulus]
[15] My cousin has two cars. [Possessor—Possessed.thing]
[16] Dick became a werewolf. [Theme+αRef—Goal+αRef]
[17] She weighed a hundred kilos. [Located.thing—Measure]
[18] The proposal pleased the chief. [Stimulus—Experiencer]
[19] The alpinists reached the peak. [Theme+Agent—Goal]
[20] The politician accepted the money. [Goal+Agent—Theme]
[21] The politician received a message. [Goal (*not* Agent)—Theme]

We have here ten sentences, all of the form **subject V NP**, but with important differences in the semantic relations between subject and (object) NP, on one hand, and the verb, on the other. To pick an example, take the difference between [20] and

[14] It goes back at least to Jespersen (1914–1929); see also Fillmore (1970a), Smith (1970). Levin (1993, p. 27ff) gives many examples and references.

[15] In the present analysis there is no need to distinguish objects from objoids. I only distinguish subjects from other NPs, the latter being sometimes referred to as **objects**, which is a convenient term to avoid using the more cumbersome **nonsubject NP**.

[16] Several of these semantic roles are poorly defined at present; here it is enough to note the great variety of semantic relations expressible by the syntactic structure **VSubj V NP**.

[21]: in [20] the subject is a Goal, and also an Agent, since the politician is understood as an active participant in the transference of the money, whereas in [21] the subject is a Goal but not an Agent, because the message came to the politician independently of any initiative on his part. All sentences in the list show comparable differences in semantic relations—yet in Allerton's system they would all be represented as elaborations of only two constructions, **subject V object** and **subject V objoid**.

It is important to stress that we are dealing here with knowledge available to any speaker; knowledge, in fact, essential for the correct use of the language. A list of formally defined constructions is useful as a first step in the description, but it must be complemented with semantic information. In the 1980s this was possibly a difficult thing to do; now we have a tolerable start in the theory of semantic roles, and the task can be taken a step forward.

3.4 Symbolic Relations

Cognitive semantic relations (CSRs) are part of the meaning of the verb they associate with; for instance, knowing the meaning of *kill* entails knowing that the schema KILL has two participants, a killer and a fatal victim. If there is no killer, we may have a death, but not KILL; if there is no fatal victim, there is no death and therefore no KILL. This is information necessarily bound to the semantics of the lexical item *kill*, and does not have to be specified elsewhere. On the other hand, something that does not appear in the semantics of *kill* is the fact that the killer is coded as the subject and the victim as a nonsubject NP. This must be stated with reference to the **lexical item** *kill*, and is **symbolic** information,[17] expressing a connection between a linguistic unit or relation and a cognitive schema (a frame).

Turning to Portuguese data, it is also symbolic information (in particular, its syntactic part) that distinguishes *espancar* from *bater* (both verbs mean 'spank, hit'): *espancar* has a subject Agent and an object Patient; *bater* also has an Agent and a Patient, but it expresses the Patient as a prepositional phrase:

[22] O cara espancou o cachorro. 'the guy hit the dog'
the guy hit the dog

[23] O cara bateu no cachorro. 'the guy hit the dog' [*no* = *em*+*o*]
the guy hit (on) the dog

The relation between semantic role and syntactic function shows in the statement of verb valencies. Since it crucially involves syntactic functions, valency cannot be derived from the semantics of the governing lexical item, nor from the corresponding schema. One of our tasks is to find a way of marking all verbs for their valency, so that they fit correctly into the constructions of the language.

[17] A better term might be **signic**, to keep the connection with the sign, but the term **symbolic** is in general use, and will be used here.

Valency statements, then, do not include a list of CSRs associating with the verb, since that list must appear in any case in the schema evoked by the verb. The semantic relations associated with each schema (that is, Rumelhart and Ortony's **variables**) are nongrammatical information, part of our knowledge of the world and of the way we categorize entities, relations, states, and events. The grammatical aspect of the phenomenon is the morphosyntactic coding of conceptual relations which we associate with each verb—and here we have to refer to each *verb*, not to each predicate or schema, since there are practically synonymous verbs with different valencies, as seen in the case of *espancar* and *bater* given above. This is the basic consideration in the discussion that follows. It is important to stress this point: what really matters in grammatical description is not semantic roles per se, but their distribution among the constituents of a sentence.

3.5 Constructions as Descriptive Tools

As Goldberg (2006, p. 1) points out, the notion of construction has been present in some form in grammatical studies since ancient times, and can be viewed, preliminarily, as a conventionalized form-meaning pairing. Within that rather loose definition,[18] a construction can be understood—for the purposes of valency description—as a sequence of categories and their syntactic functions, associated with certain aspects of the corresponding semantic representation. A construction as used in this book is a morphosyntactically defined structure, plus the semantic roles associated with each of the relevant constituents. The result is simpler than the units with which Goldberg works, but it is, I believe, compatible with her conception of construction (see Sect. 1.1).

Given a sentence like

[24] The boy had killed the mosquito.

there is naturally a great number of semantic aspects to be eventually described. We can, for instance, focus on tense and aspect, which are expressed by the verb form. Or we can characterize semantically the object (here, the Patient), which must denote a being liable to be killed: *the boy had killed the table* can be understood only metaphorically. These are Chomsky's (1965, p. 95) **selectional restrictions**, and are not included in valencies, following Jackendoff's position that

> Selectional restrictions are general semantic restrictions on arguments, which may go into much more detail than merely the conceptual category. [. . .] the appropriate linguistic level for stating them is conceptual structure and not syntax or a putative level of argument structure.
>
> (Jackendoff 1990, pp. 51–52)

[18] Which Goldberg greatly elaborates later in her book.

All those aspects are important to the final result, of course, but they are excluded from the analysis of constructions, such as applied here, in favor of other aspects, which are relevant to the description of verb valencies. These are constituent classes, syntactic functions, and semantic relations (semantic roles and CSRs). Constituent classes (NP, AdjP, V, etc.) relate intimately with syntactic structure and also with a kind of schematic semantic representation, as when we say that an NP can denote a "thing". Syntactic functions have a somewhat restricted role in valency description, but they are still necessary because the **subject** must be functionally distinguished from other NPs, which I propose to call **objects**; and constituent order can also be considered a kind of syntactic function. Finally, semantic relations are relevant for several reasons, among which the need to distinguish sentences like

[8] My dog barked. [subject Agent]

[9] My dog froze. [subject Patient]

Each construction is expressed by means of a very simple notation. For instance, the sentence

[25] O leite congelou.
the milk froze

is seen as an elaboration of the construction which is defined thus:

[26] VSubj>*Patient* V

This is not the only possible way to represent the construction exemplified in [26]; there are much richer and more complex ways to notate it. But here I envisage the construction not only as a theoretical construct (which it is, inevitably), but also as a descriptive resource, directed at the immediate objective of building a dictionary of verb valencies. Thus, for us it is enough to say that *congelar* 'freeze' occurs in construction [26], and also in a construction with a subject Agent and an object Patient:

[27] O cozinheiro congelou o leite.
the cook froze the milk

This new construction can be notated as

[28] VSubj>*Agent* V NP>*Patient*

These two constructions (and perhaps others) belong to the valency of the verb *congelar* 'freeze', being two of its diatheses.

Constructions as used here represent, within their limited area, the way lexical and constructional semantics interact in order to ultimately yield the meaning of sentences. This interaction is rather complex, and it is one of the aims of this book to unravel part of its complexity, as far as possible given our current state of knowledge of the problem. For our immediate descriptive purposes, we deal with: (a) the meaning of each constituent; (b) the semantic role of each constituent (this is

the main contribution of constructional meaning to the meaning of the sentence); and (c) the relations between syntactic function and semantic role (for instance, the subject of *arrive* is a Theme, the subject of *eat* is an Agent, the object of *eat* is a Patient). The result is an essential portion of the global meaning of the sentence. There are several complications, to be discussed in detail in later chapters, but this is the basic picture.

The notation used here is not too different from the ones found in some valency lists. The ADESSE project (described in Appendix C), a valency list of Spanish verbs, enumerates constructions giving syntactic functions and semantic roles, as for example for *llegar* 'arrive':

[29] **LLEGAR$_{ACT}$** A1: ***MOV*** A3: ***DIR***
= SUJ **= a LOC**
[ADESSE, entry **LLEGAR** ('arrive')]

The first line gives the two "arguments", one with the semantic role **móvil** (the entity that undergoes motion, here Theme), and the other **dirección** (Goal). The second line provides the syntactic representation, respectively a subject (**SUJ**), and a phrase introduced by the preposition ***a*** 'to'. There are some differences with the notation proposed here, but they are comparatively minor[19]; in both cases the description is made up of a set of constructions, and each construction is defined by means of a syntactic representation coupled with the semantic roles that associate with each of the constituents. In the system adopted here, the construction seen in [29] is expressed thus:

[30] **chegar** ('arrive') VSubj>*Theme* V *a* NP>*Goal*

This is to be read as "the verb *chegar* 'arrive' can occur in the construction defined as:" (the description of the diathesis follows). [30] is one of the diatheses of *chegar*, realized in

[31] Alguns jogadores chegaram a Belo Horizonte.
some players arrived to Belo Horizonte

The system proposed here is not to be understood as a definitive description. Given our currently precarious grasp of the facts, I find it prudent to distinguish maximally between constructions, so that we may think of grouping them in one way or the other only in a second moment. I have already mentioned that there are relevant relations between different constructions (so-called **alternations**); another example is the alternation of prepositions: in Portuguese, constituents of the form ***a* NP** and ***em* NP** are probably semantically equivalent for purposes of expressing the semantic role Goal. Thus, the sentence *cheguei a Paris* and *cheguei em Paris* both

[19] In particular, I see no point in distinguishing the arguments by numbers (A1, A3), since they are already distinguished by their semantic roles.

mean 'I arrived to Paris', and are both in current use.[20] And there are also cases of idiosyncratic syntactic alternations such as the verb *(se) apaixonar* 'to fall in love', which may be followed by a phrase with *por* or *com* (in English, you always fall in love *with*).

In our list every formal and/or semantic distinction is represented by new diatheses whenever there is no well-grounded rule describing the same distinction. This decision multiplies the number of diatheses, but guarantees the descriptive value of the list. Of course, as soon as a really good rule is proposed, the distinction is removed from the list. Therefore, for us, and pending further research, *cheguei a Paris* 'I arrived to Paris' and *cheguei em Paris* 'id.'are two different diatheses of the verb *chegar* 'arrive'.

In short, the system I am trying to elaborate aims at expressing the facts in their initial complexity. At best, it will enable researchers to ask the right questions, which is a lot. When we take this cautious way to analyze the available facts, we are just avoiding hasty generalizations, which are one of the plagues of linguistic thought.

[20] The use of *em* to mark the Goal is condemned by traditional grammarians. Here, as elsewhere, people pay them no attention.

Chapter 4
Delimitation and Definition

4.1 A Problem

Whoever works with semantic roles soon stumbles on the problem of extremely particularized conceptual relations, apparently impossible to subsume under the traditional categories of Agent, Patient, Instrument, Goal, etc. The problem arises in common sentences like

[1] Esse tijolo serve de peso de papéis. 'this brick functions as a paperweight'

The final complement seems to be some sort of Instrument; but the relation between the verb and the subject *esse tijolo* this brick' does not seem to fit easily in any of the traditional semantic roles. This is a frequent situation; sometimes one has the feeling to be only looking for convenient names for each conceptual relation, without regard to its role in grammar as a more schematic category.

4.2 Looking for Solutions

4.2.1 The Particularist Hypothesis

The multiplication of semantic roles makes us wonder if we are not missing something basic. Some authors tried to avoid the problem by adopting a radical solution. Thus, Dowty (1991), referring to linguists working within the framework of Case Grammar, and others, like Marantz (1984), remarks that they

> saw [...] the danger of using schematic [role types like Agent etc./MAP] and proposed to circumvent the problem by refraining from committing themselves to the traditional roles [...] That is, we simply call the thematic role of the subject of the verb *hit* the 'hitter role', that of the subject of *kill* the 'killer role', of *build* the 'builder role', and so on, with no assumption made that there is one thematic role type common to these arguments.
> (Dowty 1991, p. 550)

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There are problems with this proposal; nevertheless, I will suggest that the proposal is salvageable to a certain extent. I refer to the position described by Dowty as the **particularist hypothesis**.

One supporter of this position is Langacker, if we judge by the following passage:

> It is generally assumed that a rigorous linguistic theory has to provide a definitive list of [semantic] roles, and that some element from that inventory should correctly describe each participant's involvement in any verbal or clausal relationship; the failure to devise a satisfactory list has been a continuing source of concern. I do not believe, however, that a list of this sort is either necessary or achievable. An inventory of semantic roles can always be refined and articulated into more specific types on the basis of further data or a finer-grained analysis—at the extreme, every verb defines a distinct set of participant roles that reflect its own unique semantic properties (e.g. the subject of *bite* is a slightly different kind of agent from the subject of *chew*). Conversely, a role conception is arrived at by abstracting away from the peculiarities of individual examples. Since any kind of commonality provides the basis for a possible schema, and since schematization can be carried to any degree, we should not expect a fixed and limited inventory to accommodate all phenomena in every language.
>
> I do not believe that semantic roles are first and foremost linguistic constructs, but rather pre-linguistic conceptions grounded in everyday experience.
>
> (Langacker 1991, pp. 284–285)

This sums up Langacker's opinion on the problem: a radically particularistic position, which does not distinguish between CSRs and semantic roles.[1]

Langacker captures an important part of the problem, but another, no less important, portion remains to be stated. My objection is that this approach fails to take into account the fundamental role of semantic roles in the working of grammar. That is, semantic relations are not merely part of the meaning of sentences, but are also grammatical and lexical instruments. *Bite* and *chew* have, as Langacker points out, slightly different types of agents. But, first, the difference can be derived from the meaning of the verbs (i.e., from the schemata each of them evokes); and, second, if we do not go beyond these "pre-linguistic" relations there will be no way to explain why these agents are both coded as subjects, and the (also slightly different) patients as objects, and why this happens with verb after verb, to a total of several thousand, while there is not a single example of the opposite coding, subject patient and object agent.[2]

This tendency, which is captured by the semantic hierarchies previously mentioned, could not be stated in terms of elaborate semantic relations. I tend to agree with Langacker that "we should not expect a fixed and limited inventory to accommodate all phenomena in every language", but this does not mean that

[1] Yet, when Langacker has to use these relations in actual analyses, what we find is the more traditional type-roles (Agent, Instrument, Patient and the like); see, for instance, Langacker (1991, p. 216ff); Langacker (2008, p. 355); etc. The latter passage is particularly interesting because there Langacker deals with thematic hierarchies, which cannot be expressed except by using type roles.

[2] In Portuguese, and also in English, there are cases of subject Patient; objects—that is, nonsubject NP's—with the role of Agent are not attested at all.

there are no schematic semantic relations determined by the structure of particular languages.

The observation of languages does not show semantic roles based on "any kind of commonality", nor do they exhibit totally unrestricted elaboration. Within the infinite range of possibilities offered by our world knowledge, languages consistently select some features and take schematization to a specific limit. For instance, Portuguese does not take into account the semantic feature "size (large/medium/small)" for grammatical purposes, nor do I know of any language that does. Some languages distinguish "animate" from "inanimate" grammatically, some do not, and presumably all distinguish "agent" and "patient". Furthermore, the degree of schematization tends to be roughly uniform: Portuguese distinguishes a "location" (*eu estou em Brasília* 'I am in Brasília') and a "source" (*eu cheguei de Brasília* 'I came from Brasília'), but does not distinguish "close location" (*em São Paulo* 'in São Paulo') from "far location" (*em Tóquio* 'in Tokyo'). I dare say that no language makes the latter distinction in its grammatical structure (in the lexicon things are different, see Sect. 4.4.2). In other words, a semantic relation which perhaps has no privileged status in purely cognitive terms is, however, privileged by the morphosyntactic processes of a particular language. This means that the difficulty pointed out by Langacker does not exist, because elaboration cannot in practice be carried to *any* degree, and not every type of concept can be the base for a grammatically relevant relation.

Another problem is that the reduction of semantic roles to individual relations hinders the possibility of comparison between verbs—since each verb will have its own set of semantic relations—which in its turn prevents the expression of valencies with any generality. And the elaboration of an adequate grammatical description is impossible without including the valencies of verbs and other governing items.

Finally there is a further problem with the solution of assigning the subject of *hit* "the role of the hitter", and so on. To do so we need a way to distinguish this role from the "role of the hit.thing"—but how can we find a criterion without using schematic notions like "immediate causator", that is, some kind of "agent"? How can we tell apart the semantic role of the subject from that of the object in *Sally hit David*? The answer is that we identify Sally as the immediate causator of the action ("hitter"), and David as its affected element ("hit.thing"); in other words, we are using schematic relations, exactly what the hypothesis tries to avoid.

For all these reasons, I believe that the particularist approach as a whole is not viable. This does not mean that it has no serviceable elements, though; we will return to this point later on.

4.2.2 Type Roles

One alternative to the particularist hypothesis is the definition of type roles, far more schematic. For instance, both *build* and *eat* have a subject with the role of Agent in sentences like

[2] Helen ate the pie.

[3] Helen built a boat.

There is no doubt that the conceptual relation between *build* and its subject is different from the one between *eat* and its subject. But, according to the type role hypothesis, these differences are derived from semantic features of the verbs.[3] For a receptor who knows what "building" is, it is easy to understand the Agent of that action as someone who causes a thing to arise from raw materials; whereas for "eating" it must be some being that ingests something for feeding purposes. None of that, according to this hypothesis, need be a part of the semantic role associated with the subject of these verbs. The semantic role Agent provides a schematic indication which is common to the particular semantic relations perceived in the subjects of [2] and [3], and the details are filled in on the basis of knowledge of the meaning of the verb and its complements, world knowledge, and the denoted situation.

This approach can be considered traditional, and follows from Gruber's (1965) proposal, as first developed by Jackendoff (1972). But when we try to apply it to data in some number and variety, the previously mentioned difficulty arises: in many cases it is hard to fit directly perceived conceptual relations into the type roles. Thus, although it is easy to recognize a Patient in the objects of [2] and [3], the object of

[4] Agnes spoke German to me.

is not so clearly a Patient—it does not seem that the German language "undergoes" the process of being spoken.

Such cases are not exceptional, and the difficulty may arise, of course, from the lack of conveniently defined type roles. But when we try to use them, the variety is disconcerting. Too often we find ourselves "inventing" new roles, which cover very few cases—sometimes, as Langacker points out, only one. These facts suggest that type roles may not be a solution applicable to all cases. On the other hand, traditional type roles show very clearly in many cases, and each of them has a general validity, which suggests that both positions may have something to contribute in the search for a solution.

[3] More precisely, from features of the schema the verb evokes.

4.3 Semantic Roles Are Necessary

4.3.1 A Mixed Solution?

We might consider a mixed solution, including both schematic and elaborate roles. The following passage suggests a starting point:

> For very schematic frames, such as those involving simple movement, the main [frame elements] can be quite abstract: Theme (an object seen as moving), Source (the starting point of a movement), Goal (the endpoint or destination of a movement), and Path (information relevant to the itinerary of the movement). [. . .] For narrowly defined frames involving complex scenarios, they can be quite specific. For example, in the Revenge frame, we recognize Avenger (the individual who carries out an act of revenge), Offender (the individual whose prior act is to be punished through an act on the part of the avenger's) [. . .]
>
> (Fillmore 2007, pp. 130–131)[4]

Fillmore's proposal seems to refer to an indeterminate number of possible relations which, rather than semantic roles, resemble conceptual relations (CSRs), independent from linguistic coding. Here also I think there is the seed of a valid idea, and I intend to make some use of it when seeking an approach to the question. But I do not feel that the degree of schematicity depends only on the complexity of the scenario. It is also a result of an option taken by each language to treat certain CSRs and groups of CSRs more or less schematically, using them as part of its grammatical structure. Some of these options are universal, but some are certainly language-specific (examples will be given in Sect. 4.4.7).

Each schema sets up some participants[5] of the denoted event or state. Each participant has a semantic relation with the verb, and this relation can vary according to a very wide range, perhaps indeterminate in principle. It is these relations (**CSRs**, or **conceptual semantic relations**) that are part of the data, and are accessible to direct intuition. When we process a sentence like

[4] Agnes spoke German to me.

we understand the CSR of *Agnes* as a pretty complex relation. This phrase denotes the "agent" of a (potential) action having to do with speech activity, and associated with knowledge of the language; *German* expresses a particular aspect of this speech activity and knowledge. Other aspects of the speech activity may be expressed, as in *Agnes speaks softly*. In each of these cases we have a different CSR—for instance, with *softly*, by the absence of the "knowledge" ingredient. Now, in *Agnes knows German* we have "knowledge" without the ingredients "action" and "speech activity".

[4] I take Fillmore's **frame elements** as roughly corresponding to our CSRs. His approach as sketched here is developed in the FrameNet system, described in Ruppenhofer et al. (2006).

[5] 'Participant' is used in a very wide sense, to include things like Location, for instance. They correspond to the labels attached to the variables of a schema.

These observations place the question on a very concrete level of analysis, directly dependent on the data of experience—since they are semantic data, they are accessible through introspection. Such data are reasonably certain, but certainty here is bought at the price of extreme variation: we can say (with Langacker) that almost each verb has its own set of CSRs. This in itself is not a problem, because it only reflects, pretty directly, our very detailed knowledge of the world. For descriptive purposes, we might in principle stay at this level, and some linguists apparently did it, or tried to. But I must insist that a concrete and particularized description leads to disregarding certain important facts, which we have to include in the description in some way.

4.3.2 Evidence for Type Roles

Some of the claims just made require empirical proof, which I sum up in this section.

First, we know that there are clearly distinct CSRs which are nevertheless treated identically when the task is to code information into morphosyntactic elements. Thus, the verb *open* has a volitional agent in [5] and a nonvolitional one in [6]:

[5] The boy opened the window.

[6] The wind opened the window.

But the language does not 'see' the difference, and codes volitional and nonvolitional agents in the same way. This seems to work for all cases, that is, there is no special coding for volitional agents: no grammatical function, no special preposition exists to mark them as opposed to nonvolitional ones.[6]

This is a crucial point, when we take into account that the goal of linguistics is to make explicit the relation between meaning and sound (concept and acoustic image). We aim at describing symbolic units and relations; but we must start from the separate observation of sound and meaning, because the grammatical relations we are concerned with are not accessible to direct observation and must be grounded on observed (pre-linguistic) facts. The difference between the CSRs of the subjects of [5] and [6] is real and accessible to observation, but it is irrelevant for language description because they are both coded identically in the language. The difference we perceive between the role of the boy in [5] and the wind in [6] is easily derived from world knowledge: if we know what a boy is, and what the wind is, we can deduce that the causator of [6] is not volitional, since our conception of "wind" does not include volition. This is not a linguistic process stricto sensu, and has to be somehow included in the knowledge systems we apply to things in general. Marking it in the grammar, that is, distinguishing "volitional agent" and

[6] I examine an objection to this claim in Sect. 4.7.1.

"nonvolitional agent" as semantic roles, would introduce unnecessary redundancy into the description—unless it is shown that some grammatical fact depends on this difference.

A second argument against the particularist hypothesis is that, as we have seen, semantic hierarchies exclude the possibility of using CSRs only, because a hierarchy must be stated in schematic terms, with the use of type roles. The lack of type roles would block the possibility of stating semantic hierarchies, linking rules and similar generalizations which, despite many doubts about details, undoubtedly exist. We know that there is a definite tendency to code the Agent as the subject, and it shows in cases of very different CSRs, e.g.

[7] The thieves spanked the old lady.

[8] The boy broke the vase.

[9] Beethoven composed *Fidelio*.

[10] The student solved the problem.

This identical syntactic coding depends, certainly, from the fact that all these CSRs have semantic ingredients in common—something like "direct causator". If we analyse sentences using only CSRs, we would have to view the identical coding of CSRs with common semantic features as a mere coincidence.

The third reason is that it is possible to infer the CSR from the schematic semantic role, plus semantic features present in, or derivable from, the verb. Thus, the semantic difference between the subjects of [8] and [9] derives in quite a natural way from the semantic difference between *break* and *compose*. *Break* (or rather the schema BREAK) refers to an action performed by something or someone on a previously existent thing, which changes its state as a result of the action. *Compose* refers to an action whose result is the emergence of a previous nonexistent thing (usually a poem or a musical piece).[7] These features are bound to the verbs in question, and are an integral, defining part of their meanings. When processing a sentence with *break* or *compose*, the language user must identify which complement denotes the affected (or resulting) thing and which denotes the causator. The lexico-grammatical structure provides information sufficient to carry out that task, and that is all it has to offer. Everything else may be built up on the base of knowledge of the schemata evoked by these verbs. This can serve as a criterion to control the postulation of type roles.[8]

Yet another indication that we need type roles comes from verbs that entered the language recently: we observe that such neologisms adopt preexistent diatheses, with a definite preference for the most prototypical ones. A Portuguese example is

[7] Jespersen (1924, p. 159) distinguishes **object of result**, which is the case in [9], from **affected object** (translating the German grammarians' *affiziertes Objekt*). But there is no reason to distinguish two types of "object" here: the syntactic function and the semantic role are the same, although the CSRs differ.

[8] See more examples in Sect. 4.4.5.

deletar, taken around the 1990s from English *delete* as a term of the computer jargon; it is used with subject Agent and object Patient, following a highly frequent configuration of the language. How to express this prototype in terms of mere CSRs? We cannot argue that *deletar* 'delete' follows the example of its near-synonyms *eliminar* and *suprimir*, because the preference for subject Agent and object Patient is not limited to CSRs related to the schema DELETE: *salvar* 'save' also has subject Agent and object Patient, as well as several other terms of the computer language.[9] The CSRs associated with these subjects have features in common, something like **control + trigger**, and that is one reason they end up being expressed through the same semantic role. This is not an isolated example, and shows that there is a generalization here, captured by language users when accepting a neologism. In this context we may also mention the facility shown by English to verbalize nominal elements: *did you ID all the specimens?*—in these cases as well, the Agent is coded as the subject, the Patient as the object.

There is still another fact that shows how the language works in terms of semantic roles, not CSRs: children, when they acquire verbs, or when they invent new ones, favor the association subject/Agent, to the cost of making what, to the adult, are mistakes. One example I could observe directly is the sentence used by a two-year old, angry at his baby-sitter:

[11] Papai, apanha ela! 'Dad, hit her!'

The verb *apanhar* is idiosyncratic in that it shows active morphology but has a subject Patient and an Agent expressed by a prepositional phrase with *de*:

[12] Meu vizinho apanhou da mulher.
my neighbor was beaten by (his) wife

However, the little boy built his sentence as if *apanhar* patterned like, say, *castigar* 'punish', which, regularly, has a subject Agent and an object Patient.

Another example comes from a girl of about the same age, who asked her mother

[13] Colcha eu! 'cover me with the bedspread!'

Here she created a new verb, presumably *colchar* 'cover with a bedspread' (from *colcha* 'bedspread'), and it is significant that the sentence follows the normal diathesis for action verbs: subject Agent, object Patient.

All these facts are indications that the immense variety of CSRs associated with the verbs of the language, although they are a starting point in research, cannot satisfy us as the base for an analysis. I take that as a decisive argument against the particularist hypothesis. We will have to look for more abstract relations, because there is evidence that the language recognizes them and uses them in coding. What we have here is one manifestation of the parsimonious character of language, which has limited resources (lexical items, syntactic functions, classes, semantic roles) to

[9] *Salvar* did exist previously in Portuguese, but only in the meaning of saving lives or souls. *Deletar* is a neologism.

express a huge variety of concepts: a feature that is rightly insisted on by cognitive linguists, as in the following passage

> Language [. . .] radically underdetermines the rich interpretations regularly assigned to naturally occurring utterances.
> (Tyler and Evans 2003, p. 3)

The conclusion is that our research must consider not only individual CSRs associated with the verbs of the language, but also the relations provided by the language to code these CSRs into morphosyntactic elements (semantic roles).

Among others, Ackerman and Moore (2001) seem to have arrived at a similar conclusion. Referring to particularized semantic relations such as "admirer" and "admired.thing", they note that

> this kind of concrete and predicate-specific characterization of thematic roles provides a maximal differentiation of arguments, but raises the question as to what, if any, properties are shared among the arguments of different predicates [. . .] [and] whether the properties employed [. . .] are grammatically relevant or merely diacritic.
> (Ackerman and Moore 2001, p. 20)

We are then on the horns of a dilemma, because both the use of particularized CSRs and type roles raise serious methodological problems for the analysis. How can we characterize in general, schematic terms the relations expressed by the underlined complements of *I waited for the bus*, *I need a hammer*, *I owe you a lot of money* etc.?

The FrameNet project, as described in Ruppenhofer *et al.* (2006) and Fillmore (2007), adopts the notion that we need semantic relations at several degrees of schematicity, from highly schematic ones like "agent" to very concrete ones like "injured.party". This may point to a way out of the dilemma, but it is not an easy one, and it requires surveying many cases, one by one, without the option of a previous, generally applicable solution.

This solution is compatible with one suggested by Jackendoff, which can be summarized as the notion that CSRs are part of conceptual structure, whereas semantic roles belong to argument structure; and that

> "argument structure" can be thought of as an abbreviation for the part of conceptual structure that is "visible" to the syntax.
> (Jackendoff 1990, p. 48)

4.4 Semantic Roles and the Description of Valencies

4.4.1 CSRs and Semantic Roles: Degrees of Schematicity

We saw that, once the semantic role of a constituent is determined, the finer details of the semantic relation are left to the semantics of the verb, plus the semantics of other parts of the sentence, plus world knowledge. Grammatically speaking,

distinctions like the ones found between the agents of the following sentences need not be included in the description:

[14] George killed my cat. [direct volitional causation]

[15] The dictator killed millions of innocents. [indirect volitional causation]

[16] The epidemic killed 133 persons. [nonvolitional causation]

Elaboration can be pushed to quite minute details, as in sentence [16], where we understand that the epidemic kills by infection, while in [14] the method of killing is left open. All this depends not on the semantic features of the verb, but on information initially provided by the accompanying constituents, and crucially complemented by world knowledge: there is no way an epidemic can kill except by infection, and we know that dictators, despite their aberrations of character, do not as a rule liquidate their victims personally. We are here very far from grammatically relevant information.

The sheer number of possible CSRs is a serious difficulty for their definition, not really because of any difficulty of identifying them, but for the lack of suitable words to express so many meanings. For example, in

[17] The patient lives on soup and biscuits.

the CSR expressed by *on soup and biscuits* is clear enough, and we can understand the sentence without problems. But naming it is more difficult: we are reduced to paraphrases like "thing.someone.lives.on" and the like.

The enormous number of existing CSRs correlates with the fact that they are highly elaborate. When we use an NP as the subject of *eat*, we not only build the image of an Agent doing something, but we go into details of its perceptible features, as when we distinguish between the ways of eating in *John ate some crackers*, *John ate some porridge*, and *the lion ate the goat*—the image evoked by each of these sentences varies in several details, and each of these images defines a separate CSR. We cannot escape them in the first moment, because they are what we really get from the message and use to build a mental landscape in our minds; they are part of the raw data from which we must start. Of course, in most cases we generalize almost immediately, as with the subject of *eat*, which is the Agent, or at least the "eating.entity"; but we do this because there is already some previous reflection, of our own or traditional, provided by our previous experience or by the structure of our language, which authorizes us to risk the generalization. In this book, I will have to refer to CSRs in a somewhat schematic shape: for our purposes, "eating.entity" will have to be enough, and I hope the reader will know what I am speaking about when I use such designations.

When related CSRs occur with many verbs, it becomes easier to infer something more schematic in common, from the many cases we can examine. For instance, Agent can be deduced from many particular cases, which end up providing the schematic notion of "immediate causator". But *on soup and biscuits* in [17] realizes a rare CSR, apparently limited to a small set of verbs (and schemata).

4.4.2 Three Degrees of Elaboration

The question may have to do with the lexical meaning of verbs. We know that these meanings are extremely particularized: *lick* and *bite* differ according to the organ used for contact (tongue or teeth); *devour* is to eat with some violence and brutality; *pile* is to place things on top of each other, *range* is to place them horizontally, etc. The features distinguishing verbs at this level are in huge number, perhaps unlimited in principle, and the images they evoke may be sensorial, social, moral, sentimental, etc.

Another contributing factor to the semantic complexity of CSRs is the meaning of the complements themselves. The Agent of *eat* is understood in a slightly different way according to whether the Patient is *porridge* or *crackers*—the difference comes from our immense store of world knowledge, and limits are not easy to set. These relations go well beyond language, and belong to the cognitive system. These observations suggest that what we call semantic roles may be schematic relations composed of properties drawn from particular CSRs, gauged according to what the grammar can "see" (to keep Jackendoff's metaphor). For the object of *kill*, we can then define three levels of schematicity.[10]

First, at a maximally elaborate (minimally schematic) level, we have several CSRs, according to context: "goal of direct causation through physical action on the victim", as in example [14] above; "goal of indirect causation through subaltern agents", as in [15]; and "goal of indirect causation through the action of bacteria", as in [16]. This level corresponds to direct observation, that is, what the receptor actually "understands". For purposes of linguistic description, we can say they are concrete semantic relations, part of the raw data of the analysis; these relations are probably indefinite in number. They are not directly coded onto linguistic units, but must be inferred from many factors, including context.

Second, at a more schematic level, and apparently free of context, the object of *kill* expresses the "goal of causation of death"; this works for all examples in which the verb *kill* is used, and semantically defines this item. That is, whenever we use *kill*, this semantic ingredient is present, in one of its elaborations.[11] This level functions to distinguish lexical items from each other: por example, to distinguish *kill* from *wound*, because with *wound* there is no necessarily "causation of death".

Finally, even more schematically, the object of *kill* expresses a "goal of causation of event", which is what we call the Patient—here *kill*, *wound*, *eat*, *devour* etc. are identical. When we speak of (grammatically relevant) semantic roles, we are dealing with this level of schematicity.

This division into three degrees of schematicity is, for the moment, only a convenience; only detailed research will allow us to fill in the details of the picture.

[10] Not three formally distinct levels, just three points in a continuum which are of interest to us here.

[11] Allowing for extensions such as *the department killed our idea*; but let us disregard these cases to avoid excessive complication.

To take an example, *devour* can be defined as a more elaborate version of *eat*; and since *eat* is in its turn a more elaborate version of *do*, we may have a range of elaboration with *do* ⊃ *eat* ⊃ *devour*. This shows that the definition of lexical items involves more than one level of schematicity. An analogous (not identical) distinction of levels of elaboration is found in García-Miguel and Vaamonde (internet); they distinguish relations at verb level, class level and generalized semantic roles.[12] These degrees of schematicity relate to each other by inheritance. Inheritance relations are not systematically used in the present analysis because of the still rather preliminary nature of our description; but they are obviously important cognitively, and perhaps grammatically, and must be eventually stated.

There is another important point to stress. A semantic role is not to be thought of simply as a more schematic CSR; that is, a CSR does not qualify as a semantic role only because it is more schematic than others. The precise degree of schematicity relevant to grammatical description is determined by the *symbolic* nature of the relation. We group into one semantic role those CSRs which are coded in the same way by the grammar of the language. Thus, for instance, if we find that the language has no formal resources to distinguish the expression of "location" from that of "time", we can group these two CSRs as one semantic role. But this grouping is not independent of morphosyntactic facts—the CSRs in question are lumped together because, in that language, they are coded identically.

One consequence is that semantic roles do not have to be the same in all languages. There is no known reason to distinguish animate from inanimate complements in Portuguese, but other languages apparently do require such a distinction. For instance, in Spanish the preposition *a* is used to mark an object when it is animate: *vi la casa* 'I saw the house', *vi a tu hermana* 'I saw your sister'. In Russian, the same semantic distinction governs the case of the object: *ja videl stol* 'I saw the table [accusative]', but *ja videl maljčika* 'I saw the boy [genitive]'.

To take another example: in his handbook of Nahuatl, Launey reports that

> Unlike most languages, Nahuatl does not specify in its locative form whether we speak of the place in which you are, towards which you go, from which you come or by which you pass.
>
> (Launey 1992, p. 53)

In Nahuatl, therefore, there is no reason to distinguish Location, Source, Goal and Path as separate semantic roles; but in English or Portuguese they must be distinguished because each has distinct grammatical markers (usually prepositions): *in Chicago*, *from Chicago*, *to Chicago*, *by Chicago*.

Another possible example is the set of CSRs bunched together in Portuguese under the common label "possession". We have: *a casa do Henrique* 'Henrique's house', *o braço do Henrique* 'Henrique's arm', *o irmão do Henrique* 'Henrique's brother', *as ideias do Henrique* 'Henrique's ideas', etc., all expressed by the same syntactic configuration. What is more, there are other constructions that also take all

[12] Levin and Hovav (2005, pp. 10–12) give some interesting examples of different criteria that can be applied when we are concerned with the description of other areas of the grammar.

these different CSRs as if they were the same, as *o Henrique tem uma casa* 'Henrique has a house', *o Henrique tem uma ideia* 'Henrique has an idea', and so on. That the CSRs are different is evident; yet they may not be distinct semantic roles for purposes of the description of Portuguese. I follow here a common point of view, that is,

> Perhaps there is a set of semantic elements and relations that is much smaller than the set of cognitively available and culturally salient distinctions, and verb meanings are organized around them.
> (Pinker 1989, p. 166)

Not only verb meanings, but also grammatical relations. The existence of such a smaller set is a fact, supported by clear grammatical evidence.[13]

Examples like the Nahuatl one seen above show that the list of semantic elements and relations relevant to grammatical description is not random, and conforms to definite criteria (Nahuatl conflates several locational relations, not "location" plus "agent", for instance). These criteria are presumably similar in language after language, allowing for some language-specific variation.

4.4.3 Criterion of Necessity

We can state two basic delimitation criteria, which inform us when we can group two CSRs into one semantic role and when we must keep them apart. The first criterion is the following:

Criterion of Necessity
Two semantic relations should be kept distinct as two independent semantic roles when the assignment of each of them cannot be derived from extragrammatical information, or from the meaning of the lexical items involved.[14]

An example of the application of this criterion can be: take Goal and Source, respectively in the sentences

[18] Valéria arrived to Lisbon. (Goal)

[19] Valéria arrived from Lisbon. (Source)

Let us assume that grammatical functions and prepositions are part of the grammar; NPs, AdjPs, AdvPs—or rather their heads—are part of the lexicon. Then the difference between Goal and Source in [18] and [19] cannot be derived from lexical (nongrammatical) information, because from *Valéria* + *arrived* + *Lisbon*, that is, from the corresponding schemata, there is no way to ascertain

[13] The qualification *perhaps* could be dropped from Pinker's sentence.

[14] For purposes of application of this criterion, we assume that prepositions are not "lexical", but "grammatical" items.

whether she arrived **to** or **from** the city. What tells us this is the prepositions, *to* and *from*; therefore, we can say that the grammar of English can "see" the difference between the Goal and the Source of motion.

Another example is Agent and Patient, in a sentence like

[20] Valéria pinched Camilo.

Again, the lexical items and their schemata are not sufficient to tell us which is the Agent and which is the Patient. But their different syntactic functions correlate with a difference in semantic roles: the subject is the Agent, the object is the Patient. In both this and the preceding examples, grammatical information—choice of preposition or syntactic function—is crucial in identifying the semantic relation.

The distinction between grammar and lexicon is not clear-cut, as is well known. But in this particular instance it works well: for purposes of semantic role assignment, prepositions work along with syntactic functions, and systematically mark semantic relations.

Now let us contrast this situation with the opposite one. In the sentences

[21] The men felled the trees.

[22] The wind felled the trees.

there is a clear difference in the semantic relations binding the verb to the subject in each case: in [21] we have a volitional Agent, in [22] a nonvolitional one. But if we perceive it so clearly, it is because we know what a man is, and what the wind is. The grammar is identical in both cases: the same syntactic function and no prepositions, only NPs, so that grammar is of no help in finding out whether we are dealing with a volitional or a nonvolitional Agent.

This means that in this case the grammar is simply not a factor in the process of identifying the semantic relation, as long as our choice is between volitional and nonvolitional Agent; or, said otherwise, this distinction is not grammatically significant, and the semantic relations are identified without any resource to grammatical information. The semantic role of the subject can be the same in both sentences.

If we notate constructions the way it is proposed here, for instance as

[23] VSubj>*Agent* V NP>*Patient*

then this dependency on grammatical elements can be seen as compatible with the statement that the construction has a meaning, as held by authors like Goldberg (1995) for instance. A formula like [23] expresses part of the meaning of the construction, namely the part that interests us in our endeavor to describe verb valencies. The semantic role of *Camilo* in [20] is certainly independent of the lexical item (or the NP) *Camilo*, which could convey other semantic roles. It is the Patient here for two reasons: first, because it is the object of the sentence; and, second, because the verb is *pinch*—if it were, say, *love*, the semantic role of the object would be Stimulus. As we see, the semantic role of *Camilo* in [20] is not entirely independent of lexical items, because it depends on the valency of the verb. But it depends also on two crucial features of the construction: the fact that *Camilo*

is head of the object NP, and the fact that this object receives the semantic role Patient.[15]

4.4.4 Criterion of Semantic Similarity

4.4.4.1 Statement

A second criterion is needed, which we may call the **criterion of semantic similarity**. It is behind decisions like the one that "agent" and "location" should not be grouped into one semantic role because they are too distant semantically.

This condition has precedents in phonology. It is normally assumed that phones in complementary distribution can be identified as realizations of the same phoneme.[16] An example from Portuguese is the identification of [a] and [ə]: the former never occurs in unstressed word-final position, which is where [ə] occurs. However, [ə] is in complementary distribution not only with [a], but also with several other segments, like [o], [e], [p], etc. Why do we group [ə] and [a], not, say, [ə] and [o]? The answer is that [ə] and [o] (to say nothing of [ə] and [p]) are more different than [ə] and [a]. Here, then, the phonetic substance provides the base for the decision. The result is that each phoneme, while being a structural unit, has a phonetic "core", and all its realizations share a certain number of features.

Similarity is certainly easier to evaluate in phonetics than in semantics. The judgment mentioned above, that the difference between "agent" and "location" is too wide, is intuitive; and, given our rudimentary knowledge of semantic features, it will keep being intuitive for some time. Nevertheless, it is essential for the grouping of several conceptual relations into one semantic role that it be subject to some kind of semantic control, otherwise we risk to identify "semantic role" with "syntactic function": for instance, any direct object, regardless of the conceptual relation it expresses, may end up being subsumed under the role Patient.[17]

Despite difficulties, it makes sense to search for the semantic "core" underlying each semantic role we define. The reason to stress the need for semantic similarity is that a semantic role is, after all, a schema, and schemata are units of knowledge, defined as

> data structures for representing the generic concepts stored in memory.
> (Rumelhart and Ortony 1976, p. 3)

Schemata are instruments of categorization, which enable the mind to recognize stimuli even when they are novel. Thus, when we see an object we never saw

[15] Semantic roles also depend on other factors, as will be seen in Chaps. 7–10.

[16] Or **underlying segment**, if preferred. I think **phoneme** is a very convenient word.

[17] Apparently it is this danger that Ravin (1990) means, when she refers to linguists who, in the effort to make semantic roles function, gradually empty them of semantic content until they no longer correspond to any coherent semantic concept.

before, we can recognize it as a "wheel", although it is in some details different from all the wheels we have ever seen. The object in question has enough known features to allow us to place it into the category of wheels; such features make up the schema WHEEL. But this process depends on the existence of some similarity between the several representatives of the category of wheels found in life. We never categorize together completely different objects; a schema

> contains, as part of its specification, the network of interrelations that is believed to generally hold among the constituents of the concept in question. Schemata, in some sense, represent stereotypes of these concepts.
> (Rumelhart and Ortony 1976, pp. 3–4)

Semantic roles are schemata, elaborated in each individual utterance in sometimes very different ways, but always keeping some common features that allow the recognition of individual cases as elaborations of that, not some other, semantic role.[18] A semantic role is not merely a structural relation, but has a concrete, if schematic, content—it has some relation with a coherent extralinguistic concept. It is this concrete content that makes the semantic role a bridge between linguistic forms and the concepts they express. Therefore, semantic similarity is a requisite for the analysis of semantic roles as schemata; and this analysis allows the integration of the theory of semantic roles into what we know in general about human cognition.

Suppose the criterion of semantic similarity were disregarded; and suppose we found two very different CSRs which are coded in very similar ways in the language. Then (without the criterion of similarity) we would be able to group them into one semantic role. It is perhaps significant that no really good example of this situation is known. One apparent example would be Agent and Experiencer (which were grouped together by Schlesinger 1992); but their coding is not really identical, as shown in Sect. 4.7.2. This suggests that the criterion of semantic similarity may be superfluous for the task of determining differences between semantic roles; but I keep it because of its importance in showing the cognitive nature of these differences.

4.4.4.2 Controlling Schematicity

CSRs are indefinite in number, since it is their duty to express every possible semantic relation; as we ascend in the scale of schematicity, the number of possible relations is expected to decrease. In any case, it is prudent to keep schematicity under control as a methodological prerequisite.

Let us take some examples:

[24] The fight happened in the kitchen.

[18] Let us not go into the sticky question of whether all elaborations of a schema share a set of necessary and jointly sufficient features.

[25] The fight happens in Chap. 6.

[26] The fight happened in Deborah's imagination.

[27] The fight happened in two stages.

In each of these four sentences, we have a phrase of the form *in* + NP, and the CSRs are different for each one: in [24] we have a location in space, in [25] a location in a sequence of chapters, in [26] a psychological "location". In [27] the phrase has to do with the internal structure of the event, not with location proper. We have here, then, four CSRs; how many semantic roles do they elaborate?

The first thing to note is that, in spite of semantic differences, all these constituents are identically marked, with the preposition *in* plus an NP. This is one reason for grouping them all in one semantic role (only one reason, of course; they may be grammatically different from other points of view). But we still have to apply the criterion of semantic similarity, which involves the use and manipulation of semantic features, always a delicate task. This criterion will take us to the decision, I think, that we can group [24]–[26], but not [27], as containing the same semantic role, Location.

The difficulty of the task has motivated some attempts to circumvent the need to define features in introspective terms. Gaston Gross (1994), starting from the correct observation that features like "human", "concrete inanimate", etc. are usually defined intuitively, comes to the conclusion that they should be defined syntactically:

> philosophical or psychological definitions of word classes are not satisfactory for linguistic description [. . .] the classes must be established in an internal way, with the help of the means provided by the language, that is, syntactic mechanisms.
> (G. Gross 1994; *apud* Eynde and Mertens 2003, p. 18)

This leads to defining semantic elements syntactically, a hopeless attempt in my opinion. Yet the Czech valency dictionary of verbs does just that, and identifies for instance the Actor with the subject:

> Syntactic criteria are used for the identification of Actor and Patient [. . .] If a particular verb has a single actant, it is the Actor [. . .] a verb with two actants has Actor and Patient (regardless [of] the semantics) [. . .]"
> (Straňáková-Lopatková and Žabokrtský, internet, pp. 2–3)

Among their examples (translated) we have: *the school lesson began*, *nothing is as good as cotton*, *a boy grew up [to be] a man*, where the underlined phrase is, for them, an Actor in each case. This analysis reduces "Actor" to a mere synonym of "subject".

If we define semantic features like "agent" or "animate" in even partially syntactic terms, how can we make symbolic statements about them? I think that what motivates G. Gross as well as the Czech dictionary's authors is an attempt to escape from introspective judgments, which are nevertheless unavoidable in semantics—they constitute part of the raw data with which we have to deal. If we find that a semantic feature, say, "animate", correlates with certain morphosyntactic

elements, this will be a relevant finding—but only if "animate" is defined independently of those morphosyntactic elements. Semantic concepts, by their very nature, most often refer to extralinguistic elements or relations: "animate" does not refer to a linguistic configuration, but to world entities which show certain properties. Only if we define it on the basis of its meaning does it become possible to make sense of statements like: "the semantic element 'animate' is expressed, in language L, by morphosyntactic category C".

Eynde and Mertens (2003) follow some ideas put forward by Blanche-Benveniste *et al.* (1984)[19] who, while trying to avoid the use of introspection, devised a process of replacement by pronouns:

> If paradigm P1 conforms to the expression 'le, me, te, *ceci' [...], the referent unites with the feature [+HUMAN]; if P1 conforms to 'le, *me, *te, ceci, celui-ci', the referent unites with the set [-HUMAN, +CONCRETE] [...]
> (*apud* Eynde and Mertens 2003, p. 85)[20]

This amounts to identifying the feature [+HUMAN] with the possible occurrence of certain pronouns. This replacement test can possibly be accepted as a heuristic procedure (for instance, in English *who* refers always to a [+HUMAN] antecedent). But semantic features are much more numerous than pronouns, and even pronouns often do not tell us much—Portuguese *ela* 'she', for instance, may refer to a person (not necessarily female), an animal, a house or a theory.

DICOVALENCE (a French valency dictionary that follows Eynde and Mertens' approach) includes in the frame of each verb only this information about its complements:

> its syntactic function, its obligatory or optional character, its possible syntagmatic realizations and certain selectional restrictions.
> (Eynde and Mertens 2010, p. 5)

As seen, semantic roles are not included, which leaves the system open to the objections made in Sect. 3.3 against Allerton's (1982) proposal.

The difficulties inherent to the study of semantic units and relations cannot be denied; yet semantic elements must be approached directly in their own terms, not as derivatives of formal units and relations. We must eventually relate the forms of the language with the concepts (schemata, frames) that make up our world view. This, by the way, seems to be the opinion of most researchers in the area; we may quote the following passage:

> Given the importance [of thematic relations], it is crucial to find out what they really are, so that they have an independent life of their own. We must be sure we are not invoking them as a thinly disguised wild card to meet the exigencies of syntax.
> (Jackendoff 1987, p. 371)

[19] There is a brief review of Blanche-Benveniste et al.'s book in Winters (1987).

[20] P1 is the direct object, as defined by Eynde and Mertens (2010, p. 31).

4.4.5 An Example: The Process of Elaboration

Let us now examine a more detailed example of the action of the two criteria. In the two sentences

[28] Jim ate a cookie.

[29] Jim baked a cookie.

the semantic relation between the subject *Jim* and the verb in the two cases show similarities and differences. They are similar in that they both express some kind of immediate causation; and they are different in many details of what Jim actually did. The first observation means that the criterion of similarity allows us to assign the same semantic role (Agent) to the subject of both sentences. I will now examine a little more closely the process whereby, from the schematic role Agent, we derive the actual semantic relations (CSRs) in each case.

In order to do this, I make use of a set of (*very* informal) operations that apply to the perceived sequence, and lead to the assignment of the CSRs that are actually understood by the receptor. These operations summarize part of the process of connecting sound (acoustic images) and meaning (concepts). For simplicity, I use written sentences for the acoustic image, and FrameNet-like entries for the concepts.

Take the sentence

[28] Jim ate a cookie.

The receptor's main task is to connect this graphic (or phonetic) sequence with some semantic units and structures. Suppose we have already recognized the form *ate* as a form of the verb *eat*. Then the first step is[21]

Step 1: *ate*→EAT

That is, the form *ate* evokes the schema EAT. This schema has a complex structure, including a set of variables (the "immediate.causator", here the "eater", that is, the Agent; and the "affected.entity", that is, the Patient); once the schema is evoked, its whole structure is activated in the receptor's mind, ready to be used as needed.

FrameNet gives INGEST as the frame corresponding to the lexical unit *eat*, but we can go straight to the more elaborate schema EAT, because of the specific meaning of the verb.

Step 2: *Jim*→ Subject

This derives from the position of *Jim* in the sentence, and follows the definition of subject given in Sect. 2.4.

[21] The process is radically simplified here, of course; I have to omit many intermediate steps in order to bring the exposition to manageable dimensions.

Step 3: Subject → *Agent*

This derives from a diathesis of *eat*, or rather from a linking rule that assigns the subject the semantic role Agent, if no diathesis blocks it.

Step 4: *Agent* ⊃ *"immediate.causator"* ⊃ *"ingestor"* ⊃ *"eater"*

The symbol '⊃' stands for 'is elaborated as'. Since the active schema here is EAT, it allows the elaboration of the Agent into "ingestor", and further into "eater"; in other words, if we know what "eating" is, we also know that the Agent ingests something; more elaborately, the Agent *eats* something—as opposed to drinking, taking (a pill), swallowing, etc., which are also ways of ingesting, but not eating, and cannot be expressed by the verb *eat*. Incidentally, from the same source we learn that the Patient is some kind of FOOD.[22] Now we have a reasonably elaborate mental picture, which tells us in some detail what Jim did: he was the Agent of an event of eating.

Now let us contrast the above example with

[29] Jim baked a cookie.

Step 1: *baked*→ BAKE

This step evokes a different schema, BAKE. Here again, FrameNet gives a more schematic schema, COOKING_CREATION, which in principle includes frying, boiling, etc., besides baking. But since we recognized *baked* as a form of *bake*, we can jump to a more elaborate schema.

Step 2 is identical to the corresponding one for [28], and likewise gives us the syntactic function of *Jim* as the subject.

Step 3 is also identical to the former example: *Jim* (subject) is the Agent.

Step 4 elaborates the Agent in a different way, specific to the active schema, which is now BAKE; thus it gives us

Step 4: *Agent* ⊃ *"immediate.causator"*⊃ *"creator"* ⊃ *"cook"* ⊃ *"cookie.maker"*

"Creator" means that the Agent is not someone who takes something and does something to it, but rather someone who creates something (usually out of raw materials). This is part of the meaning of the verb *bake*, and is necessarily present in its schema.[23]

Now we can compare the two results: these operations start from the same construction for both sentences, and the same semantic role for the subject, with different verbs, and allow the derivation of different semantic structures, based on the difference of evoked schemata. Note in particular how the same semantic role, Agent, can be assigned to the subject of both sentences, without inconvenient, since the elaborations will follow automatically from the different choice of verbs and

[22] This information also comes, redundantly, from the meaning of the object, *a cookie*.

[23] [29] has another reading, which I disregard here: Jim may have taken an unbaked cookie, made by someone else, and baked it.

therefore of schemata. This means that Agent is the correct level of schematicity for the semantic role of the subject in these cases; in other words, assigning Agent to the subject conforms to the Criterion of Necessity.

To conclude, it is never too much to warn that the above operations are not to be conceived as an accurate description of what goes on in the receptor's mind when processing these sentences. They merely describe part of the information that the receptor *can* use when necessary—along with several other resources, not all of them linguistic stricto sensu. To return to an older (but still valid) designation, these operations describe part of the language user's **competence**.

When we take into account factors such as the meaning of the verb, plus other semantic (or pragmatic) elements in the sentence, some traditional problems find a convenient solution. An interesting example is found in Maurice Gross's (1975, p. 31) treatment of the pair of sentences below[24]:

[30] The decorator embellishes the window with bright miniskirts.

[31] The decorator embellishes the window with her bright miniskirt.

M. Gross remarks that in [30] "the decorator embellishes [the window] in an 'active' or 'volitional' way: we imagine her placing miniskirts on some kind of stand", whereas in [31] she "embellishes [the window] in a 'nonactive' or 'nonvolitional' way, with her movements in the window". He goes on to include this opposition as part of the analysis of the verb, assigning the features "volitional" and "nonactive" to the subject.

This is certainly correct as far as observation of facts is concerned. But there is another point to discuss: is this difference **grammatical**—that is, linguistic stricto sensu—or rather something that can be derived from extralinguistic knowledge? Or, said otherwise, is the difference in the role of the subject in [30] and in [31] part of our competence in the language?

Before answering, we may observe that both sentences are, in fact, ambiguous: for instance, in [31] it might be that the decorator brought her own miniskirt to hang in the window as part of the decoration.[25] Then, what we have to explain is not so much as a duality of semantic interpretation as the more prominent interpretation in each of these sentences: why is it that upon hearing [31] we tend to understand that the decorator is wearing the miniskirt? Whatever the answer may be, it has certainly nothing to do with the structure of the sentence: we may argue that when we mention seeing a girl and "her" miniskirt, we normally understand her to be wearing it; and as for [30], in order to understand that she was wearing the miniskirts we must imagine several trips to the window, each with a different miniskirt, which complicates the mental landscape, and would require some kind of preparation in the preceding discourse.

[24] Given here in translation. In the original we read: *la décoratrice enjolive la vitrine de minijupes claires*/*la décoratrice enjolive la vitrine de sa minijupe claire*.

[25] This ambiguity is also noted by Gross.

Our system simply assigns the role Agent to the subject of both sentences, and leaves features such as "volitional" to the care of extralinguistic elaboration, on the lines suggested above. Instead of conceiving of volition factors as belonging to the verb (*embellish*), we argue that these factors arise whenever they are plausible—for instance, volition does not appear with the verb *fall* because we almost never fall on purpose; whereas it is very prominent with, say, *write*. These factors, while important enough for the building of the final landscape, are not linguistic, and have no room in the description of a language.

4.4.6 The Content of Semantic Roles

It is necessary to recognize that semantic roles have concrete content, because they must relate linguistic expressions with schemata. Languages do not organize their semantic roles in a semantically random way. For example, Nahuatl identifies the CSRs "location", "goal", "source", and "path" as one semantic role; but these four CSRs are evidently related, being all "locative". On the other hand, no language is known to group the CSRs "location", "agent" and "manner" in one semantic role. Each semantic role has a coherent semantic content, expressible as a schema, and can be understood as a **set of cognitive semantic relations (CSRs) having features in common**. CSRs are the observable[26] realizations of semantic roles, just as the sounds of a language are observable realizations of its phonemes.

Considering the current state of our knowledge, we currently have no way to ascertain precisely how similar CSRs must be in order to qualify as members of the same semantic role. Only the mapping of large areas of the lexicon will help reveal the tolerance limits defined by each language and, eventually, by human language in general. The result, apparently, will include highly schematic semantic roles (such as Agent), but also more elaborate ones (like the one assigned to *on soup* in *the patient lives on soup*). There is evidence, to be seen in Chap. 9, that both ends of the schematicity axis are necessary in the description of verb valencies.

4.4.7 Decomposition of CSRs

The analysis by properties, which decomposes semantic roles into "affected", "trigger", "stative" and the like (as found for instance in Cançado 2003) can be understood in this context. If a semantic role is analyzable as a set of several related CSRs, a CSR is in its turn analyzable as a bunch of properties—"bunch" because they occur simultaneously, like phonological features composing a phoneme. The properties can be viewed as part of the raw data, that is, components of CSRs, but

[26] By introspection.

also as components of semantic roles: properties, or rather bunches of properties, are also distributed according to different degrees of schematicity. We may ask which properties are relevant in a particular language; for instance, in Nahuatl the property that distinguishes Goal from Location is not grammatically relevant, while it is in Portuguese and English. The list of properties must be inferred from the analysis of many examples. The properties have to appear, then, at different levels of schematicity: as components of CSRs (maximum elaboration) and also as components of semantic roles (maximum schematicity).

Let us return for a moment to the case of Nahuatl. As we saw, this language groups together locative phrases that other languages keep apart: *in Mexico, from Mexico, by Mexico, to Mexico*. These four phrases express four semantic roles of English, respectively Location, Source, Path, and Goal. The Nahuatl speaker is just as capable as anyone else to distinguish these four locative relations; only, his language does not provide *grammatical* resources to express them, so that the distinction is made in terms of context and/or world knowledge, or by using lexical means.[27]

Latin has two prepositions meaning 'from': *e* and *de*. They differ according to a property which is not used in English: *e* expresses a movement from inside something (*e domo* 'from [inside] the house'), whereas *de* expresses a movement from above (*de montibus* 'from the mountains'). Latin, then, can express grammatically one locative relation more than English, which does not mean, obviously, that it cannot be expressed at all in English; but this must be done with lexical resources: *from inside the house*, *from the top of the mountains*.

The five CSRs mentioned, *from (inside)*, *from (the top of)*, *in, to*, and *by*, have something in common, semantically speaking. But each language expresses them at one level of schematicity: Latin has the most elaborate system, Nahuatl the most schematic. It follows that these CSRs are decomposable in their elements. A rough analysis will give us at least the following features:

(1) "locative" (location of an entity in a space)
  (1a) "location" (where it is)
  (1b) "source from above"
  (1c) "source from inside"
  (1d) "goal"
  (1e) "path"

Feature (1) is the most schematic, and includes the other five, (1a)–(1e), which are elaborations of (1).

A natural language must have ways of expressing all these CSRs; but each language selects different resources to do it. Nahuatl only provides the most schematic information, corresponding to (1): the construction informs that one is

[27] Launey (1992, p. 53) explains that *Mexìco huītz* is in principle ambiguous, and may mean 'comes to Mexico' or 'comes from Mexico'. One way speakers solve the ambiguity is by using deictic items meaning 'here' or 'there': *nicān Mexìco huītz* 'comes here to Mexico'.

dealing with a spatial location, and only that. English constructions are more explicit, and can distinguish (1a), (1d), (1e), besides (1b) + (1c). And Latin makes also the distinction between (1b) and (1c). We may describe these facts stating that Nahuatl groups all five CSRs into one semantic role; English organizes them into four, Latin into five.[28]

The situation with semantic roles parallels, to a point, the situation with phonological features,[29] and for the same reason: phonological features also must be rooted in observable data, in this case phonetic facts. According to this conception, a semantic role is a set of CSRs, something formally parallel to the distinction between phones and phonemes in phonological theory.To quote Levin and Hovav,

> In a sense, the use of semantic roles is analogous to the use of features in phonology. Phonological features distill from the wide range of phonetic detail those aspects of sounds which are phonologically relevant. Semantic roles distill from the perhaps even wider range of semantic detail those facts of meaning which are grammatically relevant.
> (Levin and Hovav 2005, p. 36)

Semantic role decomposition into features (properties) is essential if we want to describe the difference between the three languages mentioned above. Furthermore, decomposition is possibly the most promising way to eventually arrive at a descriptively adequate set of semantic roles, for now only a desideratum in grammatical theory.[30]

To sum up, a semantic role is a class of CSRs which the language "decided" to treat as a unit, and to code in the same way. These classes may be large or small, and must have semantic features in common.

4.5 How to Define CSRs

We need to find a way to define the CSRs that appear in constructions, at the adequate degree of schematicity. In a sentence like

[32] He depends on me.

the CSR of the prepositional phrase, *on me*, is difficult to interpret in terms of the usual semantic roles. As we approach the problem, we must first of all examine many cases, because we have no precise notion of the extent of the problem. The search for semantic roles valid in the analysis of a particular language may begin, at least in the less clear cases, by establishing particularized CSRs. From that point we

[28] Actually, more than five: Antônio Martinez Resende informs me that in Latin there is also a preposition to express movement towards a position "close to" (*ad*), and another to express movement from a position "close to" (*ab*).

[29] Chomsky and Halle (1968) speak of the "intrinsic content of [phonological] features".

[30] There are concrete proposals, which may be a starting point for research: Dowty (1991), and for Portuguese Cançado (2003).

look for generalizations in order to set up more schematic semantic relations, which as we saw are essential in grammatical analysis.

The **frame elements** found in FrameNet seem closer to CSRs than to semantic roles proper. Frame elements are defined in particularized terms, like "the person eating or drinking" (frame **Ingestion**) and "the person who causes the Hidden_entity to be not perceptually accessible to potential perceivers" (frame **Hiding_objects**). It is easy to see how this is insufficient for the expression of grammatically significant generalizations. Since the statement of these generalizations is one of our main objectives, it is important to find a schematic relation (say, Agent) equally applicable to the entity that "eats", "drinks", or "hides" something. Even when we deal with particularized CSRs—as is inevitable when we begin the survey—we should look for analogies all the time. For example, we do not have a traditional semantic role for the subject of *assert*, but, whichever it is, it is analogous to the one occurring with the subject of *inform, tell, say, deny*, since it contains semantic ingredients like "action", "linguistic activity" and "transmission of information". If this association of three ingredients proves to be typical, and grammatically relevant, we may eventually group them into one semantic role.[31]

This inductive way of working is not to be taken as a theoretical principle, but rather as a research strategy, to be combined with constant referral to the theories we are building or testing; as has been frequently pointed out, research in our area depends on empirical work as a necessary factor in properly grounding the elaboration of theories. Inductive work, however, does not exclude assumptions. In our case, we can list a few things we already know, or strongly suspect, to be true, such as:

(a) Semantic roles are, in many cases, very schematic, and are not limited to the complement of specific verbs (for instance, several hundred verbs take a complement Agent[32]).
(b) Each semantic role includes a number of distinct CSRs, and correspondingly may associate with many semantically diverse verbs (*eat* and *write* both have Agents).
(c) Some semantic relations are extremely particularized, and associated with few verbs, perhaps to only one each (e.g. the nonsubject complement of *depend*).
(d) In any of these cases, a semantic role can be viewed as a set of CSRs.
(e) A criterion for the definition of a group of CSRs as a semantic role is the possibility of coding this group in a uniform manner within the grammar of the language (criterion of necessity).
(f) Another criterion is the requirement of sufficient semantic similarity between the CSRs involved, so that they can be included in a more comprehensive schema (criterion of semantic similarity).

[31] These are *verba dicendi*, 'verbs of saying'. I analyze the subject of all these verbs as the Agent, leaving the distinctions in charge of the elaboration process, based on the semantics of the verb.

[32] Most frequently the subject (which, for our purposes, is a complement).

These principles direct the research so that, to some extent, we know what we are looking for when we examine the wide variety of CSRs associated with the verbs of the language.

Acceptance of principles (a)–(f) above is, I believe, compatible with the basic position of FrameNet (Fillmore 2007; Ruppenhofer *et al.* 2006). In the FAQ included in the project site we find the question, "Are frame elements unique from frame to frame?" The answer, which refers to frames, not to verbs, is the following:

> Core Frame Elements are unique across Frames. Although something as straightforward as "Agent" will in one frame have very much in common with the "Agent" in another unrelated frame—based on what we all agree to be true about agents—it is also true that the Agent role in each frame is operating within a unique context.
>
> (FrameNet, FAQ data)

The way I read this, "frame elements" refers to CSRs. But it does not deny the possibility of similarities between the several "agents" found in frames; this is more explicitly said in the following passage:

> it is not possible to completely divorce these facts from the semantics of the "do-er", called an Agent for convention and convenience's sake.
>
> (FrameNet, FAQ data)

In the work described here, we are not directly concerned with frames (or schemata). We deal with *verbs*, consequently with semantic roles, which are symbolic relations defined in a particular language. Hence we can accept that CSRs are individual relations, but the language groups many of them into semantic roles, and fails to "see" their differences; this allows us to postulate semantic roles like Agent, Source, Patient, Instrument, etc. As we saw, the differences between the CSRs are eventually understood on the basis of other kinds of information, including nonlinguistic information. In this particular there is no necessary opposition between the position adopted here and FrameNet.

Although FrameNet insists on the uniqueness of frame elements, it does not always follow this principle, and very often the model ends up using generalizations:

> [. . .] F[rame] E[lement]s [are] distinct for each frame, but rather than invent ever newer FE names for each new frame, we can satisfy this requirement by using dotted names that combine the frame name with the FE name: thus Placement.Theme is distinct from Arriving.Theme.
>
> (Fillmore 2007, p. 156)

This use of Theme amounts to recognizing a generalization: the verb *place* and the verb *arrive* associate with the same semantic role, Theme, the "element which undergoes motion": in practice, FrameNet is here using schematic semantic roles in the traditional manner. In other cases, to be sure, generalization is not possible, so that we end up having a scale of schematicity. Given our current knowledge, this seems in fact the best solution. But, contrary to what the passage states, I do not think this is a mere question of terminological convenience: a semantic role is

something theoretically different from a CSR, since it has a tie with the structure of the language, which is not the case for CSRs.

When using and defining semantic relations, it is important to keep the distinction between the features of the linguistic structure and the final comprehension of the utterance. It is true, as we have seen, that the frame relations that connect subject and verb in *the boy tore the document* and in *the boy folded the document* are different; this is a fact, not to be contested. But this does not mean that there is a semantic difference stricto sensu between the two cases—the difference arises when we elaborate the schematic relation provided by the linguistic structure (which is based on our knowledge of the language) by adding to it features of our knowledge of the world. That is, there is a difference, but it is not linguistically based—for instance, it does not come from features of the structure of English. The difference arises as a consequence of a global understanding process, involving linguistic knowledge, plus integration into a broadly cognitive mental landscape.

4.6 Categorization and Semantic Roles

Let us pause for a moment to consider exactly what is a semantic role. It can be viewed as a class of CSRs, functioning as a unit for grammatical effect. For instance, the semantic role we call Agent will appear in actual utterances under the form of CSRs like "eater", "killer", "writer", etc.[33] All these CSRs have some properties in common, found in the literature under the names **controller**, **nonaffected**, **trigger**, etc. In order to detect these general properties, and use them to define semantic roles, we must examine many examples, involving a wide variety of verbs. Agent, for instance, represents a number of different CSRs, and is defined by means of the properties all these CSRs have in common.

Now, if we find a CSR which is associated with only one or very few verbs, the identification of properties, and in particular the definition of semantic roles, becomes specially difficult. For example, the CSRs that occur with the complements of the verb *depend* (*he depends on you*), or the prepositional phrase in *she deprived her children of comfort* are very limited in occurrence, which leaves little choice but to characterize them as "entity.that.depends.on.something", "thing. someone.is. deprived.of", and the like, which sound like the repetition of the CSR itself. But there are clear cases of generalization, such as the Agent. We saw that these generalizations are crucial for the formulation of semantic hierarchies. A semantic role is a class of CSRs—or, to be more precise, a selection of features or properties of a set of CSRs.

This is, of course, one aspect of the general process of categorization that human beings apply to their perception of the world, in order to reduce it to a picture that

[33] Or rather as even more elaborate relations—for instance, the "writer" is not the same thing in *he wrote a new book* and *he wrote his name all over the wall*.

fits into memory and can be manipulated with some ease. In a universe full of CSRs, each language groups some of them to be treated as if they were one unified thing. In a similar way, homo sapiens learned to class wolves, tigers and mammoths as "animals", and animals and men as "animated beings"—a category that is grammatically relevant in some languages. In a certain measure, then, language reflects the categorization system created by the primate's mind to account for a task that, rigorously speaking, should be impossible, namely, to mentally represent, and store in semantic memory, all received stimuli.

These categorizations are not random. For instance, it would be possible, in principle, to distinguish words in classes according to their having pleasant or unpleasant meanings; or being soft or hard; or existing in the immediate environment or only in far away lands, etc. But no language uses any of these categorization bases; instead, most languages distinguish words denoting things (nouns) and words denoting events (verbs). Languages can also use categories without much basis on reality, like the distinction between grammatical genders in nouns, found in many languages.

4.7 Discussing Examples

4.7.1 Causator and Agent

I have so far assumed that the semantic role Agent is not defined as a *volitional* causator. That is, we have Agent in the following sentences:

[33] Charlie opened the door.

[34] The wind opened the door.

There are, however, doubts about this analysis. In order to conflate these two CSRs (volitional and nonvolitional causator) into one semantic role, we must show that they function identically for all constructions of the language. But there is at least one construction where they seem to be in opposition[34]:

[35] * The door opened with Charlie.

[36] The door opened with the wind.

A way to capture this fact would be to postulate two semantic roles, say Agent (coded as the subject of [33]), and Causator (subject in [34] and prepositional phrase in [36]). According to this analysis, the construction illustrated in [36] includes a Patient (*the door*) and a Causator (*with the wind*), but no Agent.

But there is an alternative, which to me seems preferable. We can show that *with the wind* in [36] has a different semantic role from *the wind* in [34], which would

[34] I owe this observation to Luana Amaral.

free us to call the latter Agent. And there is in effect evidence that the semantic roles are different in these two cases: I will argue that *the wind* in [32] is an Agent, but *with the wind* in [36] is an Instrument. If this analysis is correct, we will have an explanation for the unacceptability of [35], based on the semantic inadequacy of *Charlie* as the Instrument for opening the door.

First of all, the preposition *with* systematically occurs with verbs marking the role of Instrument; as a matter of fact, *with* is the most frequent Instrument marker:

[37] The door opened with a kick.

[38] The door only opened with a crowbar.

Instrument occurs in the same sentence with an Agent, as in

[39] The thief opened the door with a crowbar.

If we cannot say

[40] * Camilla opened the door with the wind.

this is because of the strangeness of a person manipulating the wind. But we have

[41] Camilla dried the clothes with the afternoon wind.

[42] The captain brought the boat safely into the bay with a favorable wind.

It is even possible to add an Instrument to [34]:

[43] The wind opened the door with a violent gust.

which shows that *the wind* here is not an Instrument. This entails that [43] is not thematically synonymous[35] with

[44] A violent gust of wind opened the door.

These sentences evoke very similar events, it is true; the resulting mental landscapes are very similar. Nevertheless, this landscape is expressed in different manners: if in [43] we understand that the gust is of wind, it is because of what we know of such situations; the sentence does not *say* that the gust is of wind.[36] Similarly, in [43] the wind opened the door, and in [44] a gust of wind opened the door: we have here two grammatically different ways to evoke the same scenario.

Furthermore, in the most natural interpretation Agent would be an elaborated version of Causator, i.e. a special type of Causator. If we understand it in this way, then it becomes problematic how to explain the unacceptability of

[35] "Thematically synonymous" means "having the same verb, and the same phrases with the same semantic roles". This notion selects, from the whole of the semantic structure of a sentence, just those features that are relevant for the description of valency. Other semantic structures, associated with non-semantic role bearing constituents, can vary independently of valency factors, and are correspondingly disregarded here.

[36] Besides, in English the word *gust* is almost exclusively used in reference to the wind.

[35] * The door opened with Charlie.

by the hypothesis that it contains a Causator, because a Causator would impose less constraining conditions on a constituent's occurrences. Wherever an Agent occurs, a Causator would have to occur (not vice-versa); and a constituent that can be an Agent can also be a Causator. But in [35] unacceptability would be due to the presence of a phrase, *Charlie*, that can be an Agent (as [33] shows), but not a Causator, a situation that should be impossible in principle.

Thirdly, it has already been observed that the ergative construction typically does not accept the expression of the Agent: it is in fact one of the resources available in the language for its omission. If [36] has an Agent, this will be an exception to explain:

[36] The door opened with the wind.

These arguments show that ***with* NP** in the sentences examined have the semantic role Instrument, not Agent. Consequently, these sentences are not counterexamples to the hypothesis that English identifies the "volitional agent" with the "nonvolitional agent" as a single semantic role.[37]

I conclude that the subject of [33] is an Agent, and the same for the subject of [34]; and that "volitional" is not one of the features defining the semantic role Agent.

4.7.2 Agent and Experiencer

It has frequently been noted that there are constructions in which Agent and Experiencer are coded identically; for instance, they are both expressed by the subject in

[45] The boy hurt the cat. [Agent]

[46] The boy saw the cat. [Experiencer]

This parallelism extends to other constructions, like the passive, and to nominal constructions like

[47] The boy's hurting the cat (showed how cruel he was). [Agent]

[48] The boy's seeing the cat (showed that his eyesight was good). [Experiencer]

The semantics of the construction is different in each case: in [45] and [47] we have an action, while [46] and [48] express a perceptual event; the cat is affected by the event in [45] and [47], not in [46] and [48]. And there may also be similarities, as we shall see in a moment. Schlesinger (1992), paying attention only to the similarities, proposed some features to express the analogy between Agent and

[37] Exactly the same reasoning applies to Portuguese.

Experiencer (also Instrument).[38] Without going into details, I will only say that Schlesinger's argumentation, based on tests, does not seem convincing.

There is at least one important point in which the coding of Agent and Experiencer shows a difference. It is known that the Agent is never expressed by an object (nonsubject NP); but the Experiencer is an object in sentences like

[49] The phantom scared the damsel.

[50] This film pleased all audiences.

This is the case with many verbs: *amuse, anger, delight, fascinate, frighten, irritate, please, scare, surprise, trouble, worry*... If we identify Agent and Experiencer, we will have to explain this exception, which affects psych-verbs, whereas verbs of action comport no exception at all. Another difficulty is the wide semantic difference between the CSRs "agent" and "experiencer", which makes the vinculation of both to one schema problematic. In any case, simply identifying these two relations as one semantic role does not work, because of cases in which the Experiencer is the object. I think it is possible that the real similarity between Agent and Experiencer is that in both cases there is a strong tendency to assign them to constituents that refer to human (or perhaps animate) entities: this may be at the base of their syntactic similarities. Another possibility is simply that there are (as shown in Sects. 8.2.1 and 8.2.2) two linking rules, one relating the semantic role Agent with coding as the subject, the other doing the same for the Experiencer.

Another piece of evidence against identifying Agent and Experiencer comes from pairs of sentences like

[51] João decepcionou a turma.
'João disappointed the class'

[52] A turma decepcionou.
'the class was disappointed' [lit.: the class disappointed]

The Experiencer (*a turma* 'the class') behaves similarly to the Patient, not to the Agent that occurs in pairs like

[53] João quebrou o copo.
'João broke the glass'

[54] O copo quebrou.
'the glass broke'

Furthermore, the Experiencer is the entity that undergoes some kind of change, which again places it as parallel to the Patient, not to the Agent. And the causator of the event is the Agent in [53], and the Stimulus in [51].

These observation strongly suggest that we should keep all these four roles separate: Agent, Patient, Experiencer, Stimulus.

[38] Levin and Hovav (2005, p. 8) report a similar conclusion arrived at by Rothstein (1983).

4.7.3 Time and Location

A classic case of apparently distinct semantic roles coded in very similar ways is the expression of "time" and "location". We have here two families of CSRs, each including (in time and space, respectively) "location", "source", "goal", and "path". In Portuguese, as in English, the parallelism is very close:

[55]a. Ela mora em Chicago. 'she lives in Chicago'
b. Ela nasceu em 1988. 'she was born in 1988'

[56]a. A estrada tem quatro pistas desde Chicago.
'the road has four lanes since Chicago'
b. Ela trabalha aqui desde 2004. 'she works here since 2004'

[57]a. Ela viajou até Chicago. 'she traveled until Chicago'
b. Ela dormiu até as duas horas. 'she slept until two o'clock'

[58]a. Ela passou por Chicago. 'she passed through Chicago'
b. Ela passou pela juventude sem fazer nada de útil.
'she passed through (her) youth without doing anything useful'

[59]a. O velho atingiu o outro lado da rua.
'the old man reached the other side of the street.
b. O velho atingiu os cem anos. 'the old man reached a hundred years of age'

The similarity in coding is impressive: the language uses not only the same prepositions, but to some extent the same verbs to express space and time. Some authors (like Jackendoff 1972, 1983) saw in these facts sufficient reason to identify both fields, establishing only one set of semantic roles: Location, Source, Goal and Path, all valid for the spatial as well as for the temporal fields. The idea is that space relations are experientially more basic, and provide a model for the coding of relations that are more abstract, or less directly observable, like "time" (and also "possession", according to Taylor 2002, p. 506).[39]

On the other hand, it is true that there are different words to ask about time and location: Portuguese *quando* and *onde*, English *when* and *where*. Adverbs also tend to be specialized: *aqui* 'here' is used for "location" only, although *aí* is used for both "location", meaning 'there', and "time", meaning 'then'. And we have different verbs to express time and space extensions: *durar* 'last' (time) and *morar* 'live, reside', *ficar* 'stay' (space). But these facts do not force us to split the semantic roles, because they have to do with the semantics of lexical items, not with the relations between the verb and its complements. To take a parallel example, we can ask the Agent with *who* or *what*:

[39] An author who takes the analysis of semantic relations in locative terms to some extremes is Anderson (1971).

[60] Who opened the door?

[61] What opened the door?

but this is no reason to distinguish human Agents from nonhuman ones. The relation between subject and verb is *grammatically* the same in the two sentences, and we can assign Agent to the subject in the two cases; the relation will be elaborated starting from that schematic relation, plus the semantics of the lexical items.

It is known, by the way, that lexical items make much finer semantic distinctions than grammatical categories like semantic roles (we saw some examples in Sect. 4.4.2); this is a function of the massive number of existing lexical items, as compared with the scant resources available to the grammar. If we consider only grammatical resources, we see that "time" and "location" are expressed largely by the same elements. But there are areas in which they differ; Pontes (1992) points out that the Portuguese preposition *a* is much more frequent in the temporal meaning than in the spatial.[40]

Bennett (1975) studied the conditions under which English prepositions express time and space, with interesting results, meaning that he asks the right questions, although I often disagree with his answers. Bennett recognizes five "cases" (that is, for us, semantic roles) which he takes as relevant to the expression of spatial relations: "locative", "source", "path", "goal", and "extension". These cases subclassify the locative prepositions in the language: *above* expresses the "locative", *to* expresses the "goal", *from* the "source", *across* the "path", *for* the "extension".[41] From there, Bennett tries to ascertain whether those five relations also work for the temporal dimension. The answer is, generally speaking, affirmative:

> For instance, the sentence *I saw Gwyneth at 10 o'clock* locates the event of 'my seeing Gwyneth' at a particular point in time; and *We were walking through the forest for two hours* indicates the temporal extent of 'our walking through the forest'. Clearly, then, it is necessary to invoke [locative and extension] cases in relation to time.
>
> (Bennett 1975, p. 94)

It may be asked, then, if we can simply transfer spatial relations onto temporal relations, unifying both as one set of semantic roles. Bennett answers in the negative, though, and claims that some semantic roles are valid only for the spatial field:

> [. . .] there are a number of respects in which the temporal analysis will not parallel the spatial analysis. To a large extent this asymmetry is the result of two well-known properties of time, its unidimensionality and its unidirectionality.
>
> (Bennett 1975, p. 95)

[40] Locative *a* tends to disappear in Brazilian usage, except in connection with *de*, to express a Path: *essa estrada vai de Curitiba a São Paulo* 'this road goes from Curitiba to São Paulo'.

[41] These are typical uses; many prepositions can express more than one "case", for instance, *across* is "path" in *they ran across the street*, but "locative" in *I live across the street*.

This explains why some prepositions are used only spatially: *behind, in front of, to the right of*, etc. Bennett claims that

> As far as time is concerned, [these] possibilities have no equivalent.
> (Bennett 1975, p. 95)

But what we have here is an effect of world knowledge—something recognized by Bennett, but not fully taken into account in his conclusions. There is certainly no need to mark temporal unidimensionality or unidirectionality as grammatical or lexical features of the language. Application of the Simpler Syntax principle allows us to eliminate these factors from description: we can claim that spatial prepositions can also express time, but a preposition like *behind* does not occur temporally because it is, in that field, expressively useless (what does *behind August 5th* mean?).[42] Bennett, not considering this principle, points out the fact that we can reverse the order of complements in [62] without changing the basic meaning of the sentence, although in [63] this is not possible:

[62] The Mall goes from Buckingham Palace to Trafalgar Square.

[63] My course goes from March to June.

But this is due to the unidirectionality of time, mentioned by Bennett—something which is not a feature of the English language, but rather of time itself. If we say, instead of [63]

[64] My course goes from June to March.

we will be speaking not of a four-month course, but of a course lasting ten months (say, June 2014 to March 2015). And the sentence

[65] * Darwin lived from 1882 to 1809.

has nothing *linguistically* strange or ill-formed about it.[43]

An apparent argument against the identification of "time" and "location" as one semantic role is the existence of specialized lexical items like, in Portuguese, *durar* 'last' as in *a tempestade durou duas horas* 'the storm lasted for two hours' and *morar* 'live, reside' as in *eu morei na Austrália* 'I lived in Australia'. Since these items select time and location, respectively, it might be concluded that these CSRs must represent different semantic roles. There are several arguments to be raised against this position.

First, let us observe that what selects "time" and "location" without lumping them together are lexical items, not grammatical processes. As we saw in Sect. 4.4.2, lexical items express much more elaborated concepts than grammar is able to. Thus, the Patient of *drink* must be a liquid substance, and the Patient of *eat*

[42] *Behind* does occur with a temporal reference in other contexts, such as in *we fell behind schedule*.

[43] As for the use of * for pragmatically deviant sentences, see Sect. 1.6.2.

is solid—which does not lead us to distinguish these properties as separate semantic roles. The semantics of *drink* is such that the sentence

[66] * He drank all the crackers.

must be unacceptable because it results in an anomalous cognitive representation (the wrong "mental landscape"). *Drink* has in its semantic matrix something like "ingest liquid food"; it is incompatible with a Patient which we know to be solid. In other words, the unacceptability of [66] does not result from grammatical ill-formedness, but from a cognitive anomaly rooted in world knowledge and in the meaning of *drink*.

Now let us consider

[67] * Eu morava em 2004. *'I lived (resided) in 2004'

The explanation is parallel with the case of *drink*. The semantic matrix of *morar* includes the information that it expresses a relation of location between two entities. This is essential to the meaning of this verb: one "lives (resides)" necessarily in a place. But [67] contains a constituent, *em 2004*, which cannot refer to a place; therefore, it is marked as pragmatically ill-formed. Just as we analyze the objects of both *eat* and *drink* as Patient, we can call Location the complements of both *durar* 'last' and *morar* 'live'. A sentence like [67], then, can be considered grammatically correct. It is anomalous at another level: when we come down to the full understanding of *em 2004* we learn—because of the meaning of *2004*—that the reference is to "time", not "location", which causes the perceived anomaly.[44]

By the way, calling the semantic role Location does not mean that we understand time as if it were location. This is just a convenient label for a more schematic notion. The *semantic role* Location is defined as "location in time or space", and neither the spatial nor the temporal area is viewed as predominant; the same applies to the related semantic roles Path, Source, Extension and Goal. In a sentence like

[68] A tempestade durou duas horas. 'the storm lasted (for) two hours'

the interpretation process may start with the assignment of Extension to the complement *duas horas* 'for two hours'. From this the receptor will enrich the mental landscape in the usual way, elaborating the relations with base on the semantics of the verb and on world knowledge. Eventually, a detailed representation is reached, taking into account the semantics of *durar* 'last', which stipulates that this verb establishes a relation between an entity and the period of time during which it was in effect. Since *duas horas* 'for two hours' can denote a period of time, the resulting mental landscape is well-formed, and the sentence is perceived as acceptable. The same semantic role appears, then, in

[69] A fazenda se estende por dois municípios. 'the farm extends over two counties'

[44] See also Sect. 1.7.1, example [47].

I do not take the question as definitely settled; but the examples we examined strongly suggest that temporal and spatial CSRs should be analysed as only one set of semantic roles (Location, Goal, Source, Path, and Extension). The problem still merits attention; for the moment, though, I will conclude, with Pontes, that:

> when we think of time, we start from our conception of space and project spatial distinctions to talk about time. The latter is, then, conceived as "a place", as points in space, as a line, as undergoing motion.
> (Pontes 1992, p. 84)

4.7.4 Three Types of Patient

Now let us consider the following sentences:

[70] O José rasgou meu livro. 'José tore my book'

[71] Ludwig compôs uma nova sonata. 'Ludwig has composed a new sonata'

[72] A mãe acariciou o bebê. 'the mother caressed the baby'

The object in each of these sentences is normally analyzed as the Patient. But if we look more closely, we will find very clear differences in the relation expressed in each case. It has long been recognized that so-called Patients may be of (at least) three types: **affected Patients** are elements that undergo some change as a result of the event denoted by the verb: this is the case of [70] above, where the book changes state and becomes torn; **result Patients** come into being as a result of the event: it is the case of the sonata in [71]; and **contact Patients** participate in an event which does not result in change of state, nor in the appearance of a new entity: we have this situation in [72].[45] Our question now is: Can we nevertheless analyze all three as examples of the semantic role Patient? Or do we need three separate semantic roles?

Examination of the examples strongly suggest that we can use only one semantic role (Patient), the differences being explained by the semantics of the verbs involved. Thus, if we know what *acariciar* 'caress' means, we will not be able to interpret its object as a result Patient (since this verb does not express a creative act), nor an affected Patient (since it does not express the causation of a change of state). We are left with a contact Patient, and that is the CSR we attribute to this constituent.

When a verb can denote more than one of these kinds of events, the corresponding sentence is ambiguous, as expected. This happens with

[73] Ele rabiscou um bilhete. 'he scribbled a note'

In Portuguese, this may mean that he composed a note hastily, or that he took an already written note and crossed it out. Another example is

[45] Cf. Jespersen (1924, p. 159); also Fillmore (1970a).

[74] Mom baked the bread.

which may mean that Mom created a bread out of flour, etc., or that she took the bread which was ready but raw and put it in the oven; in the former case we have a result Patient, in the latter an affected Patient.

These ambiguous examples are admittedly in small number, but I think their message is clear: whenever a difference in CSRs can be readily derived from the semantics of the verb (apart from its valency), there is no reason to describe that difference as part of the meaning of the construction. A distinction between, say, affected Patient and result Patient is superfluous as part of the lexico-grammar of the language.

A final question is, How do we define the Patient in a sufficiently schematic way as to cover these three CSRs? I have no really satisfactory answer to this question, but I suspect it may have to do with the degree of activity of each participant, perhaps something in the line of Talmy's (1988) Agonist vs. Antagonist dichotomy. It is important to attempt a general definition, since, as seen before, a semantic role is a schema, and must have cognitive coherence; for the moment, though, I have no choice but to leave this point open here.

Chapter 5
Core CSRs

The idea to be developed in this chapter is that CSRs can be related to their schemata in two ways, which we may call **core** and **peripheral**. What follows is somewhat programmatic, but some suggestive results are already available, so that it is more than just speculation. The distinction is important for certain mechanisms of semantic coding, in particular coding by default (Chap. 9).

5.1 Core and Peripheral CSRs

To start with an example, let us take the schema COMPLAIN. This schema includes several CSRs, which appear as accompanying constituents to the corresponding verb, *complain*. The list can include "agent", "time", "location", and a relation which we will call "motive", all present in the sentence

[1] Rita complained about Roger yesterday in the kitchen.
agent motive time location

There are reasons to believe that these CSRs are not equally salient cognitively. Some of them are part of the definition of *complain*—or, more precisely, are ingredients that help distinguish the schema COMPLAIN from other schemata. The others, although they are compatible with the schema, do not characterize them against other schemata expressing some kind of action. The meaning of *complain* has ingredients marking it as a verb of action, invented[1] in order to express the relation between an agent of SAY and an element (a person, thing, or event) about which the agent expresses an unfavorable opinion (the "motive").

[1] I use this metaphor to express the basic informational function of this element. *Complain* is a verb of communicative action, or *verbum dicendi*, and what I call here the "motive" is probably the Content of the message.

M.A. Perini, *Describing Verb Valency*, DOI 10.1007/978-3-319-20985-2_5

The action of complaining must happen in time and space, and it may accommodate modifications of manner, company, etc. But none of these circumstances characterizes *complain* as a unique item, being instead common to a wide range of schemata denoting action, event, or state. Returning to the informal characterization used above, the verb *complain* was not invented to express the place or the moment in which an event occurs, but to relate, in a specific way, an agent and a motive of complaint.

We will see that the distinction between definitory CSRs (called **core CSRs**) and **peripheral** CSRs may be fundamented on empirical data; and it seems intuitively reasonable. Besides, the core/peripheral opposition, or very similar ones, appears frequently in the literature; for example, Bugarski's (1968; *apud* Bennett 1975, p. 2) distinction between tight and loose constructions, as well as the degrees of cohesion mentioned by Chomsky (1965) seem to me to arise from the same perception of coreness in CSRs. Chomsky's passage deals primarily with syntactic cohesion, but he also mentions semantic relations when he states that in the sentence *he decided on the boat on the train*

> the second Prepositional-Phrase [...] is simply a Place Adverbial, which, like a Time Adverbial, has no particular connection with the Verb, but in fact modifies the entire Verb Phrase or perhaps the entire sentence.
>
> (Chomsky 1965, p. 101)

We can mention in this context the traditional distinction between one-place predicates, two-place predicates, etc., which take only core relations into account. Fillmore (1970) says that the difference between KILL and DIE is that the former has two arguments and the second only one. He is obviously considering core semantic relations, because these schemata (and their corresponding verbs *kill* and *die*) may co-occur with complements of time, location, manner, etc., which for some reason do not count.

Another example is found in Dik (1980, 1989), who starts from a similar idea when he distinguishes the **nuclear predicate-frame**, "which defines [the predicate's] most important semantic and syntactic properties" (1980, p. 5). As seen, he lumps together syntactic and semantic properties, which I prefer to consider separately. Dik (1989) makes an opposition between the nuclear frame and **satellites**, which are "terms that provide additional information" (*apud* Santana 2009).

Pustejovsky (1995) represents the semantics of *lend* as

lend [...]
CAT = verb
SEM = R_o (θ_1, θ_2,θ_3)
ARGSTR = ARG_1 = **np** [+ financial_institution]
ARG_2 = **np** [+ money]
ARG_3 = **np** [+ human]

(Pustejovsky 1995, p. 35)

It is symptomatic that Pustejovsky does not include time or location in the definition of *lend*, although a loan always occurs somewhere and sometime. What

he does is select the CSRs with definitory value for the verb in question, disregarding the ones that express more general circumstances. For the verb *live* (as in *I live in Manhattan*), location would be core, since this verb was invented to relate a located entity (generally human) and a location.[2]

Jackendoff (1990, p. 45) represents the semantics of *run* as an **event** made up of the **motion** (GO) of a **thing** in a **path**. He does not mention that this event must necessarily take place in a moment of time, and can include circumstances of cause, purpose, and manner. The latter semantic ingredients are left out because they are not part of the individual characterization of *run*—in our terms, because they are not core elements.

Langacker, speaking of the verb *slap*, states that

> one cannot conceptualize an act of slapping without making some kind of mental reference to the entity doing the slapping and the one receiving it [. . .]
> (Langacker 1991, p. 286)

and refers to these entities as "salient facets of [the verb's] semantic structure", which entails the recognition of other, not so salient, facets.

Culicover and Jackendoff say that

> As part of its meaning, a verb specifies a certain number of semantic arguments—entities intrinsically involved in the situation that the verb denotes.
> (Culicover and Jackendoff 2005, p. 173)

It is the case to ask what "intrinsically" means in this context.

The same restriction to certain CSRs is found routinely in dictionaries. For instance, Borba's (1990) dictionary of regencies of Portuguese gives for *matar* 'kill' a subject agent/causator and an animate object, without mentioning time or location, elements essential to the action of killing, but which are not core.

Something very similar, perhaps identical, to the distinction between core and peripheral CSRs is the distinction between **core** and **peripheral frame elements** included in FrameNet:

> We classify frame elements in terms of how central they are to a particular frame, distinguishing three levels: **core**, **peripheral**, and **extra-thematic**. [. . .]
>
> A core frame element is one that instantiates a conceptually necessary component of a frame, while making the frame unique and different from other frames. For example, in the Revenge frame, AVENGER, PUNISHMENT, OFFENDER, INJURY, and INJURED_PARTY are all core frame elements, because an avenging event necessarily includes these participants. One cannot imagine an act of revenge that is not preceded by a (perceived) offense or one that is not directed against anybody.
>
> (Ruppenhofer *et al*. 2006, p. 26)

This has certainly to do with the core/peripheral opposition. But there is a difference: the explanation in terms of necessary inclusion is not sufficient, because any revenge also must occur at some time and place, and yet Ruppenhofer *et al*. do not include these CSRs as part of the core of the frame REVENGE. Note that the

[2] This applies more rigorously to the Portuguese verb *morar*; English *live* has a wider semantic value, including 'be alive'.

opposition core/periphery must be understood as purely cognitive (or semantic). Ruppenhofer *et al*., however, state that "[w]hen an element has to be overtly specified, it is core." [p. 26]—but this is a syntactic criterion, and cannot be used in the definition of a semantic function.[3]

Talmy (1996, p. 238) apparently has the same opposition in mind when he speaks of "conceptual elements and interrelations" that can be viewed as components of an event frame, as opposed to other elements which are "weakly evoked, or not evoked at all".

As seen, the opposition core/peripheral appears very frequently in the literature, and may be considered classic. It has apparently to do with a strategy of cognition which selects some features as definitory, perhaps in a functional sense: for instance, a verb exists primarily in order to account for a specific task.

As for schemata proper, it has been observed that

> the knowledge most often needed is also the most directly available and is, so to speak, right at the surface of the schema. Other parts of the schema are "deeper" and take longer to retrieve.
>
> (Hirsch 1987, p. 57)

Hirsch refers to Collins and Quillian (1969), who showed experimentally this difference in availability; I will relate below an experiment that shows essentially the same.

5.2 Empirical Evidence

5.2.1 Degrees of Cohesion

An observation that shows the grammatical relevance of the distinction between core and peripheral CSRs is the interpretation of Portuguese sentences like

[2] O Daniel está pensando em Brasília.
Daniel is thinking (in) Brasília
'Daniel is thinking about Brasília'

The constituent *em Brasília* contains the preposition *em*, which is prototypically a locative marker; but it also appears with some verbs as an introductor of complements with other semantic roles: *pensar* 'think', for instance, requires *em* before its Content complement (here *em* translates as *about* or *of*). Therefore, sentence [2] might be expected to be ambiguous: 'Daniel is thinking in Brasília' or 'Daniel is thinking about Brasília'. Yet this ambiguity does not appear, at least

[3] It would be significant to find that core elements are always necessarily overt—but this statement does not make sense if "core" is *defined* using conditions on overt occurrence. Incidentally, the statement is not true: core elements can be omitted in many cases (e.g., *the girl is reading*), and there are cases in which peripheral information must be present (see examples in Sect. 1.7.2.2).

not immediately; it takes some effort to even detect the locative reading of *em* in this sentence.

In other cases the locative reading arises readily:

[3] O Daniel está pensando dentro do banheiro.
Daniel is thinking inside the bathroom
'Daniel is thinking in the bathroom'

Here the preposition is *dentro de* 'inside', which marks a locative but, unlike *em*, cannot mark the Content of the thought with the verb *pensar*. If the locative reading is possible in principle, and seems to be the unmarked one for this preposition, why is the contentive reading the one that arises in [2]? My answer is that, for *pensar* 'think', "content" is a core CSR, and there is a much greater urgency in filling it, as if it were felt to be more fundamental for the completion of the meaning of the sentence than a locative CSR. That is, the verb *pensar* was invented to relate an Agent with a Content, and when there is doubt between the Content and some other semantic role, Content is preferred, barring syntactic or pragmatic indications to the contrary. Location is peripheral with *pensar* 'think', as it is with most verbs.

If the distinction is real, and if it is centered on the semantics of the verb, we should expect peripheral constituents (that is, those that express peripheral CSRs) to be always represented by semantically transparent phrases: those which, either because of the preposition, or because of their own semantics, can express only one semantic role. Otherwise, there would be no way to assign semantic roles to them, since they have no semantic relationship with the verb, not being represented in its valency. Now, core CSRs can be represented formally by opaque constituents—for instance, by NPs—since their semantic relation is specified by the verb in its valency. This is recognized in the FrameNet handbook:

> A frame element whose semantics cannot be predicted from its form, in particular from any marking prepositions, ought to be core since its interpretation completely depends on the target [e.g., on the verb/MAP].
> (Ruppenhofer *et al*. 2006, p. 27)

In the sentence

[4] Eu pensei muito em você em Berlim.
I thought a lot about you in Berlin [lit.: . . . in you in Berlin]

the second prepositional phrase, *em Berlim*, which is peripheral, is where the preposition *em* shows its prototypical reading, that is, Location. In other cases, transparency is total, as when the constituent is introduced by *por causa de* 'because of', which is necessarily Cause, or when the lexical item itself is transparent, like *ontem* 'yesterday' or *rapidamente* 'quickly'.

Cases like *em Berlim* 'in Berlin' in [4] show that transparency is not a simple notion.[4] Certainly, the peripheral character of *em Berlim* in [4] has to do with the co-occurrence of *em você* 'about you', which preempts the available core slot.

[4] We will study in Chap. 7 the interplay of transparency with prototypicity, stated by linking rules.

Another factor to keep in mind is that, with prepositional phrases, transparency does not depend *only* on the preposition: with *pensar* 'think', *na menina* 'in/about the girl' must be Content, whereas *na cozinha* 'in/about the kitchen' is easy to understand as Location; these cases are examined in Chap. 7. Now, core constituents may be transparent or opaque. *Em você* 'about you' is opaque because it has the preposition *em*, not a prototypical Content marker; yet it marks the semantic role Content, which only appears with some verbs (like *pensar* 'think'), possibly always as core.[5]

These facts suggest that core constituents are semantically linked to the verb in a particularly intimate manner, as opposed to the "external" connection shown by peripheral constituents. The latter, not being able to rely on features of the meaning of the verb to determine their semantic relations, are on their own, so to speak. So-called adverbs are usually transparent: *today*, *here*, *immediately, well,* etc. An NP is normally opaque, having no markers to refer to a specific semantic role. In a few cases, one semantic role may appear as prototypical of an NP, as in *a semana passada* 'last week'.[6] Correspondingly, peripheral elements represented by NPs are rare; when occurring, they probably get their semantic role by default, as in *eu vi ela a semana passada* 'I saw her last week', where *a semana passada* 'last week' must be "time" because otherwise it will lack a semantic role, since both Experiencer and Stimulus are already occupied by other NPs.

5.2.2 Designing Experiments

The distinction between core and peripheral CSRs was stated above in largely programmatic terms, but we should not exclude the possibility of obtaining concrete data. Faced with the necessity of using introspection as a source of data, we may want to apply control procedures to warrant, as far as possible, the objective character of the results. An available procedure is the application of tests, such as suggested for instance by Schütze (1996) and Cowart (1997).

The purpose of the tests is to corroborate the existence of internalized knowledge of the difference between these two types of relations, given a specific verb. A possible test is to ask the subjects to devise sentences including certain verbs. Suppose the verb to be tested is *eat*: it is to be expected that CSRs like "agent" and "patient" will appear much more frequently than "location" or "manner". If so,

[5] This situation is reflected in English with *think* in *I think of you sometimes*, as against *I think about you sometimes*, where the preposition is prototypically a Content marker. In Portuguese, the Content marker is *sobre*, unambiguously 'about' (the locative reading of *sobre* 'on' is archaic in Brazilian Portuguese).

[6] In English *last week* is not properly an NP, for it lacks a determiner. In Portuguese, *a semana passada* has the internal structure of a normal NP; but we also find *semana passada*, without the article, used only as a marker of "time" (Bolinger 1992, studied these "adverbial NPs" in English and Spanish).

the results will be compatible with the idea that these are specially salient semantic relations, and this can be interpreted as evidence for their status as core. This test has been carried out, and the results are reported in the next section. Another factor, not subject to tests but directly verifiable, is the degree of generality of each element: which CSRs characterize one verb, or a small set of verbs, and which are valid for all verbs, or for a large class of verbs (such as verbs of action)? The results of production tests and those of degree of generality do not need to coincide, but if they do they will give us stronger evidence for the core status of some semantic relations.

It is important to stress that the recognition of semantic features such as the coreness of semantic relations does not *depend* on testing; testing provides evidence in its favor, but semantic features can be accessed only through introspection. Tests have recourse to the introspection of several persons, thus increasing our degree of certainty about something we can "feel" individually.

Some authors apparently have hopes of defining semantic features formally. Thus, Faulhaber, after observing, correctly, that

> The general difficulty is that it is impossible to exclude a certain degree of subjectivity when assigning semantic roles.
> (Faulhaber 2011, p. 13)

proposes an instrument which to my mind can be accepted only as a heuristic resource:

> If a certain complement type is typically an alternative to another complement type (irrespective of the meaning of the verb), i.e., if it regularly commutes with it but not in combination with a specific verb, this restriction might throw light on possible semantic properties of that complement type.
> (Faulhaber 2011, p. 23)

Faulhaber, however, apparently accepts this procedure as decisive for the identification of semantic features, which I find inadequate.[7]

5.2.3 *Experiment: Free Production of Sentences*

The test just mentioned was carried on by Lima, Pinha and Perini (ms), and the results authorize some interesting conclusions; a description follows.

Eighty verbs were selected for testing, taken from the list of most frequent verbs of Brazilian Portuguese. Seventy-nine subjects (undergraduates in the Letters program of UFMG) were asked to freely produce sentences using each of these verbs. Each subject received 40 verbs, randomized to avoid a fixed order of presentation, and produced 40 sentences, one for each verb. After eliminating

[7] Faulhaber's position is in this point analogous with that of G. Gross and Blanche-Benveniste, criticized in Sect. 4.4.4.2.

irrelevant examples (sentences not including the verb under test, passive sentences, etc.), this resulted in a corpus of a little over 2400 sentences.

Each sentence was analyzed in terms of the expressed CSRs. For the purpose, CSRs were defined at a relatively schematic level, close to their (presumed) semantic roles. This was done to allow comparison between the verbs; thus, the object of *eat* and of *build* were both analyzed as Patient. In some cases it became necessary to distinguish more than one meaning of a verb, so that the number of tested units is a little superior to the number of verbs; for instance, the CSRs associated with the verb *considerar* were distinguished into the readings 'take into consideration' (*vou considerar a sua proposta* 'I will consider your proposal') and 'regard' (*considero Ronaldo um grande jogador* 'I consider Ronaldo a great player'). This does not contradict our previous decision of counting verbs by their phonological representation (Sect. 1.5) because here we are really concerned with core and peripheral elements of the schema, not of the verb properly.

The percentage of phrases that include each CSR with each verb (or verb reading) was verified. For instance, the CSR "agent" occurred in 100 % of the sentences with the verb *abrir* 'open'; the CSR "time" occurred in only 2.6 % with the same verb (total number of sentences with *abrir*: 38). This was interpreted as evidence that "time" is more peripheral than "agent" for *abrir* (or, rather, for the schema OPEN). The complete distribution of CSRs found for *abrir* is the following:

agent 100 %; patient 100 %; addressee 7.9 %; beneficiary 7.9 %; cause 2.6 %; time 2.6 %. [N: 38 sentences]

Note the sharp division between a group of CSRs with a very high percentage of occurrences ("agent" and "patient") and a marginal group ("addressee", "beneficiary", "cause", and "time"). This bears out Talmy's hypothesis mentioned above, that there are "conceptual elements and interrelations" that can be viewed as components of an event frame, as opposed to other elements which are "weakly evoked, or not evoked at all" (Talmy 1996, p. 238).

This difference in strength of evocation corresponds to the idea that core elements are more readily available for retrieval than peripheral ones. "Agent" and "patient" integrate the frame of events evoked by *abrir* 'open', whereas the other CSRs are weakly evoked, and do not participate in the characterization of this frame of events. It must be pointed out that this is not dependent on the entailments of each schema: an opening event necessarily occurs in some point in time, yet the CSR "time" was expressed only in 2.6 % of the examples.[8] All six CSRs are compatible with *abrir*, of course, but some factor causes their probabilities of occurrence to be radically different.

The situation seen for *abrir* is typical, and occurs with most verbs in the list. Of all verbs studied, 69 % show a definite concentration on one or two CSRs.[9] The remaining 31 % show a less radical concentration, but even so it is always possible

[8] That is, in one example out of 38 sentences.

[9] That is, when it is possible to define a group of CSRs whose higher percentages differ in less than 20 % among them, and in more than 50 % from the set of the lower percentages.

to distinguish a group of CSRs with very low occurrence. It is the case of *assustar* 'startle, frighten', which occurs with the following CSRs:

patient 93.7 %; agent 65.6 %; cause 25 %; manner 9.4 %; time 6.2 %; instrument 6.2 %. [N: 32 sentences]

The problematic CSR with *assustar* is "cause", which shows an intermediate rate of occurrence. Further study may show that for some verbs there is an intermediate category between core and peripheral CSRs, at least as long as free production of sentences is concerned. In any case, the results make it clear that the connections between verbs and CSRs—and eventually semantic roles—are not all at the same level.

Like any experiment, the one just described has its limitations. It shows very eloquently that the opposition between core and peripheral CSRs, with the possibility of an intermediate category, has empirical basis. On the other hand, it is not very useful as a survey of the distribution of CSRs among existing constructions, because the procedure (free production of one sentence per subject) strongly favors more immediately accessible, and more frequent, constructions. We may want to complement experiments like this one with a survey of examples from corpora, as well as with informal search for sentences in the traditional way.

5.2.4 Core CSRs and Lexical Extension

One factor that may correlate with coreness is the extension of a CSR in the lexicon; the hypothesis is that CSRs compatible with a wide variety of schemata tend to be peripheral. One example is Location, which is compatible with (and, in fact, entailed by) any schema referring to events, such as EAT, FALL, RAIN, etc., yet it does not seem to be a core CSR for these schemata. This may have something to do with the fact that Location, having such a widespread occurrence, does not usually contribute to characterizing schemata as individual units.

On the other hand, Location is probably core with RESIDE, as we see in sentences like

[5] A minha tia mora em Portugal.
my aunt lives in Portugal.

In this case, the defining power of the CSR with this verb and schema is evident: the verb *morar* 'live, reside' was invented in order to relate a person with a location, and this is essential to its meaning.

I am aware that this is a rather imprecise way of defining coreness. But it contains more than a grain of truth, and may be supported by a survey of the lexicon. We may investigate the degree of agreement between core CSRs as intuitively identified (by tests like the one described in Sect. 5.2.3) and the width of distribution of each CSR in the lexicon. A high correlation, if present, will be strong evidence in favor of the conception of core vs. peripheral CSRs. For the moment, I must leave the question open, as something worth looking into.

Chapter 6
Coding Semantic Relations

6.1 A Preliminary Note

Before approaching the question of the coding of semantic relations (that is, their association with the constituents of the sentence), some considerations are in order about what, exactly, is associated with what.

We usually speak of "coding the Agent as the subject", and equivalent expressions, but this is a convenient abbreviation for a more indirect relation. In a sentence like

[1] Mary helped Jim.

we talk about *Mary* being the Agent, *Jim* the Patient, and in most cases (not all) no inconvenient ensues. But in fact the role of Agent is not associated with the NP *Mary*—this association happens at a cognitive level, that is, as part of the construction of the mental landscape. The subject in [1] evokes a schema, MARY; by reference to the verb, *help*, plus the syntactic function of *Mary*, the role Agent is associated with that schema. In other words, we understand that Mary (the person, not the phrase or the word) is the Agent of the denoted action, HELP.

In this example, the usefulness of the distinction for the analysis may not be too evident. But this is so only because the relations between sentence constituents and schemata in sentences like [1] are pretty direct. In other cases the distinction is crucial, and this will become evident when we approach complex and reciprocal constructions. As will be seen in more detail in Sect. 6.6 below, in

[2] Pete moved the chair away from the table.

we have two events: the movement of the chair away from the table, and the action of Pete, who touches the chair (not the table) and does something to it. That is, the chair appears twice, although we only have one occurrence of the NP *the chair*; here we are dealing not with the linguistic unit *the chair*, but with the corresponding schema. In such cases the distinction made above is essential for a correct analysis

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of what we understand when we hear [2]: one, Pete did something to the chair; two, the chair moved away from the table. This can only be expressed if we attach semantic roles to the schemata; since the schema CHAIR appears twice (in Event 1 and again in Event 2), it can, and does, receive two separate semantic roles—here, Patient and Theme. I return to this point below, and it will hopefully become clear enough.

6.2 Coding Semantic Roles

As we know, besides the problem of defining and delimiting semantic roles, we must consider the question of coding them as constituents of a sentence. But before approaching the details of the coding system, let us reflect a little on the place of this system within the general workings of the language. This is a major point, and needs some elaboration.

The coding system aims at making explicit the association between the constituents of a sentence and their respective CSRs.[1] The constituents provide the identity (for instance, the reference) of each participant, and several mechanisms allow us to associate a CSR to each of the participants. Or, otherwise said: the system has as its aim filling in (binding) the variables of a schema evoked by the verb.[2] The system has then a unique aim, and a unique result, namely, to establish **constituent/CSR** pairs, exhaustively covering all relevant constituents of the sentence.

To detail: faced with the sentence

[3] The dog bit the boy.

the language user must build a mental landscape containing, among other things, the following pieces of information: (a) the sentence reports an event; (b) the event occurred in some unspecified location; (c) the event occurred at some point in the past; (d) the dog, not the boy, used his teeth; (e) the boy underwent contact with the dog's teeth; (f) the boy was probably hurt, etc.

Part of this information comes directly from the schema BITE, evoked by the verb form *bit*. This schema refers to an event, more precisely an action, definable as "grasp with the teeth"; in general it is understood that some force is exerted. The schema BITE contains a set of variables, each of them defining the relation of the event with one of its participants.[3] But there is some information that the schema BITE cannot provide. For instance, [3] leaves it clear that the event occurred in the

[1] Keeping in mind the qualification seen in Sect. 6.1: this association is mediated by the schemata involved.

[2] In certain cases, by a nonverbal element, as in the case of light verbs; see Sect. 6.5.

[3] "Participant" is to be taken in a broad meaning, sometimes including circumstances of location, time, etc., and even identity of reference (as in *that blond woman is Susan*).

past, but this cannot come from the schema, which is neutral in that respect; this piece of information comes from the verb form.

We still lack two crucial pieces of information, that the dog used his teeth and that the boy took the biting, not vice versa: (d) and (e) in the above list. Again, the schema alone does not help. What does help is the syntactic structure of the sentence: in [3] the verb *bite* occurs in a diathesis where the subject is an Agent and the object is a Patient. This is part of the process of variable-binding in the schema which, as we know, includes a tooth-using entity and an entity that takes the biting. The function of the diathesis is to give us indication about how to fill in the variables of the schema, and this indication is provided by mechanisms that code semantic roles as complements. These mechanisms must be understood as part of a general process of construction of the mental landscape, i.e., of utterance comprehension. It is important to keep this in mind mainly because, contrary to common belief, language users employ several different resources in order to carry out that task.

6.3 Role-Coding Mechanisms

In example [3] it is the valency of the verb, *bite*, that provides the hints for relating the constituents *the dog* and *the boy* with their semantic roles, respectively Agent and Patient: that is, semantic roles are here coded according to the properties of a governing word, which in this case is the verb. This situation is normally understood as typical, perhaps the only possible one—an idea implicitly accepted in many studies in the area. An example is Baker's (1988) proposal, named UTAH, which only considers the possibility of assigning a semantic role to an item by another item or constituent. See also the possibilities of syntax-semantics mapping mentioned in Haegeman (1991, p. 61), Levin and Hovav (2005), Goldberg (2006, p. 39), Matthews (2007), where only the governing item is mentioned as a determining element. In general, the possibility is not considered that in some cases the verb[4] may have nothing to do with the complement's semantic role.

In what follows I call into question this general belief, and suggest that several different factors may be involved in semantic role coding, although coding controlled by a governing term is possibly the most frequent situation. Research has already shown several cases in which semantic role coding depends on other factors. Limiting ourselves to sentential structures, the possible situations are the following:

1. Cases in which the semantic role is syntactically coded by reference to the valency of the main verb (this is the classic case, universally recognized).

[4] As opposed to other elements such as the evoked schemata, and the inherent semantic potential of prepositions and phrases.

2. Cases in which the semantic role is determined by a preposition, independently of the verb of the sentence.
3. Cases in which a (nonprepositional) phrase has inherent semantic role, independently of the syntactic context.
4. Cases in which the main verb is light, and semantic roles are syntactically coded, partly, on the basis of a nonverbal complement.
5. Cases in which semantic role coding results from a linking process, which associates certain CSRs preferentially with certain syntactic functions.
6. Cases in which the constituent depends, semantically, on more than one schema evoked by the main verb. These are semantically complex constructions, where a single clause must be analysed semantically as a complex of propositions.
7. Cases in which some complements receive their semantic roles—or rather their CSRs—by default, following a principle of giving preference to core CSRs over peripheral ones.

While the existence of some of these mechanisms is little news, I am not aware of an approach considering them all, as a set of mutually complementing devices. And some of them are not, to my knowledge, as much as mentioned in the literature.

The resulting picture is much more complex than generally admitted. These seven[5] coding mechanisms form a battery of resources to be used according to the occasion. Some of them exclude others, as is the case with cases 2 and 3 (cases of semantic transparency of constituents). But other mechanisms are in competition; thus, there are cases in which the semantic role can, in principle, be coded through mechanisms 1 or 3. In these cases both resources are probably available to the language user, who will activate one or the other according to the convenience of the moment. Role-coding is, then, an opportunistic process, capable of adapting its strategy to the context. The process itself is, evidently, part of the user's performance, but the mechanisms that make its functioning possible belong to language knowledge; they are elements of competence, and must be described as part of the structure of the language.

Levin (1993) voices an opinion that seems to be adopted, without much criticism, by other researchers:

> [. . .] the behavior of a verb, particularly with respect to the expression and interpretation of its arguments, is to a large extent determined by its meaning. Thus verb behavior can be used effectively to probe for linguistically relevant pertinent aspects of verb meaning.
> (Levin 1993, p. 1)

We have to agree that the determination of the verb's arguments, that is, the particular list of semantic roles associated with each verb, is a function of its meaning. But in what regards the way each semantic role is coded in syntactic structure, close examination of the data reveals so many particularities that we have to take Levin's statement only as a vague and general working hypothesis, not as a fact of the language. Yet Malchukov *et al*. (internet) say that Levin's book

[5] That is, the seven already identified; there may be others. I have focused on factors having some relation to grammar.

> shows that a semantic classification of verbs can be achieved through applying syntactic diagnostics.
>
> (Malchukov *et al*., internet, p. 1)

and Taylor (2002) voices the hope that semantics can always be taken as a reliable guide to morphosyntax:

> The expectation [. . .] is that the syntactic (and morphological) facts of a language will be *motivated* by semantic aspects and that they can be exhaustively described by means of symbolic structures.
>
> (Taylor 2002, p. 29; italics in the original)[6]

In this book it is shown, to the contrary, that the symbolic relation between semantic relations and their syntactic expression varies considerably for verbs of similar meaning—which, however, does not preclude the existence of clear tendencies and hierarchies defining preferential association between semantic roles and syntactic functions. In other words, the facts are complex, and in no way can we say that syntactic features are a reliable index of semantic classes.

As we saw, semantic roles are but a resource for the coding of CSRs, which are ingredients of comprehension, that is, of the final understanding which the receptor achieves after processing the perceived signal. There are indications that semantic roles do not always appear as a necessary step in this process; in certain cases the CSR is mapped onto a constituent by direct reference to the schema. In such cases, it must be stressed that the objective of the whole process is attained: the linking between a constituent and a CSR is established, and eventually integrated into the final mental landscape that makes up the understanding of the utterance.

I proceed now to a preliminary explicitation of each of the mechanisms in the above list. Some of them will have to be studied in more detail, which will be the topic of later chapters.

6.4 Coding by Verb Valency

This is the classic case normally recognized in the literature: a semantic role is coded as a particular constituent on the basis of its syntactic function and the valency of the main verb of the sentence.

The syntactic functions of the NP are **subject** and **object**. I call **object** any nonsubject NP, since as far as I can see there is no reason to distinguish syntactically other functions of the NP in the sentence.[7] What we have in the sentence, then,

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[6] Taylor's position cannot be taken as valid for cognitive linguists in general: see, for instance, Langacker (1987b, p. 53), where a more moderate view is expressed.

[7] For semantic role coding it is enough to tell subjects from any other NPs; see Chap. 2 above, and discussion in Perini (2008, section 4.1, 2008). For the special case of so-called **predicatives**, see Perini and Fulgêncio (2011). **Object** is, actually, a convenience term, not to repeat "nonsubject NP" all the time; in the notation of the diatheses what appears is just **NP**.

syntactically, is a subject, one or more objects (that is, all other NPs), and other terms referred to either in a concrete manner, through mention of the preposition (*in* NP, *with* NP, etc.) or through the form class (Adjective Phrase, Adverbial Phrase). This means that we can, in some cases, have more than one object in a single clause; this is no inconvenient because their semantic potential, and sometimes their ordering, is sufficient to distinguish them for the purposes of the description.

This coding mechanism depends, naturally, on a list of verbs and valencies (a valency dictionary), which is part of the structure of the language. Each verb in the language is associated with a certain number of diatheses, and the set of diatheses of a verb constitutes its valency. There is some insistence in the literature on defining valency as merely the statement of the *number* of complements of a verb, without mention of their syntactic and semantic representation; this is behind designations like **monovalent**, **bivalent**, and **trivalent** verbs. This conception of valency (which comes from Tesnière 1959) is of little interest, and leaves too much to be expressed. For instance, some authors speak of bivalent verbs—but what is a bivalent verb? A verb like *drink* does occur with two complements (*the cat drank the milk*), but also with only one complement (*her husband drinks*); *look* also has two complements, but not two NPs as *drink*, because one of the complements is a prepositional phrase (*I looked for you*)—and so on. Calling both *drink* and *look* "bivalent" is not very informative, and besides is incorrect, because *drink* can also appear with only one complement.[8] For these reasons, some linguists nowadays consider not only the number of complements in each diathesis (not each *verb*), but also the much more important issues of their syntactic functions and semantic roles.

The opposition **subject/object** is dominant in semantic role coding in cases like

[3] The dog bit the boy.

We have here an Agent and a Patient; and the identification of each depends on the syntactic function (subject or object) of the constituents *the dog* and *the boy*. The verb *bite* has in its valency a diathesis defined as composed of **subject Agent** and **object Patient**; and, since [3] admits the analysis as **subject+verb+object**, and the verb is *bite*, semantic roles are coded with basis on that diathesis: the subject is Agent, the object is Patient.

Now consider the sentence

[4] Barbara is our best teacher.

Syntactically, there is no reason to analyze *our best teacher* as anything but an object. What distinguishes this constituent from the object of [3] are semantic

[8] Herbst and Schüller (2008, p. 137) classify verbs according to their *maximum* number of complements, and thus escape this objection. But again, one may ask what is the special relevance of the diathesis that shows most complements?

factors, which led grammarians to devise the "syntactic" function of predicative. But it is not an autonomous syntactic function, as shown in Chaps. 2 and 10.[9]

The mechanism of role-coding by verb valency is crucial for all cases where the complement is an NP, since NPs are never thematically transparent. But verb valency can also be decisive for other types of constituents, notably prepositional phrases when the preposition is particularly opaque. Thus, with *gostar* 'like' the Stimulus is preceded by the preposition *de*: *ele gosta de cerveja* 'he likes beer'; but with *apanhar* 'be spanked' the same preposition introduces the Agent: *ele apanhou de uma vizinha* 'he was spanked by a neighbor'; and with *se aproximar* 'come near' *de* introduces a Goal: *ele se aproximou de mim* 'he came near me'.

6.5 Light Verb Constructions

The examples seen above suggest that semantic role coding is a deal between the verb and its complements. The verb provides the specification of the event or state and the complements specify the participants—what Tesnière (1959) called the **actants**. This appears in a passage we have already seen:

> grammatically relevant facets of a verb's meaning are represented by a list of labels identifying the role that each of the verb's arguments plays in the event it denotes.
> (Levin and Hovav 2005, p. 35)

This is the general idea, which clearly underlies usual formulations, in particular the proposed lists of possible semantic roles, and seems to be in the basis of the study of valency. This is no doubt adequate in many cases, possibly most; but there are important exceptions. In the classic case, the verb specifies the type of event or state denoted, whereas complements and adjuncts provide the participants and circumstances involved in this event or state. With so-called **light verbs**, however, the specification of the event seems to be shared between the verb and a complement.

6.5.1 Semantic Functions of the Verb in the Sentence

The verb performs several important semantic functions in the sentence. Among these functions, we can select the following three as specially relevant for our discussion:

Lexical semantic function: to specify the nature of an event or state, often in minute detail.

[9] This claim about the predicative is valid for Portuguese. I give English examples here, but I would not like to be held accountable for the details in every case.

Role-finding function: to identify a set of CSRs associated to the meaning of the verb.
Symbolic function: to assign each of these CSRs to one of the complements.

The symbolic function characterizes the syntactic contexts in which a verb can occur. The verb *eat* performs these three functions in the following way:

Lexical semantic function: *eat* denotes an action consisting in putting something solid in the mouth and swallowing it for feeding purposes.
Role-finding function: *eat* associates with an "agent" and a "patient".
Symbolic function: *eat* codes the "agent" as the subject, and the "patient" as the object.[10]

The lexical semantic function is what is usually known as the "meaning" of the verb. This function is carried out without the help of elements external to the verb; that is, the lexical semantic function associates directly with the verbal lexeme, not with its complements. The lexical semantic and role-finding functions are a direct consequence of the fact that *eat* evokes the schema EAT, and have to do with the schema rather than the verb. The symbolic function, however, crucially depends on the identity of the lexical item *eat*, and cannot be derived from the schema.

6.5.2 Exceptional Verbs

According to the usual notion, the verb is a sort of semantic axis of the sentence, and the complements[11] provide the reference for the occupants of semantic roles. Now we will examine some verbs for which this arrangement seems to fail.

One of these verbs is *undergo*, as in

[5] The player underwent a surgery.

Here we have a subject with the feature **affected**, which we can analyze as a Patient. The subject receives its semantic role in this sentence in the normal way, based on the symbolic function of *undergo*.

But the object, *a surgery*, does not fit into any of the usual semantic roles. Instead, this constituent seems to have **lexical semantic function**, that is, it specifies the kind of event evoked by the sentence—a function normally performed

[10] In the transitive construction: *o rato comeu o queijo* 'the mouse ate the cheese'. In the passive, coding is different, but this is only an apparent exception, because in a sentence like *o queijo foi comido pelo rato* 'the cheese was eaten by the mouse' there is no occurrence of the verb *comer* 'eat', but of a nominal related to *comer* by derivation; I have shown this for Portuguese in Perini (2008, 2010). For English, of course, the analysis may be different.

[11] Sometimes confused, terminologically, with arguments—for instance in the quote from Levin and Hovav seen above. I prefer to reserve the term **complement** for a morphosyntactically realized term of the sentence; an **argument** is a semantic ingredient.

by the verb, not by a complement. It seems, then, that the event specification in [5] is split, and the verb takes charge of the information that there is a Patient involved; but the kind of event (a surgery) is informed by the object.

The situation is very different in

[6] A lion ate my goat.

where the object contributes nothing to specify the kind of event, which is totally contained in the verb *ate*.

In [5], the verb has the role-finding and symbolic functions, but it is deficient in what respects the lexical semantic function. This can be seen clearly by comparing [5] with other sentences with the same verb:

[5] The player underwent a surgery.
[7] The player underwent torture.
[8] The project underwent a reformulation.

Each of these sentences expresses a different kind of event, although the verb is the same. The event is specified by the object; as a matter of fact, *undergo* always occurs with an event-denoting object:

[9] * The player underwent the coach.
[10] * The old lady underwent a foot. (OK . . . *foot treatment*, which is an event)

The verb *undergo*, then, although not totally devoid of lexical meaning, is somewhat impoverished as to that function.

6.5.3 Light Verbs

Other verbs show impoverished lexical meaning. For instance, turning to Portuguese examples,

[11] Eu dava um passeio toda manhã.
I gave a walk every morning
'I took a walk every morning'

In this case the meaning of the sequence **verb+object** may also be expressed by a specialized verb, with full lexical meaning:

[12] Eu passeava toda manhã.
'I walked every morning'

The semantic analysis of [12] is identical to [11] as far as the arguments are concerned: in both cases we have an Agent and an action, and that is all (the time adjunct does not interest us here). In [12] this is coded in the regular way, only with subject and verb; but in [11] there is in addition an object, which serves to complete the lexical meaning of *dar* (here, corresponding to English *take*). Verbs that behave like Portuguese *dar* and English *undergo* are called **light verbs**, and are defined like

> A verb with little or no semantic content of its own which combines with a (usually indefinite) direct object noun or NP which itself expresses a verbal meaning.
> (Trask 1992, p. 160)

The lexical semantic aspect is adequately expressed in Trask's definition; but we still need to examine the consequences of the semantic poverty of light verbs on the definition of semantic roles.

Scher (2003) defines the light verb construction by using the following criteria:

> (I) The main verb is semantically vague;
> (II) the complement (represented by a nominal) has as its head an action noun, generally a deverbal one, which really predicates about events;
> (III) there is, in general, a paraphrase between the light verb construction and the simple verb that corresponds to the nominal head.
>
> (Scher 2003, p. 205)

This is basically Trask's definition, plus the possibility of a paraphrase as a test. The paraphrase test, to be sure, functions very precariously, because it is subject to lexical unpredictability (see below). As for the specification of the event, Scher notes, correctly, that it does not depend only on the verb:

> In all cases, [. . .] the nominal element seems to be really responsible for denoting the event expressed by the sentence.
> (Scher 2003, p. 206)

Semantic role coding in these cases does not work in the ordinary way. According to Scher, with light verbs

> The verb [. . .] does not seem to be responsible, or at least not the only responsible factor, in the association of thematic roles with the argument NPs of sentences. The real responsible factors [. . .] seem to be the nominal elements [. . .] which, together with the light verb [. . .] compose complex predicates.
> (Scher 2003, p. 208)

I agree with Scher in the above points, to which we return below.

Trask's definition, stating that a light verb has "little or no semantic content", suggests the possibility that some have little, and others have none. In fact, a quick perusal seems to show that some verbs are "lighter" than others. Thus, *dar* in [11] assigns the role of Agent to the subject, and that is apparently all (besides expressing tense, aspect, person, etc.). Now, in

[13] Eu levei uma surra da Mathilde.
I took a beating from Mathilde

the verb *levar* 'take' does more than mark the subject as Patient, because you cannot *levar* a kiss, or some help; the restriction seems to be that the event must be not only unpleasant, but even harmful to the patient. One cannot say

[14] * Eu levei uma cirurgia do doutor Júlio.
I took a surgery by dr Júlio

although it is OK if we substitute *um tapa* 'a slap' for the surgery.

Duarte *et al*. (internet) sought to specify the semantic and syntactic contribution of each component in the sequences of light verb plus nominal; they summarize their position as follows:

> [. . .] both light verb and derived noun seem to contribute to the properties of the complex predicate, in such a way that argument structure and attribution of thematic roles are determined by both constituents through the combination of their thematic structures.
> (Duarte *et al*., internet, p. 1)

Something like the combination of thematic structures does in fact happen. We have now to specify how this combination takes place. Duarte *et al*. attempt to state the combination, but their analysis is open to certain objections. They point out, correctly, that

> C: light verbs, but not auxiliary verbs, impose restrictions on the semantic selection of the subject.
> (p. 2)[12]

In fact, light verbs not only determine selectional restrictions, but also assign semantic roles to certain constituents (e.g., *undergo* has always an affected subject); in this they differ from auxiliaries, which are neutral as to these factors.

Another distinctive feature of light verbs, according to Duarte *et al*., is

> A: possibility of paraphrasing the sequence <light V + deverbal N>with a main verb, morphologically related to the noun.
> (p. 2)

There are many cases in which this paraphrase is possible, although it does not always result in identical meanings for the two sentences. But in other cases the verb is unquestionably light and there is no main verb to base a paraphrase. This depends on the presence in the lexicon of a suitable item, which is largely accidental: *dar uma varrida* 'to give a sweeping' is an (approximate) synonym of *varrer* 'sweep', but *sofrer uma cirurgia* 'undergo a surgery', *dar uma gafe* 'commit [lit. 'give'] a social blunder', *levar uma bronca* 'take a scolding' have no synonymous verbs. At most, the existence of such a paraphrase may be one of the indications that a verb is light; it cannot be a criterion for identification.

> D: light verbs keep part of the meaning of their homonyms.
> (p. 3)

The same example shows that this is not true: we do not find in *dar um passeio* 'take a walk' any of the fundamental semantic ingredients that characterize *dar* 'give' as a full verb. This seems to be a typical situation.

> E: the light verb external argument controls the event denoted by the derived noun.

[12] I keep the authors' alphabetic references (A, B, C, etc).

(p. 3)

This again works in some cases, not in others. As we saw, *dar* as a light verb assigns the subject ("external argument") the role of Agent, that is, controller. But this property does not extend to all cases: with *sofrer* 'undergo' the subject is Patient, and has no control on the event.

F: the light verb is sensitive to the argument structure of the deverbal noun it combines with.
(p. 4)

One of the examples given is *ter*, which as a full verb "combines preferably with deverbal nouns which do not select a *source* argument [. . .] except when the *source* argument denotes an embedded event with a culmination point or a resulting state". The examples given seem to involve "goal", not "source": * *O João teve uma promessa à Maria* '*João had a promise to Maria'.[13]

But *ter* does not make this requirement: in *o João teve algum auxílio do governo* 'João had some help from the government' the deverbal noun is *auxílio* 'help', which does select a "source". The passage is not very clear, but from what I understand of it I have to disagree with this criterion; the feature is occasional, not systematic as Duarte *et al*. suggest.

Part of the objections above will be removed if we define a light verb as only those that co-occur with a nominal having a cognate verb which provides the paraphrase. In this case, *dar* will be light in *o Pedro deu uma corrida* 'Pedro ran [lit. gave a run]', since there is a cognate verb *correr* 'run', but *sofrer* will not (by this criterion) be light in *o jogador sofreu uma cirurgia* 'the player underwent a surgery', where there is no synonymous full verb. But if we adopt this solution we will not be speaking of light verbs, but rather of V+NP sequences, or complex predicates as Duarte *et al*. call them. A complex predicate would be defined in terms of a nongrammatical factor, the existence in the lexicon of an adequate verb that paraphrases it. The light verb phenomenon, which is here described in terms of the presence of a constituent (other than the verb) characterizing the denoted event, would have no place in their analysis. Besides, tying the definition of light verb to a morphological connection subject to lexical accidents will split the category, leaving outside verbs that behave, syntactically and semantically, like those that are considered "light".

To summarize, the attempt to show parallelism between light verbs and their full homonyms does not work. Duarte *et al*. deny that light verbs are functional or auxiliary elements. They are right in this point, as certainly a light verb is not the same as an auxiliary; and it is not a main verb either, at least not of the common variety, which is responsible for specifying the denoted event—an important semantic feature that can be used as a basis for a better definition.

[13] Underlining as in the original; the authors probably refer to the constituent *à Maria* 'to Maria', which is a Goal.

Which brings us to the question, What is a light verb? A light verb be defined as a third category, separate from full verbs and auxiliaries, characterized by the following features:

(a) The verb selects a constituent with the syntactic function of object,[14] whose semantic function has to do with the specification of the denoted event. This semantic function can be represented as a semantic role, called **Event Specification** (**EvSpec**).
(b) The symbolic function of the verb is limited to defining the semantic role of the subject.[15]
(c) The semantics of the verb is impoverished in comparison with its full homonym (if any), and with full verbs in general.[16]

Features (b) and (c) require further research, because they were arrived at by the examination of a small number of verbs, and may have to be reformulated; but the general idea is tolerably clear. Furthermore, (c) is pretty vague, but its presence in all cases seems to me unquestionable, and as we saw is normally recognized in the literature.

6.5.4 Event Participants

Semantically, a sequence of **light verb+object** functions as a simple verb. In

[16] Eu levei uma surra.
I took a beating

where the Agent is omitted, we have an event with only one overt participant (*eu* 'I'); and in

[13] Eu levei uma surra da Mathilde.
I took a beating from Mathilde

we have two participants: the Patient, *eu* 'I', and the Agent, *da Mathilde* 'from Mathilde'—in spite of the additional presence of an object NP, *uma surra* 'a beating', which does not contribute to the list of participants, but specifies the event. That this is the situation is clear from sentences like

[17] Eu apanhei. 'I took a beating'
[18] Eu apanhei da Mathilde. 'I took a beating from Mathilde'

where the participants are the same as in [16] and [13], respectively. Whatever the function of *uma surra* 'a beating' in [16] and [13], it is different from the function of

[14] I.e., a nonsubject NP.

[15] The verb sometimes defines some other features such as "event unpleasant to the Patient"—but this is part of the lexical semantic function.

[16] I speak of 'homonyms', but of course it is just another function of the same verb.

the phrases that add a participant to the resulting mental landscape. Another example are the sentences

[19] Eu espirrei.
I sneezed
[20] Eu dei um espirro.
I gave a sneeze

which are very close synonyms, although one of them has an object that does not appear in the other. These examples support Scher's (2003) claim that the semantic function of this constituent is to identify the event we are speaking about; we will express this property through the semantic role **EvSpec**.

6.5.5 Event Specification as a Semantic Role

Let us compare the ways symbolic coding works in sentences with and without light verbs. We saw that in the sentence

[21] I sneezed.

there is only one expressed argument (the Agent, expressed by the subject); and the event is totally expressed by the verb, which also assigns the subject its semantic role.[17] And in

[5] The player underwent a surgery.

we find again only one expressed argument (the Patient, expressed by the subject *the player*). As for the expression of the event (in the case of *undergo*), it is shared by the verb and the object, as follows:

The verb is responsible for number, aspect, tense, and person; and it assigns semantic role to the subject (here, Patient).
The object specifies the essential part of the lexical semantic function, including details of the event: in [5], a surgery.

The CSR of the object *a surgery* must be something like "event specification". Although the semantic function of this CSR looks a bit different from the more usual ones we are accustomed to ("patient", "agent", "source"...), the grammatical mechanism is similar: the semantics of this constituent elaborates the semantics of the verb. If "event specification" is a CSR (and, eventually, a semantic role), it is because the complement it is attached to restricts the meaning extension of the verb—and this is the function of complements in general. Just as *eat* has a more schematic reference than *eat a cookie*, (light) *take* is more schematic than *take a walk*. Syntactically, the situation is analogous in the two cases, and semantically the

[17] We might then say that EvSpec is a semantic role of the verb in these cases.

difference is in the degree of schematicity of the verb. The difference between cases of light verbs and of sequences of nonlight verb plus object is that the semantic role of the verb is much more reduced with a light verb, and elaboration is left to the object to a greater extent.[18]

It is true that *a walk* in *take a walk* is not properly to speak a participant of the event, because it denotes the event itself. But, in any case, participants expressed by semantic roles cannot be understood only as dramatis personae, because we accept semantic roles like Quality, Location, and also identity of reference (which I note as **αRef**),[19] in sentences like

[22] That blond woman is the director.

The semantic role of both *that blond woman* and *the director* is αRef because this sentence asserts the referential identity of these two elements. At least in the present state of research, I think we must accept a pretty wide variety of semantic relations as CSRs and semantic roles.

Thus, the valency of *undergo* includes the diathesis

VSubj>*Patient* V NP>*EvSpec*

Semantic roles must be lexico-grammatically relevant, as this is the base of the distinction between them and CSRs. Now, the semantic relation I am calling EvSpec must appear in the valency of certain verbs, and not in the valency of other verbs, thus subclassifying them: the object of *eat* is a Patient, the object of *undergo* is an EvSpec. Consequently it makes sense, for purposes of valency description, to treat EvSpec as a semantic role. As a bonus, this provides us with a short semantic definition of **light verb**: it is a verb that accepts, in at least one of its diatheses, a complement with the semantic role EvSpec.[20]

The sharing of tasks between a light verb and its object has been observed by some authors—for instance, Scher (2003), mentioned above. Jun (2003) proposes a system of semantic unification between the complement and the verb:

> the C[ognitive] S[tructure] of the nominal, instead of serving as a semantic argument of the light verb, is unified with the CS of the verb as a whole. The composite CS has an argument

[18] The difficulty in using a light verb without an object certainly comes from its excessively schematic meaning: it violates Grice's (1975) maxim of quantity.

[19] αRef does not identify with Quality. To quote Lemaréchal (1989, p. 31), we have to distinguish between [a] "propositions where the predicate introduces a supplementary attribute", as in *Pete is a doctor*, or *Pete is tall*, and [b] "propositions where the predicate constitutes already the designation of a substance previously identified and where the predication amounts to indicating that this substance is identical with the one designated by the subject", as in *Pete is the doctor*. The former are here expressed by the role Quality, the latter by αRef.

[20] Syntactically, a light verb is probably regular. An object like *a walk* in *I took a walk* cannot be resumed by a pronoun (*I took a walk; and *I took it yesterday morning*), but this can be readily described by stating that a phrase with the semantic role EvSpec cannot be resumed by *it* (probably because it is not referential). It is the same, for instance, with NPs with the semantic role Measure, as in *he weighs 160 pounds; *he weighs them since 2008*.

> structure that reflects the common arguments of the verb and the nominal, while allowing room for the nominal to include extra material not present in the light verb.
> (Jun 2003; *apud* Culicover and Jackendoff 2005, p. 223)

Jun's analysis is possibly motivated by the observation of cases of equivalence between a sequence of **light verb+object** and a full verb, practically synonymous with the sequence. I tend to feel, however, that marking the complement as EvSpec is enough to describe the facts in these cases.

6.5.6 Assertion and Presupposition

Before closing this section, I want to raise an idea which may deserve future consideration, relative to the way the semantics of nominals with light verbs is represented. In

[5] The player underwent a surgery.

we have a light verb and an object denoting the event in question. In this sentence the occurrence of the event is **asserted**. The sentence has as its central function to inform that there has been a surgery, and to add some limiting elements: the patient, the time, etc. This seems to be the case with the other examples of light verbs we have seen, always complemented by an object asserting the occurrence of the event. In the case of [5] this can be readily tested by negation: if we negate the verb, there was no surgery.

But these same NPs can also occur with verbs expressing the event, that is, nonlight verbs, and in these cases the occurrence of the event is not asserted, but **presupposed**. For instance,

[23] Dr House finished the surgery.

This sentence presupposes the occurrence of the surgery, and adds an assertion to it (Dr House finished it). If we negate the verb, the surgery is still understood as occurring, which shows that its occurrence is presupposed:

[24] Dr House did not finish the surgery.

It would be interesting to find out if this opposition between assertion and presupposition is systematic for light verbs. If so, it may be interpreted as a consequence of the lack of assertive content of light verbs, which are limited to giving information about tense, aspect, etc., plus eventual secondary information like "the event is not pleasant to the Patient" and the like. If this is a general fact (which remains to be checked), we will be able to derive from it an additional semantic criterion to characterize light verbs.

Light verb constructions represent a further complicating element to the semantic role assignment system. And, as we will see, that is not yet the end of the story.

6.6 Complex Constructions

6.6.1 One Clause, Two Events

In some cases a simple sentence must be semantically analyzed as a complex of propositions, and these cases require a partial reformulation of the concept of semantic role coding. An example is found in Jackendoff (1972), and involves verbs like *buy, sell*, and *trade*. His example is

> [. . .] the verb *trade*, which takes a direct object, an optional phrase with *to*, and an obligatory phrase with *for*.
> (2.48) Esau traded his birthright (to Jacob) for a mess of pottage.
> This sentence describes two related actions. The first is the change of hands of the birthright from Esau to Jacob. The direct object is Theme, the subject is Source, and the *to*-object is Goal. Also there is what I will call the *secondary action*, the changing of hands of the mess of pottage in the other direction. In this action, the *for*-phrase is Secondary Theme, the subject is Secondary Goal, and the *to*-phrase is Secondary Source.
> (Jackendoff 1972, p. 35; his numbering)

In such cases, naturally, one cannot simply assign double semantic roles to the complements: Esau is not simply Source and Goal, but Source of the birthright and Goal of the mess of pottage. In the notation here adopted the analysis of the sentence will be as shown in [26] below. For graphic reasons, I had to put the semantic roles *under* the syntactic form-class and functional symbols, instead of just connecting them with '>' as done for simplex constructions.

[25] Esau traded his birthright to Jacob for a mess of pottage.

[26]

Syntax:	**VSubj**	**V**	**NP**	***to*+NP**	***for*+NP**
Event 1:	*Source*		*Theme*	*Goal*	
	Agent			|	|
Event 2:	*Goal*			*Source*	*Theme*

The subject, *Esau*, is also marked as Agent, since the sentence leaves it clear that the trading was a result of Esau's initiative.[21] The two events are simultaneous and interdependent—otherwise some complements would lack a semantic role, which we know is not allowed. In the formulation given, each complement has at least one semantic role.

Without this dissociation into two events it is not possible to assign semantic roles to all constituents in [25] in an intuitively satisfactory way. This sort of analysis leads to a reformulation of some aspects of the traditional perspective. In a way, role-coding in this case follows the traditional model in that semantic roles are assigned as a result of the valency of the main verb (*trade*). But we cannot establish a simple relation between the constituents of the sentence and the semantic roles: we must define two concomitant events, and each of them defines a set of

[21] There may be a better solution than marking this constituent as Agent in the diathesis; see Sect. 8.2.1 below.

semantic roles and maps them onto the appropriate constituents. In this particular case, the duality of events correlates with the existence of two Themes: the birthright and the mess of pottage, which both undergo motion,[22] in opposite directions.

In cognitive space, what happens is the following: the constructional meaning with the verb *trade* entails assigning the role Source to the schema ESAU, Theme to BIRTHRIGHT, Goal to JACOB. And also (by effect of Event 2) Goal to ESAU, Source to JACOB, and Theme to MESS.OF.POTTAGE. As seen, two schemata, ESAU and JACOB, receive two roles each, but since these roles correspond to different events, no confusion arises. It is as if the receiver learned, first, that ESAU is the Source of the BIRTHRIGHT; then, she goes on to complete the landscape by learning that ESAU is also the Goal of the MESS.OF.POTTAGE, and so on, until the mental landscape intended by the speaker is complete.

Of course, this description of the process works only if we refer to schemata, not to sentence constituents. Here the distinction made in Sect. 6.1, that semantic roles are attached to schemata, not directly to constituents, become essential if we are to represent all the relations obtaining in [25] in a clear way (we shall see other examples further on).

6.6.2 More Examples

6.6.2.1 *Ask* and the Complex Construction

Let us now consider the verb *ask* in the meaning of 'request'. In the sentence

[27] Bob asked his father for some money.

the subject *Bob* is the Agent of *ask*; and, since *ask* is a **verbum dicendi**, the Agent is elaborated as the "speaker". *His father* is the Goal (which elaborates as the "addressee") of the same verb, ultimately of the schema ASK. But what is the semantic role of *for some money*? Verbs of saying usually include the possibility of a "message", but this CSR does not seem satisfactory for *some money*, which is not in itself a message; the message would rather be "give me some money". And, on the other hand, we understand the money as something that goes, or may go, from the father to Bob, that is, a Theme. This semantic ingredient is indispensable in the interpretation of [27].

Let us see how ASK is represented in recent cognitive models. In FrameNet we find the following (for the frame REQUEST, one of whose actualizations is *ask*):

a Speaker asks an Adressee for something [. . .]
[FrameNet, *data*, REQUEST]

[22] More elaborately, transfer of possession.

The frame elements (which we may roughly equate with CSRs) are developed in this entry of FrameNet in this manner: the Adressee belongs to the semantic type Sentient; the Message (that is, the thing asked for) belongs to the semantic type Message, and is further specified as "the content of the request"; the Speaker belongs to the semantic type Sentient. FrameNet admits the possibility that the Message be represented as a complement, which would be *for some money* in [27].[23] This is clearly inadequate: (*for*) *some money* is a concrete object, not a message—unlike, for instance, *some questions* in *Bob asked some questions*, which does express a message. Note the clear difference of semantic relation between the verb and the complement in each case: Bob does not want the questions to be transferred to him, as is the case with the money in [27].

What is behind the CSR of *for some money* is a connection with another schema, GIVE. This is recognized by Wierzbicka (1996), who states that speech act verbs may refer to a (second) action which one asks for someone to perform:

> [. . .] the verbs *ask* and *order* describe an attitude that includes the following component:
> (I say:) I want you to do it
> (Wierzbicka 1996, p. 174)

The component "you to do it" is a proposition, and can be expressed as a separate clause:

[28] Bob asked his father to give him some money.

and *some money* here is clearly Theme (but of *give*, not of *ask*).

Wierzbicka's analysis is more satisfactory than the FrameNet's. The thematic synonymy of [27] and [28] does not fit into FrameNet's analysis, according to which *some money* would presumably be Message in [27], but Theme in [28]. As the two sentences are semantically equivalent, the FrameNet analysis reaches a deadlock. The analysis must clearly recognize that, as we saw in Sect. 6.1 above, CSRs are associated with schemata, not verbs, that is, they are relations defined at a conceptual level. In the case of [27], *some money*—or rather MONEY—is the "theme" of GIVE, not of ASK or of the verb *ask*.

Starting from the semantic equivalence of [27] and [28], I propose the following semantic analysis, valid for both sentences:

[29] Event 1:
ASK (BOB>*agent*, FATHER>*addressee*, EVENT 2>*message*)
Event 2:
GIVE (FATHER>*agent*+*source*, BOB>*goal*, MONEY>*theme*)

This is still a preliminary formula, to be completed below.

[23] One example given in the site is *the offender begged for clemency*.

6.6.2.2 Representing Complex Diatheses

One of the things that make the analysis of

[27] Bob asked his father for some money.

different from the analysis of

[30] Bob gave his son some money.

is that in [27] we have two events—in this case, one is real and the other is virtual, because it is not asserted that the father gave the money to Bob. They are both necessary to the characterization of the semantic structure of the sentence. [27] has a **complex** semantic structure because there is no way to map all the semantic roles directly onto the syntax. This is possible in [30], if we assign Agent to the subject and Goal and Theme to the objects, so that [30] does not need to be represented as a symbolically complex structure.

The semantic structure of a complex construction must then be expressed as more than one event. The diathesis instanced by [27] can be analyzed as

[31]

	Bob	*asked*	*his father*	*for some money*	
Ev.1:	*Agent*	SAY	*Goal*	|	*Message*: [Ev. 2]
Ev. 2:	*Goal*	GIVE	*Source*	*Theme*	
			Agent		

In this presentation of the semantics of [27], SAY represents a predicate of linguistic communication (expressed, cumulatively with GIVE, by the verb *ask*). The same semantic representation is valid also for [28], in spite of syntactic differences:

[28] Bob asked his father to give him some money.

Message is one of the semantic roles attached to the schema SAY, besides Agent ("speaker") and Goal ("addressee"). The element **Ev. 2** has no syntactic form of its own; it is a conventional mark referring to the second event, and reference to a second event is part of the meaning of *ask*.[24] This type of semantic analysis derives from Jackendoff (2002, p. 365ff.); here I employ a slightly different formalism.

Complex analyses are regular for sentences with more than one clause, as in

[32] Bob told me his dog died.

Here we must analyze the semantic structure in terms of two events, "Bob told me Ev.2" and "Ev.2=his dog died". What is exceptional with [27] is the need to use two events to analyze what is syntactically expressed as a single clause; this is attributable to features of the semantics of *ask (for)*, composed of SAY plus GIVE,

[24] English *ask* has two meanings: here we have the one that corresponds to Portuguese *pedir* 'request'; the other meaning corresponds to *perguntar*, and appears in *Bob asked a question*—in this case, the construction is not complex.

each with its accompanying set of variables, basically as expressed by Wierzbicka in the passage previously quoted.

The descriptive character of the system we are elaborating allows us to ignore certain cases in which a complex analysis might be appropriate. For instance, the sentence

[33] The boy broke the bottle.

may, in principle, be analyzed semantically as

[34] Ev. 1: CAUSE (BOY>*agent*, Event 2>*caused.event*)
Ev. 2: BREAK (BOTTLE>*patient*)

But this decomposition does not interest us because we can map the same semantic relations onto the syntax in a more direct way:

[35] The boy broke the bottle.
Agent Patient

This simplification is possible because the events do not assign different semantic roles to the same constituent (as happens with *trade* and *ask*), so that the syntactic structure contains constituents directly relatable to all relevant semantic relations. The use of the complex construction in this case, although it is semantically defensible, is unnecessary for effects of the description of these constructions. These examples illustrate the descriptive character of the notation I am using (some might call it utilitarian, or even *ad hoc*). My excuse is that at this moment it is necessary to represent data in the most direct way, so that they can be examined and accumulated in view of further generalization and the eventual elaboration of an adequate valency theory.

At first sight, it may seem that the duality of events we are dealing with might be described in terms of Fauconnier's (1994) mental spaces. However, there is a basic difference, in that Fauconnier insists that mental spaces are built discursively and

> result in unique and temporary 'packets' of conceptual structure, constructed for purposes specific to the ongoing discourse.
> (*apud* Evans and Green 2006, p. 369)

Mental spaces, so defined, do not coincide with the events of complex structures, which are permanent and codified in the lexicon; that is, a schematic version of [29] is part of the meaning of the verb *ask*, stored in the language user's semantic memory.

6.6.2.3 Kinds of Messages

Let us go back to the semantic representation

[29]
Event 1:
ASK (BOB>*Agent*, FATHER>*Addressee*, EVENT 2>*Message*)
Event 2:
GIVE (FATHER>*Agent*+*Source*, BOB>*Goal*, MONEY>*Theme*)

We have here one event subordinate to another, which is a very common situation, particularly in compound sentences. But this subordination can occur in several different ways. Taking compound sentences for a moment, we may have

[36] Bob said that his father gave him some money.
[37] Bob revealed that his father gave him some money.
[38] Bob asked his father to give him some money.

In all of these cases we have the expression of an event subordinate to another (with variations in complementizer and verb form that do not interest us here). But the semantic relationship between the two events varies: in [36] Event 2 represents an assertion made by Bob, who is sole responsible for it; in [37] the truth of Event 2 is presupposed; and in [38] Event 2 represents the content of Bob's wish, which is not asserted nor presupposed, and does not have to be factual.

These differences result from the semantics of each of the verbs: *say* is a different thing from *reveal* or *ask*. The "message" (defined as "information transmitted to an addressee") comes in at least three flavors[25]: **assertion, presupposition**, and **wish**. These distinctions must be marked in the structure, so that [29] is reformulated as follows:

[39]
Event 1:
ASK (BOB>*Agent*, FATHER>*Addressee*, EVENT 2>*Message.wish*)
Event 2:
GIVE (FATHER>*Agent*+*Source*, BOB>*Goal*, MONEY>*Theme*)

[39] makes explicit the semantic relationship between the two events as **Message.wish**—a relationship which I analyze as the semantic role of Event 2. In the other examples, naturally, we have **Message.assertion** and **Message.presupposition**. All these are components of the meaning of the verb in question: one of the semantic features of *reveal* is that its subordinate event is presupposed, but with *say* it is only asserted, and with *ask* it is desired.

These relations can be considered semantic roles because they play a role in the subclassification of verbs; as was observed by Kiparsky and Kiparsky (1971), verbs can be divided into two categories, **factives** and **non-factives**, according to the semantic relation of their complements, respectively pressuposed and asserted (here we have a third category, verbs that express a **wish** in their complements).

[25] Plus, certainly, several others.

6.6.2.4 Notational Questions

Let us now examine a few examples. In the case of *buy*, both events involve the schema TRANSFER.POSSESSION. It then becomes possible to represent the diathesis in the following way:

[40]	**VSubj**	**V**	**NP**	***from*+NP**	***for*+NP**
Ev. 1:	*Agent*	TRANSF.POSS	*Theme*	*Source*	
	Goal				
Ev. 2:	*Source*	TRANSF.POSS	*Goal*		*Theme*

This can be expressed as the sentence

[41] Leah bought a car from Jim for $12,000.

Leah is the Agent (because she initiated the event)[26] and the Goal of the car, being also the Source of the money. Jim, Source of the car, is also the Goal of the money. In both events the schema is TRANSFER.POSSESSION. The distinction into two events allows proper representation of the semantic connections: Leah is Goal in Event 1 (whose Theme is the car), but Source in Event 2 (whose Theme is the money). In this case, the relation between the events is just one of simultaneity and does not involve wishes or messages; both events are simply asserted.

In the case of [27]

[27] Bob asked his father for some money.

two schemata are involved, SAY and GIVE,[27] which must be represented separately:

[42]	*Bob*	*asked*	*his father*	*for some money*	
Ev. 1:	*Agent*	SAY	*Goal*		Message.wish: [Ev. 2]
Ev. 2:	*Goal*	GIVE	*Source*	*Theme*	

SAY and GIVE are both ingredients in the semantics of *ask*. Neither SAY nor GIVE has a separate formal representation in this sentence: *ask* at the same time expresses the emission of a message (SAY) and gives information about this message: the WISH that someone GIVE something. By replacing *Bob* by 'VSubj', *asked* by 'V', *his father* by 'NP', and *for some money* by '*for*+NP', we obtain diathesis [43], which sentence [27] elaborates. As we saw, the marker 'Ev. 2' has no separate formal representation, and serves as a semantic connector between the two events; and the element 'Message.wish' can be considered the semantic role of Event 2.

[26] If Jim were the Agent, we would say *Jim sold a car to Leah for $12,000*.

[27] The latter may be again TRANSFER.POSSESSION, but I use GIVE as a slightly more elaborated variety (which is the one that appears in the FrameNet entry).

[43]	**VSubj**	**V**	**NP**	***for* NP**	
Ev. 1:	*Agent*	SAY	*Goal*	|	*Message.wish*: [Ev. 2]
Ev. 2:	*Goal*	GIVE	*Source*	*Theme*	

Diagram [43] represents semantic relations in a straightforward way, placing each semantic role immediately below the constituent that elaborates it—for instance, the Agent of Event 1 is VSubj, the Theme in Event 2 is *for*+NP, etc. Events are partially represented by schemata, here SAY and GIVE. We must also find the ways in which event schemata associate with verbs—and sometimes, as we saw for light verbs, with other constituents—in the appropriate contexts. We cannot go into this question now, because our main problem is how to represent the relations between constituents and verbs. For the time being, we must be content with the intuitive perception that the meaning of *ask* (*for* something) includes the emission of a message (SAY) and the WISH for a TRANSFER OF POSSESSION.

6.6.2.5 Character of the Semantic Representation

It should be clear that saying that *ask* is represented semantically by SAY plus GIVE is not to propose anything in the line of lexical decomposition as used by generative semanticists in the 1970s. This is only a way to represent a complex meaning; and the relation between this meaning and a sentence with *ask* is symbolic, and the two levels of analysis, formal and semantic, are kept carefully apart, as the two faces of the sign.

As noted above, the semantic representation used here for diatheses is somewhat *ad hoc*, in the sense that its details do not necessarily refer to some general theory. In the absence of such a general theory, we have no choice: the aims of the notation are immediate and strictly descriptive, and, up to a point, arbitrary. We are attempting to represent something on the page, and we do not really know how it "is". This does not entail, obviously, that it is not necessary to eventually develop a theory to reduce the degree of arbitrariness of the description; it means only that (as far as I know) no tolerably adequate theory currently exists.

In [43] we find the element 'Event 2', which refers to the second event and has no lexical representation. This is certainly not an "empty category" present in syntactic structure, but a notational means of semantically tying the second event to the first, at the same time making explicit the semantic role of the second event (Message.wish). In the model adopted in this book, syntactic structure is made up exclusively of overt units, endowed with phonological representations. These units have also a semantic face, which is part of the data, but the separation of the two levels, form and meaning, must be rigorously kept, lest we vitiate the objectives of the research, which have to do with describing the association between concepts and acoustic images.

The position here adopted differs in crucial ways from Hale and Keyser's (1993). Hale and Keyser correctly observe that when we decompose simple

sentences as distinct events it becomes frequently easier to identify the semantic roles. This greater ease comes, I think, from the conceptually more basic character of the evoked schemata (for instance, SAY and GIVE as part of the meaning of *ask*). But Hale and Keyser propose a syntactic analysis of the phenomenon, presumably deriving a sentence like [27] from a syntactic structure containing the verb *give*, eventually incorporated with *say* to generate the surface verb *ask*. Hale and Keyser's solution increases the role of the syntactic component (enlarging it with a transformational, or move-α, section) in order to simplify the semantic component; the serious problems caused by this kind of analysis were convincently shown by Culicover and Jackendoff (2005, chap. 1).[28] Furthermore, Hale and Keyser's analysis, which cannot be examined here in detail, seems weakened by the acceptation of some assumptions not duly founded on empirical evidence.

6.6.3 Reciprocals

Complex constructions provide a means to analyze sentences with reciprocal reference, such as

[44] Tiago e Jane se odeiam. 'Tiago and Jane hate each other'

Because in Portuguese the reflexive pronoun (here, *se*) also serves as a reciprocal marker, [44] is ambiguous: it can also mean 'Tiago and Jane hate themselves'. In this reading, [44] can be analyzed as a noncomplex construction, simply by assigning Experiencer to the subject and Stimulus to the reflexive pronoun.[29] But in its reciprocal reading 'Tiago hates Jane and Jane hates Tiago', [44] must be analyzed as a complex construction. Here we have two concomitant statements, as is also the case with *sell*, *buy*, *trade*, seen in Sect. 6.5.1; we can, then, state that [44] is the realization of a construction defined as

[45]

	[NP	**e**	**NP]$_{VSubj}$**	**Refl**	**V**
Ev. 1:	*Exp*		*Stim*		
Ev. 2:	*Stim*		*Exp*		

Or, perhaps better,

[46]

	[NP	**e**	**NP]$_{VSubj}$**	**Refl**	**V**
Ev. 1:	R_i		R_j		
Ev. 2:	R_j		R_i		

(where R = semantic role)

[28] Culicover and Jackendoff (2005) criticize Hale and Keyser's proposal directly on pp. 53ff.

[29] The reflexive pronoun is independently marked as being coreferential with the subject: this is its "meaning".

to include all cases of reciprocals, regardless of the semantic roles involved: *Tiago and Jane hate each other* (Experiencer—Stimulus)/*Tiago and Jane kissed each other* (Agent—Patient) etc.

Complex constructions are a solution to cases of "differences between what one could term semantic valency and syntactic valency", to use Herbst and Schüller's expression (2008, p. 136). What we have here is a point where the usual rough parallelism between syntax and semantics fails, so that it becomes difficult to relate semantic roles directly to morphosyntactic units. The case mentioned by Herbst and Schüller is the semantic similarity between

[47] Dick met Martha.

and

[48] Dick and Martha met.

In [47], we have two participants and two NPs, and there is no special problem in expressing the coding relations. But [48] means (in terms of semantic roles at least) just the same as [47], and yet only one NP is present.[30] Here, again, the solution is to include in the semantic matrix of the verb *meet* the possibility of expressing two simultaneous events, [A *meet* B] + [B *meet* A] following the model of [46]. This possibility sets *meet* apart from other verbs, in that with *meet* reciprocality does not have to be overtly marked with *each other*, as it must be with *pinch, hate, love, kill, see*.

Herbst and Schüller (2008), who found the examples and correctly saw the problem, do not develop a practical analysis for the phenomenon, and merely mention a "merger of participants", which I find somewhat vague, and may or may not be the basis for a convenient analysis. [46] offers us another possibility, which falls under the already known case of complex constructions.

[46] shows a feature that may seem strange: it includes consideration, at the sentence level, of subsentential constituents—that is, the two NPs that compose (with the conjunction *e* 'and') a higher NP. That is, in this formula we had to "break" an NP (*Tiago e Jane*) in order to mark its constituent NP's with the respective roles. It thus violates a general principle of sentence analysis, sometimes named the "A-over-A principle".[31] Our purpose here is merely descriptive, and [46] seems sufficiently clear as a representation of the semantics of the relevant reading of [44]. It may be that the A-over-A principle has exceptions, or it may apply to syntax but not to semantics, and so on. In any case, the fact remains that sentence [44] asserts a thematic relation between these subordinate NP's, and the most direct way to represent this fact seems to be the one given above; for immediate purposes, it will have to do as it is.

[30] A complex NP, to be sure: [$(\text{Dick})_{\text{NP}}$ and $(\text{Martha})_{\text{NP}}$ $]_{\text{NP}}$.

[31] Chomsky (1964, 1973). The A-over-A Principle was originally formulated as a condition on the application of transformations, whereas here we are dealing with an interpretive (symbolic) phenomenon.

But there may be more to be said about these cases. Note that the complex NP found as the subject in [44] and [48] can be replaced by a single plural, as in

[49] Essas meninas se odeiam. 'these girls hate each other'

and yet the system has no difficulty in decomposing the plural in its elements, assigning them separate semantic roles, which seems to indicate that the process here is fundamentally semantic.

The best way to account for this apparent problem is to consider that when we talk about roles assigned to the constituents of a complex NP we are in fact dealing with roles (CSRs) assigned to variables of the corresponding schemata. In other words, we are not dealing with a purely grammatical phenomenon. It is only in cognitive space that *Sally and Helen* and *these girls* are parallel: in both cases we have more than one person, although morphosyntax shows a composite NP or a plural one, respectively. [43] and [44] must, therefore, be amended in order to show what is really going on here: not an association of semantic roles with NPs, but rather with schemata. And we must find a way to make explicit that plurals involve more than one individual, each with its schema. *Girls* is, cognitively, something like [GIRL + GIRL + . . .], and it is on this structure that the assignment of the roles works.

Here we have a case where just using syntactic units makes it impossible to properly state the phenomenon. And this generalizes for all cases where a plural is parallel with a collective or a composite NP, as against a singular. This appears for instance in

[50] The couple/they/Sally and Paul/split up.
[51] * Sally split up.

Instead of devising an *ad hoc* feature to help explain the parallel behavior of collectives, plurals and composite NPs, we use their property of referring to more than one entity, and therefore evoking more than one schema. Here the phenomenon mentioned in Sect. 6.1 becomes evident: strictly speaking, the assignment of semantic roles is something that happens to schemata, not to overt sentence constituents.

Consequently, a really rigorous way to state the distribution of semantic roles in a sentence like [49] (in its reciprocal reading)

[49] Essas meninas se odeiam. 'these girls hate each other'

requires a previous analysis ot the NP *essas meninas* 'these girls' into the corresponding schemata, [GIRL + GIRL + . . .] in the way suggested above. I cannot go into this matter more deeply here, since it calls for a revision of part of our analyses. But a task that must be taken up eventually is the restatement of diatheses (and constructions in general) in terms of the association of semantic roles with schema variables, instead of sentence constituents.

Finally, it should be observed that the reciprocal construction, represented in [46], is not lexically governed, and applies whenever the structural conditions described are met; that is, it is not a diathesis of Portuguese. On the other hand,

the English construction exemplified in [47] *is* a diathesis, since it only works for some verbs: *Dick and Martha met* has a reciprocal reading, but we do not have **Dick and Martha saw* meaning "Dick saw Martha and Martha saw Dick".

6.7 Primary and Secondary Events

As already observed by Jackendoff (1972, p. 35), the events that make up a complex construction's semantic face are not necessarily equal in importance. Jackendoff speaks of *primary and secondary action*, and this is what distinguishes the meaning of *buy* in

[41] Leah bought a car from Jim for $12,000.

from the meaning of *pay* in

[52] Leah paid $12,000 to Jim for a car.

Although the scene depicted is the same, the first sentence profiles the transference of the car, and the second profiles the transference of the money. We can represent this in our formulas by stipulating that the numbering of the events (Event 1, Event 2) is significant, only the first event being profiled. As we see, then, profiling can be an integral part of a verb's valency, and consequently of its meaning: it is only a difference in profiling that distinguishes *buy* from *pay*.

Here we have a notion of profiling that differs a little from the way it is usually defined and exemplified. According to Langacker (1991, p. 9), profiling refers to "an asymmetry in the portrayal of the relational participants". Here we have a similar asymmetry referring to events, not to individual participants, but I believe the general phenomenon is basically the same, and until further notice I refer to it as **profiling**. It is important because it instances a nonpropositional ingredient—that is, a kind of construal—in the meaning of verbs.

Chapter 7
Prepositions, Transparency, and Prototypes

7.1 Semantically Autonomous Phrases

All cases so far examined have one feature in common: the semantic role is coded as a term of the sentence by dependency upon another term, the main verb. The verb has a valency, which characterizes it grammatically and determines the ways each of the semantic roles it is associated with can be syntactically coded; in other cases (to be examined in Chap. 8) a semantic role is coded as a constituent by a linking rule that takes into account the syntactic function of the constituent. But there are also cases in which a constituent has a semantic role which has no connection with the valency of the verb, and is independent of its syntactic function, arising without interference of any factors external to the constituent itself. The semantic role in these cases results from properties of lexical items present in the phrase (a preposition, or the phrase head). These constituents are semantically **transparent**, and their semantic role is visible even out of syntactic context.

7.2 Prepositional Phrases

When a complement is represented by a prepositional phrase, the semantic properties of the preposition can determine the semantic role, frequently in connection with the semantics of the following NP. This is no news in what respects the role of the preposition; it has been observed that prepositions have some properties in common with verbs. For example, in Latin both verbs and prepositions determine the case of the nominal: *uideo agrum* 'I see the field', *uenio ad agrum* 'I come to the field', with *agrum* in the accusative—because of the verb plus the syntactic function in the former case, because of the preposition *ad* in the latter.

It is also recognized that prepositions, like verbs, can assign semantic roles, which led to the traditional distinction of two types of prepositions: **predicating**

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prepositions, that is the ones that assign semantic role to the governed NP, and **functional** prepositions, which do not, so that in these cases the verb is responsible for the semantic role of the constituent. An example of the first type is

[1] I work here because of the salary.

The semantic role of the prepositional complement is Cause, and this comes from semantic properties of the preposition *because of*.[1] This preposition is semantically transparent, and can only express Cause; the appearance of the semantic role can be attributed exclusively to the presence of the preposition.

An example of a functional preposition is found in

[2] Wait for me.

In this case, the semantic role of the complement depends on the verb, because the preposition *for* does not systematically express the "waited.entity", or whatever semantic role we have here. The phrase *for me* is semantically opaque, and it is the valency of *wait* that defines its semantic role. In [1] the valency of the verb is irrelevant to the semantic role of the phrase introduced by *because of*; it would be an adjunct, to use traditional terms. In [2], where the semantic role of the constituent depends on the verb's valency, *for me* would be a complement.[2] In the present system so-called phrasal verbs are treated as cases of valency, that is, as verbs that require a specific preposition with a complement. This makes sense for Portuguese, but even for English I suspect it is an acceptable analysis.

But the distinction between predicating and functional prepositions is not as neat as the traditional terminology suggests. Instead of only two types of prepositions, we observe a kind of gradation, some cases being "more" transparent than others. A preposition like *of* is really very opaque, but *in*, which can assign several semantic roles, seems to be prototypically a locative marker; and *because of* is totally transparent. In Portuguese, *com* ('with') shows predilection for Company and Instrument, but it also appears in phrases with other semantic roles. For instance,

[3] A polícia acabou com a festa. [Patient]
the police ended with the party 'the police ended the party'

In [3], where *com a festa* is Patient, the semantic role is certainly due to the presence of the verb *acabar* 'end'. But in

[4] O Joaquim viajou para Curitiba com a Raquel. [Company]
Joaquim traveled to Curitiba with Raquel

the semantic role is much more autonomous, because one of the prototypical meanings of *com* is Company. *Com* can also express Instrument as in

[5] O Joaquim cortou a pera com um canivete. [Instrument]
Joaquim cut the pear with a penknife

[1] For our purposes no distinction need be made between simple and complex prepositions.

[2] The dichotomy adjunct/complement, though, leaves a lot to be said, and is not systematically used here (see discussion in Sect. 1.7).

It is instructive to compare [4] and [5]. In both, the semantic role depends on the preposition; but if *com* 'with' can assign, prototypically, either of two semantic roles, how does the receptor identify them in each case, since neither of these sentences is ambiguous? The answer is that the semantic role in these cases is interpreted with the help of two factors: (a) the preposition, which delimits the semantic possibilities—for instance, *com*+NP can be Company or Instrument, but not, say, Location or Source; and (b) a mechanism of semantic-pragmatic filtering, based on the meaning of the NP: *Raquel* is not a plausible instrument for travel—it would be different if we had *com o carro novo* 'with the new car'. And *um canivete* 'a penknife' cannot be Company. In other words, *com*+NP can be Company and Instrument with any verb, provided only that the resulting cognitive structure be well-formed. Therefore, we must hold the preposition responsible for the semantic role in these cases, since the verb does not interfere—unlike the verb in [3], since *com*+NP is a Patient only with a small set of verbs.[3]

A similar case, comparable to [4]–[5], is

[6] O Joaquim está passeando com um cachorro enorme. [Company]
Joaquim is walking with a huge dog

[7] O Joaquim assustou os vizinhos com um cachorro enorme. [Instrument]
Joaquim frightened (his) neighbors with a huge dog

To disambiguate these sentences, the interpretation process must use, crucially, both grammatical and extragrammatical information; that is, the described scene is evaluated in terms of plausibility. Here again the preposition limits the semantic possibilities (for instance, *com*+NP can never be Location), but does not decide, and sentences like [6] and [7] may be considered grammatically ambiguous: the semantics assigns to the complement more than one semantic role, but the plausibility conditions—what I call the **schematic filters**—exclude some of them.

7.3 Prototypes

7.3.1 Prototypical Roles of Prepositions

One way to analyze this phenomenon is to say that the preposition has a limiting effect on semantic roles. In the case of *com* 'with', the semantic role cannot be Location, Goal, or Source, which this preposition cannot convey, but it can be Company or Instrument.

The verb, of course, is also a limiting element: with *acabar* 'end' as in

[3] We will see below how to include in the notation this interplay of prototypical roles and verb-specific roles.

[8] A polícia acabou com a festa.
the police ended with the party 'the police ended the party'

the preposition *com* introduces a Patient, but this is exceptional, and only occurs with the verb *acabar* and a few others[4]; it must be marked in the valency of these verbs. Here we have the most common valency situation.

These two situations are not symmetrical: a Patient coded as *com*+NP is highly unusual, and only appears with about half a dozen verbs; *com*+NP Instrument and Company can occur, for all we know, with any verb—even with *acabar*:

[9] A polícia acabou com a festa com violência.
the police ended the party with violence
Agent *Patient* *Instrument*

This is an indication that the semantic roles Company and Instrument are prototypical for this preposition.

If we had only one prototypical semantic role, we might decide that when a phrase with *com* occurs, the semantic role will be stated in the diathesis only if it is nonprototypical; otherwise, we may just leave it blank, and a linking rule will fill it in (with the prototypical semantic role). But with *com* we seem to have (at least) two prototypical semantic roles, Company and Instrument. Nevertheless, there is no problem in keeping the former solution: when we have *com*+NP in a sentence and no semantic role is specified for this construction by a diathesis of the verb, we allow the phrase to link to Company *or* Instrument, or possibly either (which will result in ambiguity). In most cases the ambiguity will be resolved by pragmatic factors or semantic filtering. This can be integrated in our notation simply by postulating that diatheses have priority in application, and prototypical roles only appear if no diathesis has done the job previously.

This analysis can be tested with some examples. First, we may have

[10] A polícia acabou com a festa com gás lacrimogêneo.
the police ended with the party with tear gas
'the police ended the party with tear gas'

Why do we understand that the police ended *the party*, not *tear gas*? This interpretation would be perfectly acceptable, and appears clearly in

[11] A polícia acabou com o gás lacrimogêneo.
the police ended with the tear gas 'the police used up the tear gas'

But in [10] there seem to be two possible reasons against understanding *com o gás lacrimogêneo* as the Patient, and both have to do with the presence of *com a festa*: first, *com a festa* is contiguous with the verb, and this can be a (syntactic)

[4] For some speakers, also with its synonym *terminar*; but *concluir, completar, findar*, also near-synonyms of *acabar*, take no complement with *com*. *Com*+NP is a Patient also with *sumir* and *consumir* 'lose, make disappear': *ela sumiu com o meu caderno* 'she lost my notebook', and *correr* 'chase, run out': *eu corri com o cachorro da sala* 'I chased the dog out of the living room'.

reason to give it preference as a diathetically determined element (a "complement"); and second, if *com o gás lacrimogêneo* is understood as the Patient, we will have difficulty finding a semantic role for *com a festa*: neither Company not Instrument yield a plausible scene. As a result, *com o gás lacrimogêneo* is Instrument, and *com a festa* (since the verb is *acabar*) will be Patient.

There is some evidence for the syntactic constraint giving preference to the first *com*-phrase as a Patient. If we reverse the order of the prepositional phrases in [9],

[12] *A polícia acabou com o gás lacrimogêneo com a festa.
the police ended with the tear gas (with) the party

the result is marginal or even unacceptable. The only way to rescue it is by using some intonational contortionism, and pronouncing *com o gás lacrimogêneo* low and fast, to mark it as an insertion; and even then, to my ear, it sounds less than perfect. This means that the nonambiguity of [10] comes from two sources, which together preclude the possibility of assigning Instrument to *com a festa* (because it is not contiguous with the verb) and Patient to *com o gás lacrimogêneo* (because if we do so, *com a festa* will have no pragmatically viable semantic role). This may have to do with the fact that *com o gás lacrimogêneo* '(with) the tear gas' is adequate as a Patient for the verb: when one arrives to the second *com*-phrase, the Patient variable has already been filled in, and *com a festa* is felt as superfluous. By the way, the ordering condition, if needed, is taken care of by the way we formulate the diathesis, that is, with a syntactic component composed of **VSubj+V +*com* NP**, where the prepositional phrase appears as contiguous with the verb.

Now, if we have a first *com*-phrase that cannot be the Patient, things are apparently different:

[13] A polícia acabou com violência com a festa.
the police ended with violence with the party
'the police ended the party violently'

The constituent *com violência* 'violently' is normally understood adverbially, as an expression of Manner. Correspondingly (it seems to me) [13] is clearly better than [12].[5]

Returning to prototypes, we already saw several examples where a potential ambiguity is resolved by extragrammatical factors; I repeat the examples below:

[14] O Joaquim viajou para Curitiba com a Raquel. [Company]
Joaquim traveled to Curitiba with Raquel

[15] O Joaquim cortou a pera com um canivete. [Instrument]
Joaquim cut the pear with a penknife

[16] O Joaquim viajou com um cachorro enorme. [Company]
Joaquim traveled with a huge dog

[5] All I give here are some possibilities; this is still a point to be researched.

[17] O Joaquim assustou os vizinhos com um cachorro enorme. [Instrument]
Joaquim frightened (his) neighbors with a huge dog

We can now let the grammar assign either semantic role (Company or Instrument) to all the underlined constituents. This can be done by a rule of linking that marks these semantic roles as prototypical for this preposition; a schematic filter mechanism will exclude any implausible readings. Ambiguity, in this case, will be rare because there is little overlapping between NPs that can be Company and those that can be Instrument. And in any case the verb may help, as it does in [16] and [17]. We do not have to use valency to explain the nonambiguity of, say, [18], because *passear* 'walk' does accept an Instrument, provided that it is cognitively plausible:

[18] O Joaquim está passeando com muletas. [Instrument]
Joaquim is walking with crutches

That is, the disambiguating mechanism must be the schematic filter.
A possible case of surviving ambiguity may be

[19] O Joaquim assaltou a joalheria com um cachorro enorme.
Joaquim robbed the jewelry with a huge dog
Company? Instrument?

but even so context will probably resolve it.

When we examine the effect of extragrammatical factors, we are dealing with probability, not with categorical possibility and impossibility: it is always possible to interpret *com um cachorro enorme* 'with a huge dog' as Instrument in [16]

[16] O Joaquim viajou com um cachorro enorme.
Joaquim traveled with a huge dog

but probability is so low that language users do not take it into account, barring strong alert from the context.[6] In this particular, pragmatic constraints differ from grammatical ones, which do deal with categorical possibility: there is no way to interpret *com um cachorro enorme* 'with a huge dog' as Goal or Agent in [16] or [17], because of the semantic limitations of the preposition.

In Portuguese, *de* 'of, from. . .' is probably the most opaque of prepositions, and tells us very little about the semantic role of its constituent. But, even so, I know of no example of *de* denoting Path; and Goal occurs only with the one verb *aproximar* 'come near', as in

[20] Ele se aproximou de mim.
he came near of me 'he came near me'

[6] Perhaps in an Arctic context, referring to the dog pulling Joaquim's sledge?

Now, *por causa de* 'because of' is totally transparent, and denotes Cause exclusively; *com*, as seen, is an intermediate case. As far as can be seen at the moment, some prepositions are totally transparent,[7] but there are no totally opaque ones. This configurates a complex situation, showing the need to examine each preposition individually, in order to map their respective semantic potentials and the prototypicality of each. These facts show that prepositions are not distributed neatly into two categories (opaque, that is, functional, versus transparent, that is, predicating), but rather along a still largely uncharted scale of transparency. I envisage the possibility of applying tests, both of frequency (the relative frequency, in corpora, of each semantic role for each preposition), lexical distribution (percentage of verbs that select nonprototypical roles for each preposition), and of free sentence production (e.g., asking subjects to produce a sentence with *com*, and observing the frequency of each semantic role). Such tests may provide evidence for charting the semantic potential of prepositions—an important and urgent task.[8]

The above considerations further illustrate how the opportunistic system previously mentioned works: the ultimate task to be achieved is to associate CSRs and constituents of the sentence, and information comes from several sources, which the system uses as it can. Not all sources are linguistic, stricto sensu, and the whole system is rooted both in linguistic competence and in world knowledge.

As an example of the way the system works, we can take instances with the highly polysemic Portuguese preposition *de*:

[21] Meu pai morreu de gripe.
my father died of (a) flu

[22] Meu pai chegou de Paris.
my father arrived from Paris

[23] * Meu pai morreu de Paris.
my father died from/of Paris

[24] Meu pai chegou de gripe.
my father arrived of flu 'my father arrived with a flu'

Here CSR coding is largely governed by semantic and pragmatic factors: [23] is unacceptable because, first, *morrer* 'die' is not a verb of motion, and therefore cannot take a Source complement; and, then, *Paris* does not designate a possible Cause of death. As a result, the constituent has no possible CSR attached to it, which causes unacceptability. Now *de gripe* 'of a flu' can be a Cause of death, and fits with *morrer* 'die'; but since *gripe* 'flu' is not a place, *de gripe* cannot be Source, so that [24] tells us how my father was upon arriving, not where he came from.[9]

[7] Other transparent prepositions are *apesar de* 'in spite of', *contra* 'against', *conforme* 'according to'.

[8] There is some work done on this topic, for instance Oliveira (2009) for *em*.

[9] Not everything is clear here: *da gripe* (with the article *a*, here agglutinated with *de*) can be a Source of sorts, if the verb is adequate: *meu pai saiu da gripe muito fraco* 'my father came out of the flu very weak'. I have no explanation for this fact.

In these and many other cases, it is clear that we are dealing not only with constraints of co-occurrence between verbs and complements, but also with the well-formedness of the resulting mental landscapes. Both types of factors can interact in the same sentence: for instance, the presence of the preposition *de* prevents *Paris* to be interpreted as Location in [23], which, if possible, would yield an acceptable sentence expressing a well-formed mental landscape. Now, in *meu pai morreu em Paris* 'my father died in Paris' the preposition (*em* 'in') can express Location, and since there is no cognitive objection, the sentence is acceptable. All mechanisms are available simultaneously, and are used according to need and convenience.

7.3.2 Defining Prototypes

In the preceding section I used the term **prototype,** a word that refers to more than one notion in the literature. I will pause for a moment to define with some precision what prototypes mean in the present discussion.

Prototypes are sometimes understood as continua. Objections can be raised against this conception, because continua can be studied with a minimum of precision only when one has a way to measure them; for instance, people's height can be studied in detail because we have centimeters, inches, and the like to measure it. But such is not the case with the notion of linguistic prototypes as used by some authors; if a word is "more nominal" than another, that is, if they are in relation within a squish, as defined by Ross (1972), there is nothing but the observer's intuition to validate it. But the use of intuition here is not legitimous, because, although we do have intuitive judgments about the acceptability of a linguistic form, and about its meaning, its place in a classification system is a theoretical construct, not accessible to the language user's intuition. That is, everyone knows that *cat* is an English word, and what it means, but the part of speech it belongs to is something that depends on theoretical justification and cannot be directly ascertained by intuition.

If we are to use notions like "nouniness", we need some way to measure this and other prototypical relations in a theoretically defensible way. This is what most people do, although not always acknowledging it. For instance, Naess (2007) speaks of transitivity (i.e., valency) prototypes in the following terms:

> English *hit* [. . .] takes a 'direct', bare-NP object, *look* takes a prepositional object, and *sleep* takes no object. [. . .] Such data suggest that "transitivity" may be a matter of degree; examples [like *he thinks of the boy*] appear to be "more transitive" than the clauses without any O[bject] NP, but "less transitive" than those which treat this O[bject] NP as a privileged syntactic argument. In other words, membership of the category "transitive verb" or "transitive clause" is gradable depending on an item's degree of similarity to a central exemplar—a prototype structure.
>
> (Naess 2007, p. 14; my brackets/MAP)

As we see, Naess talks of "degree of similarity", but she binds this gradability to discrete elements, that is, the presence of an object and its bare-NP or prepositional phrase nature.

Incidentally, the notion of "degree of transitivity" as defined by Naess is little informative. According to it, *hit* is "more transitive" than *look*, and *look* more than *sleep*. But this is too simple to account for the wide variety we find in the form of complements. For instance, several prepositions can introduce complements: in English we have *look for*, *look at*, *count on*, etc., and in Portuguese *contar com* 'count on', *bater em* 'beat', *gostar de* 'like', *assistir a* 'attend', etc., and all these differences are relevant for defining the valency of each verb. Saying that they are "less transitive" than verbs that take direct objects is clearly not sufficient. Furthermore, the idea of a "central exemplar" which functions as a model of "full" transitivity is not useful for descriptive purposes.

Since there is no unanimity in the definitions available in the literature, I feel authorized to advance my own definition, which is admittedly tailor-made for the purposes of describing verbal valencies. As far as the description of verbal valencies is concerned, then,

A **prototype** is the association of a morphosyntactic element with a semantic-role relation that occurs

[i] with a majority of verbs, or
[ii] with a majority of verbs in a specified semantic class, or
[iii] with all verbs semantically compatible with that semantic-role relation.

A "morphosyntactic element" can be a syntactic function; or it can be a particular item—typically, a preposition.

This is of course a very restricted definition, and does not come close to covering all interesting cases of prototypes; but as far as verb valencies go, it provides a way to radically simplify the statement of the diatheses, thus coming closer to the ideal aim of a simpler syntax. For instance, if a constituent—say, the preposition *em* plus an NP—is found with a great majority of verbs as expressing Location, this authorizes us to consider it prototypically associated with that semantic role. In this case, we are not required to state the semantic role of a phrase of the form *em* +NP, which will automatically be assigned Location. We only have to mark the semantic role of *em*+NP in a diathesis in cases where it departs from the prototype (and prototypes, as will be seen, are expressed by means of linking rules).[10]

The above definition will be integrated into the analysis later on, when we approach the question of stating semantic hierarchies and linking rules, which can be considered aspects of the prototype phenomenon. For the moment, let us only note the role of prototypes as one of the devices that allow us to simplify description—for instance, in the case of prepositions, as shown in the preceding section. We return to this important question in Chap. 8.

[10] I keep referring to prototypes as defined for the purposes of analyzing valency.

7.4 Transparent NPs, AdvPs, and AdjPs

7.4.1 Semantic-Role Potential of the NP

We saw above some cases in which the semantics of the NP following a preposition has a role in the identification of the semantic role of the whole prepositional phrase; this explains why *with Rachel* cannot, normally, be interpreted as an Instrument. Let us now examine more closely this factor in the meaning of phrases.

We already saw that the semantic potential of a phrase may be inherent, that is, a property of the phrase itself, in fact part of its semantics.[11] In some cases, this makes for a totally autonomous unit, whose semantic role is perceptible even out of sentential context: *yesterday*, *frequently, under the trees*, *because of you*... This, however, does not apply to NPs in general, because no NP is totally transparent: any NP can be (at least) Agent and Patient, and many can have still other semantic roles.[12] Examples of NPs with semantic role different from Agent and Patient by virtue of their meaning are:

[25] Mamãe foi à Europa o ano passado ["time"]
Mom went to Europe last year

[26] Daniela considera Ronaldo o maior jogador do mundo [Quality]
Daniela considers Ronaldo the greatest player in the world

[27] A vizinha apareceu na porta uma fera [Quality]
The neighbor appeared at the door furious [literally: 'a beast']

[28] O pobre homem lamentou sua decisão o resto da vida ["duration"]
the poor man regretted his decision the rest of his life

The glosses in [25], [26], and [28] show that similar things happen in English. These examples show that the semantic potential of an NP may vary according to its lexical content—which raises an important, still largely unanswered, question: How does the semantics of the head of a phrase determine its thematic potential? Without really trying to give a complete answer, we may observe that an Agent or a Patient must be associated with a phrase with referential potential—which, in practice, means an NP, or, in some cases, a prepositional phrase (which contains an NP).[13] And the semantic role Location will normally be filled in by an adverbial phrase or by a prepositional phrase with certain prepositions: *in*, *beside*, *under* etc., but not *of* or *with*. To return to our examples above, in [25], "time" is an elaboration of Location, and in [28] "duration" is an elaboration of Path. The fact that in this case

[11] And part of the schema it evokes.

[12] Referentiality is the main function of NPs, semantically, and this is probably why they can be Agent and Patient. The fundamentally referential role of NPs was studied by Liberato (1997).

[13] For instance in *a polícia acabou com a festa* 'the police ended the party', or in *composto por Wolfgang* 'composed by Wolfgang'.

these semantic roles can be elaborated only in terms of time, not space, comes from the semantics of the NP itself. Location means in fact "location in time or space"; but since *o ano passado* 'last year' cannot refer to a place, it is necessarily understood as "time". It is the same phenomenon that we find in *Machado morreu no Rio* 'Machado died in Rio', where *no Rio* could, in principle, be "time" or "place", but "place" is selected because *Rio* refers only to location in space, not in time.

Every phrase has, then, a thematic potential as part of its meaning. All NPs can be used referentially, and can possibly be Agent as a result. Liberato (1997) showed that the qualitative reading of an NP is in certain cases an accidental feature, dependent on typical uses that are gradually coded into the language; they can even be improvised on the spot, as in *ele é a Madre Teresa dos ricos* 'he is the Mother Teresa of rich people', which has an NP with the semantic role Quality (Liberato 1997, p. 49).

Let us now summarize what is known about the way preposition and NP collaborate in establishing the semantic possibilities of each prepositional phrase. The preposition, as seen, limits the potential of the phrase. Thus, *com* may express Company or Instrument, but not Location or Source; this is categorical and context-free, and effectively limits the semantic potential of the prepositional phrase. The NP adds its own limitations, which are cognitively motivated, not arbitrary like those of the prepositions. Furthermore, the limitations brought in by the NP are not categorical, and admit of context manipulation to a certain extent; that is, they are plausibility conditions, and may be relaxed in special cases (as in fables, etc.). This is expected to vary according to the NP and to the schemata it can evoke.

As a result, the semantic potential of a prepositional phrase is not precisely the product of the semantic potentials of its two components, although this product gives us a first approximation. To take an example, we saw that *com* may express Company or Instrument, not Location or Source; and an NP like *a minha vizinha* 'my neighbor' can (plausibly) be Company, but not so easily Instrument. This gives us a semantic potential reduced to Company for *com a minha vizinha* 'with my neighbor'. This prepositional phrase cannot express, say, Location in any circumstances, because this is forbidden by the preposition; but it *can* express Instrument, although this will take some more or less elaborate contextual preparation—because the preposition allows it, and the NP only marks it as implausible, not impossible. This computation can be checked empirically: it predicts that no acceptable sentence can have *com a minha vizinha* 'with my neighbor' as Cause, Location or Source; that normally it will be Company; and that there is a (more or less remote) possibility of using it to express Instrument.

7.4.2 Adverbial and Adjective Phrases

The most obvious cases of semantic transparency appear in phrases formed by adverbs like *here*, *now*, *quickly*, *too much*, *formerly*, etc. When traditional grammar

classes these items into adverbs of time, manner, intensity, etc., it is in fact giving their semantic roles. For us, they are items lexically associated with only one semantic role, being thus transparent from this point of view.

Another case is adjective phrases, normally viewed as possible carriers of the semantic role Quality. This semantic role, however, requires some study, because it covers many different CSRs which may not be amenable to a common analysis as Quality. In sentences like

[29] The boy was tired.
[30] My sister is very angry.

the underlined phrase expresses a state or a property paired with the referent of another phrase (*the boy*, *my sister*). Sometimes it may seem inadequate to call this relation Quality, but they are always cases of semantic pairing, which gives us a starting point to characterize them semantically.[14]

[14] The notion of "semantic pairing" and its grammatical significance is examined in Chap. 10.

Chapter 8
Hierarchies and Human Subjects

8.1 The Prototypes Revisited

We have already had a brief encounter with prototypes in Sect. 7.3 above. In this chapter the notion will be more fully developed, in particular in what respects linking rules, for instance the rule that stipulates that the Agent is prototypically the subject.

The general notion of prototype goes well beyond valency linking rules, of course. One clear example is the opposition between regular and irregular verbs: we call verbs like *clean* (*cleaned, cleaned*) **regular** because they follow a morphological model also followed by many other verbs in the lexicon; in terms of the definition given in Sect. 7.3, regular verbs represent an association of certain symbolic properties (past tense and participle in *−d*, etc.) valid for a large class of all verbs in the language. Irregular verbs (*write, wrote, written*) have to be especially marked in the lexicon. What we have here is a prototype, although not exactly of the kind we are studying in this book, since it does not have to do with semantic role coding; but the two phenomena are clearly related.

Linking is one particular case of prototypicality, and also has to do with preferential symbolic associations: associations of certain semantic relations with certain syntactic functions or prepositions. There has been some relevant research on these preferential associations, especially in what concerns the semantic hierarchies to be seen in this chapter.[1] Additional evidence can be sought with the help of procedures like testing prepositional phrases out of context: for instance, asking subjects to construct sentences with *com*+NP. The prediction is that they will give this prepositional phrase the semantic roles Company or Instrument, not Patient as in the sentences with *acabar*, a verb that, exceptionally, can have a Patient realized

[1] Taylor (1989) gives a survey of the theme, but much has been added in the years since his book was published.

M.A. Perini, *Describing Verb Valency*, DOI 10.1007/978-3-319-20985-2_8

as *com*+NP.[2] We can also resort to a survey of the vocabulary: if most verbs that accept an Agent (that is, action verbs) code it as the subject, this will be evidence for the prototypical character of the association Agent / subject. There are still other aspects of language and language use which relate to prototypes, such as diachronic tendencies (which presumably favor prototypical associations) and children's mistakes when learning their first language.

One advantage of this conception of prototype is that it frees us from subjective evaluations, and provides a means to precisely quantify the degree of prototypicality of each feature. Thus the association Agent / subject (a "linking rule") can be compared with Patient / object by simply counting the verbs that admit one or the other in their diatheses, which will yield a numerical difference between the two. This can be called "degree of prototypicality": it is not a continuum, but rather a gradation precisely defined by numbers. For example, there are exceptions to the Agent / subject rule (like *apanhar* 'to take a beating', seen in Sect. 4.3.2), which must be explicitly notated in a diathesis; but for more than 95 % of the cases, the Agent is coded as the subject. On the other hand, there is also a tendency to code the Patient as an object; this is too frequent to be considered a coincidence, and therefore can be the object of another linking rule. However, the number of exceptions is much higher than for the Agent rule. The most evident exception are of course ergative sentences; but we also find that a number of verbs code their Patient as a prepositional phrase (*bati em Chico* 'I beat [in] Chico', *acabei com a festa* 'I ended [with] the party'). Suppose, just for argument's sake, that Patient is coded as the object by 80 % of the (relevant) verbs. We can now say that the Agent rule is **more prototypical** than the Patient rule, and this is not a vague notion, but can be expressed in numerical terms. In other words, we have here the tape measure that was lacking to define prototypicality with some precision.

In this chapter I explore the idea that there may be general rules that tell us which syntactic function associates with each semantic role, so that there is no need for repeating that information in the diathesis. Among these rules we may count the semantic hierarchies found in the literature, as well as other less known mechanisms.

8.2 Linking Rules

I have already mentioned that the role-coding system deals both with highly elaborate CSRs and with semantic roles, schematic by definition. This raises the question whether it would be more sensible to dispense with semantic roles, and express the semantic properties of verbs exclusively in terms of CSRs. The answer is negative, and one of the reasons has to do with semantic hierarchies. In spite of the uncertainties that surround them, semantic hierarchies exist, and cannot be stated except by using schematic semantic roles. We will now examine the function

[2] As in *a polícia acabou com a festa* 'the police ended the party', literally 'with the party'.

of hierarchies and similar mechanisms in the determination of what appears in the diatheses.

8.2.1 Agent and Subject

The most well-known semantic hierarchy is found in its original form in Jackendoff (1972),[3] and has afterwards undergone some modification. A recent statement of the hypothesis is:

> [. . .] thematic roles and syntactic positions are matched by means of a hierarchy, such that the highest-ranking thematic role, whatever it may be, occupies the highest-ranking syntactic position, namely the subject; and one works one's way down the two hierarchies in parallel until one runs out of arguments.
> (Culicover and Jackendoff 2005, p. 182)

The semantic side of the hierarchy is the following:

> **Thematic hierarchy**
> Actor/Agent > Patient/Undergoer/Beneficiary > non-Patient theme > other
> (Culicover and Jackendoff 2005, p. 185)

This thematic hierarchy is complemented by a syntactic hierarchy, beginning with the subject as the "highest" syntactic function; the subject, then, will be normally associated with the Actor/Agent semantic role.[4] If hierarchies like this were valid for all cases (all semantic roles of all complements of all verbs in the language), the statement of valencies would be superfluous: the relationship between syntactic function and semantic role would be automatically determined by general rules. That is, knowing the meaning of the verb (which includes its accompanying semantic roles) the speaker would automatically know how each semantic role is syntactically coded.

As we know, this is not the case. Culicover and Jackendoff's (or any other) hierarchy does not cover all cases, and there is little hope of devising a hierarchy that does. There is a sizable number of exceptions; to give an example, in

[1] Bia espancou Flávio.
Bia spanked Flávio 'Bia beat Flávio'
[2] Flávio apanhou de Bia.
Flávio was-spanked of Bia 'Bia beat Flávio'[5]

[3] Jackendoff's is the earliest formulation as a hierarchy, to my knowledge. But the association between subject and Agent (or "logical subject") is ancient, and has been the source of endless confusion; see a brief survey of early positions in Jespersen (1924, pp. 145–150).

[4] The difference between Actor and Agent, if any, need not concern us here.

[5] The verb *apanhar* 'to be spanked' has a Patient subject, and an Agent of the form *de*+SN, although it does not show a passive morphology. I know of no verb in English that behaves like *apanhar*; in Latin there is *uapulare*: *puer uapulauit* (**not** **uapulatus est*) 'the boy was spanked'.

[3] Bia bateu em Flávio.
Bia beat on Flávio 'Bia beat Flávio'

we have three different syntactic structures, with the same semantic relations.[6] In [1] the Agent is subject and the Patient is object—this sentence, then, follows the prototypical realization. In [2], the subject is Patient and the Agent is expressed by a prepositional phrase with *de*; and in [3] the subject is Agent and the Patient is expressed by a prepositional phrase with *em*. Cases like [2] and [3] are exceptional in that they do not follow the general patterns. They force us to understand hierarchies as statistical tendencies; and the individual formulation of verb diatheses will still be necessary, even if we come to the point of viewing them as only a way to mark exceptions.

In other words, the structure of the language includes privileged symbolic relationships, such as the connection between Agent and subject: we can say that most verbs of action show this connection. The current list of diatheses of the VVP dictionary shows a definite predominance of the subject as the way to express the Agent: in 232 diatheses, 121 have subject with the semantic role Agent (alone or associated with another role); 108 have the subject associated with other 26 semantic roles (of which Theme, Experiencer, Located.thing, Patient and Qualified.thing are the most popular, none of them with more than 19 diatheses); and 3 have no subject. This shows that there is a generalization to capture, and that the hypothesis of role-coding exclusively on the basis of individual properties of the verbs is not correct. The fact that a generalization is probabilistic does not mean that it does not exist; hierarchies are important in the description, and they are part of the speakers' competence.[7] The numbers given above answer the question, What is the semantic role assigned to the subject? If we take into account only verbs of action—that is, those that have Agent as one of their semantic roles—the predominance of the subject as the favorite coding for the Agent is even more evident. The question now is What is the syntactic coding of the Agent role?, and the results are very impressive: 96.7% of all diatheses including Agent code it as the subject.

We now face a dilemma: if we mark the association Agent / subject in every diathesis, we disregard a very clear tendency in the language; but if we do not mark it, and leave it to the charge of the hierarchy, we will have incorrect results in cases like *apanhar* in sentence [2]. A simple solution is to mark the association in the diathesis only in cases where the hierarchy is disobeyed. Thus, sentence [1] would be considered an elaboration of the following diathesis of *espancar* 'spank':

[4] VSubj V NP>*Patient*

The empty subject slot will be filled in by linking with the semantic hierarchy: it is as if we said "the semantic role of the subject follows the general rule". The

[6] These sentences may not be perfect synonyms, perhaps. But they are synonymous in what respects semantic roles and their distribution, that is, they have the same phrases in the same semantic roles: *Bia* is the Agent, *Flávio* the Patient in all three cases.

[7] This is no news, of course; the probabilistic nature of hierarchies is generally acknowledged.

hierarchy as usually stated even authorizes us to omit the semantic role of the object—which will be filled by Patient as a result of the hierarchy—so that all we have is

[5] VSubj V NP

Now for *apanhar* as in [2] all semantic roles must be marked, since this is a unique case admitting of no generalization.

This solution must be restricted so the linking mechanism does not code the Agent as subject with verbs like *ser* 'be', *morrer* 'die' or *parecer* 'seem'. We come to this problem in Sect. 8.3.

In the present proposal, linking rules are independent of each other, instead of being ordered in a hierarchy as in Culicover and Jackendoff's (2005) formulation. Thus, instead of adopting a double hierarchy like Agent, Patient coupled with subject, object, etc., we prefer independent linking rules: Agent<>VSubj, Patient<>object,[8] and so on. This way of stating things makes less claims than Culicover and Jackendoff's model, and is more adequate for the initial descriptive level to which the present inquiry is limited. Correspondingly, we will often speak of linking rules, not so often of semantic hierarchies—although these are alternative ways of treating the same set of phenomena.

In order to make this system function, it must be established that diatheses apply first, linking rules afterwards. For instance, the linking rule Agent<>subject cannot apply to [2] because the diathesis applies first, assigning Patient to the subject, and when it is time for the linking rule to apply it finds the position already occupied. Thus we are able to treat exceptional cases, by making them immune to general rules.[9] And this system also enables us to give rigorous expression to these phenomena, often noticed and described vaguely as "tendencies". Now we can say that a linking rule applies (categorically) unless countered by a diathesis.[10]

8.2.2 Mental Event/State and Subject

The linking rule seen in the previous section, the Agent Rule, is well known, and accepted as a tendency of the language by most linguists. It is inherently restricted in its application—it only applies to NPs, and only with verbs of action; and it does not exclude the possible existence of other principles, analogous in their

[8] The symbol <> is to be read "is prototypically coded as".

[9] The ordering, of course, is only abstract—it is a way to make the system work. It does not entail any commitment about the order in which such operations take place in real time in real brains.

[10] The result is also subject to filtering, as will be seen in Sect. 8.3.

application. We will examine now a linking rule that seems to work for psychological and perceptual verbs.[11]

To start with an example, the sentence

[6] Joe trusts Susan.

expresses Joe's feeling, and the sentence

[7] Joe fascinated Susan.

expresses Susan's feeling.

This is very clear, and evident to any speaker. We are dealing with the semantic role Experiencer, which often co-occurs with a Stimulus. Experiencer can be defined as representing the "entity whose mental event or state is asserted", and the Stimulus as the "factor causing the emergence of this mental event or state". The schemata involved are elaborations of what Wierzbicka (1996) terms "mental predicates", including THINK, KNOW, WANT, and FEEL, which she gives as semantic universals. Hard as it may be to define these predicates, one thing is always clear, and syntactically well marked, namely in whose mind the described state or event takes place: there is never any doubt about which constituent expresses the Experiencer and which the Stimulus.

The Experiencer is frequent as a semantic role, and represents a class of CSRs like "fascinated.entity", "truster", "appreciator", "frightened.entity", "lover" etc., besides the "seer", the "feeler", the "hearer", all including the semantic ingredient "mental event or state", which can be psychological or perceptual. The event or state is different in each case, but the differences are disregarded for grammatical effects, and contain a fundamental similarity, exactly the one captured by Wierzbicka's notion of mental predicate. The mental phenomena described by these predicates are sharply distinct from the physical phenomena evoked by verbs like *eat*, *run*, *speak*, *fall*—a distinction that seems to be a universal of human cognition.[12]

The semantic roles Experiencer and Stimulus occur with verbs of mental state or event, which belong to two semantic classes, psychological (feeling) verbs (*love, fear*) and perception verbs (*see, hear*). Feelings and perceptions are not the same thing, evidently, but here we again find what is so common in all areas of grammar: a relation that is relatively abstract or difficult to observe directly is represented in terms of a more concrete, cognitively more basic relation.[13] Thus, we have Experiencer and Stimulus not only with *see* and *hear*, but also with *fear* and *love*.

In Portuguese as in English, the Experiencer may be coded as the subject:

[11] I do not find it, in its present form, in the literature, although there are approximations (Hupet and Costermans 1976; Schlesinger 1992; Cançado 1996).

[12] See Wierzbicka (1996, pp. 119–120).

[13] Yet, as we will see, there are coding differences of the Experiencer with feeling verbs and with perception verbs, which may lead us to postulate two distinct semantic roles, although both will be defined in some way as relating to the mental state of an entity.

[8] Pedro ouviu um ruído. [perception verb]
Pedro heard a noise
Exp *Stim*

[9] Pedro ama Suzana. [psychological verb]
Pedro loves Suzana
Exp *Stim*

With psychological verbs only, another combination is available, with the subject Stimulus and the object as the Experiencer:

[10] Pedro fascinou Suzana.
Pedro fascinated Suzana.
Stim *Exp*

Another construction, equally limited to psychological verbs, has the Experiencer as subject and the Stimulus as a prepositional phrase:

[11] O cachorro (se) assustou com o trovão.
The dog startled with the thunder 'the thunder startled the dog'[14]
Exp *Stim*

The preposition in these cases is *com* or, less often, *de*.
The general facts related to these verbs in Portuguese can be summarized as:

(a) With perception verbs, the Experiencer is always the subject, and the Stimulus is the object.
(b) With psychological verbs, three constructions occur:

- the Experiencer is the subject and the Stimulus is the object (identical with the construction occurring with perception verbs);
- the Stimulus is the subject and the Experiencer is the object; or
- the Experiencer is the subject and the Stimulus is a prepositional phrase.

No verbs occur exclusively with subject Stimulus. That is, with all psychological verbs a construction is available with the Experiencer as subject; and with perception verbs the Experiencer is always the subject.[15] Furthermore, with psychological verbs the construction with Experiencer as subject and Stimulus as a prepositional phrase seems to be gaining ground: it is sometimes more colloquial, and with some verbs the version with Stimulus as subject is common mostly in the written style. For example,

[12] O show agradou o menino. [colloquial or written]
the show pleased the boy

[13] O menino agradou do show. [colloquial]
the boy pleased of the show 'the boy was pleased with the show'

[14] In English, according to Levin (1993, p. 189 ff), most verbs like *startle* do not occur with Stimulus as a prepositional phrase.

[15] Márcia Cançado, personal communication.

Also,

[14] O trovão assustou o cachorro.
the thunder startled the dog

[15] O cachorro (se) assustou com o trovão.
The dog startled with the thunder 'the thunder startled the dog'

In the case of [14] and [15], both versions are acceptable in all registers.[16]

These facts suggest the existence of a tendency to code the Experiencer as the subject, possibly a historical trend in Portuguese. And the result is that in the current language the Experiencer *can* be coded as the subject with all verbs that accept this semantic role; and with perception verbs no other coding is available.

Constructions with Stimulus subject—Experiencer object, alternating with Experiencer subject—Stimulus prepositional phrase, like [14] and [15], occur with verbs like *agradar* 'please', *alegrar* 'gladden', *animar* 'cheer up', *apavorar* 'scare', *assustar* 'frighten, startle', *desagradar* 'displease', *desanimar* 'discourage', *embasbacar* 'stupefy', *enojar* 'disgust', *entusiasmar* 'thrill', *espantar* 'amaze', *impressionar* 'impress', *incomodar* 'disturb', *preocupar* 'worry', and many others. In all these cases the construction with the Experiencer subject is complemented by a phrase with *com* or *de*. Other verbs, like *gostar* 'like', *amar* 'love', *adorar* 'love'[17] do not admit inversion: the subject is always Experiencer.

The phenomena described above did not escape notice; referring to verbs of feeling, we have the following statement by Cançado (her "Theme" is what I call here the Stimulus):

> [...] the argument that receives the thematic role Experiencer may appear either as a subject or as an object in the surface structure (S-structure) of these verbs, and the choice seems to be random. With this, in the literature we find these verbs distinguished into two classes:
>
> (1) Mário teme fantasmas ['Mário fears ghosts']
> Exp Theme
>
> (2) Fantasmas assustam Mário. ['ghosts startle Mário']
> Theme Exp
>
> In the above examples we have that in (1) the person undergoing the emotional state of fear, the Experiencer (Exp), is the subject; and in (2) the person undergoing the same emotional state, the Exp, is the object.
> (Cançado 1996, p. 91; my glosses, author's numbering)

We can now complement Cançado's observations with a more complete description of the situation. It involves both feeling and perception verbs, in different versions but, I believe, as a result of the same general tendency to make the Experiencer the subject of the sentence—a tendency that can be considered prototypical in Brazilian Portuguese, and that can be stated as a rule, the **Experiencer**

[16] In writing, and for many speakers in speech as well, the reflexive, here *se*, is required.

[17] *Adorar* in its meaning of 'worship' is not a verb of feeling.

linking Rule, abbreviated **Exp<>VSubj.** Cases in which this does not occur must be marked as exceptions, that is, they will have the semantic role of the subject specified in a diathesis. Thus, *assustar* 'startle' has two diatheses, namely,

[16] VSubj>*Stimulus* V NP>*Experiencer*

and

[17] VSubj V *com* NP>*Stimulus*[18]

In [16], each complement receives its semantic role as specified in the diathesis; in the case of [17], the subject will be assigned Experiencer by the Experiencer Linking Rule, and the semantic role of the complement *com* NP (Stimulus) may be included in the diathesis, or, perhaps preferably, be filled in by default from the remaining core CSR present in the schema STARTLE, evoked by the verb *assustar* (on role-coding by default, see Chap. 9). The two codings do not interfere because the syntactic descriptions are different: diathesis [16] applies to sentences with an object NP, and the linking rule applies in the presence of *com* NP.

We saw above that in one point verbs of feeling differ, as a group, from verbs of perception: verbs of feeling participate in a construction where the Experiencer is a nonsubject complement, and the Stimulus is the subject:

[7] Joe fascinated Susan.
Stim *Exp*

No cases of verbs of perception with this distribution of semantic roles are known. There is one doubtful case, *doer* 'hurt'. But this verb is exceptional anyway, in that it cannot refer to a person, but rather to a body part, the person appearing as the Possessor[19]: *meu pé está doendo* 'my foot hurts'. It is also difficult to express the Stimulus with *doer*, and we must have resource to a phrase of Cause, as in *meu pé está doendo por causa da artrite* 'my foot hurts because of arthritis'. The analysis of the subject here as Experiencer is doubtful; I currently tend to analyze it as the Location, for the same relation can also appear as a locational phrase: *está doendo aqui* 'it hurts here'.

8.2.3 Linking Rules and the Simplification of Diatheses

The linking rules seen above and the prototypes we saw in connection with the semantic roles of prepositions (Sect. 7.3) are among the instruments that allow the simplification of our notation for diatheses. We may understand a linking rule as the

[18] Or **VSubj Refl V *com*NP**, for speakers who have a reflexive in these cases: *o cachorro se assustou com o trovão* (ex. [15] above).

[19] The role Possessor belongs to a constituent of the NP *meu pé* 'my foot', and does not appear in the analysis of the sentence.

expression of a prototype, something like "the prototypical way to express an Agent is through the subject", just as we say "the prototypical semantic role of *em* is Location". Prototypes are a widespread phenomenon in language, and must be somehow included in the description of particular languages. Within the limited area of valency description, they can be expressed through linking rules—like the Agent Rule and the Experiencer Rule, seen in the preceding sections.

The presence of linking rules in the language authorizes us to omit semantic roles in the notation of diatheses in certain cases, as for instance in

[18] O Pedro comeu o bolo.
Pedro ate the cake

which may be considered as the realization of the diathesis

[19] VSubj V NP>*Patient*

In this case we omit the semantic role of the subject, and leave it to the care of the linking rule, namely Agent <> VSubj.

However, this may not generalize for all cases where a prototype exists, for other factors are at play. For instance, the sentence

[20] Minha amiga morava em Portugal.
my friend lived in Portugal

might be understood as the realization of

[21] VSubj>*Located.thing* V *em* NP

But here we have a problem, because *morar* 'reside' does not require *em* NP as a complement; rather, what *morar* requires is a complement (of any form) with the role Location: for example, *minha amiga morava aqui* 'my friend lived here'. Therefore, instead of having the syntactic unit *em* NP we should more appropriately have X>*Location*. That is, in this particular case the linking rule that defines *em* as a prototypical marker of Location is not relevant. These cases must be studied one by one, and a general picture cannot be given at present—we cannot simply go over the list, deleting semantic role specifications whenever a linking rule is available.

On the other hand, whenever a prototype is disobeyed this must be fully recorded in a diathesis. For instance, the sentence

[22] A menina apanhou da irmã.
the girl was spanked by (her) sister

represents the diathesis

[23] VSubj>*Patient* V *de* NP>*Agent*

which is part of the valency of the verb *apanhar*.

8.2.4 Context-Sensitive Linking Rules

An important remark must be made before proceeding: since this is a largely unexplored area of grammar, linking rules are used in the present analysis in a somewhat simplified form; we have little choice, at the present stage of the research. Thus, the rules here mentioned have to do with the connection of a semantic role with the syntactic function of an NP or with a preposition; for instance, we have the rule Agent <> VSubj, which tells us that Agents are preferably coded as subjects. And we probably have also a rule stipulating that a constituent introduced by *com* will carry the semantic roles Company or Instrument (schematic filters being in charge of eventual disambiguation).

But there are indications that other factors may be at play. For instance, it may be a simplification to speak of the prototypical semantic role of a specific preposition; take English *by*, for instance: when introducing a sentential complement, it most often conveys the semantic role Path (*he passed by the beach*) with verbs of motion; with verbs of location, *by* marks Location (*he lived by the beach*); and when this preposition occurs in an NP it marks preferably the Agent (*the bombing of the city by the government forces*). Turning to Portuguese, the preposition *em* can mark Location or Goal—but it is Goal when introducing a complement of a verb of motion, as in *cheguei em Belém no sábado* 'I arrived to Belém on Saturday', and Location otherwise: *morei em Belém* 'I lived in Belém'. This shows that linking rules may have to be stated in a more complex way than has been done here, so as to take the semantics of the verb into account.

Other semantic features of the verb seem to play a role in the functioning of linking rules. For instance, it has been repeatedly observed that the opposition between verbs that can occur in the ergative construction (*I broke the window* / *the window broke*) and verbs that cannot (*I touched the window* / * *the window touched*) correlates with something in the semantics of the verb; in these cases Fillmore (1970a) talks of "verbs of change of state" vs. "verbs of surface contact". It has also been suggested that verbs accept the ergative construction when they can express a "spontaneous" event, one that does not depend (or is seen as not depending) on an immediate causator.

These context-sensitive linking rules, if confirmed, will introduce a new category of phenomena: they are dependent on the particular verb of the sentence, and in this they resemble valency processes; but they select in the verb only a particular feature (verbs of action, verbs of motion, and the like). That is, they are sort of intermediate between valential phenomena and general grammatical rules.

There is certainly something to be studied here; but until further research reveals the connection more precisely, we must be content with these vague observations, and with the consideration that linking rules are dependent to a certain extent on the semantics of the verb.

On the other hand, the same job may be done at least in some cases by filters. For instance, *by* in *he passed by the beach* cannot be the Agent because this role is already occupied by the subject, which forces the *by* phrase to be assigned the role

Path; and in *the bombing of the city by the government forces* there is no place for a phrase expressing Path, for semantic reasons, but the Agent is available, and semantically adequate to be occupied by the phrase *by the government forces*. For the moment being this is only a suggestion for future work, and still depends on a large-scale survey of the behavior of individual prepositions.

8.2.5 Prepositions and Linking Rules

Prepositions are a heterogeneous crowd, semantically speaking. Some are semantically transparent (*por causa de* 'because' can only express Cause); some have a very wide range (like *de* 'of, from', which may express Source, Manner, Cause and several other relations, even occasionally Goal[20]); and some seem to express a few prototypical semantic roles (like *com* 'with', which can be Company and Instrument in many contexts, and also appears less frequently as a marker of other roles). This means that the semantic potential of prepositions will have to be investigated in detail, since no general solution is likely to work.

Transparent prepositions are easily disposed of: each has its semantic role as part of its meaning, duly marked in the corresponding lexical entry, or rather in the schema each of them evokes. Thus, *por causa de* 'because' is Cause; *sobre* 'about' is Content (used mainly with verbs of saying and thinking)[21]; *sem* 'without' expresses something resembling a negated Company or Instrument; *após* 'after' is "time"; *apesar de* 'in spite of' also can denote only one relation, etc.

The second group is made up of a few very frequent items: *de* 'of, from'; *em*, basically 'in, on', and *a* 'to'. I will have little to say about these prepositions here; they require special study, which has been carried out to a certain extent (e.g. Oliveira 2009, for *em*).

Finally, the third group, including *com* 'with', *por* 'by, through', and *para* 'for',[22] may be amenable to analysis through linking rules of the kind we have been considering. Here I will examine only the case of *com*, as an example of the kind of analysis that can be eventually generalized for this group of prepositions.

We have already seen that the preposition *com* is typically a marker of Company or Instrument:

[24] Fui no cinema com minha irmã. 'I went to the movies with my sister'
[25] Quebraram a janela com um tijolo. 'Someone broke the window with a brick'

[20] *De* marks the Goal only with the verb *aproximar* 'come near'.

[21] *Sobre* in the meaning of 'on' is not used in modern Brazilian Portuguese.

[22] These are only approximate translations. The distinction between *para* and *por* is a traditional nightmare for English speakers learning Portuguese.

It also occurs with several other semantic roles, like Manner in

[26] Precisa cortar as fatias com cuidado. 'It is necessary to cut the slices with care'

or Patient in

[27] A polícia acabou com a festa. 'the police ended the party' [lit. . . .with the party]

Suppose we find that Company and Instrument are more frequent as the semantic role of *com*-phrases, and that language users tend to assign these semantic roles to these phrases when taken in isolation—for instance, when asked to create sentences with *com* they tend to build complements of Company or Instrument. All this is mere speculation, of course, but it is easy to test; for argument's sake, let us (counterfactually) suppose it *has* been tested and confirmed.

In this case, we can adopt the following analysis: we formulate two linking rules, one of them associating *com*-phrases with Company, the other with Instrument:

Company<>*com*+NP
Instrument<>*com*+NP

These rules are both part of the grammar of the language, so that they compete whenever a *com*-phrase is to receive its semantic role. This competition must be regulated in order that the correct assignment be made, obviously. In cases like [27], where a *com*-phrase has a semantic role which is unusual for this lexico-syntactic configuration, we must define a diathesis, since this assignment is clearly verb-governed. *Acabar* 'end' will then have in its valency the diathesis

VSubj>*Agent* V *com* NP>*Patient*

This diathesis is defined as part of the valency of some verbs, among which *acabar* 'end'. Thus, sentences like [27] will escape the action of the linking rules (which would assign Company or Instrument to the *com*-phrase) because the diathesis applies first (that is, preferably). In other words, a diathesis blocks any linking rules applying to the same complement.

Now, if there is no diathesis to block them, we still have *two* linking rules applying to *com*-phrases. This means that in a sentence like

[24] Fui no cinema com minha irmã. 'I went to the movies with my sister'

the prepositional phrase can be understood as Company or Instrument—yet in fact it is understood as denoting a Company, not an Instrument. In the following section we will see how the assignment of Instrument in [24] and Company in [25] is blocked:

[25] Quebraram a janela com um tijolo. 'Someone broke the window with a brick'

8.3 Schematic Filters

The facts we have examined suggest the existence of several linking rules at work in the language, like the ones that associate the Agent and the Experiencer with the subject. As we saw, this allows a minimal notation of certain diatheses, so that the sentence

[28] Rita loves Ronald.

may be represented simply as an elaboration of

[29] VSubj V NP>*Patient*

This formulation raises a problem: we must mark the subject of [28] as Experiencer, but how can we prevent the other linking rule to apply here, assigning the semantic role Agent to the subject? After all, [28] is syntactically identical to

[30] Rita pinched Ronald.

Rita is the subject in [28], and should be the Agent as an effect of rule [29], which of course gives the wrong result. That is, we need a device to keep the two rules apart since one of them applies to verbs of action and the other to verbs of feeling and perception. One solution is to establish a linking with the semantic features of the verb, thus blocking one of the rules and applying the other according to the verb's being of action or of feeling/perception. This means complicating the grammar, but we will have to adopt it if no better solution is found.

But there is a better solution. We can keep the diathesis as it is in [29] and leave the separation to the schematic filtering process that applies to all realizations of the sentences of the language. The mechanism starts from observations like the following: If the Agent is associated with the subject, how come there is no Agent in [31]?

[31] Dona Mariana was the Queen.

This sentence denotes a state (co-reference between two entities),[23] which keeps us from understanding Agent as the subject. The version with *Dona Mariana* as Agent is filtered as ill-formed, since there is no schema evoked by *be* that includes an Agent.

The same solution can be applied in the case of

[28] Rita loves Ronald.
[30] Rita pinched Ronald.

which are also realizations of the schematic diathesis [29]. They are syntactically identical, but differ as to their lexical items and consequently their semantics, which conditions the semantic role coding of their subject: Experiencer in [28], Agent in [30]. Understanding the subject as Agent in [28], or as Experiencer in [30], will be

[23] That is, both NPs have the semantic role αRef.

filtered as ill-formed. This way the action of the two rules is conveniently constrained without the need for specialized grammatical devices. The grammar remains simple, and semantics performs a task which is necessary anyway, namely the blocking of ill-formed interpretations. This does not have to be marked in the diatheses, since it is a process constantly applying to all interpretations, marking them as well- or ill-formed, on the basis of meaning and world knowledge.

This solution makes it possible to simplify many of the diatheses that make up verb valencies. There is no problem in analyzing [30], [31] and [28] as realizations of [29], since the syntax is the same and the semantic roles will be correctly coded by the system. Only exceptions must be explicit; for example, the sentence

[32] Rita impressed Ronald.

is the elaboration of the diathesis

[33] VSubj>*Stimulus* V NP>*Experiencer*

present in the valency of *impress*—which blocks the application of the linking rule relating the subject with the semantic role Experiencer.

Returning now to the examples seen in the preceding section, schematic filters will also allow us to explain why the reading Instrument does not arise in [24], nor Company in [25],

[24] Fui no cinema com minha irmã. 'I went to the movies with my sister'
[25] Quebraram a janela com um tijolo. 'Someone broke the window with a brick'

Grammatically speaking, these sentences are ambiguous, but one of the possible assignments is filtered out in each, because "my sister" is an unlikely candidate for the Instrument in [24], and "a brick" is an unsuitable Company in the task of breaking a window. The ambiguity of [24] and [25] is resolved at the cognitive level, not at the lexico-grammatical one. This allows us to simplify the lexico-grammatical component in a very convenient way.[24]

Evidently, **schematic filters** are based on our entire world knowledge, and there is no way we can predict what kind of information will be called for in the next sentence to be processed. Consequently, for the moment being we must rely on our intuition, and when I state, say, that the situation where I take my sister as an Instrument to go to the movies is implausible, all I can do is hope that people will agree. For all its current vagueness, though, this resource is indispensable, and is part of the explanation of a great percentage of the cases we have to analyze. We cannot avoid its use, and when using it we must be very careful not to overstep the boundaries of common sense. And the need for detailed investigation of the semantic potential of each preposition—both the semantic roles it can express

[24] To borrow a very illustrative example from Castelfranchi and Parisi (1980), it is this kind of filtering that allows us to know that *Jim cooked the eggs in the kitchen* tells us that Jim was in the kitchen, but *Jim cooked the eggs in his brand-new frying pan* does *not* tell us that Jim was in the frying pan.

and the relative importance of each semantic role for each preposition—should not be forgotten.

8.4 The Subject First Rule

Fillmore (1970a) observed that sentences containing an Agent, an Instrument and a Patient code the Agent as the subject; if the Agent is not expressed, the Instrument will be the subject; and if neither the Agent nor the Instrument is expressed, the Patient fills the subject position. For instance,

[34] The burglar opened the window with a heavy crowbar.
Agent

[35] A heavy crowbar opened the window.
Instrument

[36] The window opened.
Patient

This fact suggests the existence of a tendency to avoid empty subjects. In Portuguese (by the way, a *pro-drop* language) the situation is the same pointed out by Fillmore:

[37] O assaltante abriu a janela com um pé de cabra.
the burglar opened the window with a crowbar
Agent

[38] O pé de cabra abriu a janela.
the crowbar opened the window
Instrument

[39] A janela abriu.[25]
the window opened
Patient

As a matter of fact, the Patient may appear as the subject even in the presence of an Instrument, as in

[40] A janela abriu com um pé de cabra.
the window opened with a crowbar
Patient *Instrument*

As seen, the object or the prepositional complement may or may not appear; but the subject is always present.[26] This agrees with the observation that **in cases where**

[25] Or *a janela se abriu*, for many speakers.

[26] More rigorously, the **VSubj** (as defined in Sect. 1.3.3) is always present.

there is only one core CSR to be expressed, it is nearly always the subject that expresses it; this looks suspiciously like another linking rule, but I will leave it only as a suggestion for the moment.

The main exceptions would be the verbs *ter* and *haver* 'there to be', which are traditionally analyzed as having object and no subject. Or, rather, this is the traditional analysis for *haver*. *Ter* in this meaning does not occur in the traditional written language, and has no traditional analysis, but in principle should follow *haver* and have only object and no subject. But there are doubts about this: *ter* 'there to be' is nowadays found (in Brazilian Portuguese) even in the written language, and there seems to be a tendency to make it agree with what "should" be its object, as in

[41] Tinham três jogadores do Chelsea na frente dele.[27]

there were three Chelsea players ahead of him

Tinham is third person, plural, agreeing with *três jogadores do Chelsea*. This shows that, even with *ter* 'there to be', there is a tendency to code the core CSR (the "presented.thing") as the subject, thus making it fit into the general case. As for *existir* 'exist', it is traditionally used with a subject, and of course agreeing with it; in the spoken language, *existir* patterns like verbs of "presentation of existence", like *aparecer* 'show up' and *desaparecer* 'disappear'. All these verbs (unlike *ter*) can readily occur with the subject in its "proper" place, as in

[42] Existem cangurus brancos. ~ Cangurus brancos existem.
exist [3rd.pl] kangaroos white
'white kangaroos exist'

but

[43] Tem cangurus brancos. ~ * Cangurus brancos tem.[28]
there are white kangaroos

Meteorological verbs like *chover* 'rain', *nevar* 'snow', and the like also occur without a subject; but they are not exceptions, because they are associated with no core CSRs, and stand alone, accompanied at most by adjuncts. In cases where the thing that 'rains' is expressed, it is by means of the subject, as expected:

[44] Choveram pedras de 5 cm.
rained [3rd.pl.] hailstones of 5 cm 'there fell 5 centimeter hailstones'

Cases like

[45] Faz calor em dezembro.
makes heat in December 'it is warm in December'

[27] From the narration of a soccer match on TV.

[28] This sentence is acceptable if the NP is strongly stressed, meaning something like "yes, white kangaroos do exist!".

look like light-verb structures, and may constitute another set of exceptions.

Finally, sentences in the imperative, although they often occur without a subject, do show agreement, and *can* have a subject, normally a pronoun referring to the listener:

[46] *Você* lava o carro e *você* arruma o quarto.
'*you* wash the car, and *you* tidy the room'

The existence of a rule expressing the tendency to fill the subject function preferably to other functions is little more than speculation at the present state of our knowledge. But the exceptions seem to be confined to some well-defined subclasses of verbs; as things stand, there are reasonable hopes that such a rule can be found to be at work in the language.

8.5 Stating Linking Rules

8.5.1 Interplay of Linking Rules and Diatheses

Linking rules can be, in principle, stated in two ways: they can state a semantic role for a morphosyntactic form, or the other way around: for instance, we may have, respectively, ***Goal*** <> ***para*** **NP** or ***de*** **NP** <> ***Source***. We still do not have means to know whether both styles will be necessary; they are not logically equivalent, though, and it may well be that only one way of stating linking rules will have to be used.[29] Here I will limit myself to some considerations on the meaning and importance of such rules in the description.

Linking rules such as the ones given in the preceding paragraph are part of the meaning of prepositions. Things would be simple if the rules were categorical and context-free, but this does not seem to be the case: several factors, not all of them structural, interfere in their application.

First, linking rules are not categorical: they define prototypical cases—in other words, they have exceptions. The exceptions must be made explicit, so that the description includes the precise lexical extension of each rule.[30] Exceptions are notated by stating the appropriate diatheses. For instance, there is a definite tendency to assign Instrument or Company to phrases introduced by *com* 'with'; this can be the object of two linking rules, ***Instrument*<>*com*** **NP** and ***Company*<>*com*** **NP**. But in

[29] I tend to believe that one functions for production, the other for reception, but this is not necessarily relevant for language description, which focuses on competence. Reliability varies: a survey of 232 diatheses occurring in the *Dictionary* shows that the rule **VSubj**<>***Agent*** works in 52.1 % of the cases, and the rule ***Agent***<>**VSubj** works in 96.7 % of the cases (i.e., with only four exceptions).

[30] Thus answering, for this particular area, the criticism of several authors that linguistic description fails to be exhaustive, even in intention (cf. for example, Gross 1975, p. 20).

[47] Ela sonhou com você.
'she dreamed of you'

com introduces a phrase with a different role, probably Stimulus. In cases like this, we can simply keep the rules that assign Instrument and Company to *com* NP, and include in the valency of *sonhar* 'dream' the following diathesis:

VSubj>*Experiencer* V *com* NP>*Stimulus*

Furthermore, we need the convention that **diatheses apply preferentially, thus blocking any linking rules that might apply to the same cases**. This gives us the right result for [47]: *com* NP cannot be Instrument or Company, because the diathesis assigns it the role Stimulus. Linking rules then only apply to cases not covered by diatheses.

8.5.2 The Role of World Knowledge

The above solution leaves something unexplained, namely: How are we to decide between the two[31] linking rules associated with the *com* NP construction? We know that it cannot be indifferently Instrument or Company; in a sentence like

[48] A Zélia foi para o Rio com o Antônio.
'Zélia went to Rio with Antônio'

we have Company, and in

[49] A Zélia foi para o Rio com o carro novo.
'Zélia went to Rio with her new car'

we have Instrument. How are we to ensure that the right role arises in each case?

In many cases, disambiguation depends on contextual factors, more specifically on schematic filters that rule out impossible or implausible scenery (schematic filters were introduced in Sect. 8.3 above). Thus, in [48] we understand *com o Antônio* 'com Antônio' as Company because this role, unlike Instrument, yields a plausible interpretation. The problem with Instrument, then, is that it causes a deviant cognitive structure for [48]—it is difficult to understand a person as an Instrument in a trip. The converse happens, of course, with [49], where *com o carro novo* 'with her new car' is understood as Instrument. That is, we may keep both linking rules, and leave the sorting of the right interpretation to our knowledge of the world.

We can even test the role of pragmatics in [48]—it is enough to imagine that Antônio is the name of Zélia's horse; in this case the phrase will (preferentially)

[31] Perhaps more than two, but let us take just two for simplicity.

denote Instrument, not Company. But this does not depend on grammatical factors, rather on details of our world knowledge ("Zélia has a horse named Antônio").

The reach of this explanation, of course, must be eventually checked against a number of other examples. In this particular case, it seems safe to assume that there are two linking rules associated with *com*, and no grammatical machinery is needed to ensure that every sentence shows the result of the right rule.

8.5.3 Lexical Markers

On the other hand, the fact that *com Antônio* 'with Antônio' in [48] cannot be understood as, say, Cause, or Path, is determined by lexico-grammatical factors. That phrase cannot have these roles because (a) there is no linking rule in the language associating Cause or Path with *com* NP; and (b) there is no diathesis of *ir* 'go' including the marking ***com* NP>*Cause***, or ***com* NP>*Path***. Note that if we had Path, the resulting interpretation would not be hopeless on cognitive grounds, because we might imagine that Antônio is the name of some town or road, and the sentence would have a well-formed semantics, 'Zélia went to Rio by way of Antônio'. But this is not possible, and if we substitute a known town name the result is unacceptable:

[50] * A Zélia foi para o Rio com Barbacena.
Zélia went to Rio with Barbacena

where Barbacena is a town on the road from Belo Horizonte to Rio. Here the lexico-grammatical constraint clearly supersedes pragmatic conveniences. That is, *com Barbacena* in [50] cannot be Company or Instrument for cognitive reasons, and it cannot be Path for lexico-grammatical reasons.

8.6 What Linking Rules Are Trying to Say

Let us now make some considerations about the problems hierarchies and linking rules are meant to solve.

First, of course, they express tendencies that are part of the speakers' competence and condition their use and acquisition of the language. Linking rules also provide a significant simplification in linguistic description. With these rules it becomes possible to state diatheses in a more general way, and to characterize cases such as subject Agent or Experiencer as prototypical (unmarked) in the language, predicting that they are easier to use and to learn. They also offer us a way to define "prototypical" objectively: a feature is prototypical when it is associated with a majority of verbs in the language, or with a majority of verbs in a clearly defined verb class: verbs of action, verbs or feeling/perception, etc.

Hierarchies and linking rules are often discussed in the context of the search for universal features of natural languages. The present work, however, has no direct commitment with that kind of search. We are only investigating phenomena of Portuguese (and of English, wherever it is parallel to Portuguese); here we discuss features of a particular language—which, evidently, *may* be more general, or even universal. Furthermore, a hierarchy is understood here simply as a waiting line to fill syntactic positions; it has as its function to ease the task of coding semantic roles, and decoding syntactic structures. As for the notion of "prominence", as discussed in some works in the literature,[32] these devices seem to point to the subject as a particularly important function. Yet, for immediate descriptive purposes at least, the notion of prominence is of little use. This does not, though, entail a definite theoretical position: there may be a relation of prominence, but it should be better defined, and its utility for description should be properly explained.

In this context, then, diatheses are mainly a way to handle exceptions—in principle rules, including linking rules, take care of all generalizable cases of association between constituents and semantic roles. This is not consistently followed in the *Dictionary*, first because of our current state of ignorance about the details, and also because in some cases no clear tendency can be seen. In the *Dictionary* we simply adopt the most prudent (and user-friendly) line of action, and keep diatheses very explicit. In any case, diatheses are an important aspect of the description, if only because of the sheer number of exceptions that we find when studying verb valency.

[32] See Levin and Hovav's (2005, p. 170–175) for a survey.

Chapter 9
Direct Schema Connections

9.1 Missing Prepositions in Topic and Relative Sentences

In certain sentences a constituent receives a semantic relation independently of the valency of the verb, apparently with reference to the core CSRs associated with the variables in the corresponding schema. In spoken Portuguese this happens in constructions including a topicalized element; for example,

[1] Esse cano sai fumaça.
this pipe comes out smoke 'smoke comes out of this pipe'

The topic NP *esse cano* 'this pipe' is assigned the semantic role Source, although it is not marked with the preposition *de*, which is prototypical for the expression of this semantic role. The semantic role is assigned here on the basis of features of the schema COME.OUT, and does not depend on the valency of the verb *sair* 'come out', which requires the Source to be marked by the preposition *de*.

Semantic relation assignment in these conditions is syntactically conditioned: the topic position of the NP is required, and the sentence is not acceptable with a nontopicalized NP:

[2] * Sai fumaça esse cano.
comes out smoke this pipe
[OK: sai fumaça desse cano, where *desse=de+esse*]

The determining factor is topicalization, not initial position; the sentence is acceptable if the topic is marked by intonation: *sai fumaça, esse cano* (with rising intonation in *fumaça* and *esse cano* in a lower tone).

Here, then, we are dealing directly with elements of the schema, not properly with the valency of *sair*. The schema COME.OUT contains a "theme" (the element undergoing motion), as well as a "source", a "goal", and a "path". In sentence [1], the constituent *esse cano* 'this pipe' cannot be the "theme", which is already occupied by *fumaça* 'smoke'; therefore, it must represent some other (core) CSR

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of this schema. But normally an NP cannot be assigned any of these CSRs, which are all marked by prepositions (as shown by the unacceptability of [2]). The topic is somehow exempt from this restriction, so that [1] is an acceptable sentence in colloquial Brazilian Portuguese.

Direct CSR assignment is not limited to topic constructions, as shown by examples like

[3] De que rio vem a água que você toma banho?
from which river comes the water which you take a shower?
'from which river comes the water you take a shower with?'

There is no preposition (*com*, *em*) before the relative clause—one would expect *. . .com que você toma banho?* 'with which you take a shower'. This omission of prepositions in relative clauses is very common:

[4] A casa que eu moro fica perto.
the house which I live is close 'the house I live in is close'

[5] O homem que eu falei é aquele ali.
the man who I talked is that one 'the man I talked about is that one'

This is occasionally found also in the written language:

[6] SENAI, formando os profissionais que o Brasil precisa.
SENAI training the professionals which Brazil needs
'SENAI, training the professionals Brazil needs'

The verb *precisar* 'need' requires the preposition *de* before the complement:

[7] O Brasil precisa de profissionais.
'Brazil needs professionals' [lit. needs of professionals']

but in [6] no preposition appears.[1]

In these sentences the NP acquires its semantic role without reference to the syntactic functions mentioned in the diathesis. On the other hand, the phenomenon is syntactically conditioned in that it occurs in topic constructions and in relative clauses, but not in other syntactic structures. The most immediate explanation is that the coding is made by direct reference to the schema: MORAR 'live' contains a core variable labeled 'location', which must be filled. Since there is no syntactic indication of which constituent is to code this CSR, the system grabs the available one—in [4], *a casa* 'the house' (or rather *que* 'which', which refers to *a casa*).

This phenomenon has only rarely been studied, to my knowledge at least. The most important work about it is Pontes (1986, 1987), who gives many interesting examples, taken from actual speech; the above analysis comes from Perini (2008, Chapter 10). For similar facts in other languages, cf. the studies collected in Li (1976).

[1] Example [3] comes from a street outdoor, and [6] from an ad in a weekly news magazine.

9.2 Role-Coding by Default: Topic Sentences

Let us return to the example

[1] Esse cano sai fumaça.
this pipe comes out smoke 'smoke comes out of this pipe'

We can hypothesize that the CSR of *esse cano* ("source") is interpreted by default, as described below.

The schema COME.OUT contains core variables labeled with the CSRs "theme" and "source". It is compatible with several other CSRs, but the latter are peripheral: "time", "location", "manner", etc. "Path" and "goal" may also be core; I have no evidence on that because *sair* is not one of the verbs researched in the study by Lima, Pinha and Perini mentioned in Sect. 5.2.3. But my guess is that one seldom uses *sair* without expressing the "thing that comes out", that is, the "theme" (except of course in anaphoric situations).[2]

Let us now suppose that there is some kind of pressure to express core CSRs, so that if a constituent is compatible with one of them it will be assigned preferably to that constituent. There is some evidence for that pressure; it would explain the fact that in

[8] O Renato estava pensando no banheiro.
Renato was thinking in/about the bathroom

the most immediate interpretation is that the bathroom is the content of Renato's thinking, not the place where he went in order to think.[3] This must have something to do with the core status of "content" (of the thinking), and peripheral of "location" in the schema THINK. In the case of [1] there is also an urgency to fill the CSR "source", since the "theme" is already occupied by *fumaça* 'smoke'; and since the topic *esse cano* 'this pipe' is a good candidate to become the "source", it is assigned this CSR. Why this functions for the topic but not for the same NP in postverbal position is something I do not understand, but seems to be a fact.

This phenomenon may be called **coding by default**: once some CSRs are coded through grammatical ways, the remaining core CSR will be coded as the remaining complement, barring syntactic or semantic incompatibility—which would occur for instance in

[9] * Sem esse cano sai fumaça.
Source

[2] The ADESSE database gives, for *salir* 'come out', the presence of the Theme (*móvil*) in 99.9 % of the cases; the Source (*origen*) occurs in 40.4 %. Compare with Goal (15.5 %), Path (3.2 %). These numbers suggest that Source is indeed one of the core CSRs for Spanish *salir*, a very close translation of *sair*.

[3] In Portuguese both relations are marked with *em* (here agglutinated with the article *o* into *no*).

where the semantics of *sem* 'without' blocks the assigning of any core CSR of *sair* 'come out'. Or in

[2] * Sai fumaça esse cano.
Source

where the syntax is not adequate: an NP can be "source" of *sair* only if it is the topic, otherwise it requires an explicit prepositional mark (usually *de* 'from').

We have here, then, a mechanism of direct connection, tying CSRs directly to constituents, without the intermediation of semantic roles. This mechanism depends, for its working, on the validity of the distinction between core and peripheral CSRs, discussed in Chap. 5.

One thing to observe is that, even when a CSR is assigned by default as in these cases, it depends on the semantics of the verb: the verb evokes a schema, and it is one of the core CSRs of this schema that is accessed by default. In other words, in a sentence like

[1] Esse cano sai fumaça.
this pipe comes out smoke 'smoke comes out of this pipe'

the constituent *esse cano* 'this pipe' codes the CSR "source" because this is a core CSR in the schema COME.OUT, evoked by the verb *sair*. We thus attain the aim of assigning each CSR to a constituent, so that it has a semantic relationship with the verb, albeit not directly assigned by the verb itself; the way this aim is achieved seems to be of little concern to the system.

This runs counter to the opinion expressed by Li and Thompson (1976), who hold that the topic

> need not have a selectional relation with any verb in a sentence; that is, it need not be an argument of a predicative constituent.
> (Li and Thompson 1976, p. 461)

and also

> [. . .] topic selection is independent of the verb.
> (id., p. 463)

This is not the case in many sentences of Portuguese: even if we take Portuguese translations of Li and Thompson's examples, the semantic (or selectional) relations between topic and verb are evident. For instance, they give a sentence in Lahu which corresponds to the Portuguese

[10] Esse campo, o arroz é bom.
this field, the rice is good 'the rice in this field is good'

The sentence is acceptable in spoken Portuguese; and the topic is a "location", clearly related to the predicate—that is, the topic tells us where the rice is good. Semantically speaking, [10] is equivalent to

[11] O arroz nesse campo é bom.
the rice in this field is good

where the phrase *nesse campo* is not a topic, and correspondingly shows the proper preposition (*em*, here represented by *n-* in *nesse*).

Furthermore, if we substitute, say, *esse lápis* 'this pencil' for *o arroz* 'the rice' in [11], getting

[12] * Esse lápis, o arroz é bom.
this pencil, the rice is good

the result is unacceptable, precisely because the topic does not harmonize semantically with the rest of the sentence, which shows that there *is* a selectional relation between them.

It is true that in some cases this semantic relation is not clear, and perhaps does not exist. One example, taken from Pontes (1986), is

[13] Essa minha barriga, só jejum.
this potbelly of mine, only fasting

But one cannot say that the topic systematically differs from the subject because it lacks a semantic or selectional relation with the verb.

The existence of this mechanism in Portuguese raises an interesting question: how does semantic role assignment function in topic-prominent languages? Is it typically done by default, or will it be necessary to define a new set of syntactic functions (topic instead of subject, and so on)? I cannot go into these issues here, and will have to leave them as questions only.

The inclusion of topic sentences like [1] in the analysis will force us to add complexity to the syntax, since there is no traditional way to analyze them. One might then wonder whether this runs counter to the Simpler Syntax principle which is followed in this work. The answer is that "simpler" must be understood as "as simple as possible"—once a simple solution fails to cover all available data, we have no way but to reformulate it, in more complex terms of necessary. In other words, data have priority over theory; if this principle is not kept present at all times, we may end up with empirically irrelevant analyses (a not unheard-of phenomenon in linguistics). The Simpler Syntax principle is a working hypothesis, and a virtual aim to pursue, not a theory to be validated at all cost. Therefore, if our syntax becomes more complex on account of the inclusion of these new phenomena, we should blame it on the complexity of the structure itself.

Topic structures are still a great mystery of Brazilian Portuguese. If we analyze *esse cano* in

[1] Esse cano sai fumaça.
this pipe comes out smoke 'smoke comes out of this pipe'

as the subject, we will have no function for *fumaça* 'smoke', at least not within a traditional system. Note that *fumaça* has the semantic role expected for the subject, and it can appear in the canonical subject position. Furthermore, there is no way to "force" agreement with the topic, since we cannot say

[14] * Esses canos grossos saem fumaça.
these thick pipes come out (plural) smoke

but must say instead

[15] Esses canos grossos sai fumaça.
these thick pipes comes out (sing.) smoke

with the verb in the singular. Therefore, the topic in this sentence is not the subject—in fact, there is no way to include such structures in a syntactic analysis of the traditional format. Here, as said before, we need to contemplate a partial overhaul of syntactic analysis (which is beyond the aims of the present book).

9.3 Role-Coding by Default: Particularized Semantic Relations

The coding mechanisms studied so far depend on tolerably clear definitions of semantic roles. But there are cases where semantic roles are difficult to define, mainly because they involve CSRs restricted to one or very few verbs.[4] The following sentences exemplify this situation:

[16] O armário está cheirando a naftalina. 'the wardrobe smells of mothballs'
[17] Esse tijolo serve de peso de papéis. 'this brick functions as a paperweight'
[18] Ele livrou a casa dos insetos. 'he rid the house of insects'
[19] O paciente passa a sopa e biscoito. 'the patient lives on soup and biscuits'
[20] Você vai se acostumar com esse trabalho. 'you will get used to this work'

The CSRs attached to the underlined phrases are difficult to interpret in terms of the usual semantic roles: they occur with too few verbs, hence the difficulty in generalizing. What can we do in these cases? In the absence of a critical mass of analyzed data, no definite solution is available; but we can risk some conjectures.

We can start from the conception of a semantic role as a set of CSRs. We saw previously (Chap. 4) the hypothesis that the usual semantic roles (Agent, Instrument, Stimulus, Location, etc.) represent classes of CSRs; more precisely, they are schematic relations extracted from classes of CSRs. Thus, from the CSRs "eater", "drinker", "writer", "painter", etc., we draw the schematic relation "immediate causator of an event", that is, Agent. This makes sense not only as an economical way to refer to CSRs that have something in common, but also as a relevant relation within the structure of the language, because the grammar makes constant reference to that schematic relation, disregarding individual features that distinguish the "reader" from the "writer", the "drinker" from the "runner", etc. No grammatical rule or process refers to those individual features, but we can find important

[4] This was observed by Herbst (internet): "participant roles [. . .] can take the form of verb specific or more general roles".

grammatical statements that refer to the Agent. This is expressed by Jackendoff in a passage quoted previously:

> "argument structure" can be thought of as an abbreviation for the part of conceptual structure that is "visible" to the syntax.
> (Jackendoff 1990, p. 48)

A semantic role like Agent, then, represents a very large class of CSRs, occurring with a wide variety of event verbs. But just as there are large classes of CSRs, there are very small ones. The latter can be considered minimal semantic roles if we find that they are needed to state some grammatical fact. However, in these cases it is not possible to find out which portion of the semantic matrix is being "seen" by the syntax; we must record the CSR as a whole, in its elaborate form.[5] This happens when a CSR relates to one verb only, or to very few verbs with similar meanings.

Taking the example

[17] Esse tijolo serve de peso de papéis. 'this brick functions as a paperweight'

the semantic relation connecting the verb *servir* 'function, work (as)' to its complements is intuitively clear. But which other verbs have similar relations? The sample is too small to allow us to safely infer the features that are relevant for grammatical purposes. When trying to formulate the diathesis of *servir* 'function' represented by [17], what can we say about the semantic role of the subject *esse tijolo* 'this brick'?[6] The language has one or two synonyms for *servir*—for example, *funcionar* 'function', which will take the same CSR. But synonyms do not help, because we want to find a more schematic relation, and synonyms only give us the same relation again and again. We derive the notion of Agent from the "immediate causator" of *eat*, *drink*, *steal*, *run*, *shout, jump* and so on, that is, from a set of partially different notions, which all include the schematic relation we are looking for. In cases where the CSR is unique, or almost, devising a more schematic semantic role from it may be impossible. Perhaps we may interpret the schema FUNCTION.AS evoked by [17] as some kind of attribution of quality, but this is not clear at the moment, partly because the word *quality* covers such an uncomfortable variety of concepts. I think we must accept the temporary solution that the subject of [17] expresses a minimal semantic role (a CSR), "thing.that.functions.as. something".[7]

[5] Elaborate CSRs correspond roughly to the frame elements found in FrameNet, where they are described as "frame-specific semantic role names".

[6] The ADESSE system would analyze *de peso de papéis* 'as a paperweight' as **Finalidad** 'purpose', which is possibly adequate; and *esse tijolo* 'this brick' is analyzed as **Entidad**—but "Entity" is not a relation.

[7] Let me add that this formulation is only a very clumsy attempt at representing a concept present in our semantic memory. The concept itself is clear, witness the fact that we understand [17] without difficulty; it is only hard to express in suitable words.

Let us turn now to the representation of these facts in a valency list. We have devised a mechanism able to relate directly CSRs and syntactic units, as we saw in the previous section in connection with sentences like

[1] Esse cano sai fumaça.
this pipe comes out smoke 'smoke comes out of this pipe'

In the case of [1], the semantic relation is one of the usual ones, namely the semantic role Source. The basic principles that work, here and in the language in general, are that (a) **no syntactic constituent (that can bear a CSR) may lack a CSR**, and (b) **there is a special urgency to represent core CSRs present in the schema**. From these principles we may elaborate a mechanism to code CSRs correctly in cases like [17].

In most cases the problematic CSR is only one; for instance, in

[18] Ele livrou a casa dos insetos. 'he rid the house of insects'

the subject, *ele*, is clearly an Agent, and the object, *a casa*, is the Patient. The problem centers on *dos insetos* 'of insects', which has no obvious analysis in terms of the more common semantic roles. Yet it seems to be a core relation, which is also shown by the preposition *de* expressing a nonprototypical CSR.

In this case we may have recourse to the mechanism seen above in connection with the CSR assigned to topic NPs in sentences like [1]. Suppose the subject and object of [18] receive their semantic roles normally, either from the valency of *livrar* 'rid' or from some more general rule (the one that connects Agent and subject, for instance). At this stage, the semantic structure of the sentence will be incomplete, because the complement *dos insetos* still lacks a semantic role. Now the schema RID has three core CSRs, namely "ridder", "thing.which.is.rid.of something" and "thing.the.ridder.rids.something.of". The first two are subsumed under Agent and Patient, respectively, and have been attached to the subject and the object. The remaining CSR is assigned, by default, to the remaining complement, which completes the semantic structure of the sentence.

This mechanism may be unnecessary if we manage to fit the CSR of *dos insetos* into some more general semantic role.[8] But this solution is unlikely to cover all cases, so assignment by default seems to be a necessary part of the general system of semantic relation assignment. For the moment being, it is hard to tell cases of assignment by default from cases where our ignorance leads us to an emergency solution. We often face the choice between a mere change in label and the Procrustean task of fitting a CSR into an accepted semantic role at any cost. Further research may enlighten us on this matter.

A more difficult case is when neither complement fits into a well-known semantic role. In such cases the solution used above for [18] will not work, because there will be no way to know which complement is to receive which CSR; in other

[8] FrameNet lists cases like this under the frame (schema) EMPTYING; *of insects* would be the Theme.

words, there are two "loose" complements for two unattached CSRs, and the problem of matching the right roles with the right constituents remains. These cases (which are hopefully rare) are still in need of a solution.

9.4 Role-Coding by Default: Semantic Role Elaboration

We saw that in

[1] Esse cano sai fumaça.
this pipe comes out smoke 'smoke comes out of this pipe'

the topic has the semantic role Source. But one might raise the objection that, if the coding is made by direct linking with the schema, we should have here not a (schematic) semantic role, but rather an elaborate CSR: nor Source, but something like "conduit.by.which.smoke.comes.out". Source, after all, does not necessarily entail coming from *inside* something, and certainly involves other things than just smoke; yet the schema evoked in [1] includes a variable that refers to something coming out of some place.

The problem becomes more evident when we explore the possibility of coding by default the semantic relation of the object in a sentence like

[21] O cachorro apavorou o ladrão.
the dog frightened the thief

This sentence depends, for semantic role coding, on a diathesis specifying that the subject is the Stimulus, because there is a linking rule connecting the subject with the Experiencer, and this case goes against it. It is then

[22] VSubj>*Stimulus* V NP

Now, suppose the semantic role of the object is left blank, to be filled in by default[9]: the evoked schema, FRIGHTEN, has two core CSRs, "stimulus" and "experiencer"—more elaborately, "frightening.thing" and "frightened.thing". If the former is assigned by diathesis, we can allow the object to receive its semantic relation by default. But what will this semantic relation look like: the elaborate relation "frightened.thing" or the schematic Experiencer?

Since (following our current assumption) it comes straight from the schema, it must be the elaborate one, namely "frightened.thing". But this apparently raises the problem that the semantic relations in [21] and its thematically synonymous sentence

[23] O ladrão apavorou com o cachorro. 'the thief was frightened by the dog'

[9] That is, we do not need to mark it as the Experiencer in the diathesis.

are the same. In [23] the semantic role of the subject is Experiencer, assigned by the linking rule Experiencer<>VSubj; in [21] the object would receive the elaborate semantic relation "frightened.thing", this time by default. Are we to say that the semantic relation assigned to *o ladrão* 'the thief' is one in [21], and another in [23]? This seems to fly in the face of evidence: these two sentences express exactly the same event, as far as semantic relations and their bindings is concerned—the dog causes the thief to become frightened.

This is only apparently a problem, and to see it we must make a brief digression on the elaboration system as applied to semantic relations.

A semantic role like Patient, assigned to a constituent, cannot be understood in this form, because it is schematic: it means, at most, that the corresponding referent undergoes a process. That is, in a sentence like

[24] The tiger killed the hunter.

the main constituents must be understood in a very specific way: the sentence denotes an event initiated by an animate agent that causes the death of the patient by using teeth and claws, and so on. The result is a very rich mental landscape, including sensorial components (one can visualize the scene, for instance). On the other hand, semantic roles are limited to telling us who is the killer (Agent) and who is the victim (Patient).

The elaboration of the semantic roles into particularized relations is performed by a mechanism which starts from the schematic indication of Agent and Patient and relates them to details derived from the meaning of the verb (*kill*, that is, the schema KILL), of the nouns (a tiger does not kill in the same way as a snake, or a disease) etc. At the end, a sizable chunk of our knowledge of the world ends up involved in the process. Here we are concerned with a small part of this mechanism, which is nevertheless a necessary step, namely the part that takes us from Patient to something like "entity.that.gets.killed", by incorporating semantic features of the verb. It is part of the general process of elaboration of schematic semantic relations, necessary in order to reach comprehension.

But if it can function from schematic to elaborate, it can also work in the opposite direction, from elaborate to schematic. The links are not directional: they are knowledge that remains available to the language user at all times, linking symbolic entities (signs) and general world knowledge. Just as they allow us to understand that *the hunter* is not only Patient, but also patient of a killing event, etc., they recognize the "entity.that.gets.killed" as an elaboration of the Patient. In

[24] The tiger killed the hunter.

if we want to relate the semantic relation with the object by default—that is, by direct connection to the schema—of course it will be something like "entity.that.gets.killed", for that is what we find in the schema KILL. This follows the orientation found in FrameNet, already quoted:

> Core Frame Elements are unique across Frames. Although something as straightforward as "Agent" will in one frame have very much in common with the "Agent" in another

> unrelated frame—based on what we all agree to be true about agents—it is also true that the Agent role in each frame is operating within a unique context.
> (FrameNet, FAQ)

But the "entity.that.gets.killed" is in its turn connected to the schematic role Patient, through the elaboration mechanism seen above, now working in reverse. Therefore, there is no real problem in assigning Patient by default—this is but an abbreviation for the whole process: the by-default mechanism assigns "entity.that.gets.killed", which is recognized as an elaboration of Patient.

The same reasoning applies to the case of

[21] O cachorro apavorou o ladrão.
the dog frightened the thief

if the object gets its CSR by default. It receives the CSR "frightened.thing", which ends up being recognized as an elaboration of Experiencer. Consequently, there is no collision with the assigning of Experiencer to the prepositional phrase in [23].

A final remark: the possibility of interpreting the role of the object in [21] *either* by default (resulting in an elaborate CSR) *or* by grammatical means (resulting in a semantic role) may sound strange: after all, which is the correct process? And how are we to identify the correct process in each case? The answer is that we can leave things as they are: both possibilities may be open to the language user, whose competence may include two (or more) ways to interpret a constituent, to be used according to the conveniences of the moment. As a matter of fact, once the process is completed, what is attached to the complement is a complex made up of a particularized CSR, plus its schematization as a semantic role: something like 'this complement expresses the "frightened.thing", which we know to be but an elaboration of Experiencer.' As said above, the system is opportunistic, and often has at hand more than one way to solve the problems it is confronted with.[10]

9.5 Role-Coding by Default: The Remaining Complement

Let us now consider the sentence

[25] Bia espancou Flávio.
Bia spanked Flávio

As we know, the semantic roles can be correctly coded by following the instructions contained in the diathesis

[26] VSubj V NP>*Patient*

[10] This ability to take different paths towards the same aim is pointed out as one of the differences between computers and the human mind: "We usually know several different ways to do something, so that if one of them fails, there's always another." (Minsky 1995, p. 156).

A linking rule, Agent<>VSubj, will attach the role Agent to the subject, and the object will be the Patient as stipulated in the diathesis.

But there are other available means to find the semantic role of the object. Suppose the diathesis is simplified into

[27] VSubj V NP

There may be another linking rule to define the role of the object here. But suppose we do not have this rule; even so, the object will be marked as the Patient by default: the verb, *espancar* 'spank', evokes the schema BEAT, which contains two core CSRs, "beater" and "victim". The "beater" is identified as the subject, because of the action of the linking rule Agent<>VSubj. One complement remains to be related to a CSR, and this can be done by default, that is, the object receives the remaining core CSR "victim", eventually schematized to Patient. Note that we do not have to create new mechanisms in order to do this: coding by default is independently necessary, so that the resource stays available anyway. It will be a solution for many cases where no linking rule exists to fill in the semantic role of some complement.

Summarizing, the semantic role of the object in [25] may, in principle, be filled in three ways: by mentioning it in the diathesis, by a linking rule (if any) of the form Patient<>object, and by default as sketched above. Which of these is the most adequate, or whether they can all act concurrently, is still to determine. Note that the default coding allows us to simplify the grammatical component to a higher degree; yet I will not opt for this, or for any other, mechanism, until empirical research shows us more clearly the way.

9.6 On Counting Diatheses

A last remark must be made in this connection. In cases analyzed as coding by default, the valency dictionary currently shows the elaborate forms (CSRs), e.g., for a sentence like

[28] O juiz condenou o assaltante a seis anos de prisão.
'the judge sentenced the mugger to six years in prison'

the dictionary gives the diathesis

C141 VSubj>*Agent* **V NP**>*Patient* ***a*** **NP**>*sentence*

The semantic role of the last constituent is filled in by default, since it seems to be exclusive of "judicial sentence" verbs.

This, as said, is a temporary solution, and "sentence" may be eventually subsumed under some more general semantic role. But we might be establishing, for *condenar* 'sentence [v.]', a distinction that does not exist at the level of schematicity defined for entries in the dictionary. This becomes particularly evident in cases like, to pick English examples,

[29] My daughter plays flute very well.
[30] My daughter plays chess very well.

Suppose (as is likely) that we have to fill the role of the object in these sentences by default. We will then have "musical.instrument" in [29], "game" in [30]. These will be, then, according to our current criteria, two separate diatheses. But the way they come to fill the role of the object is the same: starting from a thematically undefined constituent, they select the remaining role, which depends of course on the schema. The verb is the same, *play*, but the intended meaning differs, and so do the schemata: PLAY.INSTRUMENT for [29], PLAY.GAME for [30].[11] One may want to keep an eye on these cases, because they may have to be redefined—instead of two different diatheses, we may have only one for both cases. For the moment being, we have to keep the above as the best available solution; but, like so many points seen in this book, it calls for further research.

[11] FrameNet gives more schematic relations, respectively CAUSE_TO_MAKE_NOISE and COMPETITION.

Chapter 10
Other Aspects of the Role-Coding Process

To end this survey of the complex system of semantic relation coding as currently known, I present two still unmentioned phenomena that seem to have some importance: these are the **pairing of semantic roles** and the **effect of the verbal aspect**, with a final comment on **multiple roles**.

10.1 Paired Semantic Roles

The first of these phenomena has some connection, still somewhat mysterious, with nominal agreement. We may call it **semantic role pairing**, that is, semantic roles that occur necessarily in pairs, each one of them attached to a different constituent, but semantically connected in some way to each other.[1]

10.1.1 Nominal Agreement and Paired Semantic Roles

Before coming to examples, let us briefly consider certain conditions that apply to nominal agreement. Nominal agreement occurs within an NP, where the head determines the gender and number of some of the other constituents, namely, modifiers, determiners, quantifiers, possessives, etc. And it also occurs in the sentence, between an NP and another term external to it. An example of the latter situation is

[1] A Cristina é magra.
Cristina is thin

[1] Essentially the same relation is found in FrameNet, namely roles that "require" the occurrence of other roles; see the entry for FIGHT, for example.

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Magra 'thin' agrees with the subject NP, *a Cristina*, and stays in the feminine singular.[2] Here we will be concerned only with these cases; agreement within the NP belongs to the analysis of the internal structure of the NP, which we are not considering here.[3]

The semantic roles present in sentence [1] are Qualified.thing (*a Cristina*) and Quality (*magra*). These semantic roles must occur always together, since one of them expresses a quality of the other's referent (*magra* 'thin' denotes a Quality of the referent of *a Cristina*, which is the Qualified.thing). In other words, in a sentence we cannot have a Qualified.thing without a Quality, nor vice-versa. Not all semantic roles participate in a pairing relationship; for instance, an Agent can occur with or without a Patient; and the several semantic roles defining motion in physical space, Theme, Source, Goal, and Path, can occur in a sentence alone or as a group, as needed.

Besides the pair Quality/Qualified.thing, other pairings can be identified. For instance, in the sentence

[2] A Cristina é a mãe do Daniel.
Cristina is Daniel's mother

the two complements,[4] *a Cristina* and *a mãe do Daniel*, are correlated by an assertion of co-reference—that is, [2] asserts that Cristina and Daniel's mother are the same person. I represent this assertion of co-reference by associating the semantic role **αRef** with both complements. Complements with the semantic role αRef are, obviously, always paired.

Another case of pairing is Location and Located.thing, as in

[3] A Cristina está na cozinha.
Cristina is in the kitchen
Loc.thing *Location*

We cannot have a Located.thing without a corresponding Location.

In cases like [1] (Qualified.thing/Quality) and [2] (αRef), pairing is biconditional: there is a Qualified.thing **if and only if** there is a Quality, and the same for the two αRefs. In the case of Location and Located.thing, we have a conditional: if there is a Located.thing there must be a Location, but Location without a Located.thing is possible, as in

[4] Estava chovendo em Belém.
it was raining in Belém
Location

[2] The masculine singular is *magro*, the feminine plural *magras*, the masculine plural *magros*.

[3] There is a preliminary study of the internal structure of the NP in Perini et al. (1996). The phenomenon of semantic role pairing and its grammatical correlates was studied in Perini and Fulgêncio (2011).

[4] I remind the reader that we are calling the subject a complement; this makes sense in terms of the description of valencies.

where there is no Located.thing represented by a complement (perhaps we might say that the Located.thing is the event itself). For effects of morphosyntactic coding, these two situations do not need to be distinguished; the relevant distinction is between pairing (of any type) and non-pairing of semantic roles.

In a certain sense, all semantic roles are relational—for instance, an Agent is "agent" of an "action" expressed by the verb—that is, it expresses a relation between a complement and the verb. Here, however, I am dealing with the special case of sentences in which there is pairing between the roles of two nonverbal constituents.

Morphosyntactically, the construction illustrated in [1] shows agreement between two constituents with paired semantic roles: the adjective phrase, *magra*, agrees in gender and number with the subject NP. There seems to be a systematic grammatical relationship between paired semantic roles and nominal agreement. As a first approximation, we may say that

Hypothesis (strong version)
Nominal agreement occurs (outside the NP) **always and only** between constituents bearing paired semantic roles.

In order to test this hypothesis by direct inspection of the data, we must check whether (a) all cases of paired semantic roles show agreement, and (b) there are cases of nominal agreement that do not involve pairing of semantic roles. Testing must take into account the fact that agreement only shows when the complement in question is morphologically adequate; thus, there is no agreement in

[3] A Cristina está na cozinha.
Cristina is in the kitchen

because a prepositional phrase cannot agree. In

[2] A Cristina é a mãe do Daniel.
Cristina is Daniel's mother

there is no agreement—although both *a Cristina* and *a mãe do Daniel* are feminine singular—because we can say

[5] A Cristina é o meu maior problema.
Cristina is my greatest problem
fem.sing. masc. sing

where the subject (Qualified.thing) is feminine and the constituent bearing the semantic role Quality is masculine. The identity of features observed in [2] is not agreement, but a condition of semantic well-formedness (that is, a schematic filter), which prevents us for instance from stating that Cristina is Daniel's *father*, or the like. To generalize: NPs, prepositional phrases and adverbial phrases do not agree.

There is no agreement in cases of αRef because this semantic role is always assigned to NPs (AdjPs have no referential potential, and cannot be assigned αRef). In such cases, pairing does not entail agreement. And, finally, there is no agreement in cases of pairing like Location and Located.thing.

In order to capture these differences, our hypothesis must be altered into

Hypothesis (final version)
Nominal agreement occurs (outside the NP) **only** between constituents bearing paired semantic roles.

That is, there is no agreement without pairing, but pairing without agreement is possible.

Nominal agreement is usually considered a syntactic phenomenon, partly because it involves gender, a basically formal category: there is no semantic reason for *computador* 'computer' to be masculine, and *impressora* 'printer' feminine. But if the above hypothesis is true, we should recognize that, although agreement per se is a formal process, the selection of the elements that agree depends on semantic factors (i.e., semantic pairing).

Cases like

[1] A Cristina é magra.
Cristina is thin

[2] A Cristina é a mãe do Daniel.
Cristina is Daniel's mother

are analyzed traditionally as "nominal predicates": the verb is seen as a mere bearer of tense, person, etc., but does not predicate, and does not assign semantic roles. This may make sense in purely semantic terms, but for the description of valencies it is important to focus on the verb, that is, on a lexical item, not on a semantic unit. From this point of view, a verb like *ser* 'be' works like any other verb: it can appear in constructions with complements of a certain form, and these complements have certain semantic roles which depend on the identity of the verb. For example, something that must be said about the verb *ser* 'be', not about the corresponding predicate, is that it may co-occur with a subject and another NP, but not with a subject and a prepositional phrase with *com* (**ela era com você*).[5] Another property of the verb *ser* is that its subject, and no other term in the sentence, can have the semantic role Qualified.thing (as in example [1] above).

Descriptively, it makes sense, then, to treat *ser* 'be' like any verb, irrespective of its semantic peculiarities. This applies to other verbs, like *parecer* 'look', as in

[6] A Cristina parece feliz.
Cristina looks happy

and so on.

From our point of view, the peculiarity of these verbs is that they accept paired semantic roles; but it is good to keep in mind that paired roles (as well as the traditional syntactic function **predicative**[6]) also occur with verbs not traditionally analyzed as copulative, as in

[5] 'She was with you' is *ela estava com você*, with the other verb meaning 'be', *estar*.

[6] In English grammar, generally **predicative complement**.

[7] O pacote chegou amassado.
the packet arrived crushed

where *o pacote* 'the packet' and *amassado* 'crushed' are semantically paired.

Our point of view centers on the fact that *ser* 'be' is undeniably a verb, and its recognition as such is the first step in processing a sentence like [1] or [2]; that is, the speaker's knowledge is adequately represented, for our purposes, when we say that *ser* 'be' can occur in the construction

[8] VSubj>*Qualified.thing* V AdjP>*Quality*

and we have somewhere in the grammar the statement that Qualified.thing and Quality are paired semantic roles.

Let me insist once more on the descriptive nature of the analysis here developed. One of the concerns of description is to include in the analysis facts that *must* be expressed, regardless of the theory one is adopting or eventually comes to adopt. For a verb like *eat*, we must state that it can occur with a subject Agent and an object Patient, and we represent these facts as

[9] VSubj>*Agent* V NP>*Patient*

Any analysis that omits this information (however it may be expressed) can be deemed incomplete; we are here seeking observational adequacy, which is the first requirement of any grammatical analysis. And, since we are focusing on a particular area, namely verb valencies, we need not try to include all information available, but only that portion that is directly relevant to the description of valencies.

When we come to a verb like *be*, we must say that it may occur with a subject understood as Qualified.thing and an adjective phrase which is the Quality:

[10] Martha is happy.
Qfd.thg *Quality*

There is a lot more to be said about this sentence and about the verb *be* in particular. But the roles shown in [10] are part of what *must* be said, and certainly depend on the verb being *be*, because *eat* could never occur in that symbolic environment. If we think that *be* does not predicate in the usual sense,[7] this will have to be stated elsewhere; our description of valencies takes no stand on it. What [10] shows is that the verb *be* can appear in a particular construction, and this feature distinguishes it from *eat*; in this way we achieve the subclassification of these verbs, that is, we state part of their respective valencies. Of course, the same can be said in other ways, but I prefer not to discuss notational conveniences; the notation used in [9], [10], and in general in this work, is easy enough to understand, and I will keep it as an acceptable option.

It is often held that in

[7] Which depends on how we understand the meaning of *predication*, a word which seems to be less univocal than desirable.

[11] Martha is thin.

the predicating element is the adjective, *thin*; this is considered one of the features of the class of adjectives, which are predicators, like verbs and prepositions. On the other hand, in

[12] Martha is Daniel's wife.

we have an NP, *Daniel's wife*, which would have to be the predicator as well. But attributing to an NP the task of predicator—besides its normal function of indicating a reference—seems a more complicated solution. That is, it is not immediately evident how we are to conflate the two cases instanced in [11] and [12] under a single analysis. My proposal does just that, since it attributes the phenomenon to properties of the verb *be*, which can relate the (paired) semantic role pairs Qualified. thing/Quality or two (also paired) occurrences of αRef.

It makes sense to attribute the observed semantic relations to properties of the verb, chiefly when we consider the difference between [12] and

[13] Martha insulted Daniel's wife.

where the semantic relations are totally changed when we change the verb. The most immediate interpretation is that the verb is responsible for the semantic roles in both cases: otherwise, we would have to say that *Daniel's wife* is a predicating unit in [12], but not in [13], disregarding the systematic—and overt—difference in verbs (*be* as against *insult*).

The special treatment traditionally given to verbs like *be* seems to spring from the fact that they are semantically more schematic than, say, *eat*. *Eat* denotes an event, and tells us a lot about this event, but *be*, for instance in

[14] Martha is here.

tells us only that there a location involved, without any details, which are left to the complements. But there is no inconvenient in saying that *be* resembles other verbs in that it also can assign semantic roles to its complements.[8] I think this analysis covers the same facts as the traditional one, in a more concrete and intuitive way.

There is some truth to the view that the adjective (in example [11], *thin*) is the role-assigning element, being responsible for the fact that *thin* is understood as a quality of the subject, *Martha*. But I find reasons to prefer semantic pairing. First, we need to state the semantic-role properties of the verb as well, even when it is *ser* 'be', in order to express the difference between it and, say, *ver* 'see', *amar* 'love', etc., in the same contexts. That is, role-coding is shared between adjective (in a

[8] If someone feels uncomfortable with the use of the word *assign* here, we may also use the equivalent (if more cumbersome) expression "*be* can co-occur with a specified set of complements having specific semantic roles associated with them".

sentence like [11]) and verb, and the latter is far from semantically empty.[9] Second, some pairs of roles appear only together: an example is αRef, of which we must have always two: this is not easily expressible in the traditional analysis. Third, pairing occurs with other classes besides adjectives: we would have to state that NPs can also predicate, and assign semantic roles, when it is more natural to say that they have reference, and can have identical reference with other NPs. Finally, the analysis proposed here makes more sense in the context of a valency dictionary of verbs. I therefore will say that the verb (*ser* 'be') is responsible for the semantic roles of its complements, and that these are paired by virtue of their own definition—some roles can be paired (e.g., Location), some cannot (Patient), and some *must* be paired (αRef).

This position derives from our descriptive aims: in this particular case, we are primarily concerned with the observable result of whatever process generates the set composed of a verb plus some complements, each of the latter associated with a semantic role.

I am not alone in this position; for instance, the ADESSE system has an entry for *ser* 'be' as for any other verb, and does not take this verb as invisible for semantic role description. *Ser* 'be' is represented thus in the ADESSE list:

SER
A1 *Entidad* (SUJ)
A2 *Atributo* (PVO.S)
A3 *Beneficiario* (OIND) &c.
[ADESSE, entry SER]

where we find semantic roles (*Entidad, Atributo, Beneficiario*) and syntactic functions (SUJ 'subject', PVO 'predicative', and OIND 'indirect object'), associated with the occurrence of the verb *ser* 'be' in the regular way.

10.1.2 Pairing and the Analysis of Predicatives

The phenomenon of pairing we have just seen provides an alternative analysis to the function traditionally termed "predicative". The analysis of predicatives has been developed elsewhere (Perini and Fulgêncio 2011); here I give a summary, focusing on points of interest for the inclusion of syntactic functions in the definition of diatheses.

I hold that the complement traditionally called "predicative" is not an autonomous syntactic function, and may be analyzed simply as a nonsubject NP or an adjective phrase, as the case may be. Every feature traditionally mentioned as distinguishing it from the direct object, or from the adverbial adjunct or complement, is more adequately described as the effect of semantic features of the constructions or lexical items involved.

[9] In spite of the rather common idea that "[the verb *be*] is simply irrelevant here" (Frawley 1992, p. 199). For one thing, *be* is in opposition with verbs like *parecer* 'seem', in that it conveys a fact, whereas *parecer* only denotes an appearance.

The traditional notion of predicative sprang from the observation of some features of so-called predicative constructions; these features do in fact exist, but semantic pairing provides a simpler and more adequate way of analyzing them. The most important of these facts are: first,

> "information about the subject—its true predicate—is contained in a NOMINAL [. . .] which is called the PREDICATIVE"
> (Kury, 1985, p. 26; capitalization as in the original).

Taking English examples, this is the case of *Martha is thin*, where *thin* provides information about the subject; these cases are called **nominal predicates** in traditional Portuguese grammar. Compare with *Martha ate the cake*, where *the cake* does not provide information about Martha. And, second,

> [verbo-nominal predicates] have two semantic nuclei, a VERB and a PREDICATIVE NOMINAL.
> (*ibidem*)

An example is

[15] Martha considers Jim a fool.

The same facts are stated by Huddleston as follows:

> In [*Ed appointed a real idiot*] *a real idiot* describes an individual distinct from Ed, whereas in [*Ed seemed a real idiot*] it denotes a property ascribed (with the qualification implied by **seem**) to Ed [. . .]
> (Huddleston, 1984, p. 181)

These facts are quite easily accounted for by the use of semantic pairing: in *Martha is thin* the semantic roles of the subject and the adjective phrase are paired, which is one way of saying that one of them provides information about the other (*thin* is the Quality of *Martha*). In [15] the verb gives information about the denoted event, and *a fool* is a Quality attributed to *Jim* (in Martha's opinion), since these two terms have paired semantic roles—pairing being a property of certain semantic roles.

As we see, the semantic relation traditionally seen as the main distinguishing feature of a "predicative" as opposed to a "direct object" is automatically accounted for by the notion of semantic pairing. This is, to my view, the basic difference between the two functions—it is a semantic difference, not syntactic.

A syntactic structure of the form

VSubj V NP

is the formal face of several constructions. In a construction where the nonsubject NP and the subject have paired semantic roles, traditional grammar sees a predicative; otherwise, the nonsubject NP is called the **object**. There is no need to distinguish syntactically between objects and predicatives; their difference is semantic, and adequately accounted for by the nature of the semantic relations each NP bears. The above syntactic structure is correct for both [12] and [13]:

[12] Martha is Daniel's wife.

[13] Martha insulted Daniel's wife.

Sentence [12] elaborates the construction

[16] VSubj>*αRef* V NP>*αRef*

it being understood[10] that αRef only occurs as a paired semantic role. And [13] elaborates

[17] VSubj>*Agent* V NP>*Patient*

And in

[15] Martha considers Jim a fool.

we have a slightly more complicated construction, namely[11]

[18] VSubj>*Agent* V NP>*Qualified.thing* NP>*Quality*

The second nonsubject NP in [18] is likewise analyzed as a predicative in traditional grammar. But all we have to say is that pairing is established by the presence of the semantic roles Qualified.thing and Quality, which we know to be always paired.

What we have, instead of an autonomous syntactic function, is an NP, or an AdjP, or an AdvP, endowed with one of those semantic roles which we know to be paired—this either by virtue of the grammatical class, as seems to be the case with AdjPs in general, or because of a stipulation made in the diathesis. Syntactically, they are just NPs, AdjPs or AdvPs. Semantically, they must "find" a pair in the sentence. Thus, for instance, in

[11] Martha is thin.

the AdjP *thin* denotes a Quality (this is a property of the lexical item). It pairs with *Martha*, which has referential potential. In the case of

[12] Martha is Daniel's wife.

we have two NPs, and the verb determines which semantic roles will be assigned to these NPs. *Be* participates in several diatheses, as for instance the one exemplified in [11]. But here this diathesis does not fit, because *Daniel's wife* would have to be a Quality, and it does not have this semantic potential. Nevertheless, since it has referential potential, it can be αRef, and so can *Martha*; furthermore, *be* can occur in the construction

[10] Or, rather, explicitly stated somewhere in the lexico-grammar.

[11] The Agent is eventually elaborated into the "opiner", that is, the person who emits an opinion, by virtue of the semantics of *consider*.

[19] VSubj>*αRef* V NP>*αRef*

which solves the problem.

10.1.3 Looking for a Partner

A paired semantic role must thus find a pair, which is often provided by the diathesis. On the other hand, there may be cases where no diathetic indication is needed: I have in mind cases like

[20] Jones fired Smith, the poor guy.

where a qualifying phrase refers to some NP in the sentence, and this seems to be governed by pragmatic factors: in [20] the phrase *the poor guy* clearly refers to *Smith*, but in

[21] Jones fired Smith, the bastard.

the qualifying phrase *the bastard* is preferably attached to the subject *Jones*. This difference cannot be ascribed to syntactic reasons (since the syntax is the same in both sentences), nor to valency (the verb, and apparently the diathesis, are the same), and must be due to pragmatic factors, so that the pairing between these constituents does not have to be stipulated in the diathesis. On the other hand, in

[15] Martha considers Jim a fool.

we have to mark in the diathesis that *Jim*, not *Martha*, is to be paired with *a fool*—this is, according to this hypothesis, an idiosyncratic characteristic of the verb *consider*, in fact part of its meaning. Thus, at this level of schematicity, the diathesis instanced in [20] and [21] is simply

VSubj>*Agent* V NP>*Patient*

without mention of the appositive, which is added freely. But in [15] we need to mark the semantic role of the nonsubject NPs[12]:

VSubj>*Agent* V NP>*Qfd.th* NP>*Quality*

Without going further into the matter, it should be clear by now that no separate syntactic function of **predicative** is necessary in order to account for the phenomena usually mentioned as arguments for it. All we need is the notion of semantic pairing—which is necessary anyway—and indications such as the category of the constituent (NP, AdjP) plus, possibly, the order in which they occur.

This way we are able to simplify the syntax, keeping to the spirit of Culicover and Jackendoff's Simpler Syntax hypothesis. The notion of semantic pairing is also

[12] The Agent is elaborated into "opiner", as seen above.

instrumental in characterizing the constituents traditionally analyzed as **predicatives** without having to postulate a separate syntactic function.

10.2 Semantic Roles and Verbal Aspect

There are some indications that the verbal aspect influences the assignment of semantic roles, or at least the plausibility of a semantic role as against some other. Thus, in

[22] Esse professor desanimou.
this teacher discouraged

the semantic role of the subject is preferably Patient, so that the sentence means 'this teacher has become discouraged', not that he has discouraged his students. But in

[23] Esse professor desanima.
this teacher discourages

the most salient reading is that the teacher discourages his students. This effect (never studied, as far as I know) seems to have something to do with the aspectual difference between *desanimou* '(he) has discouraged', which is a perfective form, and *desanima* '(he) discourages', which is imperfective. That we are dealing here with aspect, not tense, is shown by the fact that if we use a past imperfective form like *desanimava* 'discouraged/used to discourage', the effect is similar to the one observed in [23], not to [22]: the teacher is preferably understood as the Agent.

The effect seems to vary in strength according to the verb. In

[24] Esse professor decepcionou.
this teacher disappointed
'this teacher has become disappointed/has disappointed [someone]'

both readings, subject Agent and subject Patient, seem to be equally salient. But in

[25] Esse professor decepciona.
this teacher disappoints

Agent is clearly the most salient reading for the subject.

I have no explanation, not even a decent description, for these facts. But I suspect that the effect is not due to a grammatical factor; it may have to do with the fact that verbs in imperfective forms tend to denote qualities, while verbs in perfective forms denote preferably events.

10.3 On Multiple Semantic Roles

The present analysis includes the possibility of associating a complement with more than one semantic role. For instance, in the sentence

[26] The girl ran towards the backyard.

the subject, *the girl*, is the Agent, since it denotes the entity that initiated the action, and also the Theme, because the girl necessarily undergoes motion. That is, the notion of "running" entails the presence of an entity that performs an action, and that same entity undergoes motion—this is what we understand by "running".[13]

Here, these cases have been analyzed by simply noting the two semantic roles together, Agent + Theme. This is actually an abbreviation for a cluster of properties, more complex than the one we find in cases of "pure" Agent like in

[27] The girl ate the cookie.

This possibility was raised by Jackendoff:

> The Agent is generally in the subject, but the subject can simultaneously bear other semantic relations. For example, in [*the rock moved away*] there is no Agent, but if we change *the rock* to *John*, there is a reading in which John deliberately moved away, so *John* is functioning both as Agent and Theme.
> (Jackendoff, 1972, p. 32)

Multiple roles are very probably an artifact of the way semantic roles are usually defined. When we come to the point of decomposing semantic roles into properties, as in Dowty's (1991) proposal, the difference between Agent + Theme and a "pure" Agent will be expressed more naturally as a difference in feature composition, with some features present in one of the relations but not in the other. For the moment, though, we keep to double roles when necessary.

The association of Agent plus Theme in [26] is not accidental: it derives from the fact that *run* is a verb of motion. Whenever *run* has no object, the subject is necessarily the Theme; and in any of its diatheses, *run* always involves a Theme (although it is not the subject in every situation). Further examples are:

[28] Sheila ran the wine through a small tube. [Theme: *the wine*]
[29] Sheila ran the dog around the square. [Theme: *the dog*]
[30] The surplus oil runs through this hole. [Theme: *the surplus oil*]

If we do not analyze the subject as an Agent in [30], we will have just a Theme. This may be an argument to assign Theme to a complement of *run*, primarily, and the Agent, when present, will come by addition.

Linking in these cases is of a different kind from the usual one (like the rule that stipulates that the Agent is preferably the subject, Agent<>VSubj), because it

[13] I refer to the use of *run* as in [26]. This verb may occur in other senses, as in *the tank ran dry* etc., for which this analysis is not valid. In other words, I am speaking of the schema RUN, rather than of the verb *run*.

depends on the verb of the sentence: with *throw*, for instance, the Theme is never the Agent. Therefore, it is, strictly speaking, part of the valency of each verb. It also depends on the particular diathesis: Agent couples with Theme in [26], but not in [28] or [29]. And, of course, there are other semantic couplings, not related to verbs of motion, to be examined as well.

I cannot go into details here, because much more research is needed: we must examine more examples in order to reach a reasonably complete view of the facts before integrating them into the analysis. Therefore, in the present analysis I merely indicate the semantic roles to be coupled in each particular diathesis, as we did for **Agent + Theme** with *run*, as a way to circumvent for the moment the complexity of the phenomenon.

10.4 A Note on Auxiliaries

It is well known that auxiliaries have no valency of their own, and behave semantically like aspect and tense markers. That is, the set of diatheses valid for *acordar* 'to wake up' is precisely the same valid for *ter acordado* 'to have waken up', or *estar acordando* 'to be waking up'. On the other hand, being an auxiliary is a property of some particular verbs: for instance, *ter* 'have', *ser* 'be', but not *correr* 'run'. It makes sense, then, to include this information in the entries for *ter*, *ser* and the like in the valency dictionary. Accordingly, our dictionary includes the mark **Aux**, for verbs that can be auxiliaries; this is not a diathesis, but is given along with the diatheses of the verb. For instance, the verb *andar* can be a verb of motion, as in

[31] O velhinho andou pela praia. 'the old man walked on the beach'

and also an auxiliary as in

[32] O velhinho anda esquecendo as coisas. 'the old man has been forgetting things'

This means that the entry for *andar* must include not only the diathesis represented in [31], but also the mark **Aux**, to be read as 'this verb can also function as an auxiliary'. In Portuguese as in English, each auxiliary requires a special form of the verb: *andar* as an auxiliary co-occurs with a gerund (*anda esquecendo* 'has been forgetting'), *ter* co-occurs with a participle (*tinha esquecido* 'had forgotten'), etc. This must also appear in the entry.

Chapter 11
Paring Diatheses Down

11.1 Linking Rules

Now let us apply the considerations of Chaps. 8 and 9 to the task of elaborating a list of diatheses. The VVP valency dictionary currently includes a (still partial) list of the diatheses needed to describe the valencies of Portuguese verbs. In the list, and also in the accompanying dictionary, they are stated in full, with all complements specified syntactically and semantically, as for instance

[1] VSubj>*Agent* V NP>*Patient*

which can be realized as

[2] José comeu um sanduíche de atum.
José ate a tuna sandwich

The formulation shown in [1] ignores the linking rule that stipulates that Agents are typically subjects (the **Agent<>VSubj** rule introduced in Chap. 8). It ignores as well the possibility of assigning semantic relations by default, seen in Chap. 9. We at VVP decided to present diatheses in their full versions because the *Dictionary* is directed to a wide audience, and purports to provide information to researchers of several theoretical persuasions. That is, it is not essential to agree with all our positions in order to make use of the data presented in the *Dictionary*. In this chapter, however, we take a step ahead to explore the possibilities of stating linking rules and other mechanisms that allow the simplification of diatheses.

If we include the Agent linking rule in our description, stated once and for all in the grammar, and subject to relatively few exceptions, we may reformulate [1] as

[3] VSubj V NP>*Patient*

M.A. Perini, *Describing Verb Valency*, DOI 10.1007/978-3-319-20985-2_11

Let us evaluate how a simplified diathesis like [3] can be put to work. The linking rules to be considered here are:

Agent linking rule (Agent<>VSubj)
Arguments bearing the semantic role Agent tend to be coded as subjects.

Experiencer linking rule (Exp<>VSubj)
Arguments bearing the semantic role Experiencer tend to be coded as subjects.

These are not the only rules, but they will do for the moment,[1] because they are the best supported by currently available data. The Experiencer includes the "knower" of knowledge verbs, since it also denotes a mental state of its referent.[2]

11.2 Applying the Rules

A linking rule fills in the semantic gap found in diathesis [3]. In [2] the verb of the sentence is *eat*, evoking the schema EAT, which includes two core CSRs, the "eater", more schematically the Agent, and the "eaten.thing", that is, the Patient. The Agent Rule instructs the user to code the Agent as the subject; and the Patient will be coded as the object, because it is so specified explicitly in the diathesis given in [3]. The result will be that the subject of the sentence with *eat* will be understood or coded as the Agent, and the object as the Patient.

However, we may not even need the marking Patient on the diathesis. Suppose it is noted simply as

[4] VSubj V NP

without any semantic marks; even so it will be possible to fill in both semantic roles. The subject will be assigned Agent in the manner described above. As for the Patient, let us remember that the verb is *eat*, and that the core semantic relations in the evoked schema are "agent" (which we already know is the subject) and "patient". We can then attach the CSR "patient" to the object (the remaining complement) by default, as suggested in Sect. 9.5. Therefore, [4] is enough as a statement of this diathesis. Note that coding by default requires that valencies be consulted first, then the linking rules apply, only then does the "default" arise. This is, of course, only as a matter of operational precedence: it does not entail ordering of operations in real time.

All other semantic relations that may co-occur with *eat*, as in

[1] Current hierarchies include other rules, as for instance the one that associates the object with the Patient. These rules are ignored in the following discussion, but they must be eventually tested and, if confirmed, included in the analysis.

[2] Carvalho (2012), working on Portuguese, found that the "knower", when present, is the subject in all cases.

[5] Por falta de tempo, José comeu um sanduíche rapidamente debaixo do toldo.
'because of lack of time, José ate a sandwich rapidly under the awning'

are peripheral, and thus must be conveyed by semantically transparent constituents (normally prepositional phrases or adverbs): Location will be *under the awning*, Cause will be *because of lack of time*, Manner will be *rapidly*.

Now consider the following diathesis:

[6] VSubj>*Agent+Theme* V NP>*Source*

One realization is the sentence

[7] A multidão abandonou o estádio.
the crowd left the stadium

As seen, the subject is Agent *and* Theme (this accumulation of semantic roles abbreviates a bunch of properties, cf. Sect. 10.3). Being (also) Agent, is it subject to the Agent Rule; the indication "Agent" is thus superfluous and can be omitted. Moreover, the schema evoked by *abandonar* is LEAVE, which includes the variables "agent"+"theme" and "source".[3] For LEAVE, the "theme" is always the "agent", that is, whoever initiates the action is the one that undergoes motion—this is part of the meaning of *abandonar*. Therefore, the complement that receives the semantic role Agent also receives Theme. The remaining core CSR, "source", is assigned by default to the remaining complement, *o estádio* 'the stadium'.

This means that we can omit all semantic indications in [6], reducing it to

[8] VSubj V NP

But [8] then becomes identical with [5], since their syntactic components were identical to begin with. Are we claiming that [7] and [2] represent the same diathesis?

[2] José comeu um sanduíche de atum.
José ate a tuna sandwich

[7] A multidão abandonou o estádio.
the crowd left the stadium

The answer is that we can leave things just as they are, and this has important consequences for the description of valencies. As we saw above, there are independently needed mechanisms that will take care of assigning the right semantic roles to all complements of these sentences, even if we start from a skeleton definition like **VSubj V NP**. There are a number of details to be worked out, but the basic principles are clear, and tolerably well fundamented.

Let us then admit that sentences like [2] and [7] are, in principle, semantically ambiguous; for instance, the subject of [2] can be Agent or Experiencer, each by

[3] Unlike English *leave*, Portuguese *abandonar* does not occur with Goal. That is, the schema is not exactly the same for both languages.

force of their respective linking rules. Of course, the fact is that [2] is never understood as involving an Experiencer, and this will have to be explained; we come to this point directly. First, let us go over the list of diatheses to find out how much simplification is authorized by the two rules listed above,[4] plus assignment by default. There will be exceptions, and these will still need to be stated in full; one example is the diathesis

[12] Meu vizinho apanhou da Neusa.
my neighbor was spanked (of) Neusa
'my neighbor was spanked by Neusa'

where the verb is *apanhar* which, as we saw, takes a Patient subject even though it has a normal active morphology. The diathesis realized as sentence [12] must specify that the subject is Patient (VSubj > *Patient*), since there is no general principle able to assign it its correct semantic role. Another exception is

[13] O cara bateu no cachorro.
the guy hit (on) the dog

Here the Patient is a prepositional phrase with *em* (the *n-* in *no*), a preposition that prototypically means Location. Since here it (exceptionally) introduces a Patient, this must be marked in the diathesis:

[14] VSubj V *em* NP>*Patient*

and the verb *bater* 'hit' will be marked as having this diathesis in its valency.

Once the subject of [13] receives its semantic role (Agent) by linking, we might apparently let the prepositional phrase get its role Patient by default. But then we would need a device to stop *em* NP from being assigned Location, because of the prototypical semantic role of the preposition *em* (also, very probably, object of a linking rule). The way to do this is to state in the diathesis that *em* NP codes the Patient.

We have also cases where the Experiencer linking rule is disobeyed, as in

[15] O barulho assustou as crianças.
the noise startled the children

The Stimulus is the subject, and the Experiencer is the object. Since this goes counter to the general tendency expressed by the Experiencer linking rule, we must state in full one of the diatheses of the verb *assustar* 'startle', that is,

[16] VSubj>*Stimulus* V NP>*Experiencer*

As seen previously, the same verb *assustar* also occurs in a more "regular" construction, where the Experiencer rule is obeyed, namely

[17] As crianças assustaram com o barulho.
the children startled with the noise

[4] That is, Agent<>VSubj and Experiencer<>VSubj.

This sentence corresponds to a diathesis where the subject can be left blank.

Coming back to **VSubj V NP**, this syntactic structure also fits

[18] O menino viu uma cobra.
the boy saw a snake

If we define the diathesis only syntactically, that is, as [8], we will have means to assign correct semantic roles to both complements. The subject will undergo the Experiencer linking rule, being assigned the semantic role Experiencer; since the corresponding schema, SEE, includes an Experiencer (or a "seer", which schematizes as Experiencer), no filtering will occur. And the object will be the Stimulus, by default (Stimulus is the other core CSR in the schema). Thus, we can add [18] to the list of structures covered by the diathesis given in [8]. Of course, the assignment of Agent to the subject will be filtered out by virtue of the semantics of *ver* 'see', which cannot evoke a schema with "agent" as a variable.

Here we have also the explanation for why [2] does not include an Experiencer

[2] José comeu um sanduíche de atum.
José ate a tuna sandwich

The verb *eat* evokes a schema (EAT) that does not include an Experiencer; and this is the reason why we do not understand an Experiencer in [2]. In simple words, it makes no sense to speak of the Experiencer of *eat*, which after all does not denote a mental state or event. Thus this interpretation is also filtered out.

Sentences [2], [7] and [18], then, all share the schematic diathesis shown in [8].

When we consider such schematic diatheses, each verb is still subclassified as to the diatheses it takes, although the (syntactically defined) classes will be larger than if we work with the fully specified diatheses. These larger classes are semantically heterogeneous, but this is something to be described in the semantics, keeping the strict separation of the two faces of the sign. According to this system, verbs like *eat* and *see* will still be distinct, although they share the same syntactic face of their diatheses, because they code different semantic roles onto their complements. In other words, they are syntactically identical,[5] but semantically distinct; and their differences will automatically arise from the differences between the schemata SEE and EAT.[6]

Thus viewed, diatheses are essentially a way to state exceptions to the linking rules: a rule applies unless the verb has a diathesis that counters it. Of course, we do not have the complete list of diatheses to start with, so that the task of formulating them must proceed together with the task of finding linking rules, in a parallel way. The diatheses will take care of the residue not covered by the rules; and of course we must be prepared to delete some diatheses (that is, their semantic component)

[5] As far as this diathesis is concerned; their valencies may differ in other details.

[6] As said, these simplifications are not included in our (user-friendly) *Dictionary*, where diatheses are found in their full versions.

from the list as soon as a convenient rule is discovered. This is one of the paths we will have to follow in the near future; for the moment being we cannot count on a reliable list of diatheses and linking rules. Things will hopefully improve as the research goes on.

11.3 The Theoretical Status of Simplified Diatheses

We have just seen that the use of linking rules allows us to notate the different diatheses realized by sentences like

[19] A Beth ajudou a professora.
Beth helped the teacher

[20] A Beth é a professora.
Beth is the teacher

simply as

[8] VSubj V NP

What is the theoretical status of [8]? Does it represent a diathesis, or merely an abbreviation for a set of diatheses? That is, what is the nature of the relation between [8] and a fully explicit formula like [21]?

[21] VSubj>*Agent* V NP>*Patient*

First of all, we must recognize that [8] is a schema, and abbreviates several more elaborated formulas, such as [21], and also

[22] VSubj>*Experiencer* V NP>*Stimulus*
[23] VSubj>*Agent+Theme* V NP>*Source*

etc.

[8] also subclassifies the verbs in the language, since there are some (like *nevar* 'snow'; *cair* 'fall') that cannot appear in that environment. This means that [8] is also a diathesis, albeit very schematic; but how are we to choose between the versions, the schematic and the elaborate one?

There is probably no choice here: we may need both. Consider, first, that elaboration does not stop with formulas like [21] and the like; we may go further, to the point of, say, distinguishing *drink* from *eat*, since certainly there are NPs that can occur as the object of one and not of the other (*I drank some water/*I drank a sandwich*). The degree of elaboration is dictated by the descriptive aims of the moment. We may be concerned with the description of syntax—which is necessary if we want to state fully the ways each semantic role is formally codified, and conversely the semantic possibilities of each syntactic function. In this case, it is important to distinguish verbs that can have an object from those that cannot—in

other words, verbs that can occur in [8] as against verbs that cannot occur there.[7] In a second moment, we may need more elaborated diatheses like [21] to distinguish, among verbs that do take an object, those that assign the semantic role Patient to it. And we may also be interested in finer semantic distinctions, like the one that distinguishes *eat* from *drink*. Each of these aims of research defines a level of elaboration, and all must be available, as they undoubtedly are, to the speaker's mind at all times.

Our aim here is, of course, the description of verb valencies; and for this purpose the correct level of elaboration is the one represented in [21], [22], [23], [24], etc., with specification of the syntactic structure plus all semantic roles. [8] may be considered an abbreviation, but a very informative one, because it is not abbreviated merely in order to save space in the text. As soon as we relate [8] to linking rules like the Agent Rule, the Experiencer Rule and the like, it is no longer merely a shorter way to note [21], [22], etc., but the expression of significant generalizations present in the structure of the language. It is too early at present to incorporate these considerations into our dictionary, since linking rules have not been researched to the necessary extent. But this will eventually be a factor to take into account in the formulation of diatheses, valencies, and valency dictionaries.

Here again we have phonological parallels. For example, for many speakers of Brazilian Portuguese the phoneme /t/ is pronounced [t] or [tʃ], the latter occurring before [i]; the same occurs with /d/, that is, we have [dʒ] before [i], and [d] elsewhere. To state this rule, we disregard the difference between /t/ and /d/, namely the fact that the latter is voiced, since it is not relevant to the rule in question: this rule merely states that coronal stops palatalize before [i]. But for other rules voicing difference is relevant: an example is the rule that voices /s/ before voiced consonants, which works for /s/ before /d/ but not before /t/. The degree of elaboration relevant to the statement of each of these rules differs.

[7] This is basically what Allerton's (1982) list does.

Chapter 12
Summary

12.1 Theoretical Notes

I have presented in this book a metalanguage capable of expressing the main facts relating to verb valencies. The elaboration of the metalanguage led us to discuss a number of theoretical points, such as syntactic functions, the definition of semantic roles, and the mechanisms responsible for the coding of semantic roles into syntactic structures. The metalanguage was arrived at as the result of a considerable body of research, based on observed data of Portuguese.

One of the main guiding principles of the research reported in this book is Culicover and Jackendoff's (2005) Simpler Syntax Hypothesis. I will now briefly recapitulate the main features of the mechanism that codes semantic relations as syntactic constituents, in order to relate them to the requirements of this principle. This allows us to evaluate which features are specific to the lexico-grammar of the language, and which are independently needed on cognitive grounds, thus not contributing to the complexity of syntax and the other components of grammar stricto sensu.

The mechanism depends on several kinds of semantic properties, which are empirically verifiable and deserve the title of facts. **Semantic transparency** can be tested by introspection: for instance, we can try to find a semantic role other than Cause for a phrase introduced by *por causa de* 'because'; or we can try to find in a corpus a sentence where this preposition expresses anything but Cause.[1] The attempt will fail, and we will have to conclude that *por causa de* can only express Cause: in other words, it is semantically transparent. This shows that transparency is a testable property. **Linking rules** are also testable, if less categorically than transparency: given a rule like, say, Agent<>VSubj, we can go over the list of verbs and their diatheses to check how frequently Agents are coded as subjects, as

[1] This second procedure also ultimately depends on introspection. See Perini and Othero (2011), where we examine the conditions on the use of corpora in linguistic research.

M.A. Perini, *Describing Verb Valency*, DOI 10.1007/978-3-319-20985-2_12

against other possible codings. The rule will be confirmed if we find a definite tendency in favor of Agent subjects.[2] Therefore we can also speak of linking rules as the expression of facts. **Coreness** (core vs. peripheral semantic relations) is also verifiable, as shown by the experiment reported in Sect. 5.2.3, and, hopefully, by other possible experiments suggested there.

All these properties are important for the coding mechanism, and have been included in the system. On the other hand, our system also incorporates hypotheses which, if they are not gratuitous, yet depend on more complex and indirect ways of verification. These are **diatheses** and **coding by default**: both these devices function as stopgaps, catching cases that the other devices let escape. Said that way, it sounds alarming, but in fact diatheses are not just makeshift devices to make the system work. They are one resource to notate exceptions; and, like exceptions in general, their status is provisional in principle, because at any time someone may find that they fit in a more general rule. The syntactic component of the diatheses is hypothetical to the extent that it includes categories like **subject** and **NP**, which are themselves hypothetical, although, I think, well motivated. But once these categories are accepted, their distribution is easily supportable by observation of the data.

A more complicated problem is the choice of which semantic roles to explicitly mark in the diathesis; thus, in a diathesis like

VSubj V *em* NP>*Patient*

which underlies the sentence

[1] O cara bateu em Rita. 'the guy spanked Rita'

we leave the semantic role of the subject blank because it will be filled in by a reasonably safe linking rule. And we mark the semantic role of the prepositional phrase explicitly because we know of no general rule capable of attaching the semantic role Patient to a phrase introduced by *em*. These choices illustrate the hypothetical component of a diathesis.

As for **coding by default**, it is based on verifiable fact, namely the presence of particular variables in the schema evoked by the verb. In cases of very particularized semantic relations, like when we assign "thing.the.ridder.rids.something.of" to the prepositional phrase of

[2] Ele livrou a casa dos insetos. 'he rid the house of insects'

we are forced to do so because this CSR has not been brought under a more general semantic role. It may stand, then, as a temporary (or who knows permanent) solution, but it should be kept in mind that it, too, expresses a fact. In cases like [2], assignment of the semantic role by default to the prepositional phrase amounts to saying: The subject is an Agent (by linking rule), the object is a Patient (by diathesis); and the remaining complement must express the remaining core

[2] By the same token, a linking rule can also be quantified, so that some will be "more prototypical" than others; see note on Sect. 8.5.1 above.

CSR of the schema RID, namely "thing.the.ridder.rids.something.of". This is not gratuitous, and is based on fact, namely that the verb *livrar* 'rid' certainly evokes a schema containing that CSR.

The above considerations can help us to evaluate the degree to which the present analysis allows a simplification of the symbolic component in the description of the language, as against the independently motivated semantic and cognitive component. We are here applying the Simpler Syntax hypothesis, which of course does not refer to syntax exclusively, but rather to any hypothetical set of statements about the language.

Simpler Syntax acts then as a safeguard against a trend that has seriously harmed linguistic inquiries in the last decades: the temptation to build premature theories, and to enrich them with insufficiently based detail. It provides a criterion to define the limits of the components of a description (e.g., syntax vs. semantics), something that was the object of some intense, if inconclusive, discussion for many years. And, regardless of its theoretical import, its methodological convenience is unquestionable.

12.2 General Restrictions

It is possible to state some general restrictions on the well-formedness of symbolic structures; these restrictions act as grammatical filters, excluding ill-formed structures. Among them we must have:

12.2.1 Partial Ill-Formedness Is Total Ill-Formedness

A reading including one ill-formed assignment is totally ill-formed (for instance, a sentence with a filtered subject and a nonfiltered object is unacceptable). The sentence

[3] O cachorro viu o ladrão. 'the dog saw the thief'

has, formally, at least two possibilities: first, the subject can be Experiencer, which will end up as the reading 'the dog saw the thief'. Another possibility is to assign Agent to the subject, but this will be marked as ill-formed by a schematic filter[3]; the whole second reading is automatically marked as ill-formed (in other words, we cannot have a well-formed sentence with an ill-formed subject).

This, of course, is no novelty, and applies in general to all structures: no well-formed linguistic form can include ill-formed constituents.

[3] That is, the verb *ver* evokes no schema including an "agent".

12.2.2 Paired Roles Cannot Appear Singly

This derives from the very concept of paired semantic role (Sect. 10.1), one of which has no meaning apart from its pair. For instance, given the sentence

[4] Ela virou a presidente da empresa.
'she became the president of the company' or
'she turned (rotated) the president of the company'

we cannot assign αRef to the subject and Patient to the object, which the valency of *virar*, in principle, allows, because αRef will miss its pair, and the resulting semantic structure will be ill-formed. Also, sentences like [4] never allow object omission if the subject is αRef, for the same reasons.

12.2.3 Only One Agent per Sentence

At least some semantic roles cannot appear repeated in a clause. This seems to be the problem with

[5] O João apanhou da Carol.

if we assign Agent to the subject (by the linking rule Agent<>VSubj) and Agent again to the prepositional phrase *da Carol* (by diathesis of *apanhar*).[4] The resulting assignment will be ill-formed, hence unacceptable. As a result, [5] is unambiguous, and means only 'John was spanked by Carol'.

Whether this applies to all semantic roles is still doubtful; we will not be able to investigate this properly until we have reliable criteria that tell us exactly which and how many roles there are in each semantic area.

12.3 On Coding by Default

Let us now detail a little more the process of assignment by default. Given an ambiguous sentence like

[6] Vinte soldados formam um pelotão.
'20 soldiers put a platoon in formation' or
'20 soldiers compose a platoon'

two assignments are possible, which gives rise to the ambiguity of the sentence: in one of the readings, the subject is Agent, in the other it is αRef. In both cases, the

[4] *Apanhar* has a subject Patient in its reading 'be spanked'; and it has a subject Agent when it means 'pick up'.

object *um pelotão* 'a platoon' may receive its semantic role by default—respectively, Patient and αRef.

The way the present system describes these facts can be described as follows: in the first moment, that is, at the very start of the assignment process, the subject can receive any of the semantic roles defined by the various linking rules in function in the language; here we are considering three such rules, namely Agent<>VSubj, Experiencer<>VSubj and (for argument's sake) αRef<>VSubj. Any of them can apply, in separate runs of the assigning mechanism.

The first rule makes the subject the Agent; now we need to define the role of the object, *um pelotão* 'a platoon'. In order to do this by default, we must identify the schema, which is to provide the right CSR. *Formar* can evoke two schemata, PUT.IN.FORMATION and BE.EQUAL.TO; but since the subject has been assigned the role Agent, the system selects the first schema, which is the only one that comprises an "agent" as one of its variables. Only then can the system identify the remaining CSR, that is, "patient", and attach it to the object of the sentence.

Now, if the role αRef is preferred (in another possible run of the system), the schema will have to be BE.EQUAL.TO, which will eventually provide the CSR "αRef" for the object.[5] And if the role Experiencer is chosen, the whole thing will be marked as semantically ill-formed, because there is no schema with this role associated with the verb *formar*.

I hasten to make it clear that no degree of psychological reality is claimed for the system just described: it is only a mechanism that works in order to achieve our aims, that is, associating the right complements with the right CSR in order to make it possible for the language user to build a correct mental landscape for the sentence. It may, or may not, correspond to some degree to what really goes on in our minds.

12.4 Semantic Role Coding and the Limits of Valency

It is commonly held that a verb determines the number and form of its complements, and assigns to each of them a semantic role: this is usually taken to be a fair summary of the process, and underlies the elaboration of valency dictionaries. Levin and Hovav, in their very useful survey of argument realization theories, write that

> A complete theory of argument realization has to address five major questions: (i) Which facets of the meanings of verbs are relevant to the mapping from lexical semantics to syntax? (ii) What is the nature of a lexical semantic representation that encompasses these components of meaning? (iii) What is the nature of the algorithm which derives the syntactic expression of arguments? (iv) To what extent do nonsemantic factors such as information structure and heaviness govern argument realization? (v) To what extent are the semantic determinants of argument realization lexical and to what extent can some of them be shown to be nonlexical?
>
> (Levin and Hovav, 2005, p. 3)[6]

[5] The fact that αRef is necessarily paired certainly has a role in this process.

[6] In practice, "argument realization" can be understood as an alternative designation for "semantic role coding".

Although Levin and Hovav's list leaves open the possibility that other factors besides the verb may be relevant for semantic role assignment, this possibility has not been sufficiently explored in the literature. Yet, as seen in the previous chapters, close examination shows that assignment on the basis of verb valency is an approximation: although the verb remains the most common governing unit, verb valency can be shown to be responsible for only part of the observed facts. A number of other factors intervene; many of them are known, and have been studied, but so far there has been, to my knowledge, no attempt at a comprehensive analysis taking all of them into account. Among these factors we can mention: semantic (that is, thematic) hierarchies and linking rules; the sharing of tasks between a light verb and its complements; idiosyncratic properties of lexical items (in particular, transparency); lexico-grammatical filters[7]; assignment by default; and schematic filters, all of which supplement the diatheses that make up the valency of each verb in the task of mapping semantic relations onto the constituents of the sentence.

The role of grammatical information, basically composed of verb valencies plus other grammatical mechanisms, while being no doubt crucial, is limited by other, extragrammatical factors. By surveying the importance of extragrammatical factors as against grammatical ones in the assignment of semantic roles, the present system also contributes to chart the extent of grammatical information needed in this sector of the structure—in other words, we are here again applying the Simpler Syntax hypothesis, proposed in Culicover and Jackendoff (2005), and exploring its possibilities.

12.5 Entries in the Valency Dictionary

I will now anticipate the main features of the valency dictionary of Portuguese verbs under construction in Project VVP, according to the discussion in the previous chapters; some additional examples are given in Appendix A.

One thing we know about the verb *bater* 'hit, spank' is that it can have a subject with the semantic role Agent; and a complement, represented by a prepositional phrase with *em*, with the role Patient. Besides, we also know that the first of these codings can be derived by a linking rule, namely Agent<>VSubj, whereas the second (*em* NP>Patient) cannot be derived by rule, and must be individually marked in the lexical item corresponding to *bater*. In other words, the valency of *bater* includes (among others) the diathesis

[7] *bater*: VSubj V *em* NP>*Patient*

[7] For instance, the one that prohibits an object NP to be assigned the role Agent.

which can be realized as

[1] O cara bateu em Rita. ‘the guy hit Rita’

This represents the fact that the semantic role of the subject of *bater* is a result of a general rule (“grammar”), whereas the semantic role of the prepositional phrase derives from an idiosyncratic feature of the verb *bater* (“lexicon”). In other words, there is no way to describe this diathesis of *bater* as an entirely grammatical, or an entirely lexical phenomenon. Analogous situations are very common in language description.

But what is the best way to represent the generalized information in an entry of a valency dictionary? The complete, and more informative (although redundant), form of the diathesis realized as sentence [1] is

[8] *bater*: VSubj>*Agent* V *em* NP>*Patient*

Our question is: Which of these forms of the diathesis is to be included in the dictionary, [7] or [8]?

Considering that a valency dictionary can be useful both for researchers on valencies and for people working on other areas of the language, I think the best way is to include the information contained in both formulations. All we have to do is to discriminate the information coming from general rules from information attached to the individual lexical item. Thus, the entry, in its finished form (not yet included in the present state of the *Dictionary*), will be as follows:

[9] *bater*: VSubj>*Agent* [LR] V *em* NP>*Patient*

where ‘**LR**’ is to be read as ‘by linking rule’. Correspondingly, we may have the indications ‘**Transp’** (‘by transparency’) and ‘**byD’** (‘by default’). An unmarked semantic role is to be understood as a proper part of the diathesis, that is, determined by properties of the individual verb in question. The information given in [9] can then be paraphrased as

[10] *bater*: “the VSubj is Agent by linking rule (Agent<>VSubj); the prepositional phrase *em* NP is Patient by an individual property of the verb *bater*.”

[9] has the virtue of showing both the idiosyncratic component of the diathesis (which thus performs its function of marking particular cases, or exceptions) and the generalized component of semantic role coding. Of course, several details may be eventually changed, reflecting the state of our knowledge at the present time.[8] If someone discovers a well-motivated linking rule capable of attaching Patient to the *em*-phrase in [1], the diathesis will have to be modified, by adding ‘LR’ to this constituent as well.

In the case of coding by default of individualized CSRs, we have no choice but to notate the CSR as it presumably appears in the schema, e.g., for the sentence

[8] This is the case with all statements in linguistics, after all.

[11] Ele recorreu à violência. 'he resorted to violence'

we have the diathesis

[12] *recorrer*: VSubj>*Agent* [LR] V *a* NP>*resource* [byD][9]

In this way the diatheses can offer a picture of our current knowledge about the valential properties of verbs. One aspect of this knowledge is that semantic role coding cannot be called a grammatical process, nor can it be called a lexical phenomenon: it sits astride these two traditional components of the structure of the language, thus illustrating the impossibility of maintaining a strict theoretical distinction between them. Actually, information on the way the semantic role is provided, e.g., [LR], is still not being included in the entries, because it must wait for some more research on the linking rules operating in the language. It will be included eventually.

12.6 What Can Valency Lists Tell Us?

12.6.1 The Search for Generalizations

The information provided by valencies occupies a central position in the lexico-grammatical description of a language. I summarize below some important pieces of information provided by a description of verb valencies.

First of all, let us remember that exceptions exist, and are not marginal in a language. They are part of what we might call the **anomalistic** component of language structure, which comprises, among others: **idioms,** of which there are more than 8000 in current use in Portuguese (as found by Fulgêncio 2008); **stems**, also called **clichés** (cf. Pawley and Syder 1983); and **diatheses**, as we saw in this book—to say nothing, of course, of the semantic and distributional idiosyncrasies of lexical items.[10] We have no precise evaluation of this aspect of languages (which is sometimes downplayed in the literature, as if a language were made up of regularities), but it is safe enough to say that the anomalistic component covers a very large area of the total structure of a language. The valency dictionary gives us the complete list of diatheses of the language, that is, cases where the syntactic coding of semantic roles escapes the action of general rules; and we can already say that there are many such diatheses, attached to many of the most frequent verbs of the language.[11] They do represent exceptions, but this does not detract from their essential role in the description.

[9] "Resource" is how FrameNet calls this CSR.

[10] An example of distributional idiosyncrasy is the verb *wreak*, normally used only with *havoc* or *vengeance* as object.

[11] As of April, 2015, the list comprises 232 diatheses; but work is only beginning.

It is possible to derive from the list many kinds of useful information:

- a (partial) list of constructions of the language, notated in terms of a sequence of form-class symbols (e.g., NP, V, AdjP), syntactic functions (e.g., subject, or complement of *em*), and semantic roles (e.g., Agent, Instrument);
- a list of prototypical constructions, answering the question, Which constructions occur with the greatest number of verbs?
- an evaluation of the importance of particular linking rules, answering questions like, What is the percentage of (action) verbs that undergo the action of the Agent<>VSubj rule?
- a list of prototypical semantic role sets: What is the most common association of semantic roles within a single sentence?
- a list of prototypical codings of semantic roles; e.g., What is the most common morphosyntactic form used to code Location?
- the prototypical semantic roles associated with individual prepositions; for instance, What is the most common semantic role associated with the preposition *com*?

In the above points, "most common" refers always to the number of verbs in the lexicon, not to frequency of occurrence in texts of a corpus, which has no grammatical significance (although it is important for other purposes).[12] The use of the list in connection with the above points presupposes of course an adequate system of retrieval, an eventually necessary supplement to the *Dictionary*, once it is made available in the internet.

Apart from the uses of the list given above, we may mention two others, which are perhaps the most important, but will have to be given here only as suggestions for further research:

- The list offers a field for the empirical testing of theories: considering that a linguistic theory must, as a minimum requirement, have observational adequacy,[13] it must predict all structures, rules, and prototypicality relations found in a list of verbs and valencies.
- Apart from the description, knowledge of the valency list—and more generally of the anomalistic component—is important as part of the basis for the teaching of foreign languages.

In fact, one of the most serious problems in the planning of foreign language courses is what to include, and in which order; and one of the earmarks of the nonnative speaker is the lack of control of the many irregularities in the structure and use of the language. The use of prepositions, in particular, tends to become a nightmare, because their use is often not controlled by clear semantic factors (e.g., English *on the street*/*in the left lane*). The list (along with a frequency count of

[12] Cf. Maurice Gross (1975), p. 20.

[13] Cf. Chomsky (1964), p. 62ff.

verbs[14]) provides a way to evaluate the most important idiosyncratic uses of a preposition, so as to include them earlier in a planned course. In this particular, as in many others, a verb valency list has a lot to tell us.

12.6.2 Grammar and the Lexicon

An important function of a valency dictionary, as far as linguistic theory is concerned, has to do with the distinction between grammar and lexicon. Dictionaries used to be understood as portraits of the lexicon, and the lexicon as a repository of idiosyncratic information—as against grammar, which would contain generalized information about the language. As is well known, this view has been successfully challenged, and the distinction between grammar and lexicon has been shown to be much less neat than previously believed. On the other hand, there *are* idiosyncratic features, attached to individual lexical items, and there *are* general statements valid for whole classes of forms. Dealing with valencies is dealing with exceptions: individual constructions, and sets of constructions, that accept the presence of some, but not all, verbs of the language. Here it becomes very clear how the traditional limits between grammar and lexicon simply do not work. We have constructions that accept all verbs (e.g., the negative); and constructions valid for a subset of the verbs—and here we have, in principle, a range going from 99 % to just one verb. The range is not fully realized, but even so the variety is great: the transitive construction,

VSubj>*Agent* V NP>*Patient*,

appears in the valencies of hundreds of verbs,[15] whereas the construction illustrated by

[13] O governo fez do país um chiqueiro.
'the government turned the country into a pigpen'

appears in the valency of just one verb, *fazer* in the reading 'turn (into)'. Given this situation, how are we to reach a rigorous distinction between "general" phenomena (grammar) and "idiosyncratic" ones (lexicon)? The study of verb valencies provides much important information on the gray area between these two types of phenomena, and is an important step towards reaching a more detailed and empirically accurate view of the way the facts of language are organized—in particular, about the size, limits and details of this territory, the extremes of which we call grammar and lexicon.

[14] Which, here, *is* relevant.

[15] In the current VVP valency dictionary, the transitive diathesis appears in the valencies of a little over 50 % of all verbs.

12.6.3 On Grammars and Leakings

It is a saying attributed to Edward Sapir (1921) that 'all grammars leak'. About this Levy (1983) comments:

> grammars do not usually make explicit the range of validity of a rule. Granted that they give the exceptions to the rule as a limit, they seldom define positively which is the extent of a rule, to which lexical items it applies.
> (Levy, 1983, p. 133)

One of the things a valency dictionary can do is define the limits of application of a great number of rules. For example, a syntagmatic ("PS") rule defines the syntactic structure

[14] VSubj V NP

The dictionary informs us exactly which verbs can occur in this structure; and this definition is complete in the measure that the dictionary itself is complete.

Whether or not one accepts transformational rules, the phenomena they capture are always with us, and are also delimited by the dictionary. Suppose we admit some kind of relation between the sentences

[15] John met Mary.
[16] John and Mary met.

This relation is often called an *alternation*. The dictionary tells us with precision which verbs can occur in [15], which in [16]; and from that we can derive for instance the information that they are exactly the same verbs—or not, if that is the case.

The rule defining [14] is purely syntactic, and very simple. What we really need are syntactic structures associated with semantic roles:

[17] VSubj>*Agent* V NP>*Patient*
[18] VSubj>*αRef* V NP>*αRef*

and so on. The dictionary also gives us the exact extension of each of these structures (which are rules, since they define structural possibilities): the precise list of all verbs that occur in each rule or combination of rules.

This way the dictionary helps plug at least some of the leaks in grammars.

12.7 Epilogue: Towards More Schematic Roles

In this book we have seen how complex is the phenomenon of verb valency, and how many questions it raises; and we have discussed some of these questions, occasionally coming to a proposed solution. There is obviously still a lot to be done. I shall now merely mention a few points that seem to call for immediate attention, and that have to do with the process of elaboration briefly hinted at in Sect. 4.4.5.

We saw there that in a linguistic description it is not necessary to specify elaborate roles like "ingestor" or "eater", which can perfectly well be subsumed under the more schematic role Agent; elaboration will be taken care of on the basis of verb meaning. The main argument is that if we specify that, say, the subject of *eat* is the "eater" (instead of merely the Agent), we replicate information already present in the verb, that is, "*eat* denotes an action of eating". Now I return to that basic idea, and anticipate some of its possible developments.

12.7.1 Semantic Roles in the Dictionary

These developments need not affect the *Dictionary*, at least not immediately. Here we must keep things at a concrete level—first, because the *Dictionary* should, as far as possible, present tolerably secure results, not too dependent on ongoing research. And, mainly, because we view the *Dictionary* as an instrument useful to researchers of several persuasions, with different descriptive aims, so that a more concrete representation is called for.

Therefore, when stating a diathesis we ignore the discussion in the present chapter, and in similar passages of this book. The subject of *saber* 'know' is given as the Knower, and for the moment being the *Dictionary* is not concerned about the possibility that it may be subsumed under the same label as the Experiencer. Of course, as research proceeds, we may want to change the entries in order to update them, but even this should be done with some caution, in view of our clients' interests. For now, let us understand these notes as suggestions for future research.

12.7.2 Simpler Semantics

This book presents a proposal that brings syntax to a very simple stage; there is doubtlessly still something to be done, but I believe it cannot get much simpler than the system outlined in Chap. 2—in this sense my proposal answers Culicover and Jackendoff's call for a simpler syntax. But what about simplifying *semantics*?

Semantics, for us here, means semantic roles, and more specifically their number and degree of schematicity. Semantics will then be simplified in the measure that we can work with fewer roles, and more schematic ones: Agent instead of "eater", plus "writer", plus "opener" etc.; Experiencer instead of "knower", plus "feeler", plus "seer", and so on. Elaborate roles are conceptually more complex than schematic ones, since they contain more information; and they are more varied and more numerous. There are reasons to believe that our current system can be substantially reduced by systematically considering the effect of verb meaning on the final interpretation (the mental landscape) constructed by language users. In the next section I list some cases where this possibility seems to suggest itself, and that

deserve further investigation—which is necessarily postponed to a later stage in the research. One of our aims in Project VVP is to explore this avenue, but there is definitely too much for one team; we would like to see this possibility discussed and investigated by other linguists as well.

12.7.3 Examples

12.7.3.1 Theme and Patient

Loredo Neta (2014), while studying the conditions for object omission, opts for the role Theme in all cases where movement is asserted, even if it is accumulated with other properties, such as "affected entity" and the like. Thus, she analyzes

[19] Esse caminhoneiro não transporta mercadorias perecíveis. [LN's example]
'this truck driver does not carry perishable goods'

as an elaboration of

[20] VSubj>*Agent* V NP>*Theme*

This would presumably be one of the diatheses of *transportar* 'carry' in the *Dictionary*. But there is a possibility that the object of [20] be analyzed simply as the Patient (understood as the affected entity), the reading "theme" being derived by elaboration with reference to the meaning of the verb.

Verbs like *transportar* (Loredo Neta gives many, e.g., *abrigar* 'shelter', *ajuntar* 'gather', *amoitar* 'hide', *antecipar* 'bring forward', *desenterrar* 'unearth', *hospedar* 'host', *remover* 'remove', etc.) can usually denote some kind of movement on the part of the affected entity; we may express this by saying that they include the semantic ingredient (CSR) "theme"; but the same entity is also affected, and is therefore some kind of "patient". The relative salience of one or the other of these features varies: with *transportar*, as in [19], the movement is clearly more salient, whereas with *abrigar* as in

[21] Minha família abrigará dois peregrinos. [LN's example]
'my family will shelter two pilgrims'

we understand that the pilgrims will "come" to our place, but this feels like something secondary to the assertion that we will shelter them (i.e., they cannot be sheltered in our home if they do not come). I will argue that both cases can be analyzed in the same way, and that this difference in salience can be seen as the effect of other factors, related to the individual meaning of each verb plus, possibly, pragmatic inferences.

The verb in these examples denotes movement of something, caused by an Agent. The Agent is always the subject, and the moved thing is the object; the semantic form can be represented as[16]

[16] '(> "agent")' and the like stands for a variable still to be filled in.

[22] [CAUSE (>agent) [MOVE (>theme)]]

Now suppose we represent [22] in a more schematic way as

[23] [CAUSE (>Agent) [MOVE (>Patient)]]

where Patient is the affected element. The meaning of the verb leaves it clear that this affectedness must be some kind of movement: the only way to understand the affected entity in a moving event is to understand it as the moving entity, that is, the "theme". With a verb that does not denote movement, like *quebrar* 'break', the semantic representation would be similar,

[24] [CAUSE (>Agent) [BREAK (>Patient)]]

underlying sentence

[25] A cozinheira quebrou os ovos. 'the cook broke the eggs'

But since the notion BREAK does not involve movement, we do not understand the Patient (affected entity) as the "theme". That is, the difference between "moving entity" in [19] and "state-changing entity" in [25] does not have to be recorded in the diathesis, since it derives from the potentialities of Patient ("affected entity"), combined with semantic features of the specific verb in the sentence (more precisely, its evoked schema). It is as if we said that the perishable goods mentioned in [19] are the affected entity, and that given that the verb is *transportar* 'carry' the only way it can be affected is by being moved some place else. In [25], the eggs are also the affected entity, but since the verb here is *quebrar* 'break', this entity is affected by changing its state (from whole to broken). Note that this explanation uses information that must be expressed about these verbs, being an integral part of their meaning. If we mark the opposition between "theme" in [19] and "state-changing entity" in [25] in the diathesis, we will be repeating information which is already available, being derivable from the meaning of the verb and the content of the schema.[17]

It may be too soon to conclude that Theme and Patient must be identified as one and the same semantic role, because we only considered a small set of very similar examples. But these facts are certainly suggestive, and the question merits some examination.

12.7.3.2 Speaker and Agent

In sentences containing a verb of communication (*verbum dicendi*), we have a "speaker", as Alice in

[17] Possibly, the main function of the role Patient here is merely to contrast this element with the Agent, which is not affected by the denoted event.

[26] Alice told me the whole story.

On the other hand, Alice is also the "agent", since we understand that she triggered the event. It is thus at least possible to analyze the subject in [26] as the Agent, rather than the Speaker.

The same reasoning seen in the previous example applies here: *tell* is a verb of communication, and the only way we can understand its Agent is as the "speaker". Therefore, marking the subject as Speaker is redundant, since the verb already informs us that there is a "speaker"; all we have to do is to identify the syntactic constituent that codes it, and this may be done by labeling the subject Agent in the corresponding diathesis. Here again we see that it is possible to simplify the semantics of the diathesis by using information contained in the verb—more exactly, in the schema it evokes.

This conclusion probably applies also to the case of Opiner, defined as the person who emits an opinion, and which occurs with verbs like *consider*, as in

[27] Jane considers Martha a fool.

I believe that if we assign Agent to the subject of [27] it will not be difficult to derive the CSR "opiner", with a little help from the semantics of verbs like *consider*, *think*, *find* and the like.

12.7.3.3 Knower and Experiencer

Carvalho (2012) uses Knower as a role occurring with verbs of knowing; she found that in all cases the Knower is the subject. On the other hand, we saw in Sect. 8.2.2 that the Experiencer role can be defined as asserting a mental state or event, and certainly the Knower answers that description as well: a natural question is whether we can identify these two roles and merge them into one.

Semantically, this makes sense; but there one syntactic difficulty, namely that with psychological verbs the Experiencer can appear as the subject or the object, whereas with verbs of knowledge the Knower is always the subject. That is, apparently the language can "see" the difference between Knower and Experiencer, which might motivate us to distinguish them as separate semantic roles. This is not an unsurmountable difficulty, because we may state a linking rule establishing that the Knower is prototypically the subject, and simply mark the exceptions in the respective diatheses. But this will entail ignoring the difference found between verbs of knowing and perception (which admit no exceptions to the linking rule) and psychological verbs (which admit a diathesis where the Experiencer is not the subject). On the other hand, we also saw that there is a tendency in the language to get rid of nonsubject Experiencers. In Sect. 8.2.2, I decided in favor of identifying the sensory Experiencer with the psychological Experiencer, which means that the same solution is called for here, and we can then modify Carvalho's analysis by using "knower" as an elaboration of the semantic role Experiencer. This does not mean that the question is settled, however; there is still some room for argument.

12.7.4 Looking Ahead

The examples given in the previous section are only a small sample; as work proceeds, we must keep revising the list of semantic roles, to arrive at better definitions and to restrict their number, if that is the case. This is only one of many important problems raised by work on the *Dictionary*; as said earlier, research on verb valency results in some answers and many questions, thus suggesting ever newer directions to our future work.

Appendix A: Some Verbs and Their Valencies

In this Appendix I give a small sample of the entries that compose a valency dictionary of Portuguese verbs.

Notation Used in the List

The diatheses are indicated in full, that is, after the eventual application of linking rules and coding of semantic roles by default. Thus, the list is neutral with respect to several hypotheses advanced in this book; for instance, the information that the VSubj of *eat* is an Agent does not depend on accepting the Agent<>VSubj rule. On the other hand, the notation does depend on the syntactic analysis proposed in Chap. 2, and on the delimitation of semantic roles as developed in Chaps. 3–9; I hope the syntactic and semantic analysis presented in this list may be acceptable to most linguists. Eventually, as explained previously, assignments that depend on linking rules will be marked with [LR], on transparency with [Transp], and on default assignment with [byD]. Here (as in the current *Valency Dictionary*) these marks are not given, since they still depend on some research.

It was seen in Chap. 9 that in some cases we need role-coding by direct connection with the schema, which results in highly elaborate CSRs being attached to sentence constituents; one example is *he rid the house of insects*, where the VSubj is Agent, the object is Patient, and the *of*-complement is the *thing.the.ridder.rids.something.of*. In the valency list these elaborate CSRs are written without capitals; thus, one diathesis of *livrar* 'rid' will be

VSubj>*Agent* **V** **NP**>*Patient* ***de*** **NP**>*thing.the.ridder.rids.something.of*

M.A. Perini, *Describing Verb Valency*, DOI 10.1007/978-3-319-20985-2

References to these elaborate CSRs are merely descriptive, and do not entail theoretical commitment; they are sometimes taken from the FrameNet entries, which tend to be very elaborate.

Each entry includes examples which, for the moment being, are all made-up sentences, but will be eventually complemented with examples from a corpus. A complete list of symbols utilized in the notation of diatheses can be found at the head of this book.

Naming Diatheses

The examples below contain several cases of the same diathesis occurring with different verbs. Such repetitions must be represented in the list in some way: it is important to know that *assaltar* 'mug; burgle', *beber* 'drink', and *ler* 'read' (as well as many other verbs) occur in the diathesis which we define as

C1 VSubj>*Agent* **V NP**>*Patient*

In order to facilitate reference, each diathesis is given a label—a conventional symbol such as **C1** (**C** stands for 'construction'). Then we can say simply that *ler*, *assaltar* and *beber* all occur in C1. Each single diathesis receives one such label, even those that occur with only one verb: C14, C24, C30 etc. Some of these constructions have traditional designations, which ease the task of reference and memorization: **transitive**, **ergative**, **intransitive** construction and so on, and these are used in the text. But even these keep their numerical designation: the transitive construction, for instance, is C1, the ergative is C4, etc. Numbering diatheses is important because one of the things we want to learn from the list is which of them occur with the greatest number of verbs.[1] This is an ingredient of our definition of "rule" as opposed to "exception" in sentence grammar. The transitive construction (C1) occurs with thousands of verbs, whereas the diathesis C57,

VSubj>*Patient* **V** ***de*** **NP**>*Agent*

occurs with only two verbs, *apanhar* 'be spanked' and *perder* 'lose (a game)'.[2] The notation of these quantitative differences has obvious implications for the description of the language, predicts details of the acquisition of the language, and provides advice on the planning of courses of Portuguese as a foreign language.

[1] And also, of course, because we do not have traditional designations for all diatheses; currently (April, 2015) the *Dictionary* registers 232 diatheses.

[2] The same distribution of semantic roles and syntactic forms found in C57 also occurs with a few compound expressions with light verbs, such as *levar uma surra* 'to take a beating'; these compound expressions are not included in the *Dictionary* for the moment.

This is the meaning of the codes added at the head of each diathesis in the list given below. The numbers (C1, C2 etc.) refer to our current list of diatheses, and reflect an approximate order of discovery.[3]

Shifts of Meaning

As is known, for some verbs a difference in diathesis corresponds to a difference in meaning. For instance, *apanhar* in the construction given above means 'be spanked', but in the transitive construction (C1) it means 'pick up'. The verb is only one, always *apanhar*, as explained in Sect. 1.5, but the meaning shifts according to the diathesis. In other cases, comparable meaning shifts occur without a change in diathesis; one example is *bater*, which in C1 (subject Agent, object Patient) may mean 'defeat' or 'mix (e.g., eggs)'.

This is a common phenomenon, and although difficult to describe in a rigorous way, it is important enough to deserve mention in the valency dictionary. In the definitive list, therefore, we plan to consignate major semantic shifts. The problem, of course, is to determine which shifts are major; this will have to depend on a quasi-arbitrary decision, and will be marked as an informal addendum, rather than as a full-fledged part of the entry.

Notes and Doubts

Finally, many diatheses are accompanied by notes, with references to passages in this book (labeled *DVV*), and explicitation of doubtful points. The latter, if nothing else, show the degree of uncertainty we are in with respect to the analysis of these constructions. As will be seen, doubts are many, although the general panorama seems reasonably clear. This means that there is still a great deal of research to be done; and I hope these quick notes will provide suggestions of possible roads to be taken in the exploration of verb valencies in the near future. And, whenever a note grows beyond a certain limit, we present it separately as a Miniarticle, of which we currently have about thirty, placed at the end of the *Dictionary*.

Because of some cross-references among contiguous entries, the verbs in the following list are not in alphabetical order (they are in the *Dictionary*, of course). Constituents in *italics* are not relevant for the diathesis in question ("adjuncts" in a traditional terminology). We start with *ficar*, a particularly complex verb in the Portuguese lexicon.

[3] That is, following the Köchel system; the BWV is more logical, but presupposes a complete and systematic analysis of construction types, not yet available.

FICAR ‘stay’, ‘become’

C26 **VSubj**>*Located.thing* **V** **X**>*Location*

O rapaz ficou no apartamento.
‘the young man stayed in the apartment’

We have ‘X’ here because the Location phrase may also be realized by an adverb: *aqui* ‘here’, as well as by prepositional phrases with several prepositions: *em* ‘in’, *perto de* ‘close to’, *longe de* ‘far from’, etc. (see Sect. 1.6.2).

.....

C81 **VSubj**>*Location* **V** ***com*** **NP**>*Located.thing*

O deputado ficou com o dinheiro.
‘the congressman kept [stayed with] the money’

C81 and C82 are very similar in meaning, but C81 intimates that the subject kept the money on purpose; that is, we may have an “agent” ingredient to add to Location in this case. This ingredient is not present in C82.

.....

C82 **VSubj**>*Located.thing* **V** ***com*** **NP**>*Location*

O dinheiro ficou com o deputado.
‘the money stayed with the congressman’
A criança ficou com a mãe.
‘the child stayed with [its] mother’ [i.e., the mother kept the child]

.....

C46 **VSubj**>*Qualified.thing+Theme* **V** **X**>*Quality+Goal*

O rapaz ficou furioso.
‘the young man became furious’

That is, the young man “moved” from his former quality to the quality of furious (this analysis is inspired on Jackendoff 1972, p. 31).

.....

C91 **VSubj**>*Theme+thing.whose.manner.is.asserted* **V** **X**>*Goal+Manner*

Paulo ficou bem acomodado.
‘Paulo got comfortable’

1. The CSR “thing.whose.manner.is.asserted” may be unnecessary in the diathesis, being probably derivable from features of the verb’s meaning.
2. This diathesis is possibly the same as C46, if Quality and Manner can be subsumed under a single semantic role, possibly State. The semantic

difference can be taken care of by the difference between *furious* (which expresses an internal state, that is, a Quality) and *comfortable*, which is an external State.

.....

C92 **VSubj**> *Companion* **V** ***com*** **NP**>*Company*

O Alfredo ficou com a Sônia.
'Alfredo stayed with Sônia'

1. The VSubj here may have its CSR provided by default.
2. Companion and Company are paired (Companion ↔ Company); alternatively, we may analyze Companion as Location, which is a possibility, in which case this will be an example of C81.

.....

C25 **VSubj**>*Qualified.thing* **V** **X**>*Quality*

Fiquei calado.
'I remained silent'

1. Qualified.thing may be coupled with Located.thing, and Quality with Location. Cf. C46, where there is a "movement" towards a Quality, and we consequently have Theme and Goal.
2. Compare C25 and C46, where the same verb, in the same syntactic environment, expresses a clearly different meaning—represented by the difference in semantic roles.

.....

C40 **VSubj**>*Existing.thing* **V**

O costume de se casar em maio ficou.
'the custom of getting married in May persisted'

.....

C93 **VSubj**>*Located-thing* **V** **X**>*Measure*

Meu apartamento ficou em 500 mil.
'my apartment cost 500 thousand'

1. 'X' is a better analysis for the nonsubject complement than '*em* NP' because the form may vary without difference in semantic role: *meu apartamento ficou caro* 'my apartment cost a lot (lit.: expensive)'. The occurrence of *em* here may be attributed to a property of 'price' phrases.
2. This construction may be identical with C26, if we consider that *em 500 mil* is a Location, understood as a point in a scale by virtue of the meaning of *500 mil*. For the moment being, though, we keep the two constructions apart.

LER 'read'

C1 **VSubj**>*Agent* **V** **NP**>*Patient*

Eu li um livro de Kafka.
'I have read a book by Kafka'

.....

C2 **VSubj**>*Agent* **V**

Os meninos estão lendo.
'the children are reading'

.....

The ergative construction that occurs in English *this text reads (like a novel)* does not occur with Portuguese *ler*.

PEDIR 'ask (for something), request' ('to ask a question' is *perguntar*, not *pedir*)

C80	**Syntax:**	**VSubj**	**V**	**NP**	***a* NP**	
	Ev. 1:	*Agent*	SAY	|	*Goal*	*Message.wish*: [Ev.2]
	Ev. 2:	*Goal*	GIVE	*Theme*	*Source*	

Rubinho pediu dinheiro ao pai.
asked money to [his] father
'Rubinho asked his father for some money'

1. This is a complex construction (cf. *DVV,* Sect. 6.6), including two events in its semantic representation. All codings refer to the syntactic structure given on top—which means that some constituents will have two semantic roles, not coupled, but each of them dependent on a specific event.
2. The syntax admits an inversion, **VSubj V *a* NP NP** (*Rubinho pediu ao pai dinheiro*) which is, strictly speaking, another diathesis.
3. The ***a* NP** phrase is replaceable by a clitic: *me*, *te*, *nos*.[4] This is not included here, being a general lexico-grammatical phenomenon, independent of the valency of *pedir*.

[4] In formal written style also *lhe(s)*.

.....

C94 ***Syntax*: VSubj V NP**

Ev. 1:	*Agent*	SAY	|	*Message.wish*: [Ev.2]
Ev. 2:	*Goal*	GIVE	*Theme*	

Rubinho pediu dinheiro.
Rubinho asked money
'Rubinho asked for some money'

The constituent ***a* NP**, which would be the Goal in Event 1 and the Source in Event 2, is not expressed; it is however understood schematically: 'Rubinho asked *someone* for some money'. **VSubj V *a* NP** does not occur: **Rubinho pediu ao pai*. This may be the result of a general constraint on the omission of the Theme (Loredo Neta 2014).

.....

C2 VSubj>*Agent* **V**

Esses pobres coitados pedem *para sobreviver*.
'these poor creatures beg to survive'

.....

C95 Syntax: VSubj V NP *por* NP

Event 1: *Agent*		|	|	*Message.wish*: [Evs. 2, 3]
Event 2: *Goal*		*Theme*		
Event 3: *Source*			*Theme*	

Ele está pedindo uma fortuna pela fazenda.
'he is asking a fortune for the farm'

We have here a complex construction involving three events: Event 1 is the speech act of asking; Event 2 is the (wished) transfer of the fortune; and Event 3 is the (also wished) transfer of the farm.

.....

Some other structures with *pedir* are suspect of being fixed expressions (idioms):
Eu peço a Nossa Senhora por vocês. 'I pray Our Lady for you'
This construction is limited to religious contexts; ***a* NP** must be the name of a deity or a saint.
Ele pediu Beatriz em casamento. 'he asked Beatriz in marriage'

Here we usually have *pedir em casamento* ‘ask in marriage’, but not *noivado* ‘betrothal’, *namoro* ‘date’.

CAIR ‘fall’

C4 VSubj> Patient **V**

Meu chapéu caiu *no chão*.
‘my hat fell on the floor’

1. The Patient is also Theme in most cases; but this can be added by elaboration from the semantics of the verb.
2. *Cair* denotes a wide variety of events, but most of them fit into the above diathesis, because they occur in sentences with VSubj Patient and no object. Examples: *essa lei já caiu* ‘this law has already expired’; *caiu uma chuva violenta* ‘a violent rain fell’; *a qualidade do ensino caiu* ‘the quality of teaching fell’; *o cabelo dela caía até o ombro* ‘her hair reached [came down] to her shoulders’.
3. The Location—represented by the adjunct *no chão*—can be metaphorical, as in *o sujeito caiu em transe* ‘the fellow fell into a trance’. Here, as often happens, the adjunct (*no chão*) alternates with a Quality (or State) phrase, as in *o menino caiu doente* ‘the boy fell ill’.

.....

C34 VSubj>*Theme+Patient* **V** ***de*** **NP**>*Measure*

A fábrica caiu de produção.
‘the factory’s production fell’ [lit.: the factory fell of production]

The VSubj is Theme (slides down on a scale) and also Patient (changes its state). This may have to be included in the diathesis, or (less probably) derives from the semantics of *cair*.

.....

C26 VSubj>*Located.thing* **V** **X**>*Location*

O Natal cai no sábado que vem.
‘Christmas falls on next Saturday’

Meu sítio cai na jurisdição de Ibirité.
‘my country house falls under the Ibirité jurisdiction’

.....

C97 VSubj>*Qualified.thing* **V** **X**>*Manner*

Essa bacalhoada caiu bem.
‘the codfish tasted delicious’ [lit: fell well]

A curious feature of this construction: it admits a Beneficiary, but only if it is coded as a clitic: *essa bacalhoada me caiu bem* ‘. . .tasted delicious to

me', but not *. . .*caiu bem ao/para o Carlos* '. . . tasted delicious to Carlos'. This has nothing to do with valency, though; rather, it must be described in the context of the semantic conditions on the use of clitics.

.....

Possible cases of idioms:

(a) *Essa cor não cai bem na Alice.*
'this color does not suit Alice' [lit.: does not fall well on Alice]

Probably a fixed expression: the Manner phrase only occurs with *bem*, *mal* and synonyms.

(b) *Seu texto caiu na prova.*
'your text was the subject of the examination'
[lit.: fell in the examination]

This construction is limited to examination contexts.

BEBER 'drink'

C1 **VSubj**>*Agent* **V** **NP**>*Patient*

Os convidados beberam todo o meu uísque.
'the guests drank all my whisky'

.....

C2 **VSubj**>*Agent* **V**

Os camelos quase não bebem.
'camels hardly drink'

The omission of the Patient follows the proposal found in Sect. 1.6.1.

.....

C98 **VSubj**>*Agent* **V** >*Patient: alcoholic beverage*

O marido dela bebe.
'her husband drinks'

C98 is distinct from C2 because of the privileged Patient ("alcoholic beverage"); most verbs do not admit this reading. With C2, the Patient is schematic, with C98 it is elaborate.

CONFIAR ‘trust’, ‘entrust’, ‘confide’

C105 **VSubj**>*Agent* **V** **NP**>*Content* ***a*** **NP**>*Goal*

O Jesuíno confiou suas dúvidas a alguns amigos.
‘Jesuíno confided his doubts to some friends’

The Agent of a verb of communication (*dicendi*) is the “emitter” of the Content; the Goal is the “addressee”.

.....

C30 **VSubj**>*Agent+Source* **V** **NP**>*Theme* ***a/para*** **NP**>*Goal*

Carminha confiou muito dinheiro a um banco.
‘Carminha entrusted a lot of money to a bank’

The Goal is sometimes analyzed as a Beneficiary (Wenceslau 2003). But we can easily derive “beneficiary” from the more schematic relation Goal, plus the meaning of the verb.

.....

C51 **VSubj**>*Experiencer* **V** ***em*** **NP**>*thing.someone.trusts*

O Lauro confiava em todo mundo.
‘Lauro trusted everybody’

The VSubj is the Experiencer, because the sentence denotes a mental state/event of Lauro’s (cf. Sect. 8.2.2). As for *em* **NP**, it is filled in by default from the schema, and may be actually a case of Stimulus. ADESSE gives *contenido* ‘content’, which is not satisfactory because it is semantically too distant from the usual Content (found with verbs of communication, see C105 above).

.....

A group of verbs of stealing: *roubar, furtar, lesar, assaltar.*

ROUBAR ‘steal’, ‘rob’

C13 **VSubj**>*Agent* V **NP**>*Theme* ***de*** **NP**>*Source*

Roberto roubou mais de um milhão do Estado.
‘Roberto stole more than a million from the State’

.....

C12 **VSubj**>*Agent* **NP**>*Source* ***em*** **NP**>*Theme*

Roberto roubou o Estado em mais de um milhão.
'Roberto robbed the State of more than a million'

.....

C2 **VSubj**>*Agent* **V**

Ele roubou, mas foi preso.
'he stole, but was arrested'

A normal case of complement omission, with the Theme and Source understood as schematic. This example may eventually come under C13; for the moment being it is kept separate until we know more about complement omission.

.....

C1 **VSubj**>*Agent* **V** **NP**>*Patient*

Os menores roubaram a padaria.
'the minors robbed the bakery'

.....

C59 **VSubj**>*Agent+Goal* **V** **NP**>*Theme*

Você roubou meu relógio!
'you stole my watch!'

FURTAR 'steal' (*not* 'rob')

C13 **VSubj**>*Agent* **V** **NP**>*Theme* ***de*** **NP**>*Source*

Roberto furtou mais de um milhão do Estado.
'Roberto stole more than a million from the State'

.....

C2 **VSubj**>*Agent* **V**

Ele furtou, mas foi preso.
'he stole, but was arrested'

See note to *roubar*.

.....

C59 **VSubj**>*Agent+Goal* **V** **NP**>*Theme*

Você furtou meu relógio!
'you have stolen my watch!'

Theme is probably just an elaboration of Patient—in which case we would have C1 here.

LESAR 'defraud', 'damage'

C12 **VSubj**>*Agent* **V** **NP**>*Source* ***em*** **NP**>*Theme*

Roberto lesou o Estado em mais de um milhão.
'Roberto defrauded the State in more than a million'

.....

C1 **VSubj**>*Agent* **V** **NP**>*Patient*

Os menores lesaram a padaria.
'the minors defrauded the bakery'

A doença lesou a minha vista.
'the disease damaged my eyesight'

.....

Roubar, *furtar* and *lesar* have very similar meanings, but they differ in valency. *Roubar* is the most general, and can appear in C13 and C12; *furtar* appears in C13 but not in C12; and *lesar* appears in C12 but not in C13.

ASSALTAR 'mug'; 'burgle' also 'assault'

C1 **VSubj**>*Agent* **V** **NP**>*Patient*

Alguém assaltou minha casa de praia.
'someone burgled my beach house'.
O criminoso assaltou a velhinha.
'the criminal mugged/assaulted the old lady'.

1. *Assaltar* does not admit the expression of the Theme (the thing stolen), being limited to the Agent and the Patient or Theme.
2. This verb can also be used, in this same diathesis, in the reading 'assault', without implication of stealing: *os inimigos assaltaram a fortaleza* 'the enemies assaulted the fortress'.

Appendix B: The FrameNet Project (with Larissa Ciríaco)

Introduction: Reviewing Databases

In Appendices B–E we review some currently available databases and valency dictionaries, with the aim of evaluating their relevance for the description of verbal valencies, and also of justifying differences between them and the descriptive model adopted in Project VVP—that is, to explain why we did not simply adopt one of the existent systems, but decided to create a new one. The reviews are limited to studies that concern particular languages, leaving aside cases like the Leipzig Classes Valency Project, which takes a number of languages and aims "to investigate the argument-structure properties of verbs of different valency classes in a typological perspective" [Comrie, internet].

These reviews are sketchy and selective; detailed description and criticism of all systems would require a whole book. Here we concentrate on features relevant for comparison with the VVP system described in the present book. To be specific, there are two features that we consider essential to the usefulness of a database: the determination of **syntactic structure** and of **semantic roles**. These two factors are basic in order to define the two endpoints of the analysis, and to characterize the sound-meaning relation that is at the heart of linguistic analysis. If semantic relations, for instance, are defined in partially (or totally) formal terms, there will be no way to properly ascertain the ways a particular language, or language in general, relates sounds and meanings. As will be seen, there are some databases that do just that, thus becoming useless for the purposes of valency studies.

As for syntactic structure, the problem centers on the listing and definition of syntactic functions. Some databases simply assume the traditional analysis, which is so full of inadequacies that its choice seriously harms the way constructions are

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notated. For instance, the so-called "indirect object" is a complex of several semantic relations, more or less arbitrarily associated with a variety of syntactic configurations (see Sect. 2.6.2). We need a serious reworking of the list of syntactic functions needed for the description of diatheses; a concrete proposal is presented in Chap. 2 of this book.

Now, other features can be tolerated, because even if our point of view is different from the one adopted in a database, the data can still be used, given some adjustment. Thus, if a list starts not from verbs defined as phono-morphological units, but from pairs of verb plus reading (e.g., *get* 'obtain', *get* 'receive', *get* 'arrive'), it will run counter to the principles explained in Sect. 1.5; but it can still be used, because the identity of all these "verbs" is easily derived from the common label *get*. Also, a list constructed around alternations can be used even if we do not want to admit alternations for the moment, because each alternation is composed of a set of constructions, which can be considered in isolation.

The reviews tend to concentrate on points of disagreement; but we would like to leave it clear that every one of the reviewed projects is an important step in the long road towards understanding the complex phenomenon of valency. All are useful, each in its own way, and we have found them precious as sources of data, analyses and ideas. Of the many works we had resource to during the elaboration of the present book, we would like to mention the databases found in ADESSE, FrameNet, the Erlangen Patternbank (in particular Herbst and Schüller 2008), Levin (1993), and Borba's (1990) dictionary as the most useful of all.

The FrameNet Database

The FrameNet project, based at the University of California, Berkeley, is an online lexical resource for English (available at <framenet.icsi.berkeley.edu>); it has been extended to several languages by other projects vinculated to FrameNet. Its objective is

> to document the range of semantic and syntactic combinatory possibilities—**valences**—of each word in each of its senses [. . .]
> (Ruppenhofer *et al*., 2006, p. 5)

The database contained, as of 2006, about 10,000 lexical units (form/meaning pairs), with abundant exemplification. The analysis is based on the **frame semantics** model, initiated by Fillmore in the 1970s (cf. the texts collected in Fillmore 2003).

The database offers many promising ideas and is undeniably very useful in practice; yet it incorporates certain questionable elements, from the descriptive point of view. For instance, Baker (2009) observes that

> One of the trademarks of FrameNet is not to explore a restrict number of thematic roles [. . .] Instead, the **frame elements** are defined separately and, in theory, the **frame elements** that bear the same name in different **frames** could behave differently at the semantic level.
> (Baker, 2009, p. 41)

To give an example from Ruppenhofer *et al*. (2006, p. 5), the sentence *Matilde fried the catfish in a heavy iron skillet* is analyzed as containing the semantic relations Cook, Food, and Heating_instrument. This is taking elaboration too far, grammatically speaking; for instance, *Matilde* may perfectly be analyzed as Agent, and the fact that she **cooked** something comes from the semantics of *fry*. Characterizing *Matilde* as an Agent is important for several reasons, for instance the observation that this sentence follows the general tendency of associating the Agent (not the Cook!) with the subject.[5]

FrameNet annotations are described in the following way:

> Formally, FrameNet annotations are constellations of triples [. . .] each consisting of a frame element (for example, **Food**), a **grammatical function** (say, **Object**) and a **phrase** (say, **NP**).
> (Ruppenhofer *et al*, 2006, p. 6)

A problem with this example is that Food cannot be understood directly as a semantic role—in *he ate the fish* it is the "eaten.thing", but the same phrase, still meaning 'food', can be "causator" (or "agent") in *the fish made me sick*. That is, from a linguistic standpoint frame elements do not provide the complete information, often lacking exactly the semantic relation that binds the verb to its complement (or the respective schema). On the other hand, it must be said that semantic relations *may* generally be deduced from the entries. For instance, in FrameNet the description of **Hiding_objects** informs that "an Agent causes a Hidden_object to become perceptually inaccessible [. . .]". From there we can infer the semantic relations involved, but, as seen, in a very indirect manner. Most of the work, in this particular, must be done by the user.

Even from a purely cognitive standpoint, the position described by Baker seems difficult to support, in view of the ability shown by humans to interpret novel beings and situations by reference to previous experience. What is it that allows us to interpret an emu (something we have never seen) as a bird? What leads us to code an event never previously perceived as involving an "agent" and a "patient"? Now, from the grammatical side, it is well known that the extreme variety seen in semantic relations does not identify with the valency of the items, but is the product of a process of elaboration that is only partly linguistic, and takes into account the meaning of the verb, the context, and general world knowledge. This variety does not exclude the necessity of postulating schematic semantic roles. The extreme particularistic approach may be useful as a preliminary descriptive strategy, not as a working hypothesis to orient our conclusions.

Apparently, Baker does not see the problem, and sees frame elements as the only valid relations in description. He states that

[5] In this book this tendency is described as a linking rule, Agent<>VSubj.

> [in the FrameNet database] lexical units correspond to the Saussurian concept of sign, connecting a form (the *signifiant*) to a meaning.
> (Baker, 2009, p. 43)

On the contrary, Saussure leaves it clear that meaning is structural, just as form is. Therefore, the frame elements FrameNet deals with are not meaning relations in the linguistic sense, and correspond rather to our CSRs. Saussure's position is made explicit in the following passage:

> [Concept and acoustic image] are intimately bound and depend on each other [*s'appellent l'un l'autre*]. Whether we are looking for the meaning of the Latin word *arbor*, or for the word Latin uses for the concept "tree", it is clear that only associations established by the language seem to us to conform to reality, and we discard any other that can be imagined.
> (Saussure, 1916 (1969) p. 99)

This passage clearly indicates that Saussure conceived meaning as an element just as linguistic as the *signifiant* itself. Subsequent research has amply proved Saussure to be correct in this point.

Another problematic aspect in FrameNet's position is that it apparently purports to deal with purely cognitive units, exempt from coloring by their linguistic expression. This belief, which occurs in some works in cognitive science, is criticized in Perini (1988). Baker expresses this position in the following passage:

> Because of the fact that conceptual frames are very little dependent on languages [. . .], the conceptual frame component (with exception of lexical units) in the FrameNet database relative to English can serve as a starting point to construct a FrameNet database relative to some other language.
> (Baker, 2009, p. 44)

But this depends on a "fact" that was not shown to be real. What is universal is reality, not its linguistic coding. Each language structures reality in its own way; examples are many, and well known, and we do not know the precise extent of these differences. I agree that we do not have to start from square one; but the English FrameNet can only serve as a source of ideas, never as a model for the analysis of other languages. To take just two examples, Portuguese *esperar* corresponds to English *hope*, *expect* or *wait*. English *turn* corresponds to Portuguese *voltar* 'turn back', *tornear* 'turn something by using a lathe' or *virar* 'turn towards someone'. And the linguistic representations of locative relations in Latin, English and Nahuatl differ widely (as shown in Chap. 4). It would be easy to find many similar cases, for any two languages. The work of Wierzbicka (1988, 1996, etc.) has been directed partly towards the search for the universal component in the categorization of concepts, and shows that it is not an easy task.

The entries of FrameNet are organized primarily by frames (not by lexical items), and they contain discursive descriptions. For example, if we look up *ask* we are routed to the entry REQUEST, defined as

> [. . .] a **Speaker** asks an **Addressee** for something, or to carry out some action.
> The customer DEMANDED a refund.
> I BEGGED my parents to let me stay up late.
> (FrameNet, entry REQUEST)

As seen, we get the examples, accompanied by a semantic analysis. The syntactic analysis, although present, is not systematic; for each frame element, the entry provides the syntactic ways of expression, as

> [. . .] the **Addressee** can either occur as an NP Object (usually with a following complement clause) or as a PP Complement of verbs or nouns.
> (*ibid.*)

The job of elaborating the constructions referred to is up to the user.

An example will better illustrate the greater emphasis on linguistic aspects in the VVP model as compared with FrameNet. The FrameNet handbook explains that

> Some frames are more abstract, such as Change_position_on_a_scale, which is evoked by L[exical] U[units] such as *decline, decrease, gain, plummet, rise*, etc.
> (Ruppenhofer *et al*., 2006, p. 5)

The verb *rise*, for instance, evokes the frame CHANGE_POSITION _ON_A_SCALE in sentences like

[1] The price of the soybean rose by $20.

In FrameNet, this sentence (or its verb) evokes that frame. In VVP we say that in [1] *rise* occurs in the construction

[2] VSubj>*Theme* V *by* NP>*Measure*

The two descriptions are semantically similar: the Theme is an element that changes position in a scale, because the other complement is a Measure. If we had something that kept the same position, not corresponding therefore to that frame, it would be a Located.thing, not a Theme, as in

[3] The price of the soybean is $20.

FrameNet would presumably see [3] as realization of another frame, something like POSITION_ON_A_SCALE (without "change"). Coherently with this position, the entries of FrameNet are organized around semantic elements:

> Each lexical unit is linked to a semantic frame, and hence to the other words which evoke that frame. This makes the FrameNet database similar to a thesaurus, grouping together semantically similar words.
> (Ruppenhofer *et al*, 2006, p. 8)

We raise no objection to the FrameNet analysis in this particular, but it seems less useful for immediate descriptive purposes. The VVP model is more informative in grammatical terms, because it represents the semantic roles of each constituent directly, and also gives the syntactic form that codes each of them, the latter expressed in terms of an explicitly described system. The main difference is possibly one of level: the FrameNet descriptions tend to leave morphosyntactic differences in the shadow, and concentrate on the cognitive aspects. This feature, while not being a point of conflict theoretically, has perceptible practical consequences. FrameNet focuses basically on schemata (frames), while VVP focuses on

lexical items (verbs). Thus, Ruppenhofer *et al*. (2006) sometimes include semantic features that have no grammatical import in the analysis of a verb:

> Clearly, the NP-complements of *want* [. . .] are understood to metonymically stand for events centrally involving them: 'to want an orange' is typically 'to want to eat an orange'. (Ruppenhofer *et al*., 2006, p. 13)

This is certainly true, but the fact remains that it is possible to analyze sentences with *want* without decomposing them into more than one event (unlike sentences with *pedir* 'ask for', seen in Sect. 6.6), because the relevant semantic roles can be assigned directly to the complements of a simple sentence with *want*. This is then a point in which the two systems differ, while still being compatible—and preserving the usefulness of FrameNet in the elaboration of the VVP system.

Some important points, however, are left open in FrameNet. To recapitulate: first, we find no attempt to formulate semantic roles of a more general nature, and the model tends to be particularistic and to focus on CSRs (cf. Baker's passage cited above). Second, there is no discussion of the bases of the syntactic analysis, which reflects the more cognitive orientation of the project. FrameNet, then, in spite of Ruppenhofer *et al*.'s allegations, is not properly a valency description system, although it no doubt provides very useful information for research in this area. FrameNet's objectives are different, but compatible on the whole with the ones of the VVP project, and correspondingly it is one of the major sources of consultation used in VVP in what respects the structure of schemata (frames).

Appendix C: The ADESSE Database

ADESSE (*Base de datos de verbos, Alternancias de Diátesis y Esquemas Sintáctico-Semánticos del Español*)[6] is a database providing syntactic and semantic information about Spanish verbs; in particular, it includes the diatheses in which each verb fits. The objective of the project is

> to get a corpus-based database for the empirical study of the interaction between verbs and constructions in Spanish.
> (Vaamonde *et al*., 2010, p. 1903)

The goals of the ADESSE project are very similar to the VVP's, although it expresses its data in a somewhat different way. ADESSE is a precious source of data, including a list of annotated verbs built with clear descriptive objectives, and focus on the linguistic phenomenon, not only on its semantic aspects.

Follows a comparative analysis of some differences and similarities between ADESSE and VVP.

Syntactic Analysis

ADESSE uses basically the traditional syntactic functions—a system that, as was shown in Chap. 2, is deficient in important details. In VVP the syntactic analysis of the sentence is reformulated, in favor of a simpler and more adequate model. For instance, ADESSE distinguishes the **direct object**, the **oblique object,** and the **indirect object**; thus, in the sentence

[6] Available at <http://adesse.uvigo.es>. The project is under the coordination of José M. García-Miguel, of the University of Vigo.

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[1] Ellos le arrojaron piedras al ladrón. 'they threw stones at the thief'

al ladrón 'at the thief' is an indirect object, while in

[2] Ellos arrojaron puedras a la ventana. 'they threw stones at the window'

a la ventana 'at the window' is an oblique object. But the syntactic difference (presence of the clitic *le*) can be reduced to a semantic condition, since *le* tends to appear when the reference is to an animate being. In any case, the occurrence of this redundant pronoun is not governed by the individual verb in the sentence, being of little interest for the description of valencies. In Portuguese, the redundant pronoun does not occur, so that the two sentences are syntactically identical: *eles jogaram pedras no ladrão* 'they threw stones at the thief', *eles jogaram pedras na janela* 'they threw stones at the window'. For Portuguese at least, then, an identical analysis is defensible for both sentences, which makes the opposition between indirect and oblique objects unnecessary.

The definition of indirect object, by the way, is not sufficiently clear, and at least in some cases seems to depart from the strict separation between formal and semantic categories. Thus, in the sentence *Juan vistió a su hijo* 'Juan dressed his son', we find *a su hijo* analized as a Direct Object, in spite of being introduced by a preposition, *a*. This is justified by the fact that in *Juan viste una camisa blanca* 'Juan wears a white shirt' the preposition is not present; rather,

> the same basic transitive pattern (i.e. Active VSubj-DObj) is used to express a different subset of participants involved in the situation. On the one side, we get "the one who dresses"[. . .] On the other side, we get "the one who gets dressed".
> (Vaamonde *et al*., 2010, p. 1904)

But this is a semantic criterion, and here we should be concerned with syntactic (that is, formal) functions. We must agree that the same basic *semantic* pattern is present in the two cases; but the syntax differs, because the formal instruments used to build the structure are different. Since we do not really need the function of indirect object, we can simply analyze *Juan vistió a su hijo* 'Juan dressed his son' as **VSubj V *a* NP**, and *Juan viste una camisa blanca* 'Juan wears a white shirt' as **VSubj V NP**. It is true that there is a semantic correlation (*a* is used with animate nouns[7]), but this must be included in its proper place, the description of symbolic relations, not in the syntax. Consequently, we cannot say of these two sentences that they represent "the same syntactic pattern" (p. 1904), since the presence of the preposition makes them different. Now, the choice between the two constructions is really not a valential process, and may have to be described by a general rule that requires ***a*** before a nonsubject NP under certain semantic conditions. I have no definite opinion on the analysis of these Spanish facts, but if pressed I would suggest the use of the syntactic variable X in the diathesis, coupled

[7] This is a point in which the feature "animacy" is relevant in Spanish grammar; in Portuguese, as far as I can see, it is grammatically irrelevant.

with a separate rule establishing the appearance of ***a*** before an NP with certain semantic roles, also conditioned to features of the NP's meaning ("animate").

In VVP, syntactic functions are reduced to a minimum, and when distinguished they are tied to formal marks; thus, *por Daniel*, *em Daniel* and *para Daniel* are syntactically analyzed simply as sequences of different prepositions plus an NP, without attributing an abstract function to the phrase. The exception, as seen in Chap. 2, is the subject, which in fact must be syntactically distinguished from other NPs in the sentence, this distinction being essential in the formulation of the diatheses. In ADESSE the specific preposition is noted, so that all syntactic functions beside the subject could be dispensed with; that is, analyzing a constituent both as ***a*** **NP** and as an "indirect object" does not carry more information, syntactically speaking, than just marking it as ***a*** **NP**. And, of course, we also have the semantic role, which must be noted in any case.There is no reason, for instance, for marking the difference between a "beneficiary" Goal (*I gave the book to Jim*) and a "locational" Goal (*I threw the book to Jim*) as two different syntactic functions. This is traditionally analyzed as a syntactic difference between indirect object and adverbial adjunct of location, respectively, but this distinction is superfluous: we can derive the semantic difference from the meanings of the two verbs.

To give another example, ADESSE distinguishes the **predicative** as a separate syntactic function—but as we can see in Sect. 10.1.2, and also in Perini and Fulgêncio (2011), the traditional opposition between the predicative and the (direct) object can be reduced to a matter of semantic roles. It should be observed, though, that this superabundance of syntactic functions does not seriously detract from ADESSE's usefulness, since it is generally easy to disregard the distinctions felt to be superfluous.

Another point in which the syntactic analysis of ADESSE needs improvement is the representation of form classes. For example, one of the diatheses of *llegar* 'arrive' is described as[8]

A1:*MOV* A3:*DIR*
= **SUJ** =**a** LOC

that is, translated into our terms,

VSubj>*Theme* V ***a*** NP>*Goal*

But the ADESSE notation fails to represent the fact that the directional constituent is composed of ***a*** 'to' **plus an NP**; its semantic role is already represented in the line above (*DIR dirección*, that is, 'Goal'), and syntactically the phrase is identical to the subject, apart from the preposition. This is probably just another aspect of the traditional system of syntactic analysis adopted by the project; actually, for purposes of valency description, the locative phrase in this construction can be adequately described simply by reference to the presence of the preposition (***a***

[8] *MOV* = *móvil*, that is, the thing that undergoes motion, here Theme; *DIR* = *dirección*, that is, Goal.

NP as against just **NP**), plus the semantic role. As argued in Chap. 2, there is no need for a specific *syntactic* function (LOC) here.

Still with reference to the entry *llegar* 'arrive', one of the diatheses has only LOC, without the preposition, i.e.,

A1:*MOV* A3:*DIR*
= **SUJ** =LOC

This corresponds to the sentence *llegué aquí* 'I arrived here', where the Goal is represented by an adverb. The syntactic representation fails in this point, because it does not show the class difference between *aquí* (adverb) and the element that follows the preposition (e.g., *llegué a esta ciudad* 'I arrived to this town'), which is an NP. In this detail, too, the syntactic model adopted by ADESSE could be improved. I make a concrete proposal in Sect. 1.6.2, where the notation 'X' for syntactically free constituents is introduced.

Form and Meaning: Counting Verbs

A point of some importance is how to count the verbs: are we to consider Spanish *pasar* ('hand over' or 'suffer') one verb or two? ADESSE follows what is apparently a general trend of valency dictionaries, distinguishing from the start different readings (*pasar* is two verbs). In this it differs from VVP, which counts verbs by form only (*passar*, a close translation of Spanish *pasar*, is only one verb, with more than one meaning).

The option followed by ADESSE in this particular is theoretically questionable. Of course, different meanings of a word must be represented somehow in the description of the language. But there are important theoretical reasons to organize the entries of a dictionary in purely formal terms (phonological and morphological), and to consider *pasar* only one verb. One reason is that if we want to express the relation between form and meaning, it is essential that at some moment we have both forms and meanings defined in their own terms. Consequently, we must define the units we are describing formally, so that we have a basis to eventually establish relations between forms and meanings. The verb *pasar* has two clearly distinct readings ('hand over' and 'suffer').[9] That is, it is a fact of the language that one form (*pasar*, a regular verb of the first conjugation) may mean more than one thing. This is an important phenomenon, and affects many verbs; but it can be expressed with some rigor only if we have conditions to tell a "verb" from a "verb reading". If we define a verb as the association of a morphological form with a reading, we will have to admit that—by definition—all verbs are monosemic. And where is the expression of the important fact that by using *pasar* I may express more than one

[9] The same for Portuguese *passar*: *passei o sal para Beth* 'I handed over the salt to Beth' vs. *passei fome* 'I suffered hunger'.

meaning? We will have to express this fact in some other way, using other notions—for instance, that each morphological form may belong to more than one verb. Nothing is gained with this additional complication; we then prefer the solution to call **verb** a form, which can be associated to more than one meaning. One way to view this opposition is to say that VVP positions itself at a more concrete level of analysis than ADESSE; and that this concrete level is, in any case, indispensable, since it is the starting point of the decoding process (see detailed argument in Sect. 1.5).

Semantic Roles

ADESSE recognizes the central status of semantic roles in the description of valencies:

> One basic goal of ADESSE is to document empirically the linking of syntactic functions and semantic roles, so semantic role annotation arises as a fundamental task of the project.
> (Vaamonde *et al*., 2010, p. 1908)

And they also recognize that

> [. . .] Delimiting a useful closed list of semantic roles is a complex work which has been dealt with in many occasions and with really different results.
> (*ibid*.)

The solution adopted in ADESSE is to consider different levels of elaboration. The starting point are verbal classes, semantically defined, and each of them is "associated with a set of [semantic] roles, which are prototypical for the cognitive domain evoked by the verbs belonging to it". For instance, perception verbs are associated to Causator (Iniciador), Stimulus (Percibido, 'perceived.thing') and Experiencer (Perceptor), knowledge verbs to Cognizer (Conocedor) and Content (Contenido), and so on.

This strategy is no doubt adequate, considering our current state of ignorance; it is the strategy adopted in Project VVP. For example, Carvalho (2012), studying the valencies of cognition verbs, posits comparatively elaborate semantic roles such as Cognizer, Known.thing, Origin.of.knowledge, and so on. This becomes possible when we consider semantic classes of verbs in isolation, and we thus avoid the dangers of hasty generalization. It is to be hoped that more general, schematic relations will eventually be devised, and duly grounded on reliable data. Also, I suspect that semantic verb classes can profitably be defined in terms of the semantic roles typically associated with them; for instance, so-called action verbs are associated with an Agent. This deserves further investigation, and it agrees with ADESSE's position.

The considerations developed in the present book make it possible to go one step further in what respects the definition and assigning of semantic roles. We now have a more adequate way to define difficult roles that are represented in ADESSE in a too schematic way, as when two variables associated with *ser* 'be' are given as

Entidad 'entity' and Atributo 'attribute'; we speak instead of roles like Qualified. thing and Quality, which are more informative labels. The main goal, as ever, is to reach generalizations whenever possible; and in this sense ADESSE should be considered as a stage in a necessarily long road.

Alternations

The ADESSE system makes use of alternations, defined as "alternative conceptualizations of a scene [with] focus on different facts of a situation". Seen in this way, alternations may have grammatical relevance, specially if it can be shown that such alternative conceptualizations are systematically represented in the morphosyntax. Now, if differences in conceptualization are subject to a great amount of lexical idiosyncrasy, they may not be relevant for the description of valencies.

In any case, the VVP model positions itself at a more concrete level. In the VVP system, alternation members are analyzed separately, as realizations of different constructions; however, this does not exclude eventually grouping them according to some explicit criterion.[10]

Quantification

ADESSE offers a statistics of occurrence of each diathesis (**realizaciones valenciales**) in the corpus. This kind of quantification seems to me of little relevance for our purposes—one would prefer a quantification over the list of verbs of the language, which would be descriptively more interesting. Thus, instead of (or besides) the information that the diathesis exemplified by *la niña regresó a casa* 'the girl came back home' occurs in 95 examples in the corpus (Vaamonde *et al*. 2010, p. 1905), it would be more interesting to know how many verbs can occur in that diathesis. This would allow us to define the most prototypical constructions of the language. Of course, the quantification offered in ADESSE can be useful for other purposes—we can mention the planning of foreign language methods, where it is important to know which constructions are most frequent in texts of the language.

But ADESSE entries provide another kind of quantification, which *is* relevant to valency description: for each verb, it gives the percentage of cases in which each "argument" occurs (in our terms, the percentage of occurrence of each semantic role). Thus, for *llegar* 'arrive', we have

[10] See more discussion in Sect. 1.4. We must keep in mind that alternations, if defined in the ADESSE way, are symbolic relations.

Móvil [Theme]	100 % [of surveyed examples in the corpus]
Origen [Source]	4.6 %
Dirección [Goal]	60 %
Beneficiario [Beneficiary]	1.3 %
Finalidad [Purpose]	0.7 %

Here we see a neat division of semantic roles in two groups, a division that can be interpreted as drawing apart core and peripheral semantic roles: Theme and Goal are more central than the others, and this shows clearly in the percentages. Therefore, this aspect of the ADESSE survey can be used as an indication of the coreness of semantic roles for each (Spanish) verb. The ADESSE percentages are particularly interesting because the source of the data differs from the one used in Lima, Pinha and Perini (ms), reviewed in Sect. 5.2.3, which instead of surveying occurrence in a corpus used free production of sentences. If the results of the two procedures are found to be similar, this will be strong evidence in favor of their relevance for detecting the core/peripheral character of each role with each verb.[11]

Use of Corpus Data

The data used in ADESSE come from a corpus of Iberian and American Spanish (ARTHUS: *Archivo de Textos Hispánicos de la Universidad de Santiago de Compostela*). VVP, for the moment being, relies mainly on specially constructed sentences. We find this to be the most sensible option for a project that must work with small human resources. We have the intention, though, of eventually including data from a corpus of Brazilian Portuguese as a validation component in the analysis.

Usefulness

While working on the entries of VVP, we found ADESSE to be the most useful of currently available systems of verb subclassification in terms of their valency. Its objectives are specifically linguistic, but also rooted in the relation between language and cognition; and its presentation is clear in all details, which by the way makes criticism easier. The corresponding list of analyzed verbs is an excellent instrument for testing, criticizing and improving the system itself.

[11] Of course, the comparison is limited by the fact that the two experiments use data from different languages. But, since Portuguese and Spanish are so close, at least some conclusions can be drawn with a minimum of reliability.

Appendix D: The Erlangen Valency Patternbank

This system is the base of Herbst, Heath, Roe and Götz's *A Valency Dictionary of English* (2004); it is described in Herbst and Schüller (2008) and in Herbst (internet). There is a very useful review of the dictionary by Fillmore (2008).

The bank's coverage is restricted to constructions that show verbs of action in the syntactic patterns VSubj+V, VSubj+V+NP, and VSubj+V+Adv, but there are plans for expansion:

> The patterbank will continually be expanded to include lexical items and valency patterns not covered in the [*Valency Dictionary of English*].
> (Herbst, internet, p. 1)

The Erlangen system shows many points of convergence with VVP, and some points of divergence as well. Among the relevant features of the system we may list:

(a) **Patterns (that is, constructions) are described "in terms of surface-oriented formal categories",** thus avoiding underlying structures and consequently transformational devices, with the aim of providing "a description which is as theory-neutral as possible". This is also the orientation adopted in Project VVP.

(b) **Patterns are listed separately, without consideration of alternations.** This is certainly adequate, at least in the present stage of our knowledge of relations between constructions (cf. Sect. 1.4 above).

The exception is that the Erlangen system analyzes passives in connection with the "corresponding" actives. In this point the system departs from its (correct) decision of listing constructions separately. For Portuguese, it has been shown (Perini 2010; forthcoming) that passives are not part of the valency of a verb, but

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rather adjectival constructions[12]; the reason is that the participle is not a member of the verb lexeme, but a derivationally related nominal.[13] Correspondingly, the VVP system analyzes the passive as a diathesis of the verb *ser* 'be'. To be fair, it must be said that these conclusions concerning the participle apply to Portuguese, and things in English may be different.

(c) **The description of each pattern includes a syntactic structure coupled with the semantic roles of each complement.**

Here the two systems agree.

Additionally, the definition of each construction in the Erlangen system specifies the semantic class the verb belongs to—such as, e.g., being a verb of action. The VVP model does not give this kind of information in the *Dictionary* entries, but, as we saw, it is relevant for the process of elaboration of semantic roles. Thus, we may say that any verb that can occur with an Agent is a verb of action, or the other way around, that any verb of action is compatible with an Agent. It may also be that "being compatible with an Agent" is a synonym of "verb of action".

The definition of semantic roles remains a problem. The dilemma facing every researcher that must use semantic roles is clearly recognized:

> developing a model of semantic roles is like steering a course between Scylla and Charybdis: either one designs roles that are very specific and therefore serve only a very limited purpose or one makes use of more general semantic roles, which inevitably results in considerable amount of overlap between categories and gradience in the analysis.
> (Herbst and Schüller, 2008, p. 131)

The problem is finding the precise degree of schematicity at which semantic relations will be useful for the analysis of valencies. Herbst and Schüller make use of a lexical criterion: the relation is taken at a level of schematicity that allows "the recognition of semantic relations across individual verbs" (p. 129). This is certainly a desirable result, because otherwise we would have to analyze separately cases like *she ate the orange* and *she peeled the orange*, since the actions involved, and therefore the semantic relations, differ in the two cases; calling *she* the Agent, and *the orange* the Patient in both cases allows us to reach a generalization recognized by the language.

But we need an explicit criterion telling us where to stop. Why not analyze identically (Agent/Patient) cases like *she liked the orange*? I think I have provided an answer with the criteria of Necessity and Semantic Similarity given in Chap. 4. These two criteria take into account the grammatical coding of each relation (CSR), plus a measure—admittedly intuitive, for the moment—of semantic distance between the several CSRs that make up each semantic role. While being still short of an ideal answer, I think this goes further than the Erlangen solution.

[12] Perhaps not typically adjectival; but they certainly are not part of the valency of the verb which is cognate with the participle.

[13] I give the main arguments for this analysis below in Appendix F.

Perhaps reflecting this state of indefinition, the Erlangen system only represents semantic roles in a limited way, which explains why so many entries only give the syntactic face of the diathesis:

> Semantic roles are only indicated in cases where two complements are identical in form and could easily be confused.
> (Herbst *et al*., 2004)

This may make sense as far as the interests of the language teacher are concerned. From the point of view of the researcher, though, it disregards precisely the most interesting (and by far the most difficult) aspect of the problem, that is, the definition of the semantic roles. In the VVP dictionary, the aim is to assign each relevant constituent a semantic role, even if this sometimes forces us to adopt temporary solutions.

(d) **The Patternbank defines separate entries for readings** (so that a verb may be analyzed into sense A, sense B, etc.).

Here the VVP system makes a different decision, defining entries (and verbs) by phono-morphological criteria, so that *arrive* (as well as *get*, *turn*, etc.) is one verb, with several diatheses and several readings. This is argued for in Sect. 1.5, and seems to me the only theoretically defensible position.

(e) **Complements are marked for optionality.**

Cases of lexical optionality are indicated by the presence of two separate patterns—a convenient notation, also adopted in VVP. Thus, for *Tom was reading (a newspaper)* the Patternbank simply recognizes two patterns (diatheses), one with and another without the object.

The Erlangen system distinguishes three types of optionality, namely **obligatory**, **contextually optional**, and **optional**. Contextual optionality is defined as the case where

> the complement slot need not be filled if the information required can be obtained from the context.
> (Herbst and Schüller, 2008, p. 111)

Contextual optionality cannot be applied to Portuguese valencies, because in principle *any* complement can be contextually omitted, which makes this category irrelevant, since it is valid for all cases. This is evident in cases like

[1] A Lena cortou a batata mas não fritou. ‘Lena cut the potato but did not fry [it]’

But even in English object omission is possible, if in a different construction:

[2] Lena cut, but did not fry, the potato.

Contextual optionality of complements is not a valency phenomenon; omission in anaphoric contexts is a generalized process, grammatically (and pragmatically) conditioned, not an individual characteristic of particular verbs. In this particular, the Erlangen system departs from its correct statement that “[v]alency is seen as a property of lexical units” (Herbst, internet, p. 8). Optionality is relevant for valency

description only if it occurs in nonanaphoric situations, in which case it is determined by features of the governing item (see discussion in Sect. 1.6.1).

(f) **The Patternbank does not use the "object" as a syntactic function.**

The analysis adopted in the Patternbank can be carried out without the use of the traditional **object** function:

> terms such as object are deliberately being avoided since they are used in different ways in different frameworks (covering either only noun phrases or noun phrases and other formal categories such as *that*-clauses or *to*-infinitives); being defined on the basis of criteria that are purely formal [. . .], that are primarily semantic [. . .], or a mixture of formal and semantic criteria.
>
> (Herbst (internet), p. 4)

I have come to the same conclusion, but not because the object is incoherently defined in the literature, since it could always be redefined as needed. The real reason, shown in Chap. 2, is that it is perfectly possible to describe verb valencies without distinguishing several syntactic functions for NPs—except for the subject.[14]

(g) **The data are organized around *constructemes***, that is, sets of "all valency constructions that share the same participant structures", which certainly are semantically relevant—for instance, what we call "verbs of action" can be defined as verbs that have Agent as one of their semantic roles.

On the other hand, the set of semantic roles (participants) is not the only relevant information we may need in a valency dictionary. One may mention, in addition, the typical associations between semantic role and syntactic function, for instance, What percentage of verbs admit a subject Agent? Or the typical semantic role(s) coded by particular prepositions, for instance, Which semantic roles does the preposition *com* convey?

(h) **Only complements (not adjuncts) are part of the valency description**.

> A lexical unit has the property of **valency** if it opens up one or more valency slots which can or must be realised by a complement. [. . .] a **complement** is any formal realisation of a valency slot [. . .]
>
> (Herbst, internet, p. 3)

If we take this as a definition of complement, it is circular. However, in Herbst and Schüller's book a clearer notion is provided, namely,

> A **complement** is a clause constituent that is determined by the governing element in that
>
> – it must occur if the governing element is to be used in a grammatical sentence
>
> or
>
> – it is determined in its form by the governing element.
>
> (Herbst and Schüller, 2008, p. 22)

[14] Here again, my results are valid for Portuguese; I make no claims about other languages.

This is very close to the way complements are defined in VVP: complements are constituents of obligatory occurrence, and/or determined in some way by the governing word. But I would not restrict this to the *form* of the complement: what most typically characterizes the complement, I think, is that its *semantic role* is determined by the governing word. In certain cases (seen in Sect. 1.6.2) the syntactic form of the complement is free, and only the semantic role is required by the verb (*he lives in Boston/under the bridge/here*)—whereas in no case the semantic role is free, only the form being determined.

This is clear in many cases; but a practical problem arises in cases of transparency, as in *he thinks about his new job*, where the semantic role of the complement (*about his new job*) is not visibly due to the main verb, because it is transparent, and can only have the role Content.[15] In these cases we have to compare the sentence with near-synonymous ones (always a risky move): we observe that in *he thinks of his new job* the complement, *of his new job*, must be understood in its nonprototypical reading Content, and this must be due to the verb, *think*. It is, therefore, a complement. Now, according to the same definition, *about his new job*, whose semantic role does not depend on the verb, will not be a complement, but an adjunct. As seen, we have here a situation that does not conform with the general idea that a verb "requires" a complement with a specific semantic role: the role is the same in both cases, but one of them depends on the requirements of the verb and the other does not. I think these facts tend to show that the dichotomy complement/adjunct is not adequate to describe the observed phenomena; accordingly, this opposition is not systematically used in the analysis underlying the VVP dictionary.

Returning to Herbst and Schüller's definition, it only mentions the form of the complement as being determined by the verb, but they also state elsewhere that

> What makes distinguishing complements from adjuncts difficult is that the distinction does not coincide with formal categories of any kind.
> (Herbst and Schüller, 2008, p. 113)

I tend to agree with this observation, and I take it as an indication that the distinction, in the limited sense in which it functions, is basically semantic, not morphosyntactic.

(i) **The system makes some (limited) use of quantitative valency,** that is, the traditional distinction of governing words into avalent ("zerovalent"), monovalent, divalent, etc.:

> At a relatively superficial level, one can distinguish between different uses of a valency carrier in purely quantitative terms. At the syntactic level quantitative valency describes the number of complements realised in a particular clause.
> (Herbst and Schüller, 2008, p. 136)

[15] Herbst and Schüller call this role the Topic. I avoid this designation because the same term is used in a different meaning in this book (Sects. 9.1 and 9.2).

As already pointed out in Sect. 6.4, this distinction has little interest for the description of valencies. Besides, it applies only to diatheses, not to verbs qua lexical items.

(j) **The Patternbank makes some superfluous distinctions**.

One example cited by Fillmore (2008) has to do with the verb *discuss*, which is analyzed differently according to whether the Speaker is animate or inanimate. For a sentence like

[3] The teacher discussed the possibility of canceling the class.

the Patternbank gives as participants Speaker and Topic (=Content); and for

[4] This article discusses several theories.

it gives Speaker/Text and Topic.

But if we analyze the semantic role of the subject in both cases simply as the Agent, all other differences will derive naturally from the meaning of the constituents of the respective sentences. First, the Agent of a verb of saying (*verbum dicendi*) is automatically understood as the "speaker"; then, if the subject is inanimate, we must understand the action of discussing in a different way than if it is a person. The distinction between Speaker and Speaker/Text is *linguistically* unnecessary—as is the distinction of two different senses of *discuss* in these two sentences.

(k) **Data are limited to sentences occurring in the corpus.**

Here we may quote Fillmore's observation that when we work exclusively with examples from a corpus

> There is no way of knowing whether unrepresented patterns are not in the corpus, are in the corpus but were not included in the database, or are simply not in the language.
> (Fillmore, 2008, p. 26)

As remarked elsewhere (Perini and Othero 2011), if this situation is carried to extremes, the *exclusive* use of the corpus as a source of data comes to the point where one cannot even say that we are studying the language, rather than a sample of utterances: one reverts to Harris's (1951) position that the description of a language should be a maximally compact representation of observed utterances. This entails negating the status of the grammar as a mentally internalized system, which was one of the main contributions of Chomsky's generative theory to linguistic studies. The question of the proper use of the corpus—which, in itself, is not to be questioned—has to do with the object itself of linguistic inquiry.

The Erlangen system is described in Herbst and Schüller (2008) and in its other texts in detail, and a lot more could be said about it. My aim here is not to offer a complete review, but to give the reasons for some points in which the VVP system differs from the Erlangen Patternbank. I will then close here my review, adding that, in spite of some features which are, to my mind, inadequate, the Patternbank remains a useful source of analyzed data and much lucid discussion.

Appendix E: Other Databases and Valency Dictionaries

Levin (1993) English Verb Classes and Alternations

The wealth of information contained in Levin's book makes it an indispensable instrument for the researcher in the area. And before we go on to criticism, let us make it clear that it is a precious repository of useful information for the study of verbs. In spite of its somewhat unsystematic approach, the book incorporates an enormous body of data, and is packed with suggestive observations and insights—to say nothing of the numerous references to relevant bibliography. Levin's book makes no claims at being a description of English verb valencies; it is, rather, a general survey of many aspects of the behavior of verbs, not all of which are relevant to the study of valencies—but most of which are relevant to *some* aspect of the study of verbs. In particular her comments, informal as they often are, are a precious source of insights into verb meanings. We may say that Levin did a sizable part of the heavy work; but many important details are still to be elaborated. The critical notes that follow may be taken as a short guide for the valency researcher who makes use of Levin's survey as a source of ideas and data.

Correlation Between Valency and Verb Meaning

Levin gives much attention to semantic verb classes, which form the backbone of her list. Accordingly, she puts emphasis on the alleged parallelism between valency and the meaning of verbs:

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> This work is guided by the assumption that the behavior of a verb, particularly with respect to the expression and interpretation of its arguments, is to a large extent determined by its meaning.
> (Levin, 1993, p. 1)

> If the syntactic properties of a verb indeed follow in large part from its meaning, then it should be possible to identify general principles that derive the behavior of a verb from its meaning.
> (p. 11)

Of course there is truth in this assumption; but it is only true to some (not necessarily "large") extent. The way to make it more precise is by charting the lexicon, thus quantifying the extent of the correlation between verb meaning and valency. That is, as of now we are not entitled to categorical statements like

> what enables a speaker to determine the behavior of a verb is its meaning.
> (p. 4)

which can be easily falsified by examples like those of *pisar*, which means exactly the same with or without the preposition *em*: *pisar a grama*/*pisar na grama*, both 'step on the grass'; *apanhar*, *espancar* and *bater*, with the same meaning in very different diatheses: the three sentences below all mean 'Zé beat the dog' (or 'the dog was beaten by Zé', which comes to be the same thing for our purposes):

[1] O Zé espancou o cachorro. **VSubj**>***Agent*** **V** **NP**>***Patient***
[2] O Zé bateu no cachorro. **VSubj**>***Agent*** **V** ***em*** **NP**>***Patient***
[3] O cachorro apanhou do Zé. **VSubj**>***Patient*** **V** ***de*** **NP**>***Agent***

and many others. The speaker must certainly know more than just the meaning of these verbs to use them properly. Now, it is true that in most cases the Agent is coded as the subject—this tendency, like several others, is expressed by means of a linking rule, as seen in Chap. 8. The main question here is how extensive the action of such rules is, as against idiosyncratic behavior like in the verbs above.[16] This is recognized by Levin:

> the hypothesis that the syntactic behavior of a word is fully semantically determined is not uncontroversial.
> (p. 12)

More than being controversial, the hypothesis that the syntactic behavior of a word is *fully* semantically determined is demonstrably false. It is limited, on one side, by general (linking) rules; and, on the other side, by idiosyncrasies of individual verbs.

It must be said that this inconsistency does not seriously detract from the descriptive value of Levin's lists, because she always carefully notes any

[16] There is some relevant research on this point. To mention only works connected with the VVP project, both Lima (2007), studying verbs of victory or defeat, and Carvalho (2012), studying verbs of knowledge, found some correlation between semantic class and valency, but also important exceptions.

deviations—which are many—so that the lists in a way refute some of the theoretical assumptions expressed in her Introduction.

Alternations

Levin's model relies on alternations, and the book is largely organized around them. Yet, as we saw in Sect. 1.4, the usefulness of the notion of alternation is limited. To take an example, Levin treats as an alternation pairs of sentences with *there* as a subject, as against a lexical subject, e.g.,

[4] A problem developed.
[5] There developed a problem.

The justification for bunching these constructions under the same alternation is apparently that they involve the same verbs, and share the same basic meaning. Yet this is not the most economical way to express these facts: we can—in fact, must—simply state that *develop* occurs in the two diatheses (that is, both are present in the valency of *develop*); and the similarity in meaning will automatically result from the fact that the verb is the same, and the only lexical NP present has the same semantic role, namely Presented.thing. This way, the similarities are accounted for without the need for the extra notion of alternation.

Levin does not seem to adopt the idea of alternations as alternative conceptualizations of a scene (which is the criterion used by ADESSE), as seen by examples like

[6] Sylvia jumped the horse over the fence.
[7] The horse jumped over the fence.

which are analyzed (p. 31) as representing an alternation, although they certainly do not portray the same scene: one can say, at most, that the scene described in [6] contains the scene of [7]. In other cases, the members of Levin's alternation do represent alternative conceptualizations, as for (p. 59)

[8] The car collided with the bicycle.
[9] The car and the bicycle collided.

Levin's notion of alternation is, then, less systematic than the one offered in ADESSE.

Semantic Roles

Another problem with the analysis underlying Levin's list is that semantic roles are used without a serious effort to define them rigorously, either at a cognitive (CSR) level, or at a grammatical level. Levin concentrates instead on an attempt to classify

verbs semantically, which I suspect is a task that depends on the establishment of semantic roles, not vice-versa. Sometimes no semantic role is given, which results in poorly defined constructions.

In many cases the semantic role can be deduced from a feature attributed to the verb: a verb of "action" will always have an "agent", and so on. But these verb features are also informally used, and result in indirectly asserting that we have action in *Italy and France touch* (that is, have a common border) (p. 37), which seems to me incorrect.

Observations like the above show that Levin's model of analysis needs some refinement, including among other things more careful definitions of semantic roles.

Syntactic Functions

Levin gives the syntactic structure as a chain of form-class symbols, as for instance, for the sentence *Mira blamed Terry for the accident*, 'NP V NP *for* NP'. This is basically correct, except for the lack of the subject function which, as we saw in Chap. 2, is necessary as a formal function, apart from its semantic role. This is possibly not too serious for English, a non-*pro*-drop language that does not favor postposed subjects, so that "subject" and "NP that immediately precedes the verb" are (almost) coextensive; but if we approach a language like Portuguese, it becomes essential to define the subject as a special function of some NP in the sentence. Levin does refer to the traditional subject, sometimes in quotation marks (for instance, on page 88: 'Alternations involving Postverbal "Subjects"'), but does not discuss its definition.

The syntactic structure is not systematically given for all constructions under study, leaving the task to the reader, who in most cases must analyze the examples himself.

Semantics vs. Pragmatics

Finally, Levin's system occasionally shows lack of distinction between strictly linguistic facts and facts that may more adequately be attributed to world knowledge, as in the discussion of the verb *burp*:

> many [of these verbs] show a more limited range of objects in their transitive use than they show subjects in their intransitive use, even though both types of arguments bear the same semantic relation to the verb. For instance, as C.S. Smith (1970) points out, one can burp a baby, but not a doctor, although both babies and doctors can burp.
>
> (p. 32)

This refers, however, to our knowledge of babies and doctors, and what we usually do with them. We *can* burp a doctor—only this is a most unusual event. Grammatically speaking, there is nothing ill-formed in *she burped the doctor*.

DICOVALENCE 2, a French Valency Dictionary

DICOVALENCE 2, *Dictionnaire de valence des verbes français*, is an informatized database that includes the valencies of about 3700 French verbs.[17]

The Pronominal Approach

A special characteristic of DICOVALENCE is the adoption of a pronominal approach, described in this way:

> first of all, for each valency place (called "paradigm") [i.e., syntactic function/MAP] the dictionary specifies the pronoun paradigm that is associated with that place and that summarizes the possible lexicalizations; then, the delimitation of a valential frame, called "formulation", is based not only on configuration (number, nature, optional status, composition) of these pronominal paradigms, but also on other construction properties associated with that configuration, such as the passive "reformulations".
>
> (Eynde and Mertens, 2010, p. 2)

This means, in practice, that valencies are verified for each verb by means of sentences in which the complements are represented by pronominal elements. According to the authors, this approach has the advantage that

> the restricted number of pronouns allows for systematic and exhaustive verification of their combinations with predicators, without recurring to the interpretation of certain properties (semantic features used in syntax) proposed by the linguist. The possibility or impossibility of using this or that pronoun is in effect significant: the pronouns reveal the fundamental properties a predicator imposes on its dependents.
>
> (Eynde and Mertens, 2003)

This way to use pronouns in analysis was proposed originally in Eynde and Blanche-Benveniste (1978); Blanche-Benveniste *et al*. (1984). It apparently functions as a test to neutralize the idiosyncratic properties of nonpronominal lexical items, and to give semantic intuition some formal base, a concern which is one of the methodological trademarks of the DICOVALENCE model.

[17] DICOVALENCE is currently coordinated by Piet Mertens of Louvain University, Belgium. Mertens worked initially with Karel van den Eynde, deceased in 2008. The dictionary is available at the address http://bach.arts.kuleuven.be/dicovalence/.

The entry corresponding to the verb *supprimer* 'suppress' given in the project handbook is the following (I have omitted part of the information, which is not relevant here):

VAL$	supprimer: P0 P1
EG$	nous avons supprimé tous les obstacles à la publication de ce dico
FRAME$	subj:pron|n:[hum], obj:pron|n:[hum, nhum, ?abs]
P0$	que, qui, je, nous, elle, il, ils, on, ça, celui-ci, ceux-ci
P1$	que, qui, je, nous, vous, la, le, les, se réfl., se réc., en Q, ça, ceci, celui-ci, ceux-ci, l'un l'autre
RP$	passif être, se passif, se faire passif
AUX$	avoir

(adapted from Eynde and Mertens, 2003, p. 4)

The first line records the syntactic functions ("paradigms") occurring in sentences with this verb. Note that only the subject (P0) and the object (P1) are recorded, presumably for being complements, excluding adjuncts; this is the rule in valency dictionaries, and is essentially correct. Of course, we still have the problem of justifying the opposition complement/adjunct, which is not approached in the handbook.

The second line gives a sentence exemplifying the diathesis.

The third line specifies, for each constituent, its syntactic function, its obligatory or optional character (the question mark indicates optionality), its possible syntactic realizations and "certain selectional restrictions"—in the case, "human", "nonhuman", and "(optionally) absolutive".

The fourth and fifth lines give a list of pronouns that can appear in each function, respectively subject (P0) and object (P1).

The sixth line defines the possibilities of passivization.

The seventh line specifies the auxiliary verb used with *supprimer*.

The syntactic functions are the traditional ones, adopted without discussion and with some additions:

> the terminology used to designate the syntactic functions in the FRAME field follows closely the grammatical tradition, to which some labels are added to distinguish the P2 and P3 paradigms and identify the quantitative complement, the attribute, and the evaluative adjunct.
>
> (Eynde and Mertens, 2010, p. 31)

A remarkable feature is the absence of any mention of the semantic roles associated with the verb complements. The entry informs that the subject of *supprimer* must be [+HUMAN], but says nothing about the semantic relation between it and the verb. For instance, the verb *engraisser* 'fatten, become fat' has two entries in the dictionary, which correspond to two diatheses. One of them includes the following information:

VAL$ engraisser: P0
FRAME$ subj:pron|n:[hum]

and the other entry contains

VAL$ engraisser: P0 P1
FRAME$ subj:pron|n:[hum], obj:pr|n:[nhum, ?abs]

As seen, the subject (P0) is noted identically in the two cases, without reference to the fact that, to take their own examples, in *il a fort engraissé* 'he became very fat' the subject is Patient, and in *ils engraissent artificiellement les veaux* 'they artificially fatten the calves' the subject is Agent. All we learn is that the subject of *engraisser* is human, which, by the way, is not true: *mon chat a fort engraissé* 'my cat became very fat', *la boisson m'engraisse* 'drink fattens me'.[18] This information has nothing to do with the verb's valency, but rather with its meaning, more precisely with the evoked schema: FATTEN[19] is an event which (generally) involves living, although not necessarily human, beings as patients. What interests us, and is not directly represented in the entries in DICOVALENCE, is which of the associated complements of *engraisser* in a sentence refers to this being that becomes fat. In other words, we need to know who becomes fat in the sentence

[1] O fazendeiro engordou alguns frangos. 'the farmer fattened some chickens'

and in the sentence

[2] O fazendeiro engordou. 'the farmer became fat'

By not providing this information, DICOVALENCE is deficient as a system for the description of verb valency.

The "Complexity" Relation

DICOVALENCE makes use of a relation between structures, named **complexity**, which is attached to some lexical items, and relates in certain cases what we would analize as different diatheses of a verb. One of their examples is

[3] Nous bavardons. 'we chat'
[4] Je bavarde avec toi. 'I chat with you'

Here DICOVALENCE distinguishes two different predicators *bavarder* 'chat', one of them "governing one valency term which sends to a referent C having the 'complexity' feature", and a second *bavarder* with "two valency terms which send to two referents, members of the referent complex C" (Eynde and Mertens, 2010, p. 37).

One problem here is the distinction of *bavarder* 'chat' into two predicators, when they are morphologically and semantically identical. It seems much more

[18] My examples/MAP.

[19] I use the English word to refer to the schema.

adequate to define just one verb (or 'predicator'), which simply occurs in several diatheses, as happens with a large part of all verbs. The complexity feature defined for the item *nous* 'we' is part of the semantics of that item, which is necessarily plural; it may occur also in words that are not always plural, as when we say

[5] Les garçons bavardent. 'the boys are chatting'

which shows that we are dealing with the feature 'plural', not with a feature inherent to some lexical items.

Note, by the way, that sentences like [3] are ambiguous, and the "complex" meaning does not obligatorily arise: we may understand [3] as meaning that we are both good conversationalists, not necessarily with one another. This is even more evident in[20]

[6] Jim and Sue are dating.

which may be taken to mean that Jim is dating Sue (and vice-versa), or that both Jim and Sue have current dating partners. Correspondingly, we may leave the ambiguity of

[7] They are dating.

to the fact that *they* is plural, and that we may speak of someone that he or she is dating without necessarily naming his or her partner. That is, the ambiguity here is not grammatical, not even lexical in the strict sense, but pragmatic: it depends not on grammatical structure, but on our knowledge of what it is to date someone. This applies to the other examples mentioned in Eynde and Mertens (2010), as for example *interférer* 'interfere', *flirter* 'flirt', *frotter* 'rub', *se fiancer* 'to get engaged' etc. All these can be understood as reciprocal actions performed by two persons, and it is this knowledge that is at play in the examples given, not any grammatical properties of the verbs (or 'predicators') involved. In the VVP system, such structures are analyzed as complex constructions (Sect. 6.6.3).

Form, Meaning, and the Pronominal Approach

According to the authors, features such as HUMAN, INANIMATE, ABSTRACT and CONCRETE INANIMATE

> are often used in an intuitive manner, as if they did not need previous definitions, when in fact they present numerous problems.
> (Eynde and Mertens, 2003, p. 18)

They approvingly quote Gaston Gross's statement that

[20] I am jumping from language to language in these examples, but it is because both behave in parallel ways as far as this problem is concerned.

> philosophical or psychological definitions of word classes are not satisfactory for linguistic description and [. . .] classes must be established internally with the help of the means offered by the language itself, namely, syntactic instruments.
> (Gross, 1994, p. 17, *apud* Eynde and Mertens, 2003)

And they conclude that

> the pronominal paradigms provide a definition at the same time syntactic and internal of some of these semantic features.
> (Eynde and Mertens, 2003, p. 18)

These claims are open to some objections; the main one is that when we use syntactic criteria to define *semantic* features (so considered by Eynde and Mertens themselves) we disqualify semantic features as part of the data. They cease being pre-theoretical facts, undeniably part of the evidence, because then they depend in part on theoretical definitions. One must ask then, Where are the data relating to meaning? Where do they come from?

One of the syntactic criteria utilized by Eynde and Mertens is the possibility of pronominal reference: a constituent is [+HUMAN] when it can be resumed (in French) by the pronouns *le, me, te*, but not *ceci*. But it seems more adequate to say that a constituent is [+HUMAN] when it refers to a person, which is (*pace* G. Gross) equally clear and easy to handle, with the advantage of being directly connected with the observed phenomenon. 'Denoting a person' is not something definable in syntax; it is a direct experience, independent from any theorization, and accessible to any language user, professional linguist or not. The ability to identify phrases that refer to a person is a condition of the use of the language, and is part of the raw data linguists deal with. It makes little sense to reduce it to a theoretical unit, just as we do not deal theoretically with the difference between the speech sounds [a] and [o]: this is something to be perceived, and which provides data for the analysis. We would not think of providing a linguist with instructions on how to distinguish [a] and [o]: any language user performs this task by using her competence (and her ears). By the same token, and now positioning ourselves at the other pole of the form/meaning axis, we cannot give instructions, or definitions, so that a linguist can distinguish phrases that refer to persons (*the neighbor's wife*) from phrases that do not (*the neighbor's cat*/*car*): this is to be done without dependence on theory. In short, the perception that *the neighbor's wife* refers to a person is a *fact*, not a theoretical construct, dependent on a definition. Linguistics comes in when we try to make explicit what allows speakers to evoke, starting from a phonetic sequence, a schema that refers to a person.

The pronominal approach seems, then, an attempt to avoid the resource to intuition—that is, introspection—when studying semantics. But the attempt to free the analysis from all kinds of introspection is an illusion: even if we define [+HUMAN] in terms of possibility of resumption by certain pronouns, how can we know that these pronouns, not others, are the correct ones, except by consulting speakers' introspections about the acceptability of sentences? And what authorizes us to choose these pronouns, not others, as a diagnostic of the "human" status of a phrase? We should not underestimate the very real difficulties involved in the use of

introspection; but to use introspection or not is not a choice open to linguists. The fact remains that part of our data comes from introspection, and we must live with it.[21]

The feature [HUMAN] is not particularly important, because there is no real need for it in stating the diatheses. But what can we do with "agent" and "patient"? In Portuguese (as in English or French) there are no pronouns specialized in expressing particular semantic roles; French *qui*/*que* and English *who*/*whom* have to do with a difference in syntactic functions, not semantic roles. A constituent is Agent when it evokes in the receptor's mind something or someone that triggers an event by direct action.

DICOVALENCE starts from some questions which are stated thus:

> How can we distinguish the different uses of the same verb? How can we identify the complements that belong properly to a verbal use, as opposed to peripheral elements that can be added to any verb? How can we characterize the complements, and how can we distinguish them?
>
> (Eynde and Mertens, 2003, p. 63)

I agree that these are fundamental questions; and I have tried to answer them all in the present book.

Although DICOVALENCE contains useful data and ideas for the analysis, the use of the pronominal approach, which is to my mind fundamentally flawed, is the main point that makes it inadequate as a system of description of verbal valencies. The adoption of the traditional approach to syntactic functions also detracts from the value of the dictionary.

Busse's (1994) Dicionário sintático de verbos portugueses *[Syntactic Dictionary of Portuguese Verbs]*

This dictionary was elaborated by a team of Portuguese linguists under Winfried Busse; it is the Portuguese version of *Französiches Verblexicon* (Busse and Dubost 1983), and follows a descriptive model described in Busse and Vilela (1986).The dictionary covers about 2000 verbs and is based on a written language corpus of European Portuguese, with notes on some different Brazilian uses, and a German translation of each verb.

The grammatical analysis adopted is basically formal, indicating form classes and ordering of terms, without a consistent notation of semantic roles. Prepositional phrases are noted with individual prepositions, as for instance *dar alguma coisa a alguém* 'give something to someone', analyzed as **Np V N *a*+Np**; this is a positive aspect (also adopted in VVP), and eschews pseudo-functions like "oblique/indirect object", as well as the pseudo-class "prepositional phrase".

[21] For some further considerations on the use of introspection in linguistic analysis, see Talmy (2007); Perini and Othero (2011).

Adverbial constituents, however, are noted by implicitly taking into account their semantic roles: they are distinguished into **M** (manner), **L** (location), **D** (direction), **T** (time), and **Q** (quantity). Consequently, one can say that the distinction between form and meaning is not rigorously kept.

The result shows some of the deficiencies pointed out in Chap. 3 with relation to Allerton's (1982) model. For instance, it does not distinguish the ergative construction from the transitive without object. Thus, for *engordar* 'fatten, become fat' the dictionary presents two diatheses, namely

engordar [. . .]
$_1$N-V-N *Ele engordou o porco* ['he fattened the pig'] [. . .]
$_2$N-V-Q *Engordei dois quilos*. ['I put on two kilos']
(Busse, 1994, p. 199; glosses added)[22]

A crucial piece of information is not represented, that the subject is Agent in the first construction and Patient in the second. If we disregard the constituent **Q** (since we could say simply *engordei* 'I put on [weight]'), the behavior of *engordar* will be identical to that of *comer* 'eat', which, unlike *engordar*, has subject Agent even in the absence of an object.

The list of semantic roles used in the dictionary (which are used only with adverbial complements) is very short. There are some curious omissions, like the distinction between Goal and Source, judging from the analysis of *chegar* 'arrive' (p. 103). Here **D** (direction) is the semantic role given for the complement in *o comboio chega a Lisboa* 'the train arrives to Lisbon' and also for *o rápido acaba de chegar de Lisboa* 'the express has just arrived from Lisbon'. This is a distinction carefully marked in Portuguese by specialized prepositions, and requires two distinct semantic roles, Goal and Source. Apparently the dictionary falls into the trap of trying to base the whole analysis on a small number of semantic roles, which, as argued by Fillmore, Langacker and others, and in this book as well, is a hopeless pursuit.

A feature also found in this dictionary is the distinction of entries by meaning: *admitir*-1 occurs in *tiveram que admitir a derrota* '(they) had to admit defeat', and *admitir*-2 occurs in *foi admitido a exame* '(he) was admitted to the examination'. This distinction must appear at some point in the analysis, since it is a fact of the language. But, as we saw in Sect. 1.5, making the distinction from the start presents problems, both methodological (how to ascertain how many, and which, readings we have for a given verb, in the absence of reliable criteria) and theoretical, since it establishes a confusion between form and meaning and hinders the eventual investigation of the relations between the two fundamental faces of language.

The symbol **P** stands for "predicative complement", which is "normally followed by the specification of the morphological class the element belongs to" (p. III); that is, the dictionary distinguishes object NPs from predicative NPs. But indications are that this is not a syntactic distinction, but rather a consequence of the

[22] The dictionary notes the subject as N here, but as Np for *dar*; the 'p' indicates that the referent is human. The distinction is kept "sometimes" (*às vezes*, p. IV), not systematically.

semantics of the phrases involved, and does not have to be represented in the diatheses.[23]

Examination of the dictionary does not leave it sufficiently clear which are the criteria used to define what is and what is not to be included in the diatheses—a question generally put in terms of the distinction between complements and adjuncts. In the dictionary the decision is apparently to include all constituents present in the sentences of the corpus, without distinction. This means that the constructions included in the entries do not represent properly diatheses, but rather sets of examples of the use of each verb. For instance, *dormir* 'sleep' is associated with the following constructions:

dormir [. . .]

$_1$N-V	[. . .] *os criados que dormiam junto à velha cozinha* [. . .]
	['the servants who slept by the old kitchen']
$_2$N-V-L	*Fernando Pessoa "dorme" nos Jerônimos.*
	['Fernando Pessoa "sleeps" in the Jerônimos'][24]
$_3$N-V-com N	*Dormi com a Lena.*
	['I have slept with Lena']
$_4$N-V-N	*Era hora de dormir a sesta* [. . .]
	['it was time for taking (lit. sleeping) the siesta']

(p. 184; glosses added)

We might ask why the locative constituent is represented in the formula in one case (*nos Jerônimos*, 'in the Jerônimos' analyzed as **L** in the second example), but not in other cases (*junto à velha cozinha* 'by the old kitchen', without representation in the formula in the first example). Also, if *com + NP* (*com a Lena* 'with Lena') is part of one of the constructions in which *dormir* occurs, why not *sem + NP* (*sem a Lena* 'without Lena')? Apparently it is because the latter phrase did not occur in the corpus. But conditioning the description to data present in a corpus is a gratuitous limitation, unnecessary and detrimental to the representativity of the analysis, which after all purports to be valid for the language as a whole.

There does not seem to be a systematic distinction of the several constructions with reflexives. Thus, the notation is the same for *arrepender-se* 'repent' (p. 64), *quebrar-se* 'break', as in *o jarro quebrou-se* 'the vase broke' (p. 349), and *matar-se* 'to kill oneself' (p. 301). But these are not parallel cases: with *arrepender* 'repent' the reflexive is obligatory, and conveys no semantic role; with *quebrar* 'break' the reflexive is one of the marks of the ergative construction, and marks the semantic role Patient of the subject; and with *matar* 'kill' the reflexive marks the coreference between subject (Agent) and object (Patient), and does not have to appear in diatheses, since it is the result of a general rule.[25] Yet in all cases the notation says merely **N-Vse**. Here we have again the purely formal orientation of the work contributing to hide important facts of the language.

[23] See Sect. 10.1 above; also Perini and Fulgêncio (2011).

[24] The Jerônimos is a monastery in Lisbon where Pessoa's grave is located.

[25] Reflexivization, or rather a rule establishing coreference between a reflexive pronoun and its antecedent.

In spite of its defects, Busse (1994) is an useful source of examples; for teachers of Portuguese as a foreign language it may be precious. But, as I hope to have made clear, there is a lot of room for improvement, and the construction of a new valency dictionary of Portuguese, be it European or Brazilian, is still a task to be completed.

Borba's (1990) *Dicionário gramatical de verbos do português contemporâneo do Brasil* [Grammatical Dictionary of Verbs of Contemporary Brazilian Portuguese]

Borba's dictionary of verbs is based on a corpus of about 25,000 pages of contemporary written Brazilian text, including a total of approximately 6000 verbs, with a wealth of examples, all from the corpus. The dictionary represents a tremendous descriptive effort, undertaken by a numerous team during 8 years, and is a most useful source of data and ideas; it is a landmark in the history of Portuguese lexicography.

As is inevitable in a pioneering work, the approach is somewhat unsystematic and sometimes vague.[26] Each entry contains a semantic classification of the verb (e.g., "indicates action-process"); information about the semantic role of the subject ("**agent/causative** subject"); information about different readings (e.g., for *dobrar* we have 'bend', 'fold', 'double' etc.). For nonsubject complements, the semantic role is often not given; instead, we find the syntactic representation, plus internal semantic features, like for *dobrar*: "with complement expressed by a **concrete** noun". In some cases, the semantic role of the complement is given, as for *chegar* 'arrive':

> **CHEGAR**—I. Denotes action-process, with subject **agent** and two complements: one expressed by a **concrete-inanimate** noun and another [denoting] direction or beneficiary. (Borba, 1990, p. 262; emphasis as in the original)

The reading in the quote corresponds to the "transitive" use of the verb: *cheguei a mesa para perto da janela* 'I brought the table near the window'. As we can see, the notation is not systematic; here the dictionary gives the semantic role of the subject (Agent) and of one of the complements ("direction", that is, Goal; and "beneficiary"), while the remaining complement (which would be the Theme) is identified only by syntax and internal semantics.

The semantic features given for some complements are irrelevant for valency, but this is of course a corollary of the descriptive model adopted. One cannot say that Borba's dictionary purports to describe valencies; it is rather a source of general information about each verb. On the other hand, it seems to be too dependent on the examples found in the corpus; for instance, the specification of "concrete-inanimate" for the Theme of *chegar* is incorrect, because one can say

[26] The approach adopted in the dictionary is explained in a separate book (Borba 1996).

[1] Cheguei a menina para perto da janela. 'I brought the girl near the window'

where the Theme is animate. And even, I think,

[2] Chomsky chegou a linguística para mais perto da psicologia.
'Chomsky brought linguistics closer to psychology'

where it is not concrete.

A positive feature of this dictionary is that it does not rely too much on traditional syntactic analysis. For instance, it makes no use of questionable notions like "indirect object", but notates—correctly—the syntactic form of complements, without attempting a more abstract analysis. Thus, *gostar* 'like' takes a complement with the preposition *de*, traditionally analyzed as indirect object; yet in the dictionary we only find "complement of the form ***de*** + noun [. . .]" (p. 797). This is, as argued in Chap. 2 of this book, the best way to formally represent such complements.

The entries are often very concretely defined, without a definite effort at generalizations, even when they are evident. For instance, for *gostar* 'like', the list distinguishes the reading with a complement denoting "**something that can be eaten/drunk**", as in *Alaíde gostava de cerveja?* 'did Alaíde like beer?' and a separate reading with a complement denoting "**animate** noun", as in *Ele gosta até de boi e de burrinho* 'he likes even oxen and donkeys' (p. 797). This is going too far in the separation of readings; but, as is the case with excessive discrimination in general, can be easily fixed by merging different but evidently related readings into one.

This dictionary is an indispensable instrument for valency research in written Brazilian Portuguese. It lists the uses of each verb (in itself an important contribution), and provides ideas for the analysis, even if sometimes they must be reviewed and reformulated in terms of a more coherent descriptive model. Most of all, it seems to comprise the near-totality of verbs currently used in the language, and must be used as a necessary first step in the elaboration of a valency dictionary of (written) Brazilian Portuguese.

Appendix F: Why the Passive Construction Is a Diathesis of *ser*

In this Appendix I give the reasons why passives are not considered diatheses of all "transitive" verbs, as normally done in valency dictionaries.

To start with an example, the sentence

[1] Esse bolo foi comido pelas formigas.
'this cake was eaten by the ants'

is analyzed not as a diathesis of *comer* 'eat', but as a diathesis of *ser* 'be'. The entry for *ser* 'be' in the *Dictionary* includes the diathesis

C270 VSubj>*Patient* **V VPart**>*EventResult* ***por* NP**>*Agent*

The reasons for including this example as a diathesis of *ser* 'be', not of *comer* 'eat' are developed in Perini (2010); I give below a summary of the argumentation.

The basic argument is that the nominal participle[27] (here *comido* 'eaten') differs from any verbal form such as *como* '(I) eat', *comendo* 'eating', *comer* 'to eat', *comíamos* '(we) ate' etc. in morphological, syntactic and semantic respects. These are reasons not to consider the nominal participle part of the lexeme we usually call "the verb *comer*".

Morphologically, *comido* varies in gender (feminine *comida*) and has a plural in—*s* (*comidos, comidas*), as in

[2] Essas bananas foram comidas pelas formigas.
'these bananas (fem. pl.) were eaten by the ants'

If we include the nominal participle in the verb lexeme, it will be the only verb form having gender inflection, and the only one making its plural in–*s*.

[27] The distinction between nominal and verbal participles is given below. For now, it is enough to know that the passive includes a nominal participle.

M.A. Perini, *Describing Verb Valency*, DOI 10.1007/978-3-319-20985-2

Also, all forms in a verbal lexeme are present for all verbs (with a few exceptions, it is true, limited to so-called defective verbs): if I know of a form like *comer*, I can predict the existence in the language of *comíamos*, *comi* and all the other forms that comprise the verbal lexeme. But this does not apply to the nominal participle: many verbs lack it, such as *ser* 'be', *ter* 'have', *estar* 'be', *brilhar* 'shine', *ficar* 'stay', *ir* 'go', *gostar* 'like' etc., as can be checked by their feminine forms: **sida, *tida, *brilhada, *ficada, *ida, *gostada*.

Furthermore, there are several nominal participles that would correspond to nonexistent verbs. For instance, we can say

[3] Debussy foi incompreendido por seus contemporâneos.
'Debussy was misunderstood by his contemporaries'

but there is no verb **incompreender* in the language.

Syntactically, *comido* has a radically different valency from any verbal form. Note that valency can be stated for a verb in its entirety (that is, the whole lexeme): the valency of *comer* is the same for *comendo*, *comíamos* etc. All the 50-odd forms of a Portuguese verb have exactly the same valency; thus, we can substitute any of these forms for *comi* em

[3] Eu comi o bolo. 'I ate the cake'
[4] Eu como o bolo/eu comia o bolo/eu comendo o bolo/eu comer o bolo etc.

and we can state the valency for the verb, not for each of its forms separately. But *comido* cannot appear in the same construction:

[5] * Eu comido o bolo

and this applies for all cases of nominal participle.

Semantically, one must observe that the meaning relations between the members of a verbal lexeme are totally regular: the semantic difference between *comer* and *comendo, comemos* etc. is the same for all verbs, without exception. But the nominal participle does not follow this regularity, and we have cases like *comido* 'eaten', which expresses the result of a process; *aborrecido*, which denotes a quality (*menino aborrecido* 'annoying boy') and several others.

All this points to a nonverbal nature of the nominal participle: it looks rather like an adjective; this correlates with the fact that it agrees in gender and number, which is also an adjectival property. I conclude that the nominal participle is not a member of the verbal lexeme, but a derivationally related adjective. A consequence of this analysis is that

[1] Esse bolo foi comido pelas formigas.
'this cake was eaten by the ants'

cannot be analyzed as a diathesis of *comer*, since no form of this verb appears int he sentence. I analyze it instead as a diathesis of *ser* 'be', similar (although probably not identical) to the one that actualizes as

[6] Esse bolo é delicioso.
'this cake is delicious'

Finally, we may observe that the agentive complement with *por* 'by' that appears in [1] is very frequently associated with (noncontroversial) nominals, as in

[7] A destruição da cidade pelos inimigos
'the destruction of the city by the enemy'

This is the reason why C270 is given as the analysis for passive sentences.

One final note: I have referred to forms like *comido* as **nominal participle** because there is another form also called **participle**, which must be clearly distinguished from it. This is the form that appears only with the auxiliary *ter*[28] in sentences like

[8] Elas tinham comido todo o bolo.
'they had eaten the whole cake'

Here we do have a verbal form: there is no nominal agreement—and therefore no feminine form, nor plural in–*s*; the valency of the sequence *tinham comido* follows the general valency of the verb *comer*; no verb lacks this form; and the semantic relation with the other members of the lexeme is regular. Therefore, we need two homophonous forms, one of which is a member of the verbal lexeme (the **verbal participle**), and related to it by inflection, and the other a derivationally related adjective (the **nominal participle**).

Actually, for some verbs the two forms are morphologically distinct, for example

Verb		Verbal participle	Nominal participle[29]
aceitar	'accept'	*aceitado*	*aceito*
acender	'turn on'	*acendido*	*aceso*
eleger	'elect'	*elegido*	*eleito*
expulsar	'expel'	*expulsado*	*expulso*
extinguir	'extinguish'	*extinguido*	*extinto*
limpar	'clean'	*limpado*	*limpo*
matar	'kill'	*matado*	*morto*
morrer	'die'	*morrido*	*morto*
prender	'arrest'	*prendido*	*preso*
segurar	'hold'	*segurado*	*seguro*
suspender	'hang'	*suspendido*	*suspenso*

[28] In the written language, also with *haver*.

[29] The association suggested in the table between the verb and the nominal participle is, evidently, false; I am just expressing the traditional position. *Aceso* is not the nominal participle of the verb *acender*, but a derivationally related adjective.

As expected, in these cases it is the nominal (morphologically irregular) form that appears in the passive:

[9] O político foi morto/*matado.
'the politician was killed'

although if we use the auxiliary *ter* we need the verbal participle:

[10] O político tinha matado um desafeto.
'the politician had killed an enemy'

OOOOOOOOOOO

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