WHAT ROLE AND REFERENCE GRAMMAR CAN DO FOR FUNCTIONAL GRAMMAR

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ABSTRACT

The aim of this paper is to establish a preliminary comparison between two functionally-oriented models such as Functional Grammar (FG) and Role and Reference Grammar (RRG). Both models are compatible in many respects, as is clear from the fact that both adopt a very similar model of clause organization, e.g. a multilayered model. Furthermore we believe that some aspects such as the design of lexical representations can be enriched if a conflation of some methodological principles stemming out from these two models is established. In this regard, we firstly give an outline of how FG lexical representations could be further enriched by looking at RRG logical structures. Our major concern is to show how FG lexical entries could be extremely reduced if more abstract mechanisms are adopted (e.g. the use of a metalanguage, macroroles, lexical templates, etc.).

KEY WORDS: Functional Grammar, Role and Reference Grammar, lexis, lexical templates, logical structures, linking algorithm.

RESUMEN

El objetivo de este artículo es establecer una comparación preliminar entre dos modelos funcionales como son la Gramática Funcional (GF) y la Gramática del Papel y la Referencia (GPR). Ambos modelos son compatibles en varios aspectos, como es el hecho de que ambos adoptan un modelo de la organización de la cláusula muy similar, es decir, un modelo multicapas. Asimismo, creemos que algunos aspectos, tales como el diseño de las representaciones léxicas, pueden ser enriquecidos si se combinan algunos principios metodológicos procedentes de estos dos modelos. En este sentido, se ofrece, en primer lugar, una descripción de cómo las representaciones léxicas de la GF pueden enriquecerse mediante la incorporación de las estructuras lógicas de la GPR. Nuestro principal objetivo es demostrar cómo las entradas léxicas de la GF podrían reducirse considerablemente si se adoptaran mecanismos más abstractos (Ej. El uso de metalenguaje, macro roles, plantillas léxicas, etc.).

PALABRAS CLAVE: Gramática Funcional, Gramática del Papel y la Referencia, léxico, plantillas léxicas, estructuras lógicas, algoritmos de enlace.

REVISTA CANARIA DE ESTUDIOS INGLESES, 42; abril 2001, pp. 137-166

0. INTRODUCTION

Both Functional Grammar (hereafter FG) and RRG (hereafter RRG) share a functional approach to language. According to Nichols (1984), both paradigms would fall into what she calls "moderate" functional approaches. Such approaches do not reject the notion of structure in language like the extreme ones do, e.g. Hopper (1987), but they propose a different notion of structure from the one assumed by formal approaches. Both theories have a strong typological orientation, and both view pragmatics as having an important role in grammar. From an FG perspective, this functional orientation is explicitly manifested as follows:

> In the Functional Paradigm, syntax cannot be regarded as autonomous with respect to semantics. Rather, the very essence of syntax is that it provides the means of creating meaningful expressions. And the system of language cannot be regarded as autonomous with respect to pragmatics. Rather, the very essence of language is that it must function properly and effectively in verbal interaction (Dik 1983: 3)

Seemingly, RRG makes it abundantly clear that syntax cannot be conceived as the all-powerful component:

> RRG takes language to be a system of communicative social action, and accordingly, analyzing the communicative functions of grammatical structures plays a vital role in grammatical description and theory from this perspective... Language is a system, and grammar is a system in the traditional structuralist sense; what distinguishes the RRG conception from the standard formalist one is the conviction that grammatical structure can only be understood and explained with reference to its semantic and communicative functions. Syntax is not autonomous. In terms of the abstract paradigmatic and syntagmatic relations that define a structural system, RRG is concerned not only with relations of cooccurrence and combination in strictly formal terms but also with semantic and pragmatic cooccurrence and combinatory relations. (Van Valin 1993: 2)

Much research in RRG over the past fifteen years has been focussed on expanding and enriching the system of lexical representation, on developing the theory of syntactic structure, and on refining the linking algorithm which relates the two representations to each other. FG's main departure in the eighties was the development of a hierarchical representation for the clause, which was in turn inspired by the work of Foley and Van Valin (1984).[1] Since then, most of the literature on FG has been oriented towards finer descriptions of the clause level, the nature of pragmatic functions and the discourse level. However, other relevant areas within this

[1] For a comparative analysis of the layering theories in RRG and FG, see Van Valin (1990).

model such as the nature of lexical representations, the treatment of expression rules, morphology and phonology have received a much more marginal attention. By way of example, while there is abundant exemplification on the application of the layered model, this contrasts with the examples given for lexical representations which are confined to the textbook examples (e.g. *murder, assassinate, kill, die*, (cf. Dik 1997a: 101)). In connection with this, we believe that the Fund —the storage place for lexical representations— and the linking algorithm can be enriched by looking at what RRG has to offer.

Since this paper primarily concentrates on both lexical representations and the linking algorithm, we maintain that a preliminary analysis of the FG lexicon shows, in our view, the following weak points, which will be analyzed in the following sections:

– Lexical representations should be constructed using a metalanguage so that significant linguistic generalizations can best be captured. In this regard, RRG logical structures can serve as an initial point of departure in such an enterprise.
– Predicate frames and meaning definitions do not interplay in any significant way. Instead, they are conceived as two modules which do not speak to each other in any explicit way. In this regard, the notion of macroroles and the format of logical structures in themselves open a new horizon for FG.[2]
– The nature of semantic functions needs to be revisited in the sense that a much more simplified inventory could be postulated. In connection with this, the notion of macroroles formulated within RRG could be a way out to the pervasive nature of semantic functions in FG. In any case, it is fair to note that the last proposal of FG semantic functions is moving towards reducing the whole inventory to two major functions (A1 and A2), although this proposal has been underdeveloped and does not exactly correspond to RRG macroroles.
– FG does not postulate any syntactic level as such; FG's underlying representation of the clause is mainly semantic and the morphosyntactic realization of the different operators and arguments is done via expression rules. However, it would be more explanatory to have a system which could account for the fusion of the full set of semantic representations with their corresponding syntactic structures (or syntactic templates). This would signify constraining the explanatory power of the underlying representations and furthermore this would allow the development of a more elegant linking algorithm.

[2] In this regard, Schack Rasmussen (1994) , using a Jackendovian system of representation, also argues for one single level of lexical representation, and claims that meaning definitions in FG should play a more active role in the explanation of syntactic and semantic regularities in the lexicon.

RRG, however, postulates a syntactic level, which consists of a number of syntactic templates that are associated with the semantic logical structures (cf. Section 3). This theoretical move makes RRG closer to constructionist approaches, in that the analysis of sentences involves articulating explicitly the mapping between syntactic structure of a sentence and its semantic representation. The notion of 'grammatical construction' plays an important role in the RRG analysis of many important grammatical phenomena.

– FG is almost silent about the design of a linking algorithm. In this regard, FG formulates semantic functions along a hierarchy of semantic functions, ordered according to the degree of accessibility to the two syntactic functions distinguished in FG: Subject and Object.

In what follows, we aim to show that the development of these methodological underpinnings could enrich both the FG lexicon and the linking algorithm. Unfortunately, a discussion on the development of a set of syntactic templates within an FG framework is beyond the scope of this paper.

1. LEXICAL REPRESENTATIONS IN FG AND RRG: A PRELIMINARY COMPARISON

In the last few years, the lexicon has come to occupy a prominent place in linguistic theory. In fact, one of the points of convergence between the different linguistic models resides in the fact that the syntactic properties of a predicate can be predicted from its meaning properties. Consequently, lexicon and grammar are conceived as two distinctly clear components in the theory. Both RRG and FG share this assumption.

In contrast, there is a group of theories stemming out of the work in Cognitive Linguistics which conceive both the lexicon and grammar as a continuum. Thus, lexicon and grammar are not regarded as two separate components. The basic claim behind these approaches is that the syntactic configurations of predicates is derived via constructions, associations of form-meaning correspondences. These proposals fall under the rubric of "constructionist" approaches (cf. Goldberg 1995, 1996; Kay 1997, etc.). RRG is also a constructionist approach, albeit with some important differences from Construction Grammar [CG]. Van Valin and LaPolla (1997) give constructional templates for a number of simple and complex sentence constructions from several languages. Despite these methodological differences between FG and CG, we believe that an integration of some of the constructionist proposals in FG could potentially be extremely useful for FG. However, this theoretical move becomes more complicated in FG terms since CG postulates pairing *syntactic forms* with meanings, and FG does not postulate any syntactic forms whatsoever.

Moreover, what linguistic theories seem to differ is whether the organization of the theory is monostratal or derivational. Both FG and RRG propose a monostratal theory of language in which no projections or derivational principles

are formulated. Thus, the argument structures of the predicate —be these predicate frames or logical structures— are the building blocks for the construction of the underlying clause structure in FG and RRG.

The information contained in a predicate frame constitutes the initial point of our discussion. According to Dik (1997a: 79), a predicate frame contains the following type of information:

– Predicate variable.[3]
– The form of the predicate.
– The (sub-) category of the predicate.
– The quantitative valency.
– The qualitative valency.
– Selection restrictions imposed on their arguments.
– Meaning definition.

A predicate frame is conceived as a sort of "blue print" for the predications in which these occur, i.e. the structure of the predication is built around the predicate frame. Furthermore, a predicate frame designates a state of affairs or *Aktionsart* (States, Positions, Processes and Actions). FG recognizes the impossibility of organizing verb classes in terms of the notion of *Aktionsart* since the SoA type is compositionally derived from the properties of the arguments and satellites. Dik (1997a: 106) states: "Setting up a typology of SoAs then raises the question of what properties of predicates and terms enter into the definition SoA types." Nevertheless, in our opinion, the full range of both syntactic and semantic parameters that converge within a given lexical class can best be accounted for in terms of SoA types plus semantic information typical of the lexical domain that the predicates belong to. The FG position is diametrically opposed to the RRG position. Van Valin and LaPolla (1997, chapter 3) argue that the nature of the state of affairs determines the participants therein, and likewise the properties of the predicate, especially in terms of *Aktionsart*, determine its argument structure. This is one place where FG and RRG clearly take opposing positions.

In the remaining sections, we will comment on each block of information stressing the extent to which predicate frames can be enriched by shifting some of the methodological gears. In doing so, we will bring to light RRG's logical structures and show the way this notational device is much more compact in terms of coming to grips with lexical representations. Finally, the last section of this paper

[3] Based on the work of Hengeveld (1992) and Keitzer (1992), each predicate is characterized by a variable f_i, which symbolizes the property or relation designated by the predicate. This notational feature is especially useful to signal the anaphorical reference to properties or relations. However, since these properties are not really relevant in the set of predicate frames analyzed in this paper, for the sake of clarity we shall leave it unspecified.

concentrates on the design of the linking algorithm in RRG (cf. section 3). We believe that much of this proposal could be integrated into an FG framework. Obviously, this theoretical move entails a number of significant changes in the FG lexicon, which are beyond the scope of the present paper.

1.1. Quantitative valency

The quantitative valency marks the number of arguments subcategorized by a given predicate. FG introduces a twofold distinction between arguments and satellites. Arguments then are required by a predicate to form a complete nuclear predication. The notational device used to mark this type of information is the range of variables $x_1 \ldots x_n$. Satellites provide information about additional properties of the SoAs (Level 1 satellites), the time and location of the SoAs (Level 2), the speaker's evaluation of the propositional content (Level 3), the communicative strategy of the speaker (Level 4) and the setting of the utterance (Level 5).[4] FG marks satellites with the following convention: σ_1, σ_2, σ_3, σ_4, σ_5.

Predicates can thus be one-place (monovalent), two-place (bivalent) or three-place (trivalent). Dik (1997a) states that the maximum number of arguments for basic predicates is three, while for derived predicates is four, though such predicates are extremely rare. In contrast to approaches like GB, FG and RRG make no distinction between internal arguments (those which are theta-marked by the VP) and external arguments (those which are theta-marked by the entire predication (Williams 1981)). Let us then consider the following example:

(1) a. Kim [Arg] gave the book [Arg] to Pam [Arg] in the library [σ_2 Satellite].
b. [Past e_1: [give [V] (x_1: <Kim>)$_{Ag}$ (dlx_2: book)$_{Go}$ (x_3: <Pam>)$_{Rec}$] (σ_2: library)$_{Loc}$]

Arguments form the nuclear predication and are located around the nucleus of the verb, while the location satellite is outside, i.e. in the core predication. However, if we consider verbs of movement, FG's twofold distinction is not at all satisfactory in the sense that the direction constituent is regarded as a direction satellite (Level 1 satellite), something which, in our view, is quite debatable:

(2) a. Kim ran to the store.
b. [Past e_1 [run [V] (x_1: Kim)$_{Ag}$] (σ_1: store)$_{Dir}$]

In (2), the nature of *the store* is problematic in that on the one hand this is related to the predicate while on the other it seems to simply be adding an internal

[4] For more extensive discussion on the typology of satellites in FG, see Dik, Hengeveld, Vester, and Vet (1990).

property to the SoAs, that is, *the store* is not uniquely determined by the predicate itself. Thus, for such cases it would be necessary to introduce a new distinction, something in between pure arguments and satellites. As shall be seen below, RRG's treatment of this type of arguments which lie halfway between prototypical arguments and satellites is more attractive and explanatory than the binary FG division.

Let us now examine RRG's proposal. RRG makes a three-way distinction with respect to quantitative valence: arguments, argument-adjuncts and adjuncts. Arguments occupy positions in the decompositional representation of a verb (its logical structure [LS]) or other predicating element, while adjuncts are arguments of higher predicates which take the LS of the main verb as one of its arguments. This contrast is illustrated in (3).

(3) a. Kim [Arg] gave the book [Arg] to Pam [Arg] in the library [Adjunct].
b. **be-in'** (library, [[**do'** (Kim, Ø)] CAUSE [BECOME **have'** (Pam, book)]])

Arguments are morphosyntactically divided into direct core arguments, e.g. *Kim* and *the book* in (3a), and oblique core arguments, e.g. *to Pam* in (3a). Argument-adjuncts, on the other hand, are related to the main verb but not uniquely determined by it; the predicate in the decomposition that licenses them is not a necessary part of the LS of the verb. This is illustrated in (4).

(4) a. Kim [Arg] ran to the store [Arg-Adj].
b. **do'** (Kim, [**run'** (Kim)]) & BECOME **be-at'** (Kim, store)

In (4), the store is an argument-adjunct, because it is not part of the LS of the verb *run*, which is **do'** (x, [**run'**(x)]), but it is nevertheless part of the semantic representation of this use of *run*, and the predicate which licenses it shares an argument with the LS of *run*, namely *Kim*.

RRG threefold distinction is more accurate than that of FG. More specifically, in FG, problems arise when it comes to differentiating arguments from σ_1 satellites because the boundary between the two is not always clear and the reason for this is that they are in fact arguments in the expanded LS of the predicate; note that both provide information about the internal properties of the SoAs designated by the predication. This is the reason why no decision regarding argument structure can really be made without first examining a verb's meaning potential and its paradigmatic context.

Continuing with notational features on the argument structure level, it is interesting the RRG distinction between internal and external variables. Internal variables do not have syntactic impact and encode that semantic information which is characteristic of the meaning of a word, whereas external variables mark those arguments which are grammatically relevant. Let us consider the representation proposed for *speech-act-verbs* in Van Valin and LaPolla (1997: 117):

(5) **do'** (x, [**express**(α).**to**.(β).**in.language**.(γ)' (x,y)])

The Greek letters represent internal variables which can be associated with the *y* argument in different ways to yield different speech act verbs. This is summarized in (6).

(6)	a. *speak*	*y* = α	α = metalinguistic noun	e.g. *speak a few words*
		y = β		e.g. *speak to Kim*
		y = γ		e.g. *speak Telugu*
	b. *say*	*y* = α	α = metalinguistic noun, indirect discourse complement	e.g. *say a few words* e.g. *say that he would leave*
	c. *talk*	*y* = β		e.g. *talk to Kim*
		y = γ		e.g. *talk Cajun*
	d. *discuss*	*y* = α	α = topic noun	e.g. *discuss the situation*
	e. *tell*	*y* = α	α = utterance noun	e.g. *tell a joke*
		y = β		e.g. *tell Kim*

All of these different verbs can be derived from the basic LS in (5) by means of different associations of the *y* argument with the internal variables and different selectional restrictions on the internal variables. This LS forms the basis for the more complex LS of ditransitive *tell*. Thus, this twofold distinction into internal and external variables allows us to concentrate the full range of lexical properties of a lexical item into one single unified structure, something which lacks FG representations.

In essence, this notational device offers a nice format since both those aspects of the meaning of a word which are grammatically relevant and those which form part of the meaning of a word are encoded into one unified structure. This is one of the first issues FG can benefit from an RRG description. However, despite the elegance of this approach, RRG representations need further semantic decomposition.

1.2. Qualitative valency

The qualitative valency of a predicate refers to the semantic role of the arguments in the SoAs designated by the predication. Then, FG semantic functions are largely determined by the type of SoAs. Dik (1997a: 119) establishes an inventory of semantic functions according to argument position. As shown in Table 1, first argument positions (A1) are assigned to the only argument in one-place predicates or to the most central argument in many-place predications.

Second (A2) and third (A3) functions are those assigned to the second and third arguments of many-place predicates (See Table 2).

Furthermore, these functions are ordered along a hierarchy, viz. the Semantic Function Hierarchy (SFH), which establishes the "pattern" for Subject and Object assignment possibilities (cf. Dik 1978a):

(7)	Ag >	Go >	Rec >	Ben >	Instr >	Loc >	Temp
Subj	+ >	+ >	+ >	+ >	+ >	+ >	+
Obj		+ >	+ >	+ >	+ >	+ >	+

TABLE 1. FIRST ARGUMENT SEMANTIC FUNCTIONS	
Agent (Ag)	the entity controlling an action (=Activity or Accomplisment)
Positioner (Po)	the entity controlling a position
Force (Fo)	the non-controlling entity instigating a Process (=Dynamism or Change)
Processed (Proc)	the entity that undergoes a Process.
Zero (Ø)	the entity primarily involved in a State
ProcExp (ProcExp)	the entity that experiences a [+exp] Process
Zero Experiencer (ZeroExp)	entity that experiences a [+exp] State

TABLE 2. SECOND AND THIRD ARGUMENT SEMANTIC FUNCTIONS	
Goal (Go)	the entity affected or effected by the operation of some controller (Agent/Positioner) or Force
Recipient (Rec)	the entity into whose possession something is transferred
Location (Loc)	the place where something is located.
Direction (Dir)	the entity towards which something moves / is moved
Source (So)	the entity from which something moves / is moved
Reference (Ref)	the second or third term of a relation with reference to which the relation is said to hold

This scale shows that as we move from the more central to the more peripheral semantic functions, the assignment of Subject and Object becomes more difficult, and consequently the resulting constructions become more marked.

Given that all first arguments behave similarly with respect to Subject assignment, Dik (1997a: 276) affirms that it would be necessary to generalize across first arguments in general. In line with this assertion, Dik reconsiders the SFG in such a way that the full set of semantic functions are reduced to two: A1 and A2 resulting in the following:

(8)

A1	>	A2	>	Rec	>	Ben .....
Ag		Go				
Pos		Rec				
Fo		Ben				
Proc		Instr				
ϕ		etc.				

According to Dik (1997a: 277), Subject and Object assignment is sensitive to a number of different factors. At first sight, the idea of grouping semantic func-

tions into two major groups seems to be a point of convergence with the RRG macrorole notions. However, as shall be discussed below, this correlation does not really hold in all cases.

A further problem with FG inventory of semantic functions is the question of whether or not they reflect all the possible range of semantic functions. According to Dik (1997a: 122), the catalogue of semantic functions is far from being definitive:

> None of these distinctions made here is definitive, nor is it clear which and how many nuclear semantic functions would suffice to capture the crosslinguistic inventory of semantic functions. In general we will try to find those semantic functions which are necessary and sufficient to capture both the semantics, the grammatical behaviour, and the formal expression of term structures in the nuclear predication.

However, no distinction is made between the arguments of the verb and the participants in the SoAs, as in models like RRG, Construction Grammar, or Rappaport and Levin (1998). For these models, the semantic arguments of the verb (also called participant roles) act as a sort of selection restrictions which reduce the semantic coverage of the arguments. In other words, participant roles are instances of the more general argument roles, which are associated with the representation of constructions or are determined by the place the argument occupies within the LS, and capture specific selectional restrictions. By way of example, Goldberg (1995: 48) formulates the following representation for the predicates *rob* and *steal*, where it becomes clear that the arguments of the verb function as selection restrictions upon each of the arguments:

(9) rob <**robber victim** goods>
(10) steal <**stealer** source **goods**>[5]

Likewise, RRG draws this distinction between argument roles, which have syntactic impact, and participant roles, which define the semantic nature of the arguments of the predicate:

(11) **do'** (x, [**walk'** (x)]) x = mover
(12) **do'** (x, [**shine'** (x)]) x = L-emitter
(13) **know'** (x,y) x = cognizer; y = content

This is in consonance with the RRG view that role labels are merely mnemonics for the different argument positions in the LSs.

[5] See Van Valin and LaPolla (1997: 146, 386-7, 657-8) for the RRG analysis of verb pairs like *rob* and *steal*. Unlike Goldberg's analysis, the RRG account provides an explanation for the fact that many speakers have extended *rob* to the *steal* pattern, while the opposite extension never occurs.

Thus, FG semantic functions are different in that they are not mnemonics in a pure sense because no distinction is made between the participant roles in a SoA and the thematic functions typical of a verbal predicate. This also explains the fact why A1 and A2 semantic functions cannot be comparable or compatible with the RRG notion of macroroles. In this regard, Nuyts (1992: 200) claims that it is necessary to distinguish between a set of conceptual roles, which categorize the positions that entities can have in a speaker's or hearer's knowledge of the world, and a more limited set of case categories, which function in predicate frames and canalize the more subtle conceptual roles. FG semantic functions seem to be floating somewhere in-between conceptual roles and case categories, while RRG makes a sharp distinction between the two.

In line with this assertion, RRG conceives semantic functions as merely mnemonics which operate over argument positions. RRG distinguishes two types of semantic functions: thematic relations like agent, effector, theme, patient, etc., and the semantic macroroles of actor and undergoer, which are semantic generalizations over specific semantic roles. Thematic relations are ordered along a continuum by virtue of the position these occupy within a LS:

(14)

Arg of DO	1st arg. of **do'** (x, ...	1st arg. of **pred'** (x, y)	2nd arg. of **pred'** (x, y)	Arg. of state **pred'** (x)
AGENT	EFFECTOR	LOCATION	THEME	PATIENT
	MOVER	PERCEIVER	STIMULUS	ENTITY
	ST-MOVER	COGNIZER	CONTENT	
	L-EMITTER	WANTER	DESIRE	
	S-EMITTER	JUDGER	JUDGMENT	
	PERFORMER	POSSESSOR	POSSESSED	
	CONSUMER	EXPERIENCER	SENSATION	
	CREATOR	EMOTER	TARGET	
	SPEAKER	ATTRIBUTANT	ATTRIBUTE	
	OBSERVER		PERFORMANCE	
	USER		CONSUMED	
			CREATION	
			LOCUS	
			IMPLEMENT	

Thematic relations are defined in terms of argument positions in LSs, e.g. effector is the *x* in **do'** (x, ...), patient is the *x* in **predicate'** (x), theme is the *y* in **beat'** (x, y), etc. Hence in (3b), *Kim* is an effector, *the book* is a theme, *Pam* is a recipient, and *the library* is a location.

The second type of semantic role, semantic macroroles, corresponds to what has traditionally been called 'logical subject' and 'logical object'; in (3a), *Kim* is the actor and *the book* is the undergoer, while in (4a) *Kim* is the actor. In a sentence like

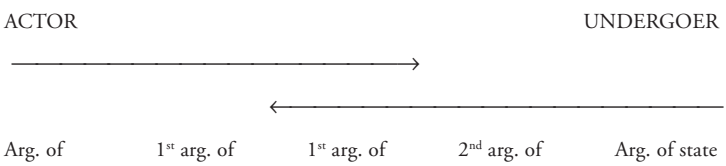

Figure 1. The RRG Actor-Undergoer Hierarchy

The glass broke, *the glass* is an undergoer, not an actor. The contrast between macroroles and grammatical relations can be seen clearly in the following examples.

(15) a. María cerró la puerta.
'María [Actor] closed the door [Undergoer]'.
b. La puerta fue cerrada por María.
'The door [Undergoer] was closed by María [Actor]'.
c. María cantó.
'María [Actor] sang'.
d. María murió.
'María [Undergoer] died'.

In (15b, d) the subject is an undergoer, not an actor, and in (15b) the actor is the object of a preposition and not the subject. Hence actor is not equivalent to syntactic subject, and undergoer is not equivalent to syntactic direct object.

The relationship between specific argument positions (and thematic relations) and macroroles is captured in the Actor-Undergoer Hierarchy in Figure 1.

The determination of which argument serves as actor and which as undergoer is based on its position in the LS; note that the hierarchy in Figure 1 makes no reference to thematic relation labels at all. Hence what is important from the RRG perspective, however, is not the label assigned to the role of an argument but rather the argument's position in LS. The role labels are merely mnemonics for the argument positions in LSs.

At this stage, it would be interesting to see to which extent FG semantic functions can be comparable to RRG macroroles. Recall that the SFH is structured in terms of two major functions: A1 and A2. The question is whether these two functions are similar to Actor and Undergoer. The comparability of these notions is not really straightforward since A1 and A2 are parallel to Actor and Undergoer in the case of transitive verbs:

(16) a. John (Actor) ate the sandwich (Undergoer).
a'. John (Agent) ate the sandwich (Go).

In (16), both from an RRG perspective and an FG perspective *John* is an Actor/Agent (A1) and hence it is assigned the function Subject, while *the sandwich* is an Undergoer/Goal (A2), and thus it receives the function Object. However, things become less clear if we consider the treatment of intransitive verbs:

(17) a. The glass (Undergoer) broke.
a'. The glass (Processed) broke.

In this case, *the glass* is an Undergoer, while from an FG perspective this would be assigned an A1 semantic function. In sum, as Martín Arista (2000) has stated, one of the potential areas of convergence of FG and RRG concerns generalizations across semantic roles, that is, the notions of First Argument and Second Argument in FG and the semantic macroroles of Actor and Undergoer in RRG. This author remarks that convergence is not attained because the notion of First and Second Arguments is underdeveloped in FG, thus lacking explanatory character. Indeed, grammatical principles and rules do not refer primarily to these notions, whereas in RRG semantic macroroles fill a fundamental role in the linking between semantics and syntax (cf. Section 3).

1.3. Selection restrictions

Although most linguistic approaches to lexical representation agree on the need to specify the semantic/pragmatic nature of the different terms which can fill in the different argument slots as encoded in the argument structure of a lexical entry, the exact nature and function of selection restrictions are questions that are far from being resolved. For example, some linguists claim that these are not linguistic at all, but rather form part of our knowledge of the world. Others, however, maintain that they are linguistic because as speakers of a language, we intuitively know how many arguments a predicate has, as well as what their characteristics are. Both FG and RRG follow this line of research. What they do differ is in the status of predicates figuring in selection restrictions, or else, whether selection restrictions should be regarded as primitives or as language dependent predicates. We believe that a more viable proposal, as shall be pointed out above, to tackle the pervasive nature of selection restrictions necessarily involves the use of primitive predicates.

Both in FG and RRG, selection restrictions specify the nature of the arguments, which can appear in complement and subject positions. FG uses predicates of the language to characterize the semantic/pragmatic nature of the arguments in the predicate frame. Thus, the nature of selection restrictions is language dependent in the same way that meaning definitions (cf. below). For example, *drink* prototypically subcategorizes two arguments. The first argument is characterized as *animate*, and the second as *beverage*:

(18) drink [V] $(x_1$: <animate>$)_{Ag}$ $(x_2$: <beverage>$)_{Go}$

These restrictions block, to a certain extent, the generation of anomalous sentences such as:

(19) The table ate a beer [Violation of the selection restrictions of the first argument].
(20) Ron drank a sandwich [Violation of the selection restrictions of the second argument].

Interestingly enough, Dik (1997a: 94-97) affirms that selection restrictions should not be regarded as bans on term insertion in those cases in which the semantic nature of the term does not accommodate to the nature of the selection restrictions imposed on the argument. In fact, he remarks that violation of selections restrictions is a source of metaphorical expressions. Unfortunately, no further argumentation is provided on this particular issue, which, we believe, is of crucial importance for the development of robust collocational frameworks.

RRG uses the qualia from Pustejovsky (1991) to represent the semantic properties of nominals, and selection restrictions of verbs are represented by attributing qualia features to particular argument positions in the LS of the verb. Hence given the LS **see'** (x, y) for *see*, the requirement that the *x* argument be a higher animate entity would be represented by specifying that the NP filling that position have the formal quale 'higher animate'. Similarly, given the LS for (intransitive) *shatter* INGR **shattered'** (x), there would be a specification that the formal quale for *x* include 'brittle' as one of its properties.

An alternative to the FG and RRG proposal stems from the work on ontologies currently being developed by Nirenburg at the CRL. Briefly put, a more lexical-conceptual representation than that provided by qualia in RRG or FG selection features is necessary in order to distinguish between verbs within the same lexical class. A first step to specifying such a representation would be anchoring each lexical template to a well-designed conceptual ontology by means of which word senses would be related to each other on the basis of an underlying model of the world. As Nirenburg and Raskin (forthcoming) point out, only then can one justify the postulation of a certain number of theoretical concepts, a certain set of roles and features, and a prescribed range of values.

For example, in the *Mikrokosmos* approach, an ontology is conceived as a language-neutral body of knowledge about the world. It constitutes a repository of primitive symbols used in meaning representation, which are interconnected by means of a rich system of semantic and discourse-pragmatic relations defined among the concepts. The major function of an ontology then is to supply "world knowledge to lexical, syntactic, and semantic processes" (Mahesh and Nirenburg 1995: 1).[6]

[6] For an ontology-based representation of the different semantic parameters which permeate the lexical class of *manner-of-cutting* verbs, see Faber and Mairal (2000).

1.4. Meaning definitions

Undoubtlessly, providing lexical items with an articulated theory of lexical representation has become one of the most difficult tasks for any linguistic model. Recent research in lexical semantics has shown that the meaning of a word consists of two major elements: the structural elements and the idiosyncratic elements (cf. Rappaport and Levin 1998: 106).

Following Levin (1995: 76-80) and Levin and Rappaport (1996a: 468), lexical representation approaches can be divided into two major groups: "role-centered approaches" and "predicate-centered approaches." Role-centered approaches, or role list approaches, maintain that the meaning of a word can be defined in terms of a set of roles, cases, or participants, which are conceived as primitives. Suffice the following examples:

(21) **give**: [+V, -N]
THETA GRID: [Actor, Theme, Goal] (Radford 1988)
(22) **see** (A, Th) (di Sciullo and Williams 1987: 29)

The question is to which extent we can reduce the whole meaning potential of lexeme to a set of labels, which oftentimes are not really explanatory. In fact, role-list approaches have been criticized from different angles, all of which stress a range of methodological issues (e.g. the lack of reliable diagnostics for determining the nature of the arguments, lack of internal organization, etc.) which seriously question the validity of these notions as an adequate system of lexical representation.[7]

Alternatively, predicate-centered approaches develop more articulated lexical representations using a system of lexical decomposition. Within this group, two further schools of thought can be distinguished:

(i) those which use natural language phrases as part of the meaning definition of a lexical entry and reject the use of a metalanguage.
(ii) those which use metalanguage to encode the lexical properties of a lexical item.

In connection with this, FG and RRG take opposing views in the sense that FG sticks itself to group one, while RRG follows the second trend of research.

Dik (1978b) develops a system of lexical representation, which he terms *Stepwise Lexical Decomposition* (SLD). One of its principal corollaries is that lexical items should be defined using natural language phrases.[8] The idea behind SLD is that meaning definitions constitute a web in which more specific predicates are

[7] For more detailed argumentation, we refer the reader to Levin and Rappaport (1996b) and Van Valin and Wilkins (1996).

[8] Dik (1997a: 23) argues that the use of a metalanguage is a viable proposal for the description of the grammatical domain. In fact, most of the grammatical operations are captured in FG by

TABLE 3. RRG AKTIONSART-BASED VERB CLASSES AND THEIR REPRESENTATIONS

VERB CLASS	LOGICAL STRUCTURE
State	**Predicate'** (x) or (x,y)
Activity	**do'** (x, [**predicate'** (x) or (x,y)]
Achievement	INGR **predicate'** (x) or (x,y), *or* INGR **do'** (x, [**predicate'** (x) or (x,y)]
Accomplishment	BECOME **predicate'** (x) or (x,y), *or* BECOME **do'** (x, [**predicate'** (x) or (x,y)]
Active accomplishment	**do'** (x, [**predicate**$_1$**'** (x, (y))] & BECOME **predicate**$_2$**'** (z,x) or (y)
Causative	α CAUSES β where α, β are LS of any type

defined in terms of more general ones. Given the important role meaning plays in FG, it is surprising that there is no connection between the information contained in meaning definitions and the actual argument structure of the predicate, as encoded in the predicate frame. In fact, according to Dik (1997a: 101-102), meaning definitions do not have a direct role in the construction of the underlying clause structure, although he admits that under certain circumstances meaning definitions may be "unpacked" when necessary. The idea is that SLD eventually leads to a set of predicates which cannot be defined any further. Whether these undefinables have the status of concealed primitives, which can be used in the construction of a more cognitive-conceptual structure, is still an open question.

As illustrated in (3) and (4), RRG uses a decompositional representation for representing the semantic structure and argument structure of verbs and other predicates (their logical structure). It is based on the *Aktionsart* distinctions proposed in Vendler (1967), and the decompositional system is a variant of the one proposed in Dowty (1979). Verb classes are divided into *states, activities, achievements*, and *accomplishments* together with their corresponding causatives. *States* and *activities* are primitives, whereas *accomplishments* and *achievements* consist of either a state or activity predicate plus a BECOME and an INGR operator.[9] The basic classes and their representations are presented in Table 3.

means of abstract operators and functions. However, according to Dik, the same does not hold for the lexical domain. In our view, this explains why the lexicon, as it stands in FG, presents a very incomplete account of lexical phenomena.

[9] Rappaport and Levin (1998) also propose an inventory of templates, which are very similar in form to those of RRG. Both consist of a set of structural elements or primitives and a set of constants.

There are a number of tests which determine which class the verb in a clause is to be assigned (see Van Valin and LaPolla 1997, §3.2). Van Valin and Wilkins (1993) discuss a number of different decompositional systems and their associated semantic metalanguages in terms of their granularity, i.e. how fine-grained the representations are. If the purpose of the system is to capture grammatically relevant aspects of meaning only and not to provide a fine-grained lexical semantic representation, then the semantic metalanguage need not be as detailed.

The LS of the verb forms the core of the semantic representation of the clause, and it is this semantic representation that is related to the syntactic representation by means of the linking algorithm. The linking algorithm is bidirectional: it maps the semantic representation into the syntactic representation, and it also maps the syntactic representation into the semantic representation. In the semantics-to-syntax linking, there are principles which project the appropriate syntactic representation from the semantic representation of the sentence. Linking will be discussed in more detail in section 3 below.

Before we proceed to a more in-depth comparison of the two formats of lexical representation (cf. Section 2), for the sake of clarity we shall present some predicate frames and logical structures. Then, the format of a lexical entry in FG would be represented as follows:[10]

(23) be sleepy [V] $(x_1$: <animate>$)_{Proc}$
df = [begin [V] $(x_1)_{Proc}$ [e_1:[fall asleep [V] $(x_1)_{Proc}$]]]$_{Process}$

(24) be drowsy [V] $(x_1$: <animate>$)_{Proc}$
df = [begin [V] $(x_1)_{Proc}$ [e_1:[fall asleep [V] $(x_1)_{Proc}$]]]$_{Process}$ (σ_2: [appear [V] (x_1: calm [A] & relaxed [A])$_{ø}$)$_{Circumstance}$

(25) wake up [V] $(x_1$: <animate>$)_{Proc}$
df = [cease [V] $(x_1)_{Proc}$ [e_1:[sleep [V] $(x_1)_{Proc}$]]]$_{Process}$ (σ_2: [become [V] (x_1: conscious [A])$_{ø}$)$_{Circumstance}$

The first two representations illustrate the inceptive phase of the process and this is marked with the predicate *begin*. Both show that a participant, a processed, experiences a process such that he falls asleep. The difference between (23) and (24) lies in the fact that (24) encodes a level two satellite expressing the circumstance under which the process takes place (*x_1 appears calm and relaxed*). In contrast, (25) shows the cessative phase of the process. Accordingly, a participant ceases to sleep with the added circumstance that he becomes conscious; note that both in (24) and (25) we have called circumstance what it is really a result. However, no result function is postulated in the FG inventory so that is why we have provisionally catalogued this participant as a satellite designating a circumstance. Thus, meaning definitions in FG are constructed using natural language phrases. In this regard,

[10] We have borrowed and adapted these examples from Martín Mingorance (1998: 121-123).

we believe that the adoption of an abstract metalanguage should be extremely useful to conflate information in lexical entries. Let us now compare the RRG versions of these structures:

(26) be sleepy: **feel'** (x, [**sleepy'**])
(27) be drowsy: **feel'** (x, [**drowsy'**])
(28) wake up: BECOME **awake'** (x)

The predicates *be sleepy* and *be drowsy* are internal sensation predicates; they are paraphraseable by *feel sleepy* and *feel drowsy*, i.e. *I am/feel sleepy/drowsy*. Hence like all predicates of this class they have a complex representation with **feel'** plus a state predicate indicating the internal sensation. *Wake up*, on the other hand, is an accomplishment, and its state predicate is **awake'**, which is not in the internal sensation class; it is very odd to say **I feel awake*. Hence it is a stative predicate of state or condition. The change of state component is signaled by BECOME in the LS.

The representations in (26)-(28) highlight clearly the need for further semantic decomposition, and this entails the inclusion of an enhanced semantic component, which necessarily goes beyond the present scope of logical structures as well as that of the FG predicate frame. While the system in Table 3 enables RRG to capture many important cross-linguistic generalizations about syntax and semantics, it is nevertheless unable to capture certain types of significant morphosyntactic generalizations, due to the lack of explicit representations for the state and activity predicates that are the building blocks of the system. Van Valin and Wilkins sketch out how a more detailed decomposition for state predicates could work, and Van Valin and LaPolla do the same for an important subclass of activity verbs, verbs of saying (see (6) above). In much the same vein, Faber and Mairal (2000) present a fully decomposed semantic structure for *manner-of-cutting verbs* (cf. Section 2). These attempts at expanding the basic decompositional system crucially presuppose the RRG semantic metalanguage. One of its virtues is that it is fully compositional and restricts the substantive semantic content to the basic state and activity predicates that form the building blocks of the system. Hence the expansion of the system is focussed on just those two types of predicates, which is a much more restricted task than attempting to meaning definitions in a system such as FG's.

1.5. Lexical classes

In order to achieve a richer system of semantic decomposition, one of the first tasks is the design of an onomasiological lexicon, that is, a lexicon organized into coherent semantic classes. Both FG and RRG do not present an articulated semantic theory of lexical classes. Although Dik (1997a) does not explicitly mention lexical domains in his grammar, both the principles underlying the structure of meaning definitions as well as the procedure of SLD are compatible with a paradigmatic organization of the lexicon. Dik (1978a: 46) states the compatibility of his model of lexical representation:

Although the view of lexical analysis fits in nicely with the model of FG, the assumptions embodied in it do not necessarily follow from this model. That is, FG would also be compatible with other conceptions of lexical definition.

Interestingly enough, Dik (1997a: 84-85) suggests that further distinctions can be encoded in the type of predicate. That is, in the predicate frame of the verb *walk* we could further specify that it is a verb of movement, thus accounting for the fact that this predicate can occur with a direction satellite:

(29) walk [V, move] $(x_1$: <animate>$)_{Ag}$

However, no further discussion is provided about this proposal. What is appealing is the fact that FG recognizes the viability of designing a lexicon into coherent semantic classes to account for certain grammatical phenomena.

As advanced above, RRG establishes a set of lexical classes based on the aspectual classification of predicates. Although, there are explicit mentions to specific semantic classes of predicates, e.g. cognition, perception, speech act verbs, etc., nothing is said of how these classes have been obtained. However, both RRG and FG representations provide a nice format for the development of coherent lexical classes.

In line with this assertion, in the last few years, as an alternative to the FG lexicon, the Functional Lexematic Model (FLM) has developed a semantic architecture of the English Lexicon (cf. Faber and Mairal 1999), which has also been applied within the RRG framework (Faber and Mairal 2000). The FLM adopts a set of methodological axioms, which are constitutive in both the construction of a lexical architecture as well as for lexical representation:

(i) *Lexical class*: the set of predicates which together lexicalize all or part of a conceptual domain. In this regard, the FLM proposes lexical classes such as the following: cognition, physical perception, existence, action, movement, change, feeling, possession, speech act verbs, etc.
(ii) *Subdomain*: a subdivision of a lexical class which falls halfway between minimal groups of lexemes and the lexical class proper. Each subdomain focuses on a particular area of meaning, and can be considered articulations of the content within the lexical domain. For example, in the domain of *EXISTENCE*, the following three subdomains form the basis of the whole architecture: *to begin to exist*, *to continue to exist*, and *to cease to exist*. The total number of lexical subclasses in a lexical class form the semantic architecture of the lexical class.
(iii) *Genus*: the superordinate term of the domain or subdomain, in terms of which the other lexemes are defined.
(iv) *Differentiae*: the semantic information in the meaning definition of a lexeme which distinguishes from others in the same lexical domain.
(v) *Semantic parameter*: recurrent semantic information which appears throughout a lexical domain or subdomain.

(vi) *Synsem parameter*: recurrent semantic and syntactic information which appear throughout the lexicon in a wide range of different lexical domains.

This is an area where both FG and RRG call for a deeper analysis. Interestingly enough, the RRG lexicon could be enriched by analyzing which set of lexical templates hold within a given lexical class. In this regard, each lexical class would be conceived as a grammar formed by a set of lexical rules which would ultimately allow the reduction of lexical material in the lexicon.

2. CONFLATING LEXICAL ENTRIES INTO LEXICAL TEMPLATES

In order to design a dynamic, minimalist lexicon, ideally information in lexical entries should be extremely reduced and predictable from other sorts of information. In this regard, RRG representations are more powerful than FG predicate frames, which, as pointed out above, exhibit a rather limited potential.

The FG representation for the predicates *assassinate, murder, kill* and *die* goes as follows (cf. Dik 1997a: 101):

(30) *assassinate* [V] $(x_1: \text{<human>})_{Ag}$ $(x_2: \text{<human>})_{Go}$ ↔
murder [V] $(x_1)_{Ag}$ $(x_2)_{Go}$ $(x_3$: *treacherous* [A]$))_{Manner}$
(31) *murder* [V] $(x_1: \text{<human>})_{Ag}$ $(x_2: \text{<human>})_{Go}$ ↔
kill [V] $(x_1)_{Ag}$ $(x_2)_{Go}$ $(x_3$: *intentional* [A]$))_{Manner}$
(32) *kill* [V] $(x_1)_{Ag/Fo}$ $(x_2: \text{<human>})_{Go}$ ↔
cause [V] $(x_1)_{Ag/Fo}$ $(e_1$: [*die* [V] $(x_2))_{Proc}])_{Go}$
(33) *die* [V] $(x_1: \text{<anim>})_{Proc}$ ↔
come about [V] $(e_1$: [*dead* [V] $(x_1))_{Ø}])_{Proc}$

The corresponding RRG representations have the following format:

(34) *kill* [**do'** (x, Ø)] CAUSE [BECOME **dead'**(y)]
(35) *die* BECOME **dead'** (x)
(36) *murder* DO (x, [**do'** (x, Ø)] CAUSE [BECOME **dead'** (y)])
(37) *assassinate* DO (x, [**do'** (x, Ø)] CAUSE [BECOME **dead'** (y)])

Predicate frames function fairly well for these examples but their degree of explanatory adequacy is much more limited if we confront other types of predicates.[11] Let us note some notational differences. Firstly, the contrast between *kill* and *murder* highlights the distinctive RRG treatment of agency. Following Holisky (1987) and

[11] Butler (2000) also argues against the use of predicate frames as a powerful format for lexical representation.

Van Valin and Wilkins (1996), the 'agent' argument of a verb like *kill* is analyzed as an effector in thematic relations terms (the doer of some action without regard for whether it is controlled, volitional or intentional), which is construed as an agent under certain conditions, namely, if the referent of the argument is human and if there is no information in the clause to block the interpretation, e.g. an adverb like *accidentally*. A verb like *murder*, on the other hand, always takes an agent, as it is impossible to murder someone accidentally. This difference is reflected in the LSs for the two verbs above by the occurrence of DO, which indicates lexicalized agency, in the LS for *murder* but not in the one for *kill*. The LS for *assassinate* would be the same as for *murder*, with the added selectional restriction that the *y* argument be a socially or politically important individual. Recall that the lexical template for speech act verbs in Van Valin and LaPolla (1997) provides an illustration of the flexibility of this decompositional system (cf. Section 1.1). In contrast, FG does not present such a fine-grained distinction to account for the elusive function of agency. Moreover, RRG structures capture the result component codified in these predicates by the use of the operator BECOME **pred**'. FG is inconsistent in the codification of this participant.

Given that a lexical subclass is the receptacle of a set of linguistic features common to the members which form part of that lexical subclass, it would be desirable to see to which extent we can accommodate this set of linguistic regularities into one single template, one which defines the entire lexical subclass. In line with this assertion, if we consider a fragment of the lexical class of *manner-of-cutting verbs* in terms of predicate frames, the limitations of this type of representation become more evident:

(38) **hack** [V] $(x_1$: animate$)_{Ag}$ $(x_2$: object$)_{Go}$
df = cut [V] $(x_1)_{Ag}$ $(x_2)_{Go}$ $(x_3$: pieces : uneven$)_{Result?}$
$(\sigma_1$:way [N]: rough [A]: violent [A]$)_{Manner}$

(39) **whittle** [V] $(x_1$: animate$)_{Ag}$ $(x_2$: wood$)_{Go}$
df = cut [V] $(x_1)_{Ag}$ $(x_2)_{Go}$ $(x_3$: size [N]: small [A]$)_{Result?}$
$[e_1$: [remove [V] $(x_1)_{Ag}$ $(x_2$: pieces [N]: small [A]: thin [A]$)_{Go}]_{Manner}$

(40) **carve** [V] $(x_1$: animate$)_{Ag}$ $(x_2$: stone/wood$)_{Go}$
df = cut [V] $(x_1)_{Ag}$ $(x_2)_{Go}$ $(x_3$: shape [N] : special [A]$)_{Result?}$

(41) **saw** [V] $(x_1$: animate$)_{Ag}$ $(x_2$: object$)_{Go}$
df = cut [V] $(x_1)_{Ag}$ $(x_2)_{Go}$ $(\sigma_1$: saw [N]$)_{Instrument}$

(42) **mow** [V] $(x_1$: animate$)_{Ag}$ $(x_2$: grass/plants with long stems$)_{Go}$
df = cut [V] $(x_1)_{Ag}$ $(x_2)_{Go}$ $(\sigma_1$: machine / scythe [N]$)_{Instrument}$

(43) **clip** [V] $(x_1$: animate$)_{Ag}$ $(x_2$: piece$)_{Go}$
df = cut [V] $(x_1)_{Ag}$ $(x_2)_{Go}$ $(x_3$: something$)_{Source}$ $(\sigma_1$: sharp-edged tool [N]$)_{Instrument}$
$[e_1$: [make [V] (x_1) (x_2) $(x_4$: short [A] & neat [A]$)_{Manner}]_{Purp}$

(44) **snip** [V] $(x_1$: animate$)_{Ag}$ $(x_2$: object$)_{Go}$
df = cut [V] $(x_1)_{Ag}$ $(x_2)_{Go}$ $(\sigma_1$: scissors [N]$)_{Instrument}$ $(\sigma_1$: movement [N]: short [A] & quick [A]$)_{Manner}$

These lexical entries formalized in terms of predicate frames evidence the problem of using natural language phrases for lexical representation. For example,

FG's inventory of semantic functions cannot satisfactorily account for the Result component codified in *manner-of-cutting* verbs. Should we consider it a level-2 satellites (as in the case of verbs of sleep above) or as an argument? What is clear is that FG does not present any viable proposal and, paradoxically enough, given that the participation of this set of predicates participate in the resultative construction is quite productive:

(45) He hacked the body to pieces
(46) The magician sawed the woman in two.
(47) He snipped the apricots into small pieces
(48) He shaved his head clean

RRG captures this distinction by the structure BECOME **pred'** (y) which signals the final result of either an accomplishment or achievement.

Furthermore, the instrumental, which in the lexical class considered, is intimately related to the verb is not considered an argument of the predicate but a level-1 satellite since the instrumental is not syntactically obligatory. Given that FG predicate frames have no mechanism to add arguments in non ad-hoc manner like RRG does, then there is no obvious way to deal with syntactic configurations like the instrument subject alternation and the characteristic property of instrument alternation where the instrument undoubtedly forms part of the argument structure of the predicate as the following examples show:

Instrument subject alternation
(49) The cleaver chopped the meat.
(50) Their machetes hacked the vegetation.
(51) The secateurs snipped the flowers
(52) The hedge-clippers clipped the shrubs

Characteristic property of instrument alternation
(53) The hedge-clippers clip well.
(54) The scissors don't snip well.
(55) The lawn mower mows well.
(56) The power saw saws well.

RRG LSs can be expanded so as to allow the expression of more arguments than those that are syntactically obligatory (cf. Section 1.1). These expansions account for the prediction of certain arguments, i.e. argument instrumentals. These can occur with causative accomplishment verbs since argument instrumentals form part of the causal chain inherent in the bringing about of the result. In the case of *cut*, as shown below, *x* forms part of the causal chain and hence it can become the subject in the constructions described above. This rules out the use of instrumentals as arguments with activity predicates since the LSs for these predicates do not involve any causal chain and therefore instruments will be treated as argument-adjuncts.

Moreover, as has been advanced above, we cannot understand why there is a repetition of the argument structure of the predicate and the meaning definition. Thus, there are two separate components and there is no indication of the way they interact. RRG manages to conflate all the information into one single unified representation, although, as has been made abundantly clear throughout this paper, these LSs still need further semantic decomposition, namely the state and activity predicates.

Finally, it is impossible to account for the different alternations these predicates show without postulating a new different predicate frame.[12] As advanced above, RRG LSs may be expanded so as to permit additional core arguments (Jolly 1993). Furthermore, Faber and Mairal (2000) discuss the type of reduction processes that occur within a lexical template in order to account for the various syntactic configurations that permeate an entire lexical class.

Since predicate frames seem to provide an insufficient framework, from this follows that we need a much more powerful notational device, viz. a lexical template, which could easily be formulated by looking at RRG LSs. Then, following RRG we could unify all these structures into one single representation along the following lines:

(57) [[**do'** (w, [**use.sharp-edged.tool**(α) **in**(β) **manner'** (w, x)]) Λ [BECOME **be-at'** (y, x)]] CAUSE [[**do'** (x, [**make.cut.on'** (x, y)])] CAUSE [BECOME **pred'** (y, (z))]]]
α = x.

The representation in (57) contains an effector (*w*) who carries out the cutting activity upon a patient (*y*) by means of a sharp-edged tool (*x*). As a result, the affected entity acquires a new state, that of being cut. This structure can be more specifically interpreted as follows: an effector (*w*) uses a sharp-edged tool (*x*) in such a way that the tool becomes in contact with a patient (*y*), causing an event such that *x* makes a cut on *y*, and this, in turn, causes that *y* becomes *cut*. Furthermore, a new variable (*z*) is introduced to account for those cases where the final result is further specified (*into pieces, in strips, open* etc.). Besides, we can explain why the instrumental argument, which forms part of a causal chain, can potentially become an Actor.

From this canonical representation, we could derive most all the alternations shown by these predicates without having to stipulate a new representation for any new configuration that arises. In doing so, we postulate a number of lexical rules which would map the canonical representation to the lexical entry itself. Furthermore, these rules would account for the various syntactic configurations by means of a set of reduction processes (cf. Faber and Mairal 2000). Hence, each lexical class would reflect the form of a grammar, a lexical grammar, in the sense

[12] For more detailed argumentation, we refer the reader to Faber and Mairal (2000).

that all the linguistic properties of each of the predicates will be predicted and generated in much the same way as the rules which govern the expression of syntactic constructions.

3. ON LINKING

The RRG linking system is, as mentioned earlier, bidirectional, in that it maps both from syntax to semantics and from semantics to syntax. In this way it models aspects of what both the hearer and the speaker do in a communicative exchange. Most other theories, including FG, are unidirectional, in that they attempt to account only for what in RRG terms is the semantics to syntax linking. In FG the specification of an utterance begins with the predicate frames in the Fund and ends with the Expression Rules, which assign a morphosyntactic form to the utterance.

All linking in RRG is governed by the Completeness Constraint, which states that all of the arguments explicitly specified in the semantic representation of a sentence must be realized syntactically in the sentence, and all of the referring expressions in the syntactic representation of a sentence must be linked to an argument position in a logical structure in the semantic representation of the sentence. Failure of some element in the syntax to be associated with the semantic representation leads to the proposed form-meaning pairing being rejected as grammatical; the same is true if some element in the semantic representation fails to be represented in the syntax.

The RRG linking system is summarized in Figure 2.

In semantics-to-syntax linking, the initial step is the construction of the semantic representation of the clause, which occurs in the lexicon and starts from the LS of the main verb or predicate. Having constituted a semantic representation analogous to the ones in (1b) and (2b), the next step is to determine actor and undergoer selection; the highest ranking argument in the verb's LS in terms of the Actor-Undergoer Hierarchy will be the actor, and the lowest ranking argument in terms of the Hierarchy will be the undergoer, in the default case. This completes the 'semantic phase' of the linking, and it is then necessary to map the actor, undergoer and other arguments into the clause. This next phase is governed by the 'Privileged Syntactic Argument [i.e. 'subject'] Selection Hierarchy', which is given in (58).

(58) Privileged Syntactic Argument Selection Hierarchy:
arg of DO > 1st arg of **do'** > 1st arg of **pred'** (x, y) > 2nd arg of **pred'** (x, y) > arg of **pred'** (x)

In accusative systems like English and Spanish, the highest ranking macrorole argument is selected as the default choice for 'subject', while in syntactically ergative systems, e.g. Dyirbal (Dixon 1972), Sama (Walton 1986), the lowest ranking macrorole is the default choice. Both types of languages have constructions which allow a marked 'subject' selection: passive in accusative systems and antipassive in ergative systems.

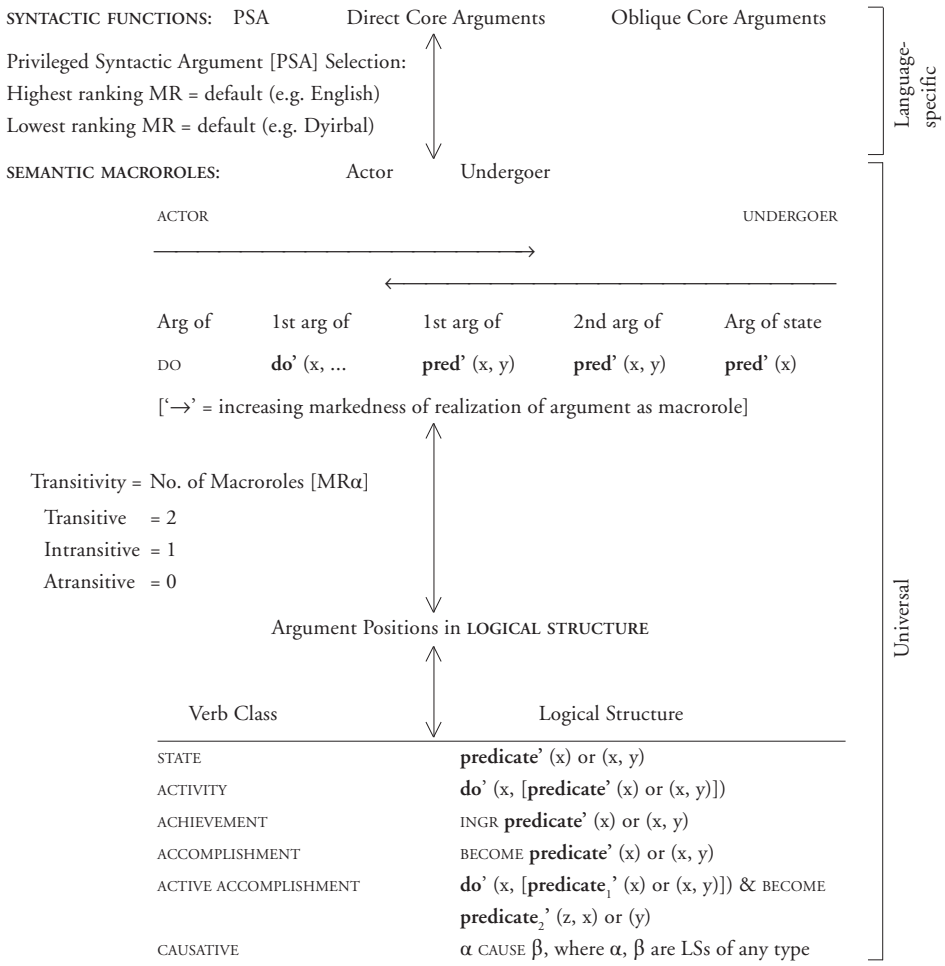

Figure 2: Summary of RRG Linking System

An example of a simple linking between semantics and syntax is given in Figure 3. (In the figure, 'PrCS' stands for 'precore slot', the position in which WH-words appear in languages like English, and 'NUC' stands for 'nucleus', the syntactic unit containing the verb or other main predicating element).

This figure also illustrates syntax-to-semantics linking. The first step in it is recognizing the voice of the main verb, because that signals whether the 'subject' is actor or undergoer. In this example, the verb is in active voice, and therefore the 'subject' is an actor. The other NP in the core of the clause, *Robin*, cannot be the undergoer, because it is marked by a preposition, in this instance *to*. The other NP

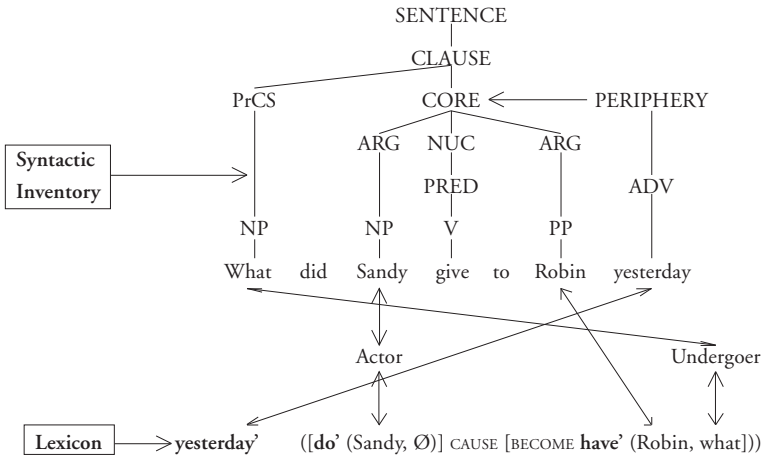

Figure 3: Linking between syntax and semantics in a simple clause in English

in the clause, *what*, cannot be interpreted yet, as its form and position signal nothing about its function in the clause. The next step is to retrieve from the lexicon the LS for *give* and assign macroroles to it. The *x* argument of **do'** would be the actor, but it is impossible to determine undergoer selection, since verbs like *give* permit two choices, a default choice, as in (3a) and Figure 3, and a marked choice as in *Kim gave Pam the book*. However, there is a very general principle which states that if there is a core argument marked by the dative case or a locative-type adposition, then it should be linked to the first argument of the two-place state predicate in the LS (see Van Valin and LaPolla 1997, §7.2 for detailed justification). This means that *Robin* would be linked to the first argument position in the **have'** (y, z) subpart of the LS. Since it has already been determined that *Sandy* is the actor and also that the *x* argument of **do'** would be the actor, *Sandy* can be linked to this position. This leaves one unlinked NP in the syntax, *what*, and one unlinked argument position in the LS, namely the *z* argument of **have'** (y, z). In order to avoid a Completeness Constraint violation, these two must be linked, and this yields the correct interpretation of the sentence. In Van Valin and LaPolla (1997), the linking algorithm is applied to both types of linking in a typologically wide range of languages, including Dyirbal, English, French, Icelandic, Japanese, Lakhota, Malagasy and Sama.

FG does not develop any articulated theory on linking as such. Recall that FG begins with the nuclear predication and the full structure of the clause is built up by the addition of the different layers with their corresponding operators and satellites. The final result is a fully-specified underlying clause structure which serves as input for the expression rules. Then, the expression rule component serves as a bridge between the structure of the clause and the actual linguistic expression. Expression rules are of three types:

– trigger rules (form of constituents).
– placement rules (order of constituents).
– prosodic rules (prosodic features of the clause).

In trying to establish the points of convergence and divergence between the two models in this particular area, just a few very marginal issues are worth commenting. For example, the FG linguistic apparatus also advocates a bidirectional nature in the sense that both productive and interpretive processes can be accounted for. That is, the model works both top-to-bottom and bottom-to-top. However, while a lot of research has been done on the productive side, less attention has been paid to the interpretive side.

In sum, the FG derivational system lacks a syntactic level of representation, as has been postulated in RRG. In our view, this is one of the areas that call for a deeper analysis within FG. In theory, it is difficult to tackle such an enterprise since FG descriptions are primarily semantically based, and no morphosyntactic forms whatsoever are postulated. However, we think that a possible way out would be a reorganization of the expression rule component. Information currently explained by expression rules (e.g. form of constituents) could be included as part of the lexical representation of a semantic class of predicates.

4. CONCLUSIONS

In this paper, we have given a preliminary comparison of both FG and RRG, especially in two key areas: the lexicon and the linking algorithm. In the lexicon, we have brought to light a number of different issues: (i) the FG need of redefining the twofold distinction between arguments and satellites; (ii) the FG inventory of semantic functions should be revisited and reduced in such a way that the notions of Actor and Undergoer could fit in nicely; (iii) FG lexical representations as well as the predicate frame would be more explanatory if a metalanguage be adopted; (iv) both RRG and FG should integrate an articulated theory of lexical classes with a view to exploring the set of regularities which converge within a given lexical class. Finally, although it might seem to be a somewhat unrelated issue to the ones mentioned above, the lack of an explicit syntactic representation prevents the theory from fully developing an explicit linking between semantics and syntax, for the obvious reason that the syntax part is undeveloped. Such a linking system does in fact constrain the lexical component of the theory, as work in RRG has shown. Without any kind of explicit morphosyntactic representation, it is impossible to describe how elements in the morphosyntax are linked to semantic representations, which is an aspect of the comprehension process in language processing. Development of such a system would make it possible for FG to better satisfy Dik's criterion of psychological adequacy.

In sum, a reorganization of the lexicon component in FG offers an enhanced representation of lexical structure, as well as a new conception of the interface between syntax and semantics. This theoretical move can be attained by integrating some of the methodological assumptions and theoretical constructs formulated in RRG.

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