The Lexical Constructional Model: genesis, strengths and challenges

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1. Introduction

The early years of the 21st century are proving to be an interesting time for linguistic theory. The last few years have seen a welcome increase in the discussion of similarities and differences both within groupings of theories (e.g. those which would claim to be functionalist in orientation) and across such groupings (e.g. formalist, functionalist, cognitivist, constructionist). This in turn is leading to increasing awareness of the possibilities for rapprochement between models, and to the realisation that a combination of ideas from different approaches may turn out to be much more powerful than any of the models taken by itself.

It is against this background that the present article is written. In it, I shall first review briefly some recent work on relationships across a spectrum of functionalist, cognitivist and constructionist theories, as a background to the rest of the discussion. I shall then look at one recent model, the Lexical Constructional Model (henceforth LCM), which richly embodies the principle of combining good ideas from a variety of compatible sources, and which is described in greater detail in other papers in this collection. The LCM is a complex model, with antecedents in a whole range of functional, cognitivist and constructionist approaches. For this reason it is useful, in understanding and evaluating the current proposals, to look how the model came into being. The first part of this article therefore demonstrates how and why the model has arisen, taking material from various approaches. I then summarise the strengths of the current model which emerge from the foregoing discussion, and conclude the paper with a discussion of some important challenges for the future.

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2. Relationships across theories

Culicover and Jackendoff (2005: 546-547), at the end of a book in which they make a number of crucial modifications to Chomskyan linguistic theory with which functionalists and proponents of constructionist approaches would feel comfortable, say that they "would like to see more investigation that compares frameworks dispassionately, for it is only by doing such comparisons that we pit them against each other scientifically rather than merely sociologically". Of some relevance to this enterprise is Butler (2003a, 2003b), which first discusses how we might characterise the set of functional approaches to language, and within that a set of functional grammars, which itself contains a sub-set of structural-functional grammars, focused on the relationship between structure and function, and capable, in principle, of describing languages in terms of a set of explicit and interlocking rules and principles. It is argued that three grammars, Dik's Functional Grammar, Role and Reference Grammar and Systemic Functional Grammar, could be seen as central to the set of structural-functional grammars. The rest of the work then presents a detailed, comparative and critical, discussion of these three grammars.

More comprehensive, though necessarily less detailed, is the comparison of eleven approaches, spread across a range of functional, cognitive and constructionist models, presented in Gonzálvez-García and Butler (2006), which in turn builds on previous work limited to just six models, and reported in Butler and Gonzálvez-García (2005). The larger project covered the following approaches: Dikkian Functional Grammar (FG: e.g. Dik 1997a, 1997b); its latest manifestation in Functional Discourse Grammar (FDG: e.g. Hengeveld and Mackenzie 2006, in press); Role and Reference Grammar (RRG: e.g. Van Valin and LaPolla 1997, Van Valin 2005); Systemic Functional Grammar (SFG: e.g. Halliday and Matthiessen 1999, 2004); the work of Givón (e.g. Givón 1995, 2001a, 2001b); the Emergent Grammar (EG) of Hopper, Thompson and other 'West Coast' functionalists (e.g. Hopper 1998; Hopper and Thomspon 1985, 1993); Langacker's Cognitive Grammar (CG: e.g. Langacker 1987, 1991)); and three Construction Grammar models (Fillmore et al., e.g. Fillmore, Kay and

O'Connor 1988[2003], Fillmore and Kay 1995; Goldberg (e.g. 1995, 2006), Croft (e.g. 2001, 2005); as well as the work of Jackendoff, most recently expounded in the Culicover and Jackendoff book mentioned above, which it was thought would make an interesting point of comparison. A close reading of the literature led to the establishment of a set of thirty-six features on which the approaches could profitably be compared. It was found that approximately half these features were shared fairly homogeneously across the set of models investigated, and formed a common core for functionalism, cognitivism and constructionism. Other, smaller sets of features clearly set off two major groupings: on the one hand a cognitive/constructionist group consisting of EG, CG, Goldberg and Croft; and on the other a clearly functionalist group comprising FG, FDG and RRG. SFG, Givón's work, the approach of Fillmore et al and Jackendoff's 'Simpler Syntax' model share some features with the cognitivist/constructionist group, but differ in having other characteristics which are not common in the main groups, and which give these four approaches a somewhat anomalous profile with respect to the other models.

One of the most noteworthy features of the model to be explored in this paper is that it capitalises on the similarities between functionalist and cognitivist approaches and achieves a synthesis of the two strands of what we might call functional-cognitive linguistics.

3. The genesis of the Lexical Constructional Model

In order to help the reader follow more easily the various stages of development which have resulted in the LCM, Figure 1 presents an overview of the model's genesis.

[Figure 1 near here]

3.1 From Dik's FG and Coseriu's Lexematics to the Functional Lexematic Model

The Functional Grammar proposed by Dik (1978, 1989, 1997a, 1997b) allocated a central role to the lexicon, which contained all the basic predicates and terms of a language[1]. The selection of a predicates from the lexicon was the starting point for the building up of the underlying structure of the clause. Predicates were listed in the lexicon in **predicate frames**, specifying the syntactic category of the predicate, the number of arguments (quantitative valency), the semantic functions of these arguments (qualitative valency), any semantic selection restrictions imposed on the arguments in non-metaphorical usage, and a meaning definition, expressed in the form of meaning postulates which link the predicate, by means of entailment relations, to other predicates of the same language. For example, Dik (1997a: 100) gives the following meaning definition for the predicate *bachelor*, in which both sides of the bilateral entailment relation are predicate frames:

1. (= Dik's (52)) *bachelor* [N] (x_i: <man [N]>)$_\varnothing$ ↔ *unmarried* [A] (x_i: *man* [N])

This tells us that the predicate *bachelor*, which is nominal, has a single argument with Zero semantic function (the function proposed for states in FG), and must be applied to an entity with the feature 'man', and that the predicate can be defined as equivalent to an expression in which the adjectival predicate *unmarried* restricts the nominal predicate *man*.

The predicates used in meaning definitions may themselves be complex, as in the case of unmarried and *man* above, and may therefore need to be defined in terms of simpler predicates of the language, in the process of **stepwise lexical decomposition**. For instance, for the series of predicates *assassinate*, *murder*, *kill*, *die*, Dik (1997a: 100) provides meaning definitions which can be stated informally as follows (Dik also provides more formal definitions):

2. (= Dik's (54)) a. *assassinate* murder in a treacherous way

[1] Terms are what fill the argument slots of predicates. The lexicon and derived predicates and terms (created by predicate formation rules and term formation rules respectively) together form the **fund** in Dik's model.

b.	*murder*	kill a human being intentionally
c.	*kill*	cause an animate being to die
d.	*die*	become dead

Dik thus provided a mechanism which allows us to relate sets of predicates within a language, in an onomasiological (thesaurus-like, rather than alphabetical, as in a dictionary) manner. However, as pointed out by Martín Mingorance (1990: 232-233), "it is somewhat paradoxical that within FG no coherent methodology has been devised for the onomasiological structuring of the lexicon which would make possible its organization in lexical fields and, consequently, the stepwise decomposition of the groups of lexemes of each field"[2]. It was this gap in FG which Martín Mingorance set out to fill in his Functional Lexematic Model (henceforth FLM)[3].

In essence, the FLM is a combination of Dik's proposals for the lexicon in FG and Lexematics, a model developed by Coseriu in the 60s and 70s and refined by Geckeler (see Coseriu 1981). The latter was an elaboration of the structural semantic model, allowing the mapping of the lexical structure of a language in terms of lexical fields or domains. In the FLM, as in Coseriu's model, the primary task is to investigate the paradigmatic structure of the lexicon. In Lexematics this task is carried out in terms of the investigation of fields and classes, the former being characterised by semes (lower level features), classemes (higher level features) and dimensions (intermediate between sets of lexemes and the lexical field itself). Once the paradigmatic structure has been worked out, the syntagmatic potential of lexemes can be investigated, in terms of selection restrictions of a semantic and syntactic nature. Martín Mingorance's work, and that of his colleagues and students in the 80s and early 90s, provides many examples of such analyses, largely though by no means exclusively in English and Spanish.

One feature of the early FLM which is of particular relevance to its later development is the fact that it develops considerably the meaning definitions of predicates in FG. No longer do we simply have a set of meaning postulates which are

[2] In a similar vein, Schack Rasmussen (1994: 41) observes that meaning definitions play no part in grammatical analysis in FG. She goes on to elaborate her own model of lexical semantic patterning in terms of **action schemes** and **semantic fields**.

[3] For a somewhat fuller description than can be provided here, see Butler (2003a: 99-105). Several of the key papers on the early development of the FLM are collected in Martín Mingorance (1998).

meant to give a (partial) characterisation of the meaning of the lexeme. Rather, the definition takes the form of a more finely nuanced predicate frame which indicates various components of the meaning. Consider, for example, the definitions for *be drowsy* and *drop off* (in the sense of going to sleep) offered by Martín Mingorance (1990: 246):

3. BE DROWSY_{V} $(x_1)_{Proc}$

   def = $[\text{begin}_{V}$ $(x_1)_{Proc}$ $(x_2$: $[\text{fall asleep}_{V}$ $(x_1)_{Proc}]$ $(x_2))_{Goal}]_{Process}$ $(y_1$: $[\text{appear}_{V}$ $(x_1$: calm_{Adj} & relaxed_{Adj} $(y_1))_0]$ $(y_1))_{Circumstance}$

4. DROP OFF_{V} $(x_1)_{Proc}$

   def = $[\text{fall asleep}_{V}$ $(x_1)_{Proc}]_{Process\ i}$ $(y_1$: $[\text{Neg intend}_{V}$ $(x_1)_{Ag}$ $(x_2$: $\text{Process}_{i})_{Goal}]$ $(y_1)_{Circ}$

In the mid to late 90s, the FLM was developed further, largely by two of Martín Mingorance's former students, Pamela Faber and Ricardo Mairal Usón (see especially Faber and Mairal Usón 1994, 1998a, 1998b, 1999; Mairal Usón 1994). Here, these developments will be illustrated from Faber and Mairal Usón's 1999 book, *Constructing a Lexicon of English Verbs*, which presents the most detailed account of the later stages of the model.

Faber and Mairal Usón see the lexicon not as a static store-house, but rather as a "dynamic, text-oriented network of information about words and their contexts" (1999: 57), and as serving not only as the basis for the language user's mental lexicon, but also as the lexical part of a model of language, an important element in Natural Language Processing by computer, and a dictionary. The dictionary itself is conceived as a grammar, in which words are allocated their semantic, pragmatic, syntactic and morphological properties, an idea which is fully consonant with those of Martín Mingorance.

The methodology adopted for the elaboration of lexical networks is a bottom-up process in which similarities and differences of meaning in the definitions of individual lexemes in a range of monolingual dictionaries are used to establish lexical dimensions, and so to create a hierarchy of domains and subdomains within an overall field. All lexemes within a given field have the same nuclear defining word (definiens), and the various lexical dimensions then permit differentiation among the set of lexemes.

Factorisation of the meaning elements of a group of lexemes leads to the definition of a subdomain, and further factorisation of the elements of the subdomains leads to the establishment of higher level domains. It will be clear that this methodology is in complete harmony with the stepwise lexical decomposition proposals of Dik.

An example of a lexical hierarchy is shown in 5, taken from Faber and Mairal Usón (1999: 159-160). This set of verbs is taken from the lexical field of CONSUMPTION.

5. (= Faber and Mairal Usón's (232))

drink to consume liquid, taking it into one's mouth and swallowing it.

- **imbibe** to drink alcohol [formal].
- **gulp (down)** to drink something very quickly.
- **quaff** to drink something quickly [old-fashioned].
- **swig** to drink something quickly in large amounts in a series of big swallows [informal].
- **swill** to drink something quickly and greedily in large amounts [informal].
- **guzzle** to drink something (especially alcohol) very quickly, greedily and noisily in an unattractive way.
- **tipple** to drink something (especially alcohol) secretly and in small amounts [informal].
- **sip** to drink something slowly in very small amounts.

As can be seen, the eight verbs indented to show their subordinate status in the hierarchy are all defined in terms of the superordinate predicate *drink*, and are differentiated by various lexical parameters such as manner and speed of drinking and the substance drunk.

An important feature of Faber and Mairal Usón's account is that, again in accordance with the principles advanced by Martín Mingorance, they investigate the syntagmatic potential of lexemes within hierarchies, in terms of their syntactic complementation patterns. They propose a Principle of Lexical Iconicity, according to which "The greater the semantic coverage of a lexeme, the greater its syntactic variation"

(Faber and Mairal Usón 1994: 211, 1998a: 8, 1999: 187). For instance, in the hierarchy shown in 5 the verb *drink* can take zero complementation, a NP, a PP with *to* (e.g. drink to someone's health) and a reflexive plus a PP with *to*/*into* (e.g. drink oneself to death/into a stupor), whereas *imbibe* has just the first two possibilities, and each of the other verbs only one (the NP in most cases, zero for *tipple*) (Faber and Mairal Usón 1999: 189). Thus complementation patterns are shown not to be arbitrary, but rather to be semantically motivated.

Faber and Mairal Uson's proposals thus involve considerable enrichment of the FG concept of the predicate frame. In order to reflect this enrichment these authors set up the category of **predicate schema**, defined as

> … a modular, dynamic characterization that subsumes linguistic symbolic units obtained through the activation of lower-level schemas. These schemas are linguistically motivated and reflect our perceptions of reality. (Faber and Mairal Usón 1999: 213)

It is important to note here the strongly cognitive orientation of the definition: schemas "reflect our perceptions of reality". Indeed, Faber and Mairal Usón's contention is that "lexical structure on both the paradigmatic and syntagmatic axes can be said to reflect cognition through the codification of linguistic knowledge" (1999: 203), and they explicitly link their concept of the schema with Langacker's (1987: 371) definition (Faber and Mairal Usón 1999: 212).

Finally, Faber and Mairal Usón show that there are connections among schemata, giving rise to what the authors (1999: 228) call **semantic macronets**. For instance there are clear links between visual perception and cognition, in the use of predicates such as *see* and *show*.

We must now leave the FLM as an extension of FG, and turn to the next development on the way to the LCM, namely the synthesis of the FLM with ideas from Role and Reference Grammar.

3.2 The Functional Lexematic Model and Role and Reference Grammar: a synthesis

Faber and Mairal Usón's 1999 book, as we have seen, paved the way for an integration of the semantic aspects of lexical structure with the syntactic aspects, in terms of the linkage between semantically-based hierarchies and syntactic complementation patterns. However, the model had no explicit component which provided a fully systematic account of the mapping of semantics on to syntax. Unfortunately, the parent model FG was being criticised for its own lack of a syntactic level (see Van Valin 1990, also the discussion in Butler 2003a: 205-209). There was, however, another functional theory, Role and Reference Grammar (RRG) which did indeed have a clearly defined syntax, in addition to a cross-linguistically validated subtheory of the semantic structures of predicates, and sets of mapping algorithms for the linkage of semantic representations to syntactic representations and vice versa.

At the heart of the semantic level in RRG are the **logical structures** (LS) of predicates, which form the core of the entry for a given predicate in the lexicon. In the standard late-90s version of the theory, a typical LS would appear as in the examples in 6 and 7 below, taken from Van Valin and LaPolla (1997: 155).

6. *drink* **do′** (x, [**drink′** (x, y)])
7. *melt* BECOME **melted′** (x)

Here, the elements in bold with primes are abstract predicates, while elements such as BECOME are semantic modifiers. Thus the meaning of *drink* is decomposed into the general activity predicate **do′** and an abstract predicate labelled **drink′**, and *melt* into the inchoative modifier BECOME and the abstract predicate labelled **melted′**. A more complex decomposition is shown in the LS for *kill* given in 8.

8. *kill* [**do′** (x, Ø)] CAUSE [BECOME **dead′** (y)]

Lexical decomposition is seen as essential in order to generalise across semantically related verbs and their arguments (Van Valin and LaPolla 1997: 90-91). The

use of abstract predicates and modifiers reflects the concerns of RRG practitioners that the theory should have a high degree of typological adequacy, so that predicates in all languages should be analysed, ultimately, in terms of a set of universal semantic elements. However, it is patently obvious (and was fully accepted by RRG linguists) that while elements such as **do′** and BECOME are perhaps plausible candidates for universal status, those such as **drink′** or **melted′** are clearly not. Some progress was being made in formulating more delicate decompositions of lexemes (see Van Valin and LaPolla 1997: 116-118 on verbs of saying, and Van Valin and Wilkins 1993 on *remember* and its equivalents in the Australian language Mparntwe Arrernte), but nothing like a detailed and systematic account of decomposition was available. Mairal Usón and his colleagues saw this as an opportunity to combine the logical structures of RRG, and the explicit mapping rules available within that model, with the greater lexical sophistication of the FLM.

It was clear, however, that any such move would necessarily involve the abandonment of the Dikkian principle of stepwise lexical decomposition, in favour of the use of abstract predicates. Mairal Usón and Van Valin (2001: 157-159) and Mairal Usón and Faber (2002: 41ff.) give three pieces of evidence to show that the FG predicate frame, with its meaning definitions based on the principle of stepwise lexical decomposition, is not an appropriate mechanism to respond to the challenge of constructing a lexically-based grammar. Firstly, FG gives no account of how predicate frames arise or how the argument structure shown in them can be linked with the meaning definition of the predicate. Secondly, each of the alternations shown by certain classes of verb (Levin 1993) would demand the postulation of a separate predicate frame, with no way of showing what information is shared across predicates, or how lexical classes are linked systematically with syntactic configurations. Thirdly, there exist constructions which cannot be dealt with adequately using the machinery available in FG. In 9, for example, it is not clear whether the resulting entity encoded in *into pieces* should be seen as an argument of the predicate or a satellite (aka adjunct).

9. You sprinkle it on and then cut the pie into pieces. (BNC A3C 319)[4]

[4] Examples marked as BNC are taken from the British National Corpus, World Edition.

Mairal Usón and his colleagues demonstrate that all these problems can be solved if the RRG system of lexical semantic representation is adopted. Firstly, the LS in RRG provides a mechanism for integrating the argument structure of a predicate with a definition of its meaning. Secondly, the LS can be expanded in such a way that additional arguments, which may not be syntactically obligatory, can be accommodated, so providing a way of dealing with alternations. Thirdly, the result component in examples such as 9 is handled in the RRG LS in the form of a structure of the type BECOME **pred′** (y) (in this instance, BECOME **pieces′** (pie)).

The crucial concept in the new model is that of the **lexical template** which characterises each lexical class and "encodes regularities and maximises information in the lexicon with a minimum cost of representation" (Mairal Usón and Faber 2002: 54). Such templates include both syntactically-relevant aspects of the meaning of a predicate and those semantic features which are relevant for distinguishing a particular lexical class from others. These correspond to the external and internal variables, respectively, of RRG: see Van Valin and LaPolla (1997: 117-118), where internal variables are proposed in order to account for the properties of verbs of saying. Effectively, lexical templates refine the meaning definitions proposed in the FLM and re-express them in terms of the abstract semantic predicates and modifiers of RRG, distinguishing notationally between those arguments which are linked to the syntax and those which are needed for the internal semantic characterisation of the class of verbs concerned. Marial Usón and Faber (2002: 45, fn. 2) see lexical templates as similar to the predicate schemas of their earlier work: however, as we have seen, the two differ crucially in the change from language-specific stepwise lexical decomposition to an RRG-based abstract metalanguage. In 10 is shown the template proposed by Marial Usón and Faber (2002: 55) for verbs of cutting[5].

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

This formula can be unpacked in ordinary language as follows:

[5] A minimally different template is presented in Mairal Usón and Van Valin (2001: 159).

> … 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.). (Mairal Usón and Van Valin 2001: 159)

The external, syntactically-relevant variables are w (with the semantic function of Effector, x (Instrument), y (Patient) and z (Result State), and the internal variables α and β. This lexical template is seen as valid for the whole of the class of cutting verbs, and can be adapted in various ways in order to account for the properties of specific verbs within that class. These adaptations involve the specification of values for internal variables, which include not only Instrument and Manner (α and β above), Manner being subdivided into an Effector type and a Movement type, but also Affected Object and Result. For instance, the verb *hew* indicates that a large rock, stone or other hard material (Affected Object) is cut in a rough way, with difficulty (Manner); *shave* encodes the cutting of hair from the face or other parts of the body, very close to the skin (Affected Object), with a razor or shaver (Instrument); *chop* indicates that something is cut into pieces (Result state), by repeatedly hitting it (Manner) with a sharp-edged tool such as an axe or knife (Instrument); and so on (Mairal Usón and Faber 2002: 60, 62). Mairal Usón and Faber propose to link the specification of object types, such as cutting instruments and type of affected object, to a well-developed ontological semantics network such as that used in the Mikrokosmos project (see e.g. Mahesh and Nirenburg 1995).

Mairal Usón and Faber (2002: 75-85) also show how templates can be formulated for each of the syntactic alternations proposed by Levin (1993) for verbs of cutting: transitive, conative, middle, unspecified object, instrument subject, characteristic property of instrument, unintentional interpretation, path phrase, resultative phrase and creation/ transformation. The minimal expression of the lexical template corresponds to the transitive alternation (see 11), for which the template shown in 12 is proposed:

11. Lady Braithwaite cut the celebration cake … (BNC KAF 124)
12. (= Mairal Usón and Faber's (46), 2002: 75) [**do′** (x, Ø)] CAUSE [BECOME **cut′** (y)]

For the conative alternation, as in 13, the template is as in 14.

13. A figure popped out of a doorway to Alexei's left, and he cut at it with his sword and ran on. (BNC G17 1991)
14. [**do′** (w, [**use.sharp-edged.tool**(α)**in**(β)**manner′** (w, x)]) & [BECOME **be-at′** (y, x)]

The instrument subject alternation, exemplified in 15, is analysed according to the template in 16.

15. The knife cut its throat. (BNC HTM 2742)
16. [[**do′** (Ø, [**use.sharp-edged.tool**(α)**in**(β)**manner′** (Ø, x)])] & [BECOME **be-at′** (y, x)]] CAUSE [[**do′** (x, [**make.cut.on′** (x, y)])] CAUSE [BECOME **pred′** (y)]]

As a final example, the resultative phrase alternation, as in 9, receives the interpretation in 17.

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

where **pred′** represents the result predicate, which functions together with *cut* as a complex predicate in what RRG terms a nuclear juncture (see Van Valin and LaPolla 1997: 442-444).

The question which now arises is how the relationships between the maximal template in 10 and the more specific templates in, for example, 12, 14, 16 and 17, can best be described and indeed constrained. The answer given by Mairal Usón and Faber is to postulate a Lexical Template Modelling Process which allows operations of particular kinds:

Lexical Template Modeling Process

> Lexical templates can be modeled by accommodating external variables, instantiating internal variables and operators (e.g. CAUSE), or else, by introducing elements resulting from the fusion with other templates iff there is a compatibility between the features in the lexical template and the syntactic construction under scrutiny. (Mairal Usón and Faber 2002: 87)

The details of this modelling process, and the inventory of lexical rules involved, are worked out in much more detail in Mairal Usón (2002), which unfortunately remains unpublished. Here, the modelling process is reconceptualised in terms of fusion between two types of template: the lexical template for a particular lexical class, and templates for various types of the construction into which verbs can enter (e.g. transitive, causative/inchoative, instrument subject, etc.). We shall see later that this is an important step in the evolution of the model into its current form. Seven types of rule are postulated (Mairal Usón 2002: 56-66):

(i) *Full matching*. This occurs when variables, subevents and operators are identical in the two templates. An example of this is that the lexical template for verbs of cutting and the template for the transitive construction have elements which can be matched exactly in this way, so accounting for the ability of this class of verbs to occur in the transitive construction (see example 11).

(ii) *Suppression of variables*. In this case, a variable in the lexical template is suppressed in order to fit with the number of variables in the constructional template, provided that the basic interpretation of the constructional template is not thereby violated. For instance, the agent of the lexical template for verbs of cutting can be suppressed in the instrument subject alternation, where the instrument functions as the effector of the action (see example 15).

(iii) *Fusion of internal variables*. For this type of modelling to occur, the internal variables of the canonical lexical template must be compatible with the semantic content of the construction with which the lexical template fuses. An example is the inability of the verb *jab* to occur in the resultative construction, explained by the

fact that the lexical template for this verb includes 'repeatedly' as an internal variable, and this is incompatible with the semantics of the resultative construction.

(iv) *Event identification condition*. In this case, the semantics of the construction must permit it to occur as a proper subevent of the lexical template. For example, the semantics of the conative construction (see example 13) can be identified with the subevent of the lexical template for, for example, cutting and hitting verbs which is expressed as BECOME **be-at′** (y, x).

(v) *Predicate integration condition*. This occurs where a new predicate introduced by the constructional template itself is compatible with the semantic content of the lexical template. An example is the caused motion construction illustrated in 18:

18. They would have laughed Philip out of such a hopeless misalliance; … (BNC CDY 1796)

(vi) *Partial matching*. This can occur when the semantics of the constructional template is compatible with at least one part of the lexical template. For instance, the template for verbs of breaking includes a component which specifies the final resulting state of being broken (i.e. involving a one-place predicate), and this licenses the use of this class of verbs in the causative/inchoative alternation, while verbs such as *hit*, which are two-place predicates with no final result state, cannot occur in this alternation:

19. I broke the glass angrily … (BNC GWH 176)

20. The glass broke with a loud noise. (BNC GVM 162)

21. One bullet had hit the windscreen. (BNC K5M 4396)

22. *The windscreen hit.

(vii) *Lexical blocking*. If one of the components of a lexical template for a given verb corresponds to a suppletive form, it can block fusion with a construction which

would normally allow the verb to occur in that construction. For example, one would expect the causative/inchoative alternation to occur with *kill*, except for the fact that the BECOME **dead′** (x) component is lexicalised in English as *die*, hence the possibility of 23 and 24 but the impossibility of 25 with the same meaning as 24:

23. But the police have killed 46 people in the past five years, … (BNC ABD 667)

24. 46 people have died in the past five years.

25. *46 people have killed in the past five years.

The 2002 paper is important in other ways besides the spelling out of the lexical rules, in that for the first time it situates lexical templates and their modelling within an overall model, dubbed the Lexical Grammar Model, whose architecture is shown in Figure 2, taken from Mairal Usón (2002: 25). Several features of the model deserve comment here.

[Figure 2 near here]

Firstly, note that the input to the mechanism of lexical templates and their modelling is an ontology. This is consistent with the proposals made in Mairal Usón and Faber (2002), where, as we have seen, the specification of the properties of instantiations for internal variables, such as the Affected Object of verbs of cutting, relies on linkage to a conceptual ontology. It will be remembered that Mairal Usón and Faber (2002) suggest linking elements of lexical templates to an ontology developed within a computational approach such as the Mikrokosmos project of Nirenburg and his colleagues. While this possibility is still recognised in the Lexical Grammar Model, Mairal Usón (2002: 18) also makes an alternative proposal which will be of importance in the later development of the model, namely that a more linguistically-oriented and culturally less biased approach might be to adopt, or adapt, the proposals made by Wierzbicka and her colleagues within the framework of the Natural Semantic Metalanguage model (see e.g. Goddard and

Wierzbicka 2002), a possibility which, as Mairal Usón recognises, was adumbrated in Butler (2002: 273-274). This second possibility is not, however, further developed in the 2002 paper.

Secondly, the model envisages a parallel set of templates for word formation, which was studied extensively within the framework of the Functional Lexematic Model (see e.g. Cortés Rodríguez (1994, 1997a, 1997b, 1997c, 1997d), Mairal Usón (1999), Mairal Usón and Cortés Rodríguez (2000-2001), also the brief summary of this work in Butler (2003a: 104-105)). Thirdly, the lexical template modelling process is seen as the initial phase in the linking of lexical templates to the final form of the clause. The second phase of linking consists of a modification of the RRG semantics-to-syntax linking algorithm, which takes as its input the result of fusion between the lexical template and the constructional template, and produces as its output the final syntactic structure of the clause. This final, and crucial, linking phase merits more detailed discussion.

RRG posits two sets of linking rules, one mapping from semantics on to syntax and corresponding to language production, the other going from syntax on to semantics, and so relevant to language comprehension (see Van Valin and LaPolla 1997: Chapters 7 and 9; Van Valin 2005: Chapters 5 and 7). Both algorithms make crucial use of the concepts of **macrorole** (MR), **privileged syntactic argument** (PSA) and **syntactic template**.

Macroroles are the semantic roles of **actor** and **undergoer**, which generalise across more specific thematic roles such as Agent, Patient, Theme, Experiencer, etc. They are needed because many rules in the grammar refer to these more generalised roles rather than to the specific ones, which in fact have no theoretical status within RRG, since they are predictable from the forms of logical structures (e.g. the first argument of an activity predicate, with **do′** in its LS, is an Effector, while the argument of a one-place stative predicate is a Patient). The prototypical actor is an Agent (an Effector performing a deliberate action), while the prototypical undergoer is a Patient, but other specific roles can also have macrorole status (e.g. the Experiencer in a state of feeling is an undergoer).

The privileged syntactic argument is the category proposed in RRG to deal with syntactic relations, and is anchored to a particular construction in a language, so that in Icelandic, for example, we have a PSA for finite verb agreement, one for passive

participle/predicate adjective agreement, and so on. For most constructions in English and some other languages, the PSA is equivalent to the traditional Subject, though Van Valin and LaPolla (1997: 263-274) argue persuasively that the categories of Subject and Object are not generalisable across a wide range of language types and so should find no place within a typologically adequate theory. PSAs are of two broad types, controllers (concerned with phenomena internal to the syntactic 'core' of the clause in RRG) and pivots (concerned with complex constructions such as clause linkage), and there are subtypes of pivots, but these details need not concern us here.

Syntactic templates are the building blocks for the construction of syntactic structures in RRG. They are language-specific, and make reference to the syntactic units recognised in the cross-linguistically validated layered structure of the clause: the clause consists of a core and a periphery; the core contains the nucleus (housing the semantic predicate) and the core arguments of the predicate, while the periphery contains non-arguments (adjuncts)[6]. So, for example, Van Valin (2005: 15) provides a set of templates for various possible configurations of the core for English, together with further templates for the pre-core slot (into which certain items such as *wh*-constituents and fronted elements which are integral to the clause obligatorily go) and the left-detached position (a position outside the clause proper which can be used to announce topical elements about which the clause will say something, as in *As for the Normandy campaign, I wouldn't have missed it for the world.* (BNC A61 2468)).

The important point about the linking algorithms of RRG is that they provide a set of universal rules, tested against a wide range of language types, and also language-specific rules, which together allow us to link the logical structures which form the semantic basis of clauses and sentences to the syntactic structures which realise the meanings conveyed. They are thus an essential part of the generative and interpretive mechanisms proposed in RRG, and constitute a very strong set of hypotheses with a great deal of cross-linguistic support. The job of the semantics-to-syntax linking algorithm is to determine the assignment of actor and undergoer macroroles, and then to decide on the morphosyntactic coding of arguments, including which macrorole (if there is more than

[6] Recently, Van Valin (2005: 21) has proposed that there is a periphery for each layer of the clause. This proposal need not concern us here.

one) will be the PSA. The algorithm also makes reference to the selection of appropriate syntactic templates which will be assembled to form the final structure, and finally assigns arguments to positions in the syntactic representation of the sentence. The syntax-to-semantics algorithm, on the other hand, first determines the macrorole(s) and any other core arguments in the clause, then retrieves the LS of the predicate in the nucleus of the clause and maps the macroroles on to it. Detailed exemplification of the linking algorithms is given in the chapters of Van Valin and LaPolla (1997) and Van Valin (2005) cited earlier, and a briefer, simplified account in Butler (2003a: 143-148).

As can be seen in Figure 2 (adapted slightly from Mairal Usón 2002: 25), the Lexical Grammar Model makes use of an adaptation of the RRG semantics-to-syntax algorithm, including the use of intermediate semantic roles, or macroroles, the concept of the privileged syntactic argument, and syntactic templates. Mairal Usón (2002: 74) proposes a set of linking rules which simply makes some terminological changes and a few minor additions to the RRG algorithm, and he goes on (in Chapter 4) to give an informal account of how the rules work for a number of different verb classes and constructions.

3.3 Further enrichment of the semantics: the role of Natural Semantic Metalanguage and Meaning Text Theory

We have seen that considerable enrichment of the semantics of RRG was achieved by the incorporation of the decompositional techniques pioneered in the Functional Lexematic Model, but that there was a pressing need for a semantic metalanguage in terms of which meanings in any language could be expressed. We have also seen that Mairal Usón (2002) mentions the work of Wierzbicka and her colleagues within the Natural Semantic Metalanguage model as a possible way of achieving this goal. As noted by Mairal Usón and Faber (2007: 147)[7], the primitives used in the semantic decompositions of Faber and Mairal Usón (1999) actually corresponded quite closely to a subset of those proposed in

[7] Mairal Usón and Faber (2007) is a revised version of a presentation given at the 2005 RRG conference. In terms of chronology, therefore, it presents the next stage in the development of the LCM.

the NSM[8]. However, a number of disadvantages have been noted in relation to the meaning explanations which are given for lexical items in the NSM: Mairal Usón and Faber (2007: 143) point out that they are unwieldy and so not conducive to a concise representation; Nichols (1982: 698) observes that Wierzbicka's approach is highly content-oriented and does not make links with the properly syntactic properties of the items being characterised. For this reason, Mairal Usón and Faber, while still striving to use NSM-like primitives in lexical decomposition, have sought to enrich their semantic descriptions of lexemes by making use of the Meaning Text Theory (MTT) of Mel'cuk (1981, 1988, 1989). Mel'cuk's 'Explanatory and Combinatorial Lexicology' framework makes use of a set of lexical functions of the form f(x) = y, where f is the lexical function, x is its argument, and y is the result of applying the function to the argument. An example is the function **Magn**, which expresses intensity, and can be applied to a range of lexemes: **Magn** (smoker) = heavy, **Magn** (bachelor) = confirmed, and so on. In Mel'cuk's own work, these functions are used largely to account for syntagmatic relations between lexemes; however Mairal Usón and Faber, following a suggestion by L'Homme (2005), use them paradigmatically, to distinguish between lexemes within a given domain.

In Marial Usón and Faber (2007: 148), a lexical template consists of two parts: the semantic properties which differentiate one lexeme from another within a given domain, specified in terms of MTT lexical functions, and the event structure of the predicate, showing its grammatically-relevant properties, in the form of a RRG logical structure. An example, taken from Mairal Usón and Faber (2007: 149), is shown in 26, which represents the meaning of *regret*:

26. [SYMPT (sadness) $\text{INVOLV}_{1,2}$ (want) DEGRAD $(\text{do})_2$ LOC_{in} $^{\text{temp}\square}$/$(\text{become})_2$ LOC_{in} $^{\text{temp}\square}$]
feel′ (x, y)

The LS for this predicate, on the right of the definition, uses the predicate **feel′**, and what distinguishes *regret* from other verbs of feeling is encapsulated in the first part of the

[8] For a list of the NSM primitives see the NSM website at http://www.une.edu.au/lcl/nsm/nsm.php#model , consulted 14.1.2008.

definition, composed of lexical functions and arguments. The feeling of regretting generates a symptom (SYMPT), in that 'x' feels sad about 'y'. There is also a sub-activity, represented by $\text{INVOLV}_{1,2}$, specifying that 'x' wants (or, more exactly, would prefer) the event (which is the second argument) not (DEGRAD) to have been carried out (do) or happened (become), in the past (temp□). Marial Usón and Faber offer many more examples showing how different combinations of lexical functions and primitives can be used to define a range of lexemes[9].

At this point, then, the model has reached a stage where the syntactically relevant properties of a predicate are formalised, so potentially allowing linkage to a syntactic structure, and where the meaning of a given lexeme is related to, and differentiated from, that of other lexemes by means of appropriate putatively universal semantic primitives taken from the NSM and lexical functions derived from MTT.

3.4 Synthesis with Construction Grammar and metaphor/metonymy theory: the birth of the Lexical Constructional Model

In Mairal Usón (2002), as we have seen, the idea is put forward that lexical templates fuse with templates representing constructions. However, these templates are discussed informally, and no clear connection is made with proposals made in Construction Grammars. In recent work Mairal Usón has combined forces with the cognitive linguist Ruiz de Mendoza Ibáñez, one of the consequences of this alliance being that the implicit link with cognitively-oriented versions of Construction Grammar such as that of Goldberg is made explicit and becomes a central plank of the model, a development which is documented in detail in Ruiz de Mendoza and Mairal Usón (2006a, 2006b, 2008) and Mairal Usón and Ruiz de Mendoza (forthcoming). Indeed, Gonzálvez-García (2007) comes to the conclusion that that the LCM, as currently conceived, leans more towards the cognitivist pole than the functionalist one. Since these ideas are spelled out fully in other contributions to this volume, I shall present only a very brief outline here.

[9] In recent work it has been proposed that lexical templates should be remodelled in terms of the qualia proposed by Pustejovsky (1995), leading to a closer integration of the two halves of the template: see Cortés Rodríguez, this volume; Mairal Usón and Ruiz de Mendoza, this volume, fn 12.

Ruiz de Mendoza and Mairal Usón (2006a: 26-28) contrast the approaches of functionalist and constructionist approaches to the relationship between lexicon and grammar. Functionalist theories such as RRG regard lexicon and grammar (in the sense of morphosyntax) as separate[10], and postulate that information from lexical semantic representations can be projected on to the morphosyntax via linking rules. On the other hand, cognitive theories, including those constructionist theories which subscribe to the main tenets of Cognitive Linguistics[11] (e.g. that of Goldberg 1995, 2006), posit that lexicon and grammar form a continuum, and that linking rules are not required. Rather, there is a large set of form-meaning pairings, or constructions, which together constitute the 'constructicon'. Ruiz de Mendoza and Mairal Usón's view is that both approaches have their weaknesses: functionalist approaches do not pay sufficient attention to the importance of constructions in determining morphosyntactic structure[12], while on the other hand constructionist approaches do not offer detailed accounts of the constraints on combining particular lexical entries with particular constructions.

As an example, Ruiz de Mendoza and Mairal Usón consider the caused motion construction discussed by, among others, Goldberg (1995: 152-179). Example 18, discussed earlier in relation to lexical template modelling, is repeated for convenience as 27 below:

27. They would have laughed Philip out of such a hopeless misalliance; … (BNC CDY 1796)

This is an example of what in Cognitive Linguistics is called coercion, regulated by the Override Principle (Michaelis 2003: 268) according to which if there is a clash between a lexical entry and a construction, the former adapts itself to the latter. Ruiz de Mendoza and Mairal Usón see this as one application of a more general principle whereby more

[10] Note that there is one significant exception, in that Hallidayan Systemic Functional Grammar, like many cognitive approaches, regards grammar and lexical items as forming a continuum.
[11] I shall use initial capitals (Cognitive Linguistics) to distinguish the movement associated with scholars such as Langacker and Lakoff from the wider area which could be termed 'cognitive linguistics'.
[12] It should be noted that in this section I am dealing only with Mairal Usón and Ruiz de Mendoza's own position. In §5.1 I shall suggest that they have underestimated the extent to which RRG is already a constructionist model.

general, higher level cognitive patterns take in, or subsume, less general, lower level patterns (Ruiz de Mendoza and Díez Velasco 2002).

In the LCM, the more general pattern corresponding to the construction is described in the same metalanguage as that used for lexical templates, so facilitating fusion of the two. For instance, the caused motion construction can be represented as in 28:

28. [LS] CAUSE [BECOME NOT **be-in′** (x, y)]

The fusion of this structure with the lexical template for *laugh* formalises the way in which 'their laughing' causes Philip to move (metaphorically) out of the misalliance he is in. This fusion, or 'lexical-constructional subsumption', can be represented as in Figure 3 (for analysis of a similar example see Mairal Usón and Ruiz de Mendoza forthcoming: the asterisk before NOT represents optionality)[13].

[Figure 3 near here]

Showing how the fusion process works is not, however, enough. As Ruiz de Mendoza and Mairal Usón point out, we also need to specify the constraints on the fusion process. They specify two types of constraint, internal and external.

Internal constraints are those specified in the lexical template modelling process of Mairal (2002), minus what was then called partial matching: full matching, variable suppression, internal variable fusion, event identification condition, predicate integration condition, lexical blocking (Mairal Usón and Ruiz de Mendoza forthcoming). Since these were dealt with earlier, I shall not elaborate further here.

External constraints are concerned with the licensing of fusion types by the higher level cognitive processes of metaphor and metonymy. As an example, the fusion between the lexical template for *laugh at* and the caused motion construction requires the conversion of the basic activity predicate **laugh-at′** (x, y) into a causative

[13] An analysis of the caused motion construction is also given in Ruiz de Mendoza and Mairal Usón 2006b: 125), but this differs in small but important ways from the more recent version. In particular, the initial lexical template is shown as **laugh′** (x, y) rather than **laugh-at′** (x, y). See further discussion below.

accomplishment predicate **laugh′** (x, y). Mairal Usón and Ruiz de Mendoza (forthcoming) point out that this is a metaphorical process, in which information about a source domain allows us to reason about another domain, the target. In this particular case, the metaphor proposed is EXPERIENTIAL ACTION IS EFFECTUAL ACTION, which works through the correspondence between two set of participants: in the source domain, the effector of the causative accomplishment has an effect on the effectee, while in the target domain, we have an actor who is just a 'doer' of the action which is then experienced by a goal/experiencer (see also Ruiz de Mendoza and Mairal Usón 2007). However, it is clearly necessary to constrain such mappings so that inappropriate metaphors are ruled out, and to this end previous work in Cognitive Linguistics by Ruiz de Mendoza and his colleagues is brought in. More concretely, three principles are invoked to constrain mappings and so explain the appropriateness or inappropriateness of metaphors:

Extended Invariance Principle (Ruiz de Mendoza 1998): based on the original Invariance Principle of Lakoff (1993), this states that "the generic-level structure of a target domain has to be preserved in such [*sic*] a way that is consistent with the topological structure of the source domain" (Ruiz de Mendoza and Mairal Usón 2006a: 39).

Correlation Principle (Ruiz de Mendoza and Santibáñez 2003): "for a metaphoric source element to qualify as the counterpart of a target domain element, the source element needs to share the relevant implicational structure of the target element" (Ruiz de Mendoza and Marial Usón 2006a: 40).

Mapping Enforcement Principle (Ruiz de Mendoza and Mairal Usón 2006a: 40): "no item in the source is to be discarded from a mapping system if there is a way to find a corresponding source element in the target domain".

Ruiz de Mendoza and Mairal Usón (2006a: 40) claim that these three principles "stipulate all possible correspondences between a source and a target domain", and go on to show how they can account for felicitous and infelicitous metaphors. They also demonstrate

that metonymies, characterised as "domain-internal mappings where one of the domains involved provides a point of access to the other" (2006a: 41) form the conceptual, cognitive basis for certain alternations, such as the causative/inchoative alternation illustrated earlier with *break* in 19 and 20, where the metonymy involved is PROCESS FOR ACTION. For much more detail of this and other metonymies and metaphors see Ruiz de Mendoza and Mairal Usón (2007).

In the latest version of the LCM (Ruiz de Mendoza and Mairal Usón 2008; Mairal Usón and Ruiz de Mendoza, this volume) cognitive models play an even more extensive role. In, the model is expanded to include no fewer than four levels, of which we have so far discussed only the first. All four levels involve constructional templates and subsumption processes, regulated by internal and external constraints. The first level, dealing with lexical templates and their subsumption into level 1 constructional templates, is now regarded as the 'core grammar'[14]. This level also allows for some inferential activity ('conceptual cueing'), such as that involved in *She's ready* (for the party) or *I will* (marry you). At level 2 further low-level inferential processes are handled, such as those involved in the interpretation of the *Who do you think you're X* construction. Level 3 deals with the high-level inferences relevant to the determination of illocutionary force, which refers to social conventions for acceptable behaviour. Finally, level 4 is concerned with high-level non-situational frames to do with the often implicit logical, temporal and conceptual relations between propositions. Examples of phenomena at each level can be found in Ruiz de Mendoza and Mairal Usón (2008) and Marial Suón and Ruiz de Mendoza (this volume).

4. Strengths

The strengths of the LCM will, I hope, have emerged from the historical sketch I have already presented, so I shall merely summarise them briefly here, in the form of a list.

[14] It is important to note that this use of the term 'core grammar' does not coincide with that in generativist models, where a distinction is made between the core, which is the object of study, and a periphery which is left aside.

- That part of the LCM which is inherited from the Functional Lexematic Model provides a mechanism for describing lexical domains paradigmatically in terms of hierarchical structures based on similarity and difference of meaning.
- The combination of the FLM-derived proposals with the account of predicate-argument structure in terms of the logical structures of RRG provides, in principle, a powerful means of relating semantics to syntax in this area.
- The use of primitives taken from the list proposed by Wierzbicka and her colleagues in the Natural Semantic Metalanguage framework, together with the use of lexical functions taken, or adapted, from Mel'cuk's Meaning Text Theory approach, allows very rich semantic descriptions of lexemes of individual languages with a basis in components which have been validated through the study of a typologically diverse range of languages.
- Thanks to the concept of lexical-constructional subsumption, the model is able to account for the ways in which particular (sets of) predicates can occur in the various types of construction whose properties have been studied in Construction Grammars. Particularly important here are the internal constraints which regulate the fusion of a lexical template with a constructional template.
- Despite the close links with Goldbergian Constructional Grammar, the LCM differs from that model in that it is concerned with providing a principled account of the division of labour between lexical semantics (aka lexical templates) and constructional semantics (aka constructional templates), instead of positing constructional templates as better overall predictors of sentence meaning.
- The current model provides cognitive underpinning for the process of lexical-constructional subsumption and its regulation, by pointing to the role of metaphor and metonymy in external constraints on subsumption processes, thereby acknowledging the systematicity of these cognitive operations as explanatory, motivating factors.
- The model also provides, albeit so far only programmatically, further levels of structure, each based on the common mechanisms of subsumption into a higher-level constructional template and conceptual cueing, which account, in principle, for various types of inferential processing, illocutionary meaning and implicit logical,

temporal and conceptual connections between propositions. Again, these processes have a strong underpinning in terms of Cognitive Linguistics.

Nevertheless, the LCM, for all its history in a diverse range of functional, cognitive and/or constructionist approaches, is still very much in its infancy, and there remain a number of questions to be answered, and challenges to be faced. These are the topic of discussion in the rest of this article.

5. Challenges

5.1 The relationship between semantics and morphosyntax

The most obvious lacuna in the current version of the LCM is that it does not make clear how semantic representations are mapped on to morphosyntactic representations. As we have seen, it is envisaged in Mairal (2002) that the fused template structure will still feed into the semantics-to-syntax linking algorithm of RRG for production or the syntax-to-semantics mapping algorithm for comprehension. The current version of the LCM, however, contains no such mechanism. Furthermore, in Ruiz de Mendoza and Mairal Usón (2006a: 28) we find the following:

> Within the broader context of a functional and cognitive paradigm, the LCM provides an alternative to the relationship between lexicon and grammar and offers a framework which bridges the theoretical gap between projectionist and construction-based approaches by developing **an inventory of constraints that simulate the role of interface (or linking rules)** on the one hand, and by vindicating the role of constructions as a crucial part in the semantic representation of the theory. (emphasis added to the original)

Presumably the linking rules referred to here are those of RRG, perhaps modified as suggested in Mairal (2002), and the constraints are the internal and external constraints which govern the fusion of lexical and constructional templates. However, these do quite

different jobs: the linking rules tell us how to get from semantic representations to syntactic ones (and *vice versa*), while the constraints tell us either about possible modifications to the structures of lexical and constructional templates or about which types of lexical template can fuse with which types of constructional template, both specified in semantic terms. Certainly, the templates specify syntactically **relevant** information, but this information is still semantic and still needs to be linked with the morphosyntax: templates in themselves contain the information necessary for linking to the relevant syntactic arguments, but do not specify explicitly how that linking should occur, although syntactic consequences of constraints are discussed informally. Presumably there are two possibilities: a projectionist account as in RRG (but see also below), or a non-projectionist account in terms of mapping between parallel structures as in Goldbergian Construction Grammar. The form of the templates used in the LCM, and especially their predictive nature with respect to the syntax, suggest a projectionist account, and this is also adumbrated by a remark in Mairal Usón and Ruiz de Mendoza (this volume), to the effect that lexical templates "combine (encyclopedic) semantic and logical variables that are linked to one another *in readiness for syntactic projection*" (emphasis added). I would therefore suggest that the original proposals of Mairal (2002) be revived, if necessary revised, and incorporated into the LCM. Once this link to the syntax is established, the proponents of the model will be in a better position to address other aspects of syntax which are not so closely related to predicate-argument structures.

A further problem related to the interaction between semantics and syntax is that the proponents of the LCM appear to have underestimated the extent to which RRG (which, as we have seen, forms the basis for the logical structures in their model) is already a constructionist model. Constructional schemas play a very important part in present-day RRG (Van Valin 2005: 131-135). Whereas generalisations which apply across constructions and across languages are captured by means of general principles of the grammar, the idiosyncratic, language-specific properties of constructions are accounted for in terms of constructional schemas which can themselves make reference to the more general principles. For instance, the general, cross-linguistic properties of the passive construction are stated in terms of general principles for two types of voice constructions: 'PSA modulation voice', which allows a non-defult argument to act as

PSA, and 'argument modulation voice', which realises a macrorole argument in a non-canonical form (Van Valin 2005: 116). Those syntactic, morphological, semantic and pragmatic properties which specifically characterise the English passive, on the other hand, are stated in the constructional template for that construction (Van Valin's 2005: 132), which makes reference to general principles of the grammar. A considerable number of such constructional schemas are detailed in Van Valin (2005). Constructional schemas are particularly important because of the part they play in linking semantics to syntax and *vice versa*. In the semantics-to-syntax linking algorithm they provide the language- and construction-specific details needed for the appropriate encoding of the semantics in the morphosyntax, while in the syntax-to-semantics algorithm they specify what the PSA is, in languages where there can be different PSAs for different constructions.

Crucially for the LCM, constructional schemas in RRG can also be used to account for coercion phenomena, including those which can result from the caused motion construction, as in example 27 of §3.4. Ruiz de Mendoza and Mairal Usón (2006a: 27) use this construction to illustrate their view that "functional projectionist theories ignore the unquestionable theoretical weight of constructions in predicting morphosyntactic structure, an issue that undermines a theory of linking". However, Van Valin (2005: 239) demonstrates that the constructional schema for the resultative construction in English accounts perfectly well for linking in the famous case of *sneeze* (see Goldberg (1995: 9), shown in 29, with the logical structure in 30:

29. Chris sneezed the napkin off the table.
30. [SEML **do′** (Chris, [**sneeze′** (Chris)])] CAUSE [BECOME NOT **be-on′** (table, napkin)]

The constructional schema for the resultative specifies that the construction is of the serial verb type, the syntax of clause linkage involving nuclear cosubordination. The syntactic template is selected by means of the appropriate general rule, there is no PSA, and the construction obeys the default linkage rules. The semantic properties of the construction are specified in terms of the predicate corresponding to the first nucleus in the syntactic structure causing the predicate corresponding to the second nucleus, which

must be static rather than dynamic. Importantly, there is no need to convert the predicate *sneeze* from intransitive to transitive (compare the analysis in Table 3 of §3.4), since the arguments of the logical structures involved come together in a nuclear juncture, so that *the napkin*, although it is an argument of the whole logical structure, is not an argument of *sneeze* itself. The LCM analysis clearly goes beyond that of RRG in discussing the internal and external constraints which govern the possibility of combining a particular predicate with a given construction, but proponents of the LCM clearly need to demonstrate the superiority of their own valency-changing analysis over the simpler and more elegant solution proposed in RRG.

Recently, Van Valin (forthcoming) has proposed an even more strongly constructionist component for RRG. He suggests that while speakers adopt a projectionist system, in which morphosyntactic structures are projected from meanings, hearers necessarily operate in a constructionist manner, in that comprehension requires 'co-composition' processes in order to arrive at the meaning of an utterance from the morphosyntactic components which are progressively assembled. Projectionist and constructionist views are thus seen as compatible, and equally necessary in a theory which takes seriously the requirements of cognitive adequacy. This is a viewpoint which proponents of the LCM might want to take into consideration when they examine in more detail the roles of projectionist and constructionist viewpoints in their work.

5.2 The relationship between grammar and the lexicon

In the following, Ruiz de Mendoza and Mairal Usón appear to reject the claim, made by many cognitive and/or constructionist linguists, that grammar and the lexicon form a continuum:

> One of the weaknesses of the excessive emphasis put by cognitive linguists on the non-discreteness of categories is the "overapplication" of this idea to all areas of linguistic enquiry, including the relationship between lexicon and grammar. The concept of non-discreteness of categories initially came from observations on the internal semantic makeup of concepts associated with concepts (prototype theory

> versus traditional feature theory). It is fairly uncontroversial there, but there are no iron-clad arguments in Cognitive Linguistics why it should apply to the relationship between lexicon and grammar. (Ruiz de Mendoza and Mairal Usón 2006b: 122)

This view is very much in line with that of Van Valin (2007: 236), who points out problems with the proposal, central to the constructionist postulation of the integration of grammar and lexicon, that "ALL LEVELS OF GRAMMATICAL ANALYSIS INVOLVE CONSTRUCTIONS: LEARNED PAIRINGS OF FORM WITH SEMANTIC OR DISCOURSE FUNCTION, including morphemes or words, idioms, partially lexically filled and fully general phrasal patterns" (Goldberg 2006: 5, emphasis in original). If this is so, then what, Van Valin asks, is the content, both theoretical and empirical, of the claim that everything is a construction? Furthermore, he observes, since constructions are learned form-meaning pairings, they must be language-specific, so raising the question of how cross-linguistic generalisations are to be captured. According to Van Valin, Goldberg finally takes a position quite close to that of Croft (2001), who claims that there are no cross-linguistic generalisations, only cognitive ones.

However, in another paper, Ruiz de Mendoza and Mairal (2006a: 29) claim that their proposal "captures relevant features that lexical template representations share with constructional representations, which makes our description fully at home with the idea of a lexical-constructional continuum". Furthermore, the subtitle of Mairal Usón and Ruiz de Mendoza (forthcoming) is 'The lexicon-grammar continuum', again suggesting that this claim is accepted. However, although the fact that the lexical and constructional templates share the same format makes it easier to show relationships between them and to allow their fusion, this does not entail that they form a continuum rather than constituting separate levels. Obviously there is a need for clarification here.

Langacker (1987: 26) puts the case for the lexicon-syntax continuum very clearly. Contrasting his view with that of formal linguistics, where "[s]yntax was thought of as the domain of generality and regularity, of productive rules with fully predictable outputs; anything falling short of these standards was relegated to the purgatory of lexicon", Langacker states that he is "aware of no a priori or factual grounds for believing

that grammatical constructions divide nearly into two groups on the basis of generality, or that the regular aspects of language structure can be segregated in any meaningful way from the irregular ones". Crucial to the debate are what Langacker (1987: 35) calls 'conventional expressions', comprising "stock phrases, familiar collocations, formulaic expressions, and standard usages that can be found in any language and thoroughly permeate its use". These, as Langacker (p36) points out, do not fit into the lexicon, as conceived in formal grammars, since they are larger than prototypical lexical items, and many of them have meanings which are derivable from those of their components. But neither do they sit easily in the syntax, since this is conceived as dealing with general rules rather than with specific combinations. Unlike formal accounts, cognitive and functional approaches cannot simply turn a blind eye to a set of constructions which is so important in communication. More recently, even Culicover and Jackendoff (2005), erstwhile stalwarts of Chomskyan linguistics, have totally rejected the lexicon-syntax divide in favour of a continuum, for largely the same reasons as advanced many years earlier by Langacker.

As we have seen, some constructions which fall into Langacker's class of 'conventional expressions' have been examined within the LCM: for instance, level 2 of the model deals with expressions of the form *What do you think you're X*. The implications of such expressions for the question of the relationship between lexicon and syntax have not, however, been explored. Also unexplored are the implications of the degree of generality of the construction: expressions such as *What do you think you're X* fall between fully abstract constructions (e.g. X causes Y to receive Z) and fully local, specific ones such as holophrases (e.g. *How do you do?*)

5.3 Extending lexical coverage

The LCM has inherited the emphasis placed, within the Functional Lexematic Model, on the verbal lexicon and its relationship with argument structure. Clearly, future developments in the model need to give attention to nominal, adjectival and adverbial aspects of the lexicon.

5.4 The upper levels of the model

The non-core levels of the model (i.e. levels 2, 3 and 4) are still somewhat programmatic, though the account given by Mairal Usón and Ruiz de Mendoza in the present volume adds some interesting detail. Further development of these levels can benefit from previous work by Ruiz de Mendoza and his colleagues (e.g. on illocution see Ruiz de Mendoza 1999; Pérez Hernández 1997, 1998/1999, 2001; Pérez Hernández and Ruiz de Mendoza 2001; Ruiz de Mendoza and Otal Campo 1997, 2002: 145-158; Ruiz de Mendoza and Baicchi 2007).

5.5 Criteria of adequacy for functional grammars

A set of criteria of adequacy to which a functional theory should aspire was proposed by Dik (1989) and is discussed critically by Butler (1991, 1999, 2003a, 2003b). In Butler (2003b: 485-489) the following modified set of criteria of adequacy is proposed:

- **Descriptive adequacy**
    - Attested linguistic productions, such as those found in corpora, should be used as an important source of data, though other sources, including intuition, informant testing and psycholinguistic experimentation are also important.
    - Typological adequacy, the requirement that a theory should be capable of accounting for the full range of phenomena found across the whole range of the world's languages, can be seen as a type of descriptive adequacy (see Hengeveld and Pérez Quintero 2001).

- **Explanatory adequacy**
    - **Psychological/cognitive adequacy**: A functionalist theory should take into account what we know of the cognitive structures and mechanisms involved in the storage and processing of language.

- **Sociocultural adequacy**: We must account for the ways in which texts/discourses are shaped by, and in turn help to shape, sociocultural relationships, and sociocultural features must be cognitively represented.
- **Discoursal adequacy**: A functionalist theory must give an account of the structure and functioning of discourse, seen as a dynamic, rule-governed, contextually-related activity, leading to structure composed of units with functional relations between them, and subject to coherence constraints.
- **Acquisitional adequacy**: A truly functionalist theory must give an account, inevitably largely constructivist in orientation, of how the properties of languages proposed in that theory can be learned.

More recently (Butler, submitted) a further criterion, that of diachronic adequacy, has been added to the descriptive set. In what follows I shall look briefly at the LCM in the light of these criteria.

Firstly, we may observe that the analysis of authentic data from corpora has so far played a rather minor role in the development of the LCM. The hierarchical meaning descriptions of Faber and Mairal Usón (1999) were developed on the basis of factorisation of meanings taken from a range of dictionaries, and it has always been maintained that corpus analysis, though important, should serve the role of providing examples and checking on the basic correctness of the proposals put forward. However, it is now widely accepted that when corpus analysis is taken as the starting point for an investigation, rather than as merely corroborative, in-depth description of the data leads, more often than not, to a very different description. I would therefore like to see corpora used as a test-bed for rigorous testing of the meanings proposed for lexemes in the LCM. Corpus studies would also be useful at a more general level, for instance in assessing the importance of frequency on issues ranging from the definition of constructional templates to a psycholinguistically adequate account of metaphor and metonymy[15]. In terms of typological adequacy, it is clear that the data base for the LCM needs expanding beyond the study of English. There are indications that this is already under way, in the form of a

[15] For discussion of the possible roles of corpus analysis in functional linguistics, see Butler (2004).

contrastive English-Spanish dictionary project (see Mairal Usón 2007). The LCM has not so far given consideration to matters of diachronic development.

A full assessment of the psychological/cognitive adequacy of the LCM is beyond the scope of the present article, since it would involve discussion of the extent to which Cognitive Linguistics itself is cognitively adequate, and this in turn requires careful definition of the term 'cognitive'. I can do no more here than offer my own opinion on this matter, which is that Peeters (1998: 226) is right to criticise much of Cognitive Linguistics for not being cognitive in the sense of "the sort of linguistics that uses findings from cognitive psychology and neurobiology and the like to explore how the human brain produces and interprets language". Langacker has based his whole theory of Cognitive Grammar on the fact that the mechanisms which underpin it, such as perception, categorisation and the like, are ones which are central to cognitive psychology, but the crucial point is that the theory is then elaborated without any concern for whether the detailed proposals made in the grammar themselves have any psychological validity. In other words, "the connection between Cognitive Linguistics and cognitive science remains weak" (Peeters 2001: 103). One important question which remains for the LCM, then, is whether there is any evidence that the 'cognitive' principles, processes and structures proposed in that part of the LCM which derives from Cognitive Linguistics (e.g. lexical constructional subsumption, and all the different principles of metaphor and metonymy) are cognitively adequate in the sense of corresponding to the mechanisms that are actually used in processing. In attempting to answer this question, it would be important to look at the quite extensive psycholinguistic literature on, for example, the processing of metaphors[16].

Level 4 of the latest version of the LCM gives us reason to hope that the model will pay attention to the study of discourse phenomena, since gives a (so far programmatic) account of cohesion and coherence constraints. However, no model of discourse structure as such is presented.

[16] There are some honourable exceptions to the generalisation made in this paragraph. For instance, Gibbs and his colleagues have investigated experimentally the processing of idioms (for an overview see Gibbs 2007), and Bencini and Goldberg (2000) have made use of empirical techniques in their study of sorting sentences either by constructions or by the morphological form of the verb.

One fruitful area for future research might be the study of the interaction between lexical and constructional meanings in language acquisition. Such work could build on the information already available about the learning of constructions (see e.g. Kelly and Clark 2005).

Finally, it would be interesting to study phenomena such as coercion and the effects of high level metaphor and metonymy from a sociocultural perspective, for instance examining the use of these devices in particular genres and registers of languages, and their function in the establishment, maintenance and breakdown of social relationships.

6. Conclusion

I hope to have shown in this article that the Lexical Constructional Model offers a very attractive account of many aspects of the semantics and pragmatics of predicate-argument relations, deriving its strengths from the wide range of approaches which have been incorporated, often in a modified form, into the model. It has also begun to deal with other (e.g. illocutionary, discoursal) aspects of language structure, and has elaborated on the proposal that a single set of cognitive principles underlies all levels of the model. Although it has a fairly long history, the LCM itself is very new, and so has a long way to go before it reaches maturity. I have pointed out some of the areas in which I feel development is required. Of these, the most urgent is surely the need to provide the model with a syntax and with clear mechanisms for linking this to the rich semantic descriptions which the LCM provides.

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Figure 1: The genesis of the Lexical Constructional Model

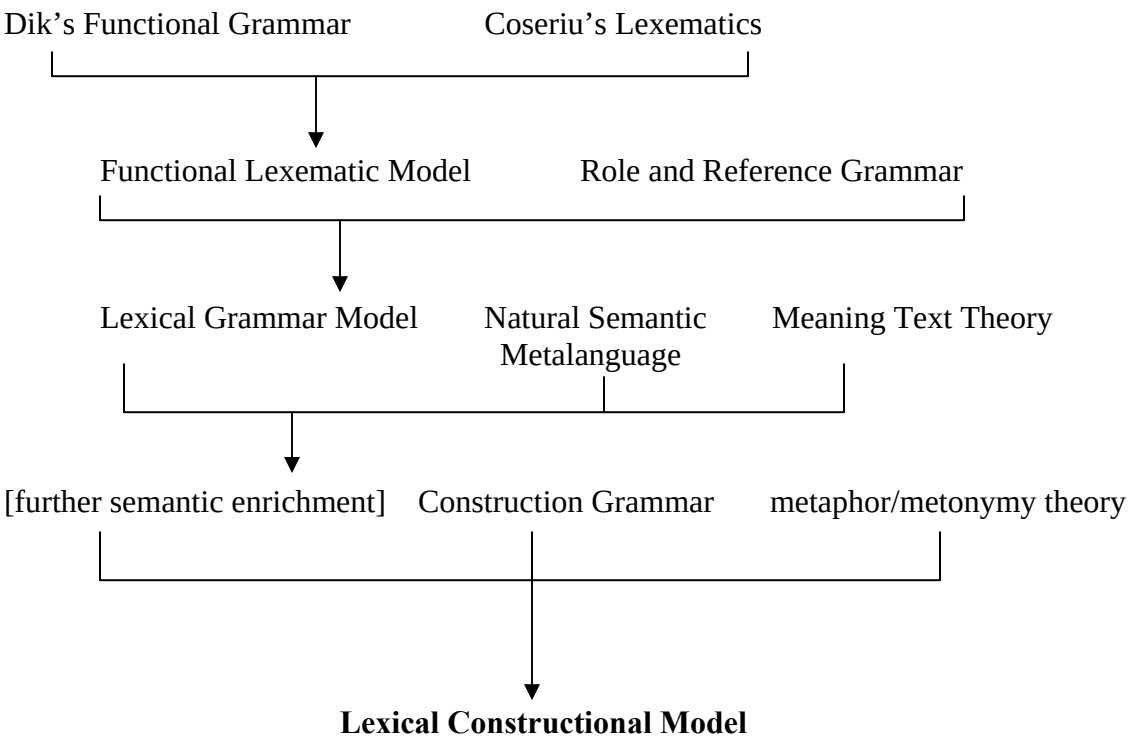

Figure 2: The Lexical Grammar Model

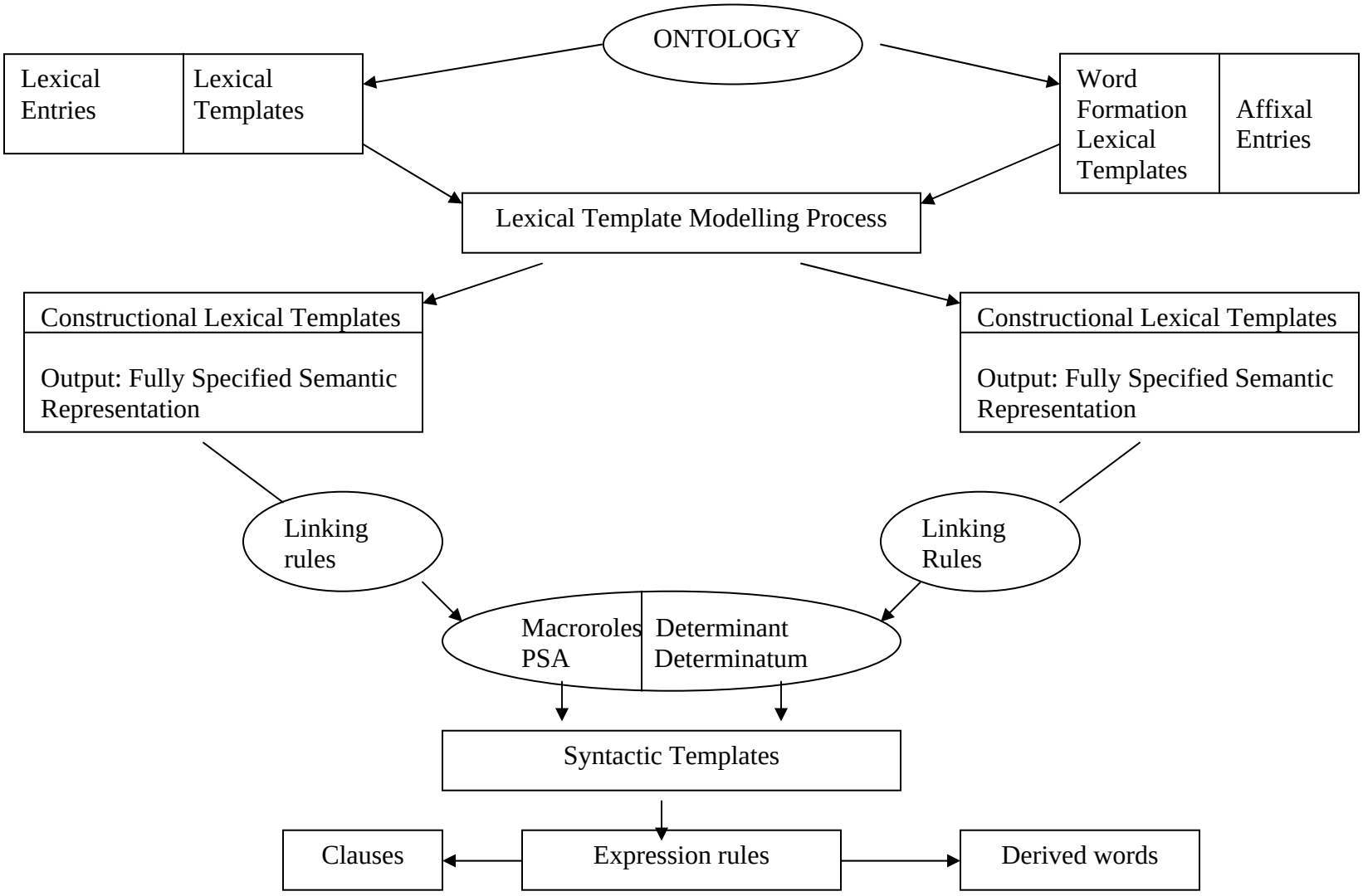

Figure 3: Lexical-constructional subsumption: the caused motion construction