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Epilogue: dynamic morphosyntax in Functional Discourse Grammar

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ABSTRACT

This epilogue addresses the most important topics and challenges for the Morphosyntactic Level in Functional Discourse Grammar that have been raised in the articles in this Special Issue. We begin by exploring the differences between the Morphosyntactic Level in FDG and the treatment of morphosyntactic phenomena in other linguistic frameworks. We then concentrate on the relevance of typological work to the construction of the formalism and to the organization of the Morphosyntactic Level. We conclude that one of its main advantages is its flexibility in accounting for the morphosyntactic diversity of the languages of the world. This flexibility is the result of three main aspects: the distinction between a configurational and a hierarchical ordering of units, the influence of external factors such as iconicity, domain integrity and functional stability, and compatibility with general observations on human language processing and production which result in a dynamic implementation of the Morphosyntactic Level.

1. Introduction

The articles in this Special Issue deal with different aspects of the Morphosyntactic Level (ML) in Functional Discourse Grammar (FDG) which can be grouped under two broad topics: the advantages of an independent level of morphosyntactic representation in FDG and the application of a dynamic implementation of the ML in the study of particular linguistic phenomena. Accordingly, this epilogue will be divided into two corresponding sections in which we will comment upon the most relevant issues raised in the various contributions. In the course of the exposition we shall also clarify and expand on certain aspects of the ML which have proven controversial or have raised debate in the linguistic community.

Before starting, though, we believe it is important to highlight a number of points which are relevant to understanding the treatment of morphosyntax in FDG. First of all, it should be remembered that FDG is characterized as "a typologically-based theory of language structure", and this typological orientation is reflected in two different ways. First, the theory is inspired by the description of many diverse languages, and indeed, Hengeveld and Mackenzie's (2008) presentation of FDG contains data from as many as 165 languages. Secondly, the theory aims to construct a coherent linguistic model which is valid for the description of any human language. Of course, all available theories of language intend to devise systems which could be applicable to all languages, so it seems interesting to briefly explore the differences between the Morphosyntactic Level in FDG and the treatment of morphosyntactic structure in other available theories.

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Typologically oriented work aims not only to achieve full descriptions of languages, but also to delimit the space available for grammars and thus define the notion of a possible human language. Since the pioneering work of Greenberg (1963) this orientation has resulted in the search for linguistic universals, i.e. properties shared by all languages, which generally call for description in terms of implicational hierarchies rather than hard and fast rules. In the formalist tradition there has also been an enormous interest in finding out the universal properties of languages, but from a different perspective. Thus Chomsky's Universal Grammar (UG) is characterized as a set of abstract properties which are shared by all human languages, which is genetically present in all human beings and which allows us to acquire a given language when presented with the relevant evidence. One significant consequence of this assumption is that generativists have felt that the detailed study of just one language might provide important insights into the nature of UG, given the fact that its properties must be present in all languages (Chomsky, 1986, p. 37):

> It is important to bear in mind that the study of one language may provide crucial evidence concerning the structure of some other language, if we continue to accept the plausible assumption that the capacity to acquire language, the subject matter of UG, is common across the species.

For obvious reasons, the language chosen has been English. However, it is certainly true that generativists have also studied the grammar of other languages, but on many occasions they have done so with the underlying intention of confirming or refuting hypotheses put forward on the basis of English. Moreover, the generative enterprise has mostly concentrated on the grammar of related Germanic and Romance languages apart from other well documented languages such as Chinese or Japanese. At times, generative grammarians have dismissed typological work on the grounds that the grammar data available on the languages of the world is not enough to put forward statistically significant results (e.g. Newmeyer, 1998). Consequently, and although generative grammarians have broadened their empirical scope in recent years (see e.g. Baker, 2010), it remains fair to say that an emphasis on cross-linguistic comparison has not been a driving force in generative grammar.

This has resulted in an unfortunate tendency to impose analyses based on English to the description of unrelated languages. Once it is assumed that a property present in the English language is part of UG, it is a natural strategy to try and search for the same property in other languages. If the property is not visible, the analysis can always resort to claiming that it must be present at some abstract level of linguistic representation. This seems to be the strategy followed in the formalist treatment of the two issues mentioned in García Velasco and Wanders (this issue): the syntax of non-configurational languages and the possible existence of a VP constituent comprising the verbal predicate and its object.

In his seminal paper on the structure of the non-configurational Warlpiri language, Hale (1983) assumes the presence of a lexicon in which entries are equipped with a dimension of lexical representation, Logical Structure (LS), which consists of an ordered array of arguments linked to the predicate's dictionary definition. He claims that Warlpiri is configurational at this level and differs from languages of the English type in the way this information is projected onto syntax. Thus, he argues, languages may 'choose' to have a configurational or non-configurational syntax, a matter which is formalized in UG by means of a parameter or binary option.

However, on the basis of data from another non-configurational language, Nunggubuyu, Heath (1986) has argued that there is no reason to believe that the language is configurational at any level, with no indirect or direct tests available supporting the belief that Nunggubuyu has a VP constituent of any kind. He thus argues against Hale's view and proposes "to accept the absence of tight multi-word phrasal units as a point of departure" (Heath, 1986, pp. 407–408).

On the same lines, rather than trying to fit a language into an already available system devised on the basis of the English language, FDG has opted for a system of morphosyntactic representation which allows for the syntactic diversity found in the languages of the world. Thus, morphosyntactic templates are constructed on the basis of both hierarchical and non-hierarchical relations. Within each layer it is also possible to find units in an equipollent relation, i.e. in a relation of mutual dependency (or independence). Since there is no reason to believe that non-configurational languages will make use of the hierarchical possibilities offered by the system, the difference in configurationality among languages boils down to a difference in the inventory of templates and units employed in syntactic construction, in much the same way that languages differ in the inventory of lexemes they have in their representational stock. Unlike the formalist approach, this organization of morphosyntax does not start from the assumption that a given property must be present (either overtly or covertly) in the grammar of languages and thus only represents what they have visibly encoded in their systems.

Chris Butler's paper (this issue) takes this line of reasoning a step further. He shows that the grammatical functions of Subject and Object as applied in Functional Discourse Grammar cannot be applied to a language as a whole, but to specific construction types within languages, as is done in Role and Reference Grammar (Van Valin and LaPolla, 1997). This point is also made in Bickel (2011) on the basis of typological considerations. Hengeveld and Mackenzie (2008, pp. 329–330) also hint at the necessity of considering syntactic functions on a construction-specific basis, but do not elaborate on this point, which is certainly worth pursuing.

Another relevant aspect of the characterization of FDG as a typologically-based theory of language structure concerns the relation between the Contextual Component and the ML. It has long been noted that the conditions under which speakers choose among alternative syntactic encodings for a similar content may be restricted by the general organization and flow of the discourse. Consider the following examples:

(1) a. I very much like cricket
b. Cricket I very much like

The examples in (1) would both receive the same representation at the Representational Level, since they encode the same semantic content. However, they obviously differ in the syntactic structure which is employed in each case to convey that meaning. It might be tempting to believe that (1a–b) simply offer different syntactic options which speakers have at their disposal in any context. Of course, we know that this is not true and, for example, only (1a) would be a felicitous answer to the following question:

(2) John, why don't you tell me something about yourself?

The reason is that the examples in (1) differ not only in their syntactic structure, but also in their interpersonal organization, encoding subtle but relevant differences of pragmatic function assignment. The theoretical question which arises thus relates to the way the relation between discourse and grammar should be captured in grammatical theory given the fact that the selection among alternative syntactic orderings may be restricted by factors relating to the general organization of discourse.

The answer which FDG provides to this question is also connected with its characterization as a theory of language structure. FDG is to be seen as a grammar which represents encoded language patterns, and as such the grammatical system should provide the necessary means to account for the structural diversity found in the languages of the world. Of course, as a functional theory of language, FDG is also concerned with the conditions under which linguistic expressions are communicatively felicitous and discursively coherent. However, the grammar should only encode those properties which receive systematic marking in a given language. In other words, even if the status of a referent as given/new or topical/focal in discourse may favour or disfavour particular syntactic configurations, it is not always the case that there is a systematic correspondence between that status and a particular syntactic structure. Therefore, FDG assumes that the Pragmatic Functions of Topic, Focus and Contrast are only assigned to constituents if the language in question shows a special morphosyntactic strategy to encode them. For example, in Wambon, Focus is marked by the suffix – *nde* as shown in (3), while Hungarian reserves the immediate preverbal position for Focus constituents as shown in example (4) (see Hengeveld and Mackenzie (2008, pp. 90–91) for discussion):

(3) Jakhove kenonop-nde takhim-gende?
3.PL what-FOC buy-3.PL.PRS.FINAL
'What do they buy?

(4) A vendégek tegnap érkeztek a szállodá-ba
The guests yesterday arrived the hotel-LOC
'It was yesterday that the guests arrived at the hotel'

The conditions under which these constructions may be felicitously used in actual discourse should indeed be captured in the Contextual Component, but the grammar should only represent the systematic means employed to mark the pragmatic status of constituents.

With this background in mind, let us now move on to discuss the aspects of the Morphosyntactic Level in FDG which are elaborated upon in the contributions to this Special Issue.

2. The contribution of the Morphosyntactic Level to the grammar

As shown in Fig. 1 in García Velasco and Wanders (this issue), the ML encodes information which derives from the Interpersonal and Representational Levels (IL and RL). The operation of morphosyntactic encoding translates the information at the formulation levels into morphosyntactic 'code' without adding or subtracting any information. This means that there is in principle nothing at the ML that cannot be tracked back directly to one or more elements of the corresponding IL and RL. Conversely, nothing should be included at the IL and RL that does not have a counterpart at the ML (and/or the Phonological Level, PL). Does this mean that the ML is merely reactive, mechanically turning the pragmatic and semantic representations into linguistic form? Not at all. The ML performs a number of operations which are specific to it and are not attributable to properties of formulation. It is here, notably, that many of the typological characteristics of the language under description are imposed. The MLs of isolating, agglutinating and fusional languages, not to mention polysynthetic languages, will all look very different despite the fact that all these types can express the same kinds of pragmatic and semantic messages. The ML is thus where FDG accounts for the vast variety of forms taken by languages. These forms are created subject to both the inner constraints of the ML and the external constraints on the linkage between the levels resulting from encoding and formulation.

Let us focus on the external constraints. No matter how the ML of a language is set up, it will be subject to three constraints on how it relates to the IL and the RL. These are the constraints of iconicity, domain integrity and functional stability.

All three can be understood as contributing to 'transparency', a notion developed in Hengeveld (2011). Transparency is a variable property of languages or subsystems of languages. Complete transparency is present when, in an FDG analysis, there are one-to-one (or biunique) relations between the component parts of each of the four levels. In psychological terms, transparency may be seen as promoting the easy encoding and decoding of linguistically expressed information. If each formal element corresponds to one functional element and vice versa, then the encoding task of finding the right expression and the decoding task of determining the meaning will be simplified. Nevertheless, in actual fact, languages tend to display various degrees of non-transparency or opacity for various reasons. For example, dummy elements introduced at the ML (such as the existential marker *there* in English or the dummy auxiliary *izan* in Basque) reduce the transparency of the relation between ML and the formulation levels, since the elements in question have no meaning and therefore correspond to nothing at the IL or the RL. Nevertheless, opacity of this kind can only be understood against the background of sufficient transparency: if languages were highly opaque, linguistic messages could never be encoded and decoded without the skills of a cryptologist!

The first constraint that ensures general transparency is that of iconicity. In FDG, this is understood in two ways. Firstly, the global left-to-right layout of the representations in formulation is designed to reflect chronological sequence in utterances. At the ML, the sequencing of elements is a precise indication of the succession of those elements in speech. This is one consequence of the 'surfacy' nature of the ML: the theory disbars any movement rules that might re-order morphosyntactic units. At the RL and IL, chronological ordering only applies to the hierarchically highest elements. Where, at the RL, a Propositional Content is made up of a number of Episodes, those Episodes will be sequenced (as ep_i, ep_j, etc.) according to the intended chronological sequence within the ongoing discourse; similarly, a Move that consists of various Discourse Acts will mark those Discourse Acts for their chronological order (A_I, A_J, etc.). Secondly, the iconicity constraint also applies to how the hierarchical build-up of the IL and RL impact encoding. An implication of iconicity is that morphosyntactic units will be built up centrifugally, mimicking the hierarchical structures that they encode. For example, if an $affix_1$ applying to a lexical property at a hierarchically deep layer occurs at a particular distance from the stem, an $affix_2$ applying to a hierarchically higher unit will not be expressed closer to the stem than $affix_1$. Another example is that of modifiers: a modifier of a Propositional Content will tend to occupy a syntactically more peripheral position than the modifier of the (hierarchically lower) Episode. Any deviation from iconicity is *prima facie* an instance of opacity.

The second constraint is that of domain integrity. This notion appeals to the entire hierarchical structure of the representations at the IL and the RL, requiring that where two elements belong to the same layer (e.g. a head and its modifier or an operator and its operand), the encoding of these elements should involve juxtaposition. For example, domain integrity anticipates that an attributive adjective will occur next to the noun it modifies or that an affix applying to a lexical property should occur next (or as near as possible) to the expression of that property at the ML. Instances of discontinuity, where elements that belong together pragmatically or semantically are in fact separated by extraneous material, are again *prima facie* cases of opacity.

The third constraint is that of functional stability. This notion is intended to capture the observation that morphosyntactic elements that are not unambiguously marked for their interpersonal and representational functions tend to occupy a steady relative position in morphosyntactic structure. This applies at each of the layers of the ML: thus at the clause layer, a language may establish up to four relative positions (P^I, P^F, P^M and P^2, standing for clause-initial, final, medial and second position respectively); the same positions (typically fewer) have been found necessary at the phrase and word layers. These relative positions, once established, then become absolute beacons for further relative positions, e.g. P^{I+1} for the first position after P^I. (See Section 3 for more details.) Variability in this regard, for example where a morphologically unmarked Subject occupies a range of positions, again constitutes a *prima facie* instance of opacity.

Against this background, we may see the initial sections of the article by Keizer (this issue) as throwing down a challenge to any simplistic assumption of transparency. She observes the consensus in the literature that each proform replaces another unit, typically one that has gone before in the discourse. In formal syntactic work, for example, it has been assumed that the morphosyntactic category of a proform must be identical to that of its antecedent: the English proform *do so*, for example, is recognized as a VP because the antecedent that allows those – in themselves meaningless – words to be interpreted as a VP. In FDG, the analogous assumption is made that the semantic category of a proform and its antecedent will be identical: the *so* in *I believe so*, for instance, will correspond to the semantic category Propositional Content (p) since the second argument of the lexical item *believe* is (p). As Keizer shows, this principle has been extended to pragmatic categories (at the IL): in *So is Jane*, for example, *so* is analysed as an Ascriptive Subact (T) because *a teacher* in *Jack is a teacher* is also so analysed. Similarly, at the ML, *one* will qualify as a (pro-)noun word (Nw_i) because of the morphosyntactic parallel between *the old car* and *the new one*.

Now, what is common to all these analyses, in terms of transparency, is that proforms involve some degree of opacity, since they do not correspond to a meaning unit at RL or IL. Rather, their meaning is established indirectly through their antecedents. In finding the semantics of *the new one*, for example, the decoder has to call up, from the Contextual Component where the relevant information is stored, the semantic unit $(x_i: (f_i: \text{car}_N (f_i)) x_i)$; in finding the pragmatic status of *So* in *So is Jane*, the decode again has to go to the Contextual Component to find the relevant ascriptive Subact.

Keizer goes on to show that many uses of pronouns display even less transparency, namely where the preceding text offers no antecedent at all. Whereas in the cases just discussed the missing semantic or pragmatic material is available in the Contextual Component, the additional data quoted by Keizer demonstrate that the interaction of the Grammatical and Contextual Components, as currently understood in FDG, will not provide enough for the interpretation processes. In *I just met*

the couple that have moved in next door: he is a lawyer and she is a doctor, the interpretation involves analysis of the lexical item *couple* that goes beyond the power of the grammar, as well as the added assumption of a heterosexual couple of course. Furthermore, and importantly for the concerns of this Special Issue, Keizer shows that existing assumptions about the ML will have to be abandoned. On current thinking, the word *one* in *the old green car and the new one*, for example, may be classified as a (pro-)noun word (Nw_i) if the interpretation is *the new car* (which may not be green). But it cannot be classified as a (Nw_i) if the (equally valid) interpretation is *the new green car*, since *green car* is a sequence of ($Adjw_i$) and (Nw_i).

In Keizer's treatment, each of these two types of opacity receives its own resolution. First, she proposes to abandon the necessary link between elements of the Grammatical and Contextual Components, which – as she has shown – does not offer a guarantee of interpretation. The solution is to remove the interpretation of proforms from the grammar and its ancillary components altogether. The interpretation of proforms is no longer a linguistic but a cognitive process, involving units of information. By analysing proforms as corresponding to empty elements of the IL or RL, Keizer has in fact restored some of their transparency: to each anaphoric proform (which is uninterpretable in itself) will correspond one or more empty pragmatic or semantic unit. Empty encoding units corresponding to empty units in formulation must surely count as transparent.

Second, she cuts the connection at the ML between the proform and its morphosyntactic context. The proform now derives its morphosyntactic category from its role in the structure defined by the relevant template and from its correspondence with lexical items at the RL. In the case of *do so*, for example, it is no longer appropriate to regard it as a VP simply because it 'replaces' an earlier VP. It is rather to be analysed entirely in its own terms, as a sequence of a verb word (Vw_i: do (Vw_i)) – corresponding transparently to a lexical verb at the RL – and an adverb phrase ($Advp_i$: (Adv_i: so (Adv_i)) $Advp_i$), corresponding transparently to a lexical adverb at the RL. This analysis of *do* is compatible, for example, with the regular formation of the negative (*didn't do so*) and of modalized versions (*would do so*), and the analysis of *so* is compatible with the existence of such lexical alternatives as found in *did likewise* (Vw + Advp) or *did the same* (Vw + Np), etc. The proposal thus increases consistency within the ML and restores transparency.

A practical benefit of this analysis for the ML is that proforms are no longer analysed as substitutes or replacements, but are seen for what they are: grammatical words which belong to one of the categories currently recognized in FDG theory. Thus in *the new one*, *one* is both grammatical and nominal; in *do so*, *do* is both grammatical and verbal and *so* is both grammatical and adverbial. Keizer's proposal thus reflects the distinction between lexical and grammatical Words summarized in Table 8 of Hengeveld and Mackenzie (2008, p. 401), although there are some differences in detail in the assignment of forms to categories. For further discussion, see Keizer (2007).

The issue of transparency and the relation between the ML and the formulation levels is central to the article by Van de Velde (this issue). He addresses, with reference to data largely drawn from Dutch, the question of syntactic discontinuity. Whereas other approaches to syntax invoke movement rules, with an underlying continuous structure being transformed into a discontinuous structure through 'stylistic rules', Van de Velde emphasizes the potential of FDG to exploit the complementarity of its levels. His point is that the 'underlying' continuity is in fact a question of semantic relatedness, whereas the discontinuity observed in the examples he analyses is such that the semantic relatedness can be reconstructed by the listener, who interprets the fact of the discontinuity as having pragmatic significance. Discontinuity is thus a matter of tolerable opacity: a non-transparent structure that yields a double return for the extra processing effort it demands of the listener.

Van de Velde's argument has implications for the understanding of the 'marked orders' invoked by Connolly (this issue), many of which involve a disruption of the expected transparent mapping between formulation and encoding. It also stimulates reflection on the notion of constituency, which has long been a given in syntactic analysis and for which discontinuous structures have always been a headache. Syntacticians' solutions have varied from movement rules to relaxation of constraints on line crossing or 'multidomination' (Carnie, 2010, p. 191), or indeed a separation of linearity and dominance into two independent systems (Carnie, 2010, p. 200). For FDG, constituency simply follows from complete transparency: if the pragmatic and semantic structures of the IL and RL are built up hierarchically and their encoding is subject to the transparency constraints of domain integrity, then the inevitable consequence is a hierarchically structured morphosyntactic 'tree' with a 'non-tangling condition' (Carnie, 2010, p. 46, *passim*). As Van de Velde shows, competing motivations provide justifications for instances of lower transparency, which are compensated by the availability of background knowledge (in the Contextual Component) to resolve misunderstandings.

The relations among the ML, the formulation levels and the Contextual Component also lie at the heart of Lachlan Mackenzie's contribution (this issue), which interprets the FDG model as oriented not to the language user as an individual but as a participant in dialogue. In this view, each participant is modelled as having his/her own processes of formulation and encoding/decoding, but as sharing the Contextual Component. The Contextual Component is the vehicle for interactive alignment, a constant and automatic lining-up of the participants' various levels of linguistic activity which is very much in evidence in dialogue and can be traced in transcriptions. At the same time, the Contextual Component becomes a dynamic location for the implicit 'common ground' that is built up by participants as their interaction develops. It is this shared common ground that provides the basis for the high degree of mutual understanding that is reflected in the fragmentary nature of many conversational gambits, in the interpretation of syntactic 'gaps', in the selection of topics and subtopics, and in so many other aspects of our communication.

Fragments and gaps, in particular, represent a challenge for transparency, at least on the assumption that fragmentary utterances are reduced versions of fuller forms and that gaps are zero-realizations of substantial 'underlying' elements.

FDG has, however, never subscribed to the idea that units smaller than full clauses, full phrases, etc. are to be seen as truncations. Rather, as Van de Velde phrases it, it has championed a wysiwyg view of linguistic structure according to which a Linguistic Expression can consist of one or more elements of any unit at the ML and expresses IL and RL representations which do not contain more information than is justified by the actual form under analysis. The views put forward in Mackenzie (this issue) show that this is more than an analytical convenience. In the dialogic model he proposes, each participant's levels of formulation and encoding are open to the co-participants, so that the formulation and encoding of messages is explicitly modelled as cooperative. It is not a question of the speaker putting a puzzlingly fragmentary or gappy utterance before the hearer, but rather of the participants' involvement in a joint project in which they share not only an understanding of the discourse situation but also preferences for formulation and encoding – manifested in minimal utterances and in the continual re-use of frames, templates, operators and lexical items.

One way of interpreting the dialogic model is to think of the notion of transparency in more interactive terms. Rather than simply seeing it as a calculus of the degree of biuniqueness across levels of linguistic analysis, we may also interpret 'transparency' as a fundamental property of language in interaction. In the version of FDG proposed by Mackenzie the co-participants are modelled as being fully transparent to one another, with the Contextual Component mediating a free flow of linguistic structuring between them. In this view, occasional opacity would manifest itself in communication as, for example, a request for clarification or for rephrasing (a 'repair strategy'). The listener's inability to find a place for a speaker's utterance in the implicit common ground would signal a failure to find a mutually accessible interpersonal and/or representational structure to correlate with the encoding that has been offered.

Examples like Keizer's ambiguous *the old green car and the new one* occur in dialogic contexts in which there is common ground, situated in the participants' joint Contextual Component, about the presence in the discourse situation of two cars, understood as being in some jointly accepted sense 'old' and 'new'. The ambiguity of the structure causes it to be less than fully transparent in that there are two semantic representations of *the new one* for one morphosyntactic one, but in dialogue the form is liable to pass unnoticed, since the words chosen are only part of a bigger picture in which the colour of the 'new' car is part of the common ground. This supports Keizer's proposal to take the treatment of such ambiguities out of the grammatical component altogether. Where there is a problem aligning the utterance with the common ground, a repair sequence can be initiated to restore transparency. Van de Velde's instances, similarly, have an interactive motivation, as he himself points out. In structures like Dutch *Op genezing heb ik alle hoop opgegeven* (Van de Velde, this issue), the topicalized *op genezing* sets up a link with a common ground assumption of the speaker's (or someone close to the speaker's) illness in the context of which the remainder of the utterance is mutually understood. The preposition *op* cooperatively signals the imminence of a lexical item (in this case *hoop*) to which it can be attached for the purposes of semantic interpretation.

Summing up, then, the relation between the ML and both the IL and RL is subject to three crucial external constraints: iconicity, domain integrity and transparency. Together, these notions conspire in delicate ways to define the space available for morphosyntactic representations in languages while, at the same time, accounting for their structural differences. Yet, the construction of the ML is also subject to internal constraints, which stem from FDG's aim to be compatible with well-established findings in language production and comprehension. This is the topic of the following section, in which the dynamic implementation of the ML is discussed with special reference to the relevant contributions to this Special Issue.

3. Dynamic implementation of the Morphosyntactic Level

Another important aspect of the architecture of FDG is its dynamic implementation (Bakker, 2001, 2005; Hengeveld, 2005; Hengeveld and Mackenzie, 2008, p. 2; Hengeveld and Smit, 2009). For the overall model, this dynamic implementation makes use of two essential principles: (i) Depth First, and (ii) Maximal Depth.

The Depth First principle is motivated by the observation that in language production the individual information from a certain level is sent down to a lower level as soon as the necessary input information for that lower level is complete (Levelt, 1989, pp. 24–27; Mackenzie, 2004; Harder, 2007). A basic assumption in FDG is that a model of grammar will be more efficient the more it resembles language production in the individual, which means that in its implementation the Depth First principle is applied systematically. The grammar would slow down considerably if the Interpersonal Level first had to be fully specified, and then the Representational Level had to be filled in completely, so that only then could the morphosyntactic configuration be determined, which after that would be mapped onto a phonological configuration. This is not how language production in the individual works, and it would therefore, given the basic assumption mentioned above, not lead to a very efficient model of grammar either.

As an example, consider the effect of specifying an illocutionary value at the Interpersonal Level. As soon as an Imperative (IMP) Illocution has been selected for the Discourse Act, there are potentially important consequences at all subsequent levels of representation: (i) at the Representational Level, the event frame will have to designate a controlled event and the first argument will have to include the addressee; (ii) at the Morphosyntactic Level, in some languages a specific constituent order is used, or there may be special imperative auxiliaries or morphological markers; (iii) at the Phonological Level, there may be specific prosodic patterns that are used with imperatives. All this means that the selection of an Imperative Illocution at the Interpersonal Level may trigger a whole range of specifications at subsequent levels, both in terms of Formulation and of Encoding, irrespective of the specification of further elements at the Interpersonal and lower levels.

The principle of Maximal Depth states that only those levels of representation that are relevant for the build-up of (a certain aspect of) an utterance are used in the encoding of that (aspect of the) utterance. This principle, too, is meant to speed up the implementation of the grammar. It avoids the vacuous specification of levels of representation that are irrelevant to the creation of the utterance at hand.

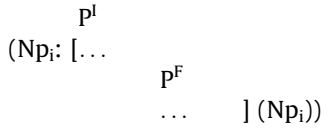
Following up on the earlier example, this means that in a certain language there may be a direct connection, circumventing the Representational Level, between the Interpersonal and the Morphosyntactic Levels in those cases in which the Imperative Illocution has to be mapped onto a specific clausal template. Similarly, there may be a direct connection, circumventing the Representational and the Morphosyntactic Levels, between the Interpersonal and the Phonological Levels when the Imperative Illocution is mapped onto a specific prosodic pattern. In this way, superfluous steps in passing on information within the top-down procedure are avoided. Looking at this from a bottom-up perspective, it means that the expression of underlying structures is potentially based on information from all higher levels, not just from the next one up.

Zooming in on the ML, dynamic implementation takes a more specific shape, in the sense that Morphosyntactic Templates are built up dynamically in response to the needs of the Interpersonal and Representational units to be expressed. This approach leads to an important advantage: if all possible Morphosyntactic Templates had to be listed as primitives in the model, the list would become infinite. Instead, templates are built up starting from the absolute positions (called 'anchor positions' in John Connolly's contribution to this issue) relevant for a certain language, creating positions relative to these as soon as absolute positions are filled by interpersonal or representational material.

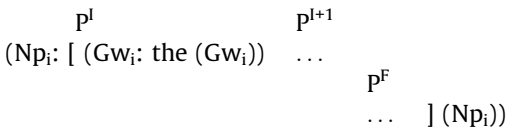
By way of example, consider the dynamic construction of a template for the English noun phrase given in (5):

(5) the three tall men that I saw yesterday

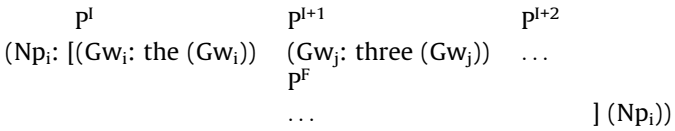
The initial template necessary for the dynamic construction of this noun phrase, listed as a primitive, makes use of two absolute positions: the initial position P^I and the final position P^F, as indicated in (6):

(6)


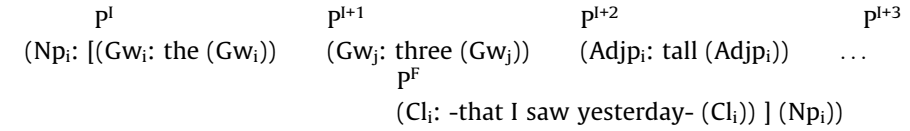
As explained in García Velasco and Wanders (this issue), the ordering of constituents in FDG distinguishes between hierarchical and configurational ordering, and hierarchical ordering precedes configurational ordering. Hierarchically speaking the interpersonal operator *+id* 'identifiable' is the highest element to be expressed, and triggers the insertion of the article *the* in P^I:

(7)


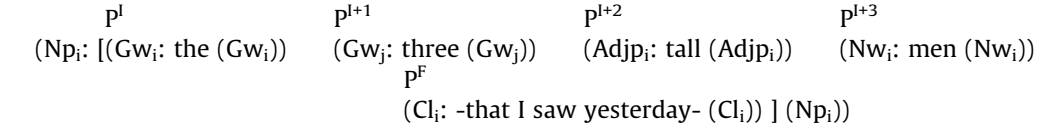
The relative position P^{I+1} that is subsequently created is now available to host the numeral *three*, which is the expression of the representational operator *3* that comes next in hierarchical order:

(8)


The two modifiers that come next hierarchically speaking, the adjective *tall* and the relative clause *that I saw yesterday* go to different places given the difference in syntactic weight between them. The adjective goes to the first initial position available, here P^{I+2}, while the relative clause goes to the last final position available, here the absolute position P^F. The result is as in (9):

(9)


Finally, the head *men* of the Noun Phrase goes to the first available initial position, in this case P^{I+3}:

(10)


Thus, a simple initial template containing just two positions is capable of handling different orders in the English Noun Phrase, due to the dynamic and online construction of templates.

In his contribution to this volume, John Connolly formalizes the procedure illustrated above by introducing an algorithm based on the operations of appending and prepending. These operations are the crucial steps in a dynamic implementation of the Morphosyntactic Level, and central ones in a computational implementation of FDG placement rules. Kees Hengeveld (this issue) takes the dynamic implementation as his starting point in predicting the positional possibilities of verbal markers of grammatical agreement and those of pronominal reference and shows that the predictions are borne out in a small sample of relevant languages. In all, these contributions show that the dynamic, top-down approach that distinguishes between hierarchical and configurational ordering, as advocated in FDG, makes the correct predictions. It does so in a way that requires a minimal number of templates for an unlimited number of combinations of constituents.

4. Conclusion

The contributions to this Special Issue raise an interesting number of topics and challenges for the ML in FDG. Most importantly, we believe that they demonstrate the general adequacy of the organization and architecture of the ML and its flexibility in accounting for the morphosyntactic diversity of the languages of the world. This flexibility is the result of the three main aspects which we have touched upon in this epilogue: the distinction between a configurational and a hierarchical ordering of units, the system's sensitivity to external competing factors such as iconicity, domain integrity and functional stability, and its compatibility with general observations on human language processing and production which result in a dynamic implementation of the ML.

In all, the articles highlight the possibilities that this new framework offers for the analysis of the structure of human languages as well as the aspects in which it should be further elaborated. We thus hope that this Special Issue will spur further research on the ML and we are confident that the FDG proposal will contribute to throwing light on the organization of morphosyntax in languages.

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