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Reflections on the lexicon in Functional Discourse Grammar

DOI 10.1515/ling-2016-0025

Abstract: This article contains a series of reflections on the nature of the lexicon in FDG inspired in large measure by the preceding articles. We start by considering how the lexicon relates to the Conceptual Component, arguing that lexemes do not label units of conceptualization but rather are associated with experientially based beliefs about their appropriate use. In our view, the Conceptual Component first develops a Message, which then influences the choice of a frame in the Grammatical Component into which appropriate lexemes are inserted. Lexemes are thus not inherently associated with frames, as was proposed in earlier work. Instead, they are marked with numerical indicators for the set of frames with which they are compatible, with *coercion* allowing one-off extensions of that frameset. It is a further consequence of our position that lexemes come with neither meaning definitions nor selection restrictions. We adopt Keizer's notion of partially instantiated frames to account for idiomatic expressions. We then turn to parts-of-speech, as they apply to lexemes in various language types. Lexemes are distinguished from Words: for example, the single class of Contentives in the Esperanto lexicon corresponds to Verb Words, Noun Words, etc. in morphosyntax. This leads to a discussion of derivation and compounding, where it is shown that two types of derivation are to be distinguished in FDG, lexical derivation, which uses lexical primitives (\$) as its input, and grammatical derivation, which takes place after insertion of a lexeme into its frame. Three major types of compounding are differentiated and exemplified from English and Dutch: predicate-argument, nucleus-modifier, and conjunct-conjunct compounds, each of which can be either endocentric or exocentric. Turning finally to the difficulty of drawing a sharp distinction between the lexicon and the grammar, we apply Keizer's (2007) distinctions among primary and secondary lexical elements and primary and secondary grammatical elements, showing how findings from various of the preceding articles can be interpreted in this light.

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Keywords: lexeme, derivation, frame, compounding, coercion, conceptual component

1 Introduction

Little attention has been paid so far to the place of the lexicon in Functional Discourse Grammar (FDG, Hengeveld and Mackenzie 2008), notable exceptions being García Velasco (2007, 2009), Honselaar and Keizer (2009), and Butler (2012). The current special issue changes this situation, bringing together a series of contributions that all in different ways explore the question how lexical information can be represented in FDG. In this short contribution we reflect on the preceding articles and sketch their relevance for the overall development of FDG. We will do so in the framework of a presentation of our own ideas on the lexicon of FDG, a view which inevitably is not necessarily shared by all the authors of the individual articles. In particular, we will focus on the relation between the lexicon and FDG's Conceptual Component in Section 2, the meaning of lexemes in Section 3, the form of lexemes in Section 4, and on the opposition between lexical and grammatical elements in Section 5. Section 6 contains a brief conclusion.

2 The conceptual component and the lexicon

The strategy linking the Conceptual to the Grammatical Component involves (a) the selection of appropriate frames for the Interpersonal and Representational Levels and (b) the insertion of lexemes into the frames that have been selected. As argued by García Velasco (this issue), this insertion process is based upon the speaker's "lexical competence", the ability to use words efficiently based on a set of largely unconscious beliefs emerging from a lifetime's experience of hearing and using those words. An individual's lexical experience entails more than knowing when a word is appropriate but also, as a result of cognitive entrenchment, involves sensitivity to long-term frequency, favoring the choice of the best entrenched lexemes. Priming, too, which is an effect of recent frequency, interacts with strategic factors, at times overruling them (Mackenzie 2012) and influencing various aspects of formulation including lexical choice (see Hengeveld and Mackenzie 2014 for our view on how the Contextual Component achieves this).

The complexity of the relation between cognitive processing and formulation causes us to be skeptical about the possibility of developing full-fledged "conceptual representations" and assigning these to the Conceptual Component of FDG. Connolly (2013) proposes just such representations (called CLR),

showing in detail how they can be mapped onto interpersonal and representational analyses and using an algorithm that would permit a computer program to do this. However, we cannot share his assumption that conceptual representations can simply be reverse-engineered from grammatical ones. In effect, Connolly's CLR's are notational variants of grammatical representations. By contrast, our view (cf. also Jackendoff 2007: 83) is that it is not possible to have empirical access to the form of the thought that underpins communication and linguistic production. We consider that multiple factors such as, to mention but a few, the balance to be struck between linguistic and gestural communication, the nature of the speaker's current emotional state, the genre of the ongoing interaction or the relative social status of the interlocutors impinge in dynamic and complex ways upon how pre-linguistic cognition and communicative intentions are formulated and then encoded.

The approach to this question taken by Butler (2012) is grounded in ontology in the sense of a hierarchically structured classification of concepts as well as a Conceptual Representation Language (COREL), both strongly influenced by FunGramKB work in computational linguistics (Periñán-Pascual and Mairal Usón 2010). FunGramKB is, as Butler stresses (2012: 625–626), a rich resource, for example including information on typical collocations and containing information that can be mapped onto Representational Level analyses. The underlying assumptions of Butler's proposals for the Conceptual Component are that concepts are labeled with lexemes and that these lexical concepts are the starting point for the implementation of the FDG model of verbal interaction.

Butler, like Connolly, takes what Kecskes (2007) calls a one-level approach to semantics. In this view semantic representations (for example of the type offered by FDG) are either indistinguishable from conceptual representations or mapped onto them in a one-to-one relation. The position we wish to defend is a two-level approach, which holds that “there is an intra-linguistic level of abstract semantic representations distinct from the extra-linguistic level of conceptual representations” (Kecskes 2007: 30). In this approach there will be a many-to-many relation between the conceptual representation and the dual representations found at the Formulation Levels within the grammar. Our view thus accords perfectly with Kecskes' (2007: 36) definitions, according to which “a word [i. e., lexeme] is a symbol that pulls together all knowledge and information that has been connected with the use of that label”, while a concept “is a construct that blends knowledge gained from actual situational contexts in an individual-centred way”. This experience-based approach to conceptualization accords well with the results of research into the bilingual mind, which strongly suggest a single conceptual system in a complex relationship with two lexica (cf. Paradis 2007) – and *a fortiori* for the multilingual mind. Lexical

properties, such as the gender of nouns, are not conceptual, although concepts, defined as blends of experiential knowledge from various sources, may be influenced by the properties of the lexemes they are associated with.¹ The equation of concepts with lexemes would entail that the English lexemes of dishonest speech *lie_V* and *lie_N*, which must be distinguished in the lexicon since they are associated with discrete frames, were identified as separate concepts (cf. Hirst 1999). However, the two notions are inextricably linked, indeed mutually defining: ‘to lie’ is ‘to utter an untruth’ and ‘a lie’ is ‘an uttered untruth’. This is a clear instance of a single concept that stands in relation to two different lexemes. Finally, the separation of the conceptual from the grammatical level is essential for the treatment of ‘indirect speech acts’ of the type that require the recognition of implicatures for their understanding; here there is clearly a misalignment between the conceptual representation (e. g., the desire to achieve a particular state like access to salt) and the linguistic formulation (an interrogative speech act such as *Can you pass the salt?*). For all these reasons, we hold to the two-level approach to semantics and doubt the proposition that lexemes label the units of conceptualization. Butler’s (2012) position will consequently not be adopted in this article.

The view of the Conceptual Component and the lexicon to be developed in these reflections, taking due note of the proposals in other articles in this volume, is that, for each Discourse Act, the Conceptual Component develops a Message in two stages. In the initial stage, global settings are determined that are passed down to the Grammatical Component, where they trigger certain global choices of frames in formulation (cf. Konopka and Brown-Schmidt 2014). In the second stage, other factors come into play reflecting the speaker’s intentions, the discourse context, the nature of the interaction (e. g., need for politeness) and the impact of entrenchment and priming as well as the structural properties of the language being spoken. Together these factors spark off multiple detailed choices in formulation, including the selection of grammatical operators and, crucially, the insertion of lexemes into the frames. Evidence for such an approach can be found in various phenomena, which we will present here one by one.

Consider the example in (1a):

- (1) a. *We have to help him. He’s my father, he’s your brother.*
 b. (M_I : [$(A_I$: –we have to help him– (A_I)) (A_J : –he’s my father– (A_J))_{Motiv} (A_K : –he’s your brother– (A_K))_{Motiv}] (M_I))

¹ This may explain the finding that grammatical gender can have a traceable effect on conceptualization (Boroditsky et al. 2003).

As shown in outline in (1b), this Move, said for example by a daughter to her aunt, contains two Discourse Acts that provide a Motivation for the nuclear Discourse Act *We have to help him*. The daughter wishes to motivate her plea by ascribing properties to her father and therefore chooses the property-assigning frame in (2):

(2) $(f_1: (v_1) (f_1))$

The variable (v_1) here involves the denotation of an individual and thus must be specified as (x_1) , and the presence of a relationship justifies the choice of the frame in (3) – note that the diamond indicates a position in which a lexeme can be inserted:

(3) $(f_1: (x_1: (f_2: [(f_3: \blacklozenge (f_3)) (x_2)_{\text{Ref}}] (f_2)) (x_1)) (f_1))$

Both *father* and *brother* are specified in the lexicon as possible fillers for the \blacklozenge slot in this particular frame, and their insertion is the next step. Notice that the two Discourse Acts that motivate the first contain information that is fully available to the addressee (the aunt). The speaker's formulation follows from a powerful communicative strategy that involves the omission of the second step in a logical argument: He is our relative [shared knowledge] – We must help our relatives [cultural presupposition] – Therefore we must help him [necessary conclusion]. It is by choosing structurally parallel frames that highlight the emotionally laden lexemes *father* and *brother* that the speaker judges her plea will have most effect.

In the following example, inspired by Butler (2012: 622),

(4) A *Aberdeen is a bustling city.*
B *I'd say, a congested city.*

a contrast is made between two adjectives that both invoke busy vehicular traffic. In A's case, his strategy involves conveying a positive emotion; in B's case, a negative emotion. Although conceptually the two words are close or equivalent and occur in the same frames, they are different in their connotations, reflecting different communicative strategies. The frame is emotionally neutral and can be specified first as in (5):

(5) $(l_i: (f_i: \text{city} (f_i) (l_i): (f_2: \blacklozenge (f_2)) (l_i))$

with the later selection of lexeme reflecting the speaker's emotional standpoint.

One of the most common types of slip of the tongue is the so-called “word exchange”. What happens here is that two lexemes (word exchanges appear not to affect grammatical words) are placed in each other’s positions. Word exchanges apply within clauses or, in FDG terms, within Discourse Acts. Here are some examples from Fernández and Smith Cairns (2011: 144):

- (6) *I left the briefcase in my cigar.*
- (7) *The Grand Canyon went to my sister.*
- (8) *We roasted a cook.*

In (6), the noun *briefcase* appears where the speaker intended to place *cigar* and vice versa. Notice that the exchangees belong to the same part of speech. This also applies to (7), which involves a proper name, also a noun. In (8), where what was intended was *We cooked a roast*, the exchange is possible because both *roast* and *cook* can be either a noun or a verb. Such slips of the tongue are understandable only if the frame is determined before the lexemes are inserted, cf. Harley (2001: 379): “... when we speak we specify a syntactic plan or frame for a sentence that consists of a series of slots into which content words are inserted. Word exchanges occur when content words are put into the wrong slot.”

Similar remarks apply to so-called blend errors, as in (9) to (11), from Harley (2001: 380):

- (9) *the chung of today* (blend of *children* and *young*)
- (10) *It’s difficult to valify.* (blend of *validate* + *verify*)
- (11) *I’m making the kettle on.* (blend of *I’m putting the kettle on* and *I’m making the tea*)

If frame selection precedes lexical insertion, these malfunctions are easily understood. If lexemes came with the full grammatical information attached, this information should block the blend.

Finally, tip-of-the-tongue phenomena involve a gap in ongoing language production that leads to a conscious search for the missing lexeme. Typically speakers have certain beliefs (not always accurate) about the lexeme in question and can even perform relevant gestures (Brown 2012: 145–147). Research has shown (Vigliocco et al. 1997) that speakers of Italian will tend to know the gender of a missing noun, and people regularly can reconstruct some of the

lexeme (*It begins with a ‘p’*). The occurrence of tip-of-the-tongue phenomena is fully understandable if frame selection precedes lexeme selection, since the frame selected by the speaker is fully valid, with only lexical access being delayed (the delay has been known to last weeks before the speaker suddenly remembers!).

3 Lexemes and their meaning

Given our view of the relationship between the Conceptual Component and the lexicon, the question arises how, and indeed whether, lexical meaning should be described within FDG. A first issue that is relevant in this respect is the division of labor between frames and lexemes. A second and related issue that has to be addressed is the status of meaning definitions.

Among the primitives that feed the Interpersonal and Representational Levels of analysis in FDG is an unbounded set of lexemes. In addition, there is a limited set of frames which determine the possible structures of the Communicated Content and the Configurational Property respectively. The former set may be referred to as the lexicon, and the latter as the “frameset”. A characteristic property of FDG is that the lexicon and the frameset are modeled as being entirely distinct. Rather, there are mapping relations between lexemes and frames indicating which are compatible with which. In a production-oriented implementation, frames are selected first, and only then are lexemes inserted into those frames. This is in keeping with the top-down organization of FDG, and is supported by psycholinguistic evidence reported in Section 2. Frames are language-specific pragmatic and semantic configurations allowed by the grammar of the language. Two simple examples of semantic frames are given in (12) and (13):

(12) $[(f_1: \blacklozenge (f_1)) (x_1)_A (x_2)_U]$

(13) $[(f_1: \blacklozenge (f_1)) (x_1)_U]$

The frame in (12) captures situations in which a first-order (x) Actor (A) acts (f) upon a first order (x) Undergoer (U), as in e. g., *The man opened the door*. The frame in (13) captures situations in which a first-order (x) Undergoer (U) is engaged in a process (f), as in e. g., *The door opened*. The question now is how the appropriate lexemes find their way into frames like these.

In an earlier account (e. g., García Velasco and Hengeveld 2002) use was made of RRG-style abstract meaning definitions such as those given in

(14) and (15). After insertion of the lexeme *open* into the matching frame in (12) and (13) the result would be as in (16) and (17):

(14) *open* [V]
 [f₁: [CAUSE (x₁) [BECOME **open**' (x₂)]]]

(15) *open* [V]
 [f₁: [BECOME **open**' (x₁)]]

(16) [(f₁: *open* (f₁)) (x₁)_A (x₂)_U]

(17) [(f₁: *open* (f₁)) (x₁)_U]

The abstract predicates CAUSE and BECOME link the participants in the meaning definitions to argument positions with certain semantic functions in the semantic frames. In RRG, the predicative element **open**' in boldface with a following prime is shorthand for a representation of the meaning element 'open' in an as yet undeveloped detailed universal semantic metalanguage.

There are two problems with this way of representing lexical meaning. The first is that it goes against the top-down organization of FDG. As argued in Section 2, the conceptual precedes the grammatical in the FDG approach. It is thus not the lexeme that has an abstract conceptual representation, but rather there is an abstract conceptual representation, referred to above as the Message, which leads the language user to the use of a lexeme that adequately captures the concept that he/she has in mind. A somewhat better representation would therefore be:

(18) [f₁: [CAUSE (x₁) [BECOME **open**' (x₂)]]] ->
open [V]

(19) [f₁: [BECOME **open**' (x₁)]] ->
open [V]

The second problem with the representation in (14) and (15), as pointed out by García Velasco (this issue), is that it is insufficiently flexible to account for creative language use.

The alternative proposed by García Velasco (this issue) and applied by Olbertz (this issue) is to use attribute-value pairs which flexibly accommodate changing lexical knowledge. This representational system adequately describes lexical knowledge and allows for a flexible approach to the lexicon. However, it is hard to implement in a grammatical system, as the attribute-value pairs are

not formalized and therefore cannot be linked easily to semantic and pragmatic frames within the grammar, a problem that the original proposal tried to address. (See, however, Olbertz [this issue] for some suggestions how various attribute-value pairs could at least be correlated with frames.)

One way of solving the linking problem would be to indicate for each lexeme, for instance using numerical indicators, which semantic and/or pragmatic frames it can be used in. Let us apply this idea to the example from Larsson (2008), dating back to Clark and Clark (1979) and Kövecses and Radden (1998), and discussed by García Velasco (this issue):

(20) *On my paper round this morning I **porched** all the papers without getting off my bike!*

The use of *porch* in this example is innovative. The original use of *porch* would be as in (21):

(21) *There is a newspaper on the porch.*

The lexical item in (21) is used in the frame given in (22):

(22) $[(f_1: \text{porch } (f_1)) (l_1)_U]$

indicating that the Location (l_1) undergoes (U) (i. e., 'has') the Property (f_1). This predication frame is used to create the location-denoting expression given in (23):

(23) $(l_1: [(f_1: \text{porch } (f_1)) (l_1)_U])$

By inserting the lexeme *porch* into the two-place action frame given in (12) and exemplified in (16) it acquires a new meaning through coercion.

The restrictions on the compatibility between lexemes and frames need to be represented somehow in the lexicon. This can most simply be done by numbering the finite set of frames and indexing each lexeme with the numbers of the compatible frames. All the lexemes that share index n will then be insertable into frame n . Following this convention, we may now indicate the possible uses of *porch* as in (24):

(24) *porch*^{22,12}

indicating through exemplificatory superscripts which frames the lexeme may be used in. Clearly, such an approach requires there to be a full inventory of

possible frames per language, such that lexemes can be exhaustively linked to frames. Note that these frames are themselves rich in semantics: they contain information on the semantic categories that they are composed of and on the semantic functions of (some of) their components. An extensive list of potential frames may be found in Hengeveld and Mackenzie (2008: 186–194).

A further potential application of this method is that the frames listed in superscript are given in order of decreasing normalcy of associations, in line with Genee's (2013) notion of 'default association'; cf. the notion of 'entrenchment' in Section 2 above. Note that the associations will be personal, i. e., different from speaker to speaker, and are open to creative expansion, as argued by García Velasco (this issue).

A consequence of what we have argued so far in this section is that, at least within the grammar, there are no meaning definitions. In this respect we arrive at a position that is different from the one that is defended by several of the authors in this volume. In our view meanings are experiential in nature and point, from within the Conceptual Component and through the process of formulation, to lexical items that have their place within the Grammatical Component. Lexical meaning within the Grammatical Component, then, is the outcome of the combination of a lexeme with a particular frame.

Keizer (this issue) extends the idea of combining frames and lexemes in an interesting way by proposing the introduction into the model of *partially instantiated frames*. She uses such frames to account for fixed combinations of elements in idioms, as for instance in the following adapted representation of *to spill the beans* 'to divulge a secret':

(25) [(f₁: spill (f₁)) (x₁)_A (mx₂: [(f₂: bean_N (f₂)) (x₂)_U])_U]

This frame is partially instantiated, as the lexical fillers of f₁ and x₂ are given, as is the plural operator (m) on (x₂). The only position that has to be further elaborated is that of (x₁).

As Keizer (this issue) notes, this approach may be extended to all kinds of formulaic language, in those cases in which these expressions may be considered to be fixed and stored as a whole. Portero Muñoz (this issue) takes up the idea of the partially instantiated frame and applies it to morphology as well. Thus, she represents the affix-like element *-head* in *Potterhead* 'person fond of Potter', an example taken from Jackendoff (2009), as in the slightly adapted frame in (26):

(26) (f₁: (f₂: -head (f₂)) (f₃) (f₁))

This frame allows the systematic description of a series of compounds such as *cokehead*, *bloghead*, *jazzhead*, etc. (see Section 4.3 below for further discussion).

Note that Portero Muñoz uses a selection restriction <addictive entity> in her representation, something we have refrained from doing in ours. The reason is that we assume that there are no meaning definitions within the grammar, and as selection restrictions follow from these meaning definitions, selection restrictions are not part of the grammar either. If they exist at all, then they are “restrictions on possible messages” (McCawley 1971: 218).

To round off this section consider the following data (some adapted from Marantz 2013: 155):

- (27) a. *Peter walks every day.*
 b. *Peter walks his dog every day.*
 c. *Peter walks to work.*
 d. *Peter walked his date home.*
 e. *Peter walked the heavy cupboard into the corner.*
 f. *Peter walked his way into the headquarters.*
 g. *Peter walked his shoes ragged.*
 h. *Peter walked off his hangover.*
 i. *Peter walks his employees off their feet.*
 j. *Peter walked the driving test.*
 k. *Peter walked the new employee through company procedures.*

(27) represents a number of constructions all containing the verb *walk*. In FDG terms, the lexeme $walk_V$ is in each case associated with a different frame. Although this particular lexeme is associated with many frames, notice that it is not associated with all: thus property-assigning frames are excluded (**Peter walks exhausted*). The lexeme is therefore represented as $(f_i: walk_V (f_i))^{[1,2,4,7,\dots]}$ where each superscript represents a compatible frame.

FDG considers that part of our knowledge of our language involves knowing which lexemes map onto which frames. For example, we know that the lexeme $(f_i: walk_V (f_i))$ shares with $(f_i: jog_V (f_i))$ and many others an association with the frame $(f_i: [(f_2: \blacklozenge (f_2)) (x_1)_A] (f_i))$; consider *Peter jogs every day* as semantically and structurally parallel to (27a). We also know that the lexeme $(f_i: walk_V (f_i))$ shares with $(f_i: escort_V (f_i))$ an association with the frame $(f_i: [(f_2: \blacklozenge (f_2)) (x_1)_A (x_2)_U (l_1)_L] (f_i))$; consider *Peter escorted his date home* as semantically and structurally parallel to (27d).

The detailed work of identifying the frameset of natural languages remains to be done. Nevertheless, as we noted above it is already clear that certain frames will be partially instantiated in the sense propounded by Keizer (this issue). Thus in (27f), we need to recognize that [possessive determiner + *way*] is a fixed component of the template in question, a template that is associated not only with *walk* but also with *make*, *charm*, *bully*, etc.: (f_1 : [f_2 : [f_3 : \blacklozenge (f_3)] (Poss way_N)] (f_2) (x_1)_A (x_2)_U (l_1)_L] (f_1)). Similarly, in the analysis of (27i), with the idiomatic expression *off their feet* appeal must be made to a partially instantiated frame: (f_1 : [f_2 : [f_3 : \blacklozenge (f_3)] (off Poss feet)] (f_2)] (x_1)_A (x_2)_U] (f_1)), which will be associated with not only *walk* but also *work*, *sweep*, etc.

Before continuing, it is worth mentioning that the FDG proposal differs from work in Construction Grammar (CxG) (Goldberg 2006). Many of the phenomena dealt with above have also been treated there, but with the important difference that constructions are defined as form-meaning pairings in CxG. In FDG, there is, as we have shown, a representational frame that captures the overall semantic organization of a linguistic expression; there is also a morphosyntactic template that captures its morphosyntactic organization. However, there is no one-to-one relation between semantic and morphosyntactic organization, as there necessarily is in Construction Grammar. Since the frameset indicates the range of possible configurations available for the operation of formulation, the frames capture semantic information in terms of the categories and functions they contain and are not directly connected to the encoding levels at which form is established. Nevertheless, there is a similarity between FDG and construction-oriented approaches in that both recognize a limited inventory of structural configurations, and a number of FDG innovations have been inspired by advances in CxG, such as the partially instantiated frames referred to above and the treatment of nominal compounds in Section 5 below.

4 Lexemes and their form

4.1 Introduction

Apart from their meaning potential, lexemes have structural properties that need to be dealt with. In this section we pay attention to two of these: the classification of lexemes into parts of speech, and the issue of basic versus derived lexemes. Both of these matters receive attention in several of the articles in this special issue.

4.2 Parts of speech

The items listed in the lexicon are classified into parts-of-speech. This classification reflects their privilege of occurrence at the two formulation levels. English is regarded as having three main parts-of-speech (verbs, nouns, and adjectives) and a derived class of manner adverbs (see below for their status) in the lexicon on the basis of examples like (28) (Hengeveld and van Lier 2010: 130):

(28) The tall_A girl_N sings_V beautifully_{Adv}.

A verb corresponds to an Ascriptive Subact at the Interpersonal Level and is head (of a Property) at the Representational Level; a noun corresponds to the head of a Referential Subact at the Interpersonal Level and is the head (in (28) of an Individual) at the Representational Level; an adjective corresponds to an Ascriptive Subact at the Interpersonal Level and is modifier (within an Individual) at the Representational Level; a (manner) adverb corresponds to an Ascriptive Subact at the Interpersonal Level and is modifier (of a Lexical Property) at the Representational Level. Parts-of-speech are thus defined functionally in terms of the different roles of lexemes in building up the Interpersonal and Representational Levels. The essential point is that in (28) none of the lexemes could be used in another pairing of Interpersonal and Representational positions without morphological adaptation. To use *tall* as a referential head, for example, it is necessary to add the suffix *-ness*.

The part-of-speech labels of lexemes are specified at the Interpersonal and Representational Levels for interpersonal and representational lexemes, respectively. This is warranted by the fact that, as explained above, lexeme classes are defined in terms of the particular functions they fulfil in building up interpersonal and representational configurations.

Not all languages classify their lexemes into four parts-of-speech. Hengeveld and van Lier (2010) have found evidence for 11 possible combinations and develop functional principles that deliver exactly those 11. See Table 1, which contains additional parts-of-speech: a Contentive can occur in all four pairings mentioned above; a Non-verb can occur in all but that associated with Verbs; a Modifier cannot occur as a head; a Nominal can occur in either of the paired positions associated with Nouns and Adjectives; and a Predicative can occur in both paired positions not associated with Nominals.

English generally has a rigid distinction between nouns and verbs. Nevertheless, it is necessary to entertain the observation that it permits certain areas of flexibility in its lexicon and to allow that the typology summarized in Table 1 abstracts away from further subclasses that a system may exhibit. The

Table 1: Parts-of-speech systems.

Number	Array of parts-of-speech	Example language
1	Contentive	Kharia
2	V/Non-verb	Turkish
3	V/N/Modifier	German
4	V/N/A/Adv	Georgian
5	V/N/A	Pipil
6	V/N	Krongo
7	V	Tuscarora
8	V/Nominal/Adv	Hungarian
9	Predicative/Nominal	Kayardild
10	V/N/Adv	Garo
11	V/Nominal	Nhanda

creative use of *porch* in Section 3 above is an example of English’s openness to flexibilizing its differentiated array of parts-of-speech. The result of this is a lexeme that can be used as the head of both an Ascriptive and a Referential Subact, a class of items that is debarred by Hengeveld and van Lier’s explanatory principles. Van Lier and Rijkhoff (2013), too, observe that alongside the global characterization of a language as belonging to one of the 11 ideal types, there is room for lexeme-specific variation; they mention the example of adjectives, some of which (like *alive*) are debarred from modifying position but accept a predicative role, or vice versa.

It is important to stress that in encoding (specifically at the Morphosyntactic Level) the classification of words is determined by totally different principles, namely their syntactic distribution and morphological characteristics. Thus *porch* in (20), although it is creatively used as an undifferentiated “Head” in formulation is indisputably a Verb word, as is visible in its syntactic positioning between subject and object and in its bearing the suffix *-ed*. The distinction between Noun word and Verb word is essential at this Level for the correct operation of syntactic and morphological operations. As Hengeveld (2013) has shown, functional identifiability at the Morphosyntactic Level is essential, especially where there is flexibility in the lexicon.

The lexemes of Esperanto, as described by Jansen (this issue), are Contentives, as is shown by the fact that they can occur in any of the positions distinguished in Hengeveld and van Lier (2010). At the formulation levels, then, it is only the stems that appear. In (29), the Esperanto equivalent to (28):

- (29) La alt-a knab-in-o kant-as bel-e.
 DEF tall-A boy-F-N sing-PRES.IND beautiful-ADV
 ‘The tall girl sings beautifully.’

the underived stems *alt-*, *kant-* and *bel-* and *knab-in-*, a derived stem (see below), will appear at the appropriate positions at the Interpersonal and Representational Levels. Any of these stems could (in other examples) appear in any of the other positions; this maximum flexibility justifies regarding Esperanto as having, like Kharia (see Table 1), only Contentives in the lexicon. However, as Jansen points out, at the Morphosyntactic Level each of the words belongs to a different word class, each invariably marked by the appropriate suffix: *-a* for Adjective words, *-e* for Adverb words, *-o* for Noun words; in (29) *-as* indicates present indicative on a Verb word.

It will be clear from our discussion of parts of speech that these characterize the lexicon only and the two formulation levels fed by it. This entails that there is no need to assign parts of speech in the Conceptual Component. As pointed out by Moseley and Pulvermüller (2014: 28), “A range of neuropsychological... and brain imaging studies... have linked the word classes [noun and verb] to specific parts of the human brain, with verb processing associated with inferior frontal and middle temporal cortex and noun processing related to other temporal and parietal areas.” However, other work has tended to show that this distinction reflects processing that correlates either with semantic classes (such as concrete vs. abstract, whether these notions are formulated as verbs or nouns, Moseley and Pulvermüller 2014) or with encoding (with distinctions pertaining to bare vs. inflected forms of words, Tyler et al. 2004, Longe et al. 2007). As long as the neurolinguistic jury is out, there is no reason to apply parts-of-speech within the Conceptual Component.

4.3 Derivation and compounding

Lexemes may be basic or derived. In the latter case, they may be the result of morphological derivation or of compounding. In Hengeveld and Mackenzie (2008: 229–230, 216–217), two types of morphological derivation and two types of compounding are distinguished. We will here elaborate on our earlier treatment of derivation and amend our treatment of compounding.

In one type of derivational process, a lexeme is inserted into a slot within a pragmatic and/or semantic frame that it was not originally designed for and is adapted formally to fit this slot. This is for instance the case of syntactic nominalizations, in which a verbal construction is inserted into a referential slot. Another example concerns the addition of *-ly* to an adjective in English when inserted into a modifier slot of a unit that is not headed by a noun (see the discussion of (28) in Section 4.2 above). These processes take place in the grammar itself, as they are the result of a process of coercing lexical elements

into slots. In these derivational processes the basic meaning of a lexeme is not affected. They are productive and semantically regular. In the second type of derivational process independent aspects of meaning are added to a lexeme, as for instance in the case of diminutive formation or the derivation of nouns indicating professions; see Jansen (this issue) and Portero Muñoz (this issue) for further examples. These derivational processes are dealt with in the lexicon itself, i. e., they take place before the insertion of a lexeme into a specific frame takes place. They are generally restricted in their productivity and semantically irregular.² Note that originally derived lexemes may become synchronically unanalyzed or even unanalyzable, in which case they are listed as basic entries in the lexicon without further attention for their internal structure.

Lexical derivations are not represented systematically in Hengeveld and Mackenzie (2008). One way to accommodate this class of derivations is to adopt the proposal by Smit and van Staden (2007) that primitives, including lexical primitives, be represented by the placeholder $\$n$, which is then defined by the relevant primitive, where definition is represented by the symbol “|”. The variable $\$$ is used rather than the variable f , as this carries along its own frame, which, though itself part of the set of primitives, is filled only after having been inserted into the grammar in the process of Formulation. So a derivational element, such as for example the prefix *un-* “ANTONYM”, is represented as an operator on a $\$$ variable defined by a lexeme, such as for instance *fair*, producing the new lexeme *unfair*:

(30) ANT ($\$m|fair$) > ($\$n|un-fair$)

This procedure thus leads to a neat separation between lexical derivation, which uses lexical primitives ($\$$) as its input, and grammatical derivation, which takes place after a frame has been inserted into the grammar.

Composition may also be of two major types, again distinguishable by the fact that some are built up in the grammar, while others are formed in the lexicon.³ Before turning to the dividing line between these two types, it is necessary to look at the classification of compounds in general. We here follow Scalise and Bisetto (2011), and its application to English in Lieber (2011), though adapting the terminology to fit the FDG framework, in distinguishing types of

² Unlike Portero Muñoz (this issue: Section 3.1), we do not see this distinction as a continuum; rather it is an empirical question whether the derivational process is of one type or the other.

³ In Hengeveld and Mackenzie (2008) we equated this distinction with the one between endocentric and exocentric compounds. As shown below, we now strictly separate these two oppositions, and add a third.

compounds in terms of the relationship between the two compounded elements. This relationship may be of three types: (i) one element is an *argument* of another element, the *predicate*; (ii) one element is a *modifier* of another element, the *nucleus*; and (iii) one element is a *conjunct*, and so is the other. The following are examples of the three types:

(30) predicate-argument: *truck driver*

(31) nucleus-modifier: *bookcase*

(32) conjunct-conjunct: *singer-composer*

In predicate-argument compounds one element is an argument of the other, for example, in *dishwasher dish* is the Undergoer of *wash*. In nucleus-modifier compounds one element modifies another, for example, in *bookcase book* modifies *case*. In conjunct-conjunct compounds the two elements are coordinated. A *singer-composer* is both a singer and a composer.

The examples in (30)–(32) can all be argued to be productively derived. They are therefore created in the grammar, not in the lexicon. Their representation is as in (33)–(35):

(33) $(f_i: [(f_j: (\$_i | \text{drive}) (f_j)) (x_i)_A (x_j: (f_k: (\$_j | \text{truck}_N (f_k)) (x_j))_{U}] (f_i))$ *truck driver*

(34) $(f_i: (f_j: (\$_i | \text{case}) (f_j): (f_k: (\$_j | \text{book}) (f_k)) (f_j)) (f_i))$ *bookcase*

(35) $(f_i: [(f_j: (\$_i | \text{singer}) (f_j)) (f_k: (\$_j | \text{composer} (\$_j)) (f_k))] (f_i))$ *singer-composer*

In (33)–(35) the compounds are represented as designating a complex property (f_i) . In (33) *truck* (x_j) is the Undergoer argument of *drive* (f_j) . In (34) *book* (f_k) modifies $(:)$ *case* (f_j) . Together they form the complex Property f_i . In (35) *singer* (f_j) and *composer* (f_k) are juxtaposed. Together they form the Property f_i .

These representations within the grammar are justified by the fact that component parts of these compounds may themselves be modified, which means they are not completely fixed units but accessible to further grammatical modification. Here are some examples (our emphasis):

(36) Mega truck driver *Dennis Anderson recently visited BamaJam Farms to check out the site of the future arena.*

(http://www.southeastsun.com/news/article_48cf4f00-e3f8-11e2-b695-0019bb30f31a.html)

- (37) *Oak Cookbook Case*.
 (<http://www.woodworkersworkshop.com/twc/work/cookbookcase.htm>)
- (38) *The story centers around tenor singer/composer Roland Hayes*.
 (<https://www.cctvcambridge.org/node/277692>)

In (36) *mega* modifies *truck*, not *driver* or *truck driver*; in (37) *cook* modifies *book*, not *case* or *bookcase*;⁴ and in (38) *tenor* modifies *singer*, not *composer* or *singer-composer*. In all these cases the representation of these compounds as produced within the grammar allows the insertion of these modifiers within their underlying representation. This is shown in (39)–(41):

- (39) $(f_i: [(f_j: (\$ | \text{drive}) (f_j)) (x_i)_A (x_j: (f_k: (\$ | \text{truck}_N (f_k): (f_i: \text{mega} (f_i)) (f_k)) (x_j))_U] (f_i))$
mega truck driver
- (40) $(f_i: (f_j: (\$ | \text{case}) (f_j)): (f_k: (\$ | \text{book}) (f_k): (f_i: \text{cook} (f_i)) (f_k)) (f_j)) (f_i))$
cookbook case
- (41) $(f_i: [(f_j: (\$ | \text{singer}) (f_j): (f_i: \text{tenor} (f_i)) (f_j)) (f_k: (\$ | \text{composer} (\$)) (f_k))] (f_i))$
tenor singer-composer

Not all compounds are productive in this way. All three classes discussed so far may also be instantiated non-productively. Here are some examples:

- (42) predicate-argument: *pickpocket*
- (43) nucleus-modifier: *redneck*
- (44) conjunct-conjunct: *bittersweet*

In none of these cases is further modification of one of the component parts of the compound possible.

In order to represent these non-productive compounds we may again use the symbol for lexical primitives introduced above. The symbol \$ defines a primitive and may for that reason not itself be further modified. These compounds are then represented in the lexicon in the following way:

- (45) $(\$ | \text{pick_pocket}_N)$

⁴ By contrast, in this example *oak* modifies *cookbook case* as a whole.

(46) ($\$_1$ | red_neck_N)

(47) ($\$_1$ | bitter_sweet_A)

One might argue that these non-productive compounds should be represented as simple primitives, rather than as consisting of two elements. This kind of representation would, however, not only ignore speakers' awareness of the compositional nature of the lexical elements involved, but also deprive us of the possibility of representing the headedness of the compound, to which we turn next.

For each of the three types discussed above, a compound may have a head, in which case it is *endocentric*, or it may not have a head, in which case it is *exocentric*. Combining this with the earlier division based on the relation between the compounds, this leads to a classification into six types, given in Table 2, again taken in adapted form from Scalise and Bisetto (2011):

Table 2: Classification of compounds.

predicate-argument		nucleus-modifier		conjunct-conjunct	
Endocentric	Exocentric	endocentric	exocentric	endocentric	exocentric
<i>truck driver</i>	<i>scarecrow</i>	<i>bookcase</i>	<i>loudmouth</i>	<i>singer-composer</i>	<i>vodka juice</i>

As regards predicate-argument compounds, there is a distinction between *truck driver* and *scarecrow*: the first is headed, as a *truck driver* is a type of driver, while the second is non-headed, as a *scarecrow* is neither a type of crow nor a type of scaring. Similarly, in nucleus-modifier compounds a *bookcase* is a type of case, while a *loudmouth* is neither a type of mouth nor a type of loud. In conjunct-conjunct compounds, too, the same difference can be made: a *singer-composer* is both a type of singer and a type of composer and is thus actually two-headed, while a *vodka-juice* is neither a type of vodka nor a type of juice. Note that the latter type of compound is rather uncommon in English but frequent in other languages. A famous example is Mandarin Chinese *fū mǔ* 'parents' (literally 'father mother').

The headedness of a compound is not only important semantically, but in many languages also grammatically. For instance, in Dutch the gender of the head of an endocentric nucleus-modifier compound determines the gender of the compound as a whole, while this is not the case in exocentric nucleus-modifier compounds. Compare the following Dutch examples (Booij 2002: 142, 144):

- (48) a. *de soep* b. *het vlees* c. *het soep-vlees*
 DEF.COMM soup DEF.NEUT meat DEF.NEUT soup-meat
 ‘the soup’ ‘the meat’ ‘the soup-meat’
- (49) a. *dom* b. *het oor* c. *de dom-oor*
 stupid DEF.NEUT ear DEF.COMM stupid-ear
 ‘stupid’ ‘the ear’ ‘the stupid person’

The compound in (48c) has neuter gender, as shown by the form the definite article takes. This gender it inherits from the head of the compound given in (48b), and not of the modifier in (48a). The compound in (49c), on the other hand, has common gender, a property that it does not share with any of the members of the compound. Importantly, the common gender in (49c) is determined by the fact that in Dutch “nouns referring to human beings [or, more in general, animate] are non-neuter” (Booij 2002: 144), which explains why other exocentric nucleus-modifier compounds such as *heet-hoofd* (‘hot-head’) ‘person who gets angry easily’, *een-oog* (‘one-eye’) ‘one-eyed person’, *warm-bloed* (‘warm-blood’) ‘warmblood’, and many more have common gender, though in all these cases the rightmost element of the compound has neuter gender. These examples clearly show that the compounding rules in the lexicon need to have access to both semantic and morphosyntactic information.

Headedness is relevant for both productive and non-productive compounds. Its representation is different in the two cases. We will restrict ourselves to the two cases illustrated in (48) and (49) here, the first one of which is productive, while the second one is not. The compounding process may be represented for these two cases as in (50)–(51), inspired by Booij’s (2009) representation of compounds within a Construction Morphology approach:

$$(50) (f_i: (f_j: (\$_i | vlees_{N_{neut}}) (f_j): (f_k: (\$_j: soep_{N_{comm}}) (f_k)) (f_j)) (f_i)) > (Nw_i: soepvlees_{N_{neut}} (Nw_i))$$

$$(51) (\$_m | oor_{N_{neut}}) + (\$_n | dom_A) > (\$_l | dom_oor_{N_{comm}})$$

The compounding process represented in (50) takes place in the grammar. At the representational level two lexemes are combined, and during the process of Morphosyntactic Encoding the noun class of the semantic head is passed on to the complex nominal word expressing the compound. The compounding process in (51) takes place in the lexicon. Two lexical items are combined in a non-productive but recognizable way, and the noun class of the resulting compound is determined by semantic rather than morphosyntactic considerations.

Finally, when a lexical compound has become synchronically unanalyzable, it is simply listed as a basic entry in the lexicon without further attention for its internal structure. A case in point would be *pineapple*.

An issue brought up by both Portero Muñoz (this issue) and Genee (this issue) shows how composition and derivation may be intimately related, in the sense that what at first sight seems to be a derivational morpheme may actually be a lexical element with limited distribution and hence be representative of compounding rather than derivation. FDG offers a straightforward solution for these cases. Among morpheme classes it distinguishes stems, roots, and affixes. Roots are defined as dependent lexical morphemes, in the sense that roots have lexical content but may only be used in combination with another lexical morpheme, be it a root or a stem.

Portero Muñoz (this issue) discusses the case, mentioned above, of apparent derivations such as *Potterhead* in the meaning of ‘person addicted to Harry Potter novels’ in which *-head* seems to be derivational in nature, while at the same coexisting with the independent lexeme *head*. By considering *-head* to be a lexical Root rather than a derivational suffix, the intermediate status of this element is neatly accounted for. So *Potterhead* would be a case of lexical compounding rather than a case of lexical derivation. Expanding on the analysis of such compounds suggested above, it would receive the following representation:

$$(52) (\$m | Potter_{Ns-x}) + (\$n | head_{Nr-y}) > (\$1 | Potter_head_{Ns-y})$$

in which the subscript ‘Ns’ indicates that *Potter* and *Potterhead* are noun stems while “Nr” indicates that *head* is a noun root.⁵

A similar point is made for Blackfoot, as described by Genee (this issue). The causative *áttsi* is argued not to be involved in lexeme derivation but rather itself to be a Root, which combines with the causativized lexeme in much the same way as English *make* combines with lexemes to create causative constructions. Genee raises the further interesting point whether, in parallel to lexeme derivation, we should not also consider frame derivation. Rather than considering a four-place Configurational Property frame as simply being ‘there’, available for expressing Messages involving four participants, there is the possibility that the frameset is restricted to those needed for underived lexemes but is expanded when necessary.

5 We recognize, of course that where such lexical roots come to be used very frequently, they can develop into affixes, as happened with English *-ful* and seems to be currently happening with “viewpoint *-wise*” (cf. Portero Muñoz, this issue).

5 Grammatical versus lexical elements

A major theme in most of the articles in this volume concerns the distinction between “grammatical” and “lexical” elements (for the separateness of lexical and grammatical processing in language production, see Ullmann [2001]). As has already been made clear, in FDG the lexicon is part of the grammatical component, constituting, along with the set of frames and the set of operators, the totality of primitives that inform the operations engendering the Interpersonal and Representational Levels. The grammatical/lexical distinction, then, concerns the division of labor among the primitives that feed formulation. We have already seen, as a consequence of Keizer’s (this issue) proposals for partially instantiated frames, that there is an interpenetration of the lexicon and the frameset. The issue focused on in this section will be the relation between the lexicon and the set of operators.

Keizer (2007) finds evidence for two intermediary categories of phenomenon that cannot be accounted for simply by the lexicon or by operators or functions, and proposes a four-step cline as follows from the fully lexical through to the fully grammatical:

- primary lexical elements (=full lexemes)
- secondary lexical elements (=partially lexicalized combinations like *sort of*)
- secondary grammatical elements (=partially grammaticalized forms like numerals)
- primary grammatical elements (=non-affixal grammatical forms like *of*)

Keizer then proposes to represent the secondary grammatical elements as “lexical operators” within FDG, distinguishing them from “operators”, which capture the primary grammatical elements.

Olbertz (this issue) considers various verbs that are commonly used in Spanish in combination with primary lexical verbs and concludes that they should be analyzed as “lexical operators”, equivalent to Keizer’s secondary grammatical elements. They appear in partially instantiated Configurational Property frames as shown in (39) (slightly adapted):

$$(53) \text{ } (para\text{-}_v f_1: [(f_2: (\$1| \blacklozenge_v) (f_2)) (v^n)] (f_1)) \text{ where } v = \text{variable over entity types; } n \geq 0$$

Note that *para*-_v ‘stop’ here occupies the operator position with respect to the variable (f_1). If *para*- at any time develops into a primary grammatical element, the operator position will come to be occupied by a standard operator such as *Cess*(ative), with the insertion of *para*- occurring at the Morphosyntactic Level as a grammatical morpheme.

Jansen (this issue) argues that for the Esperanto affix data he considers, no such constellations as (39) apply. Rather – and this is equally true of Genee’s (this issue) account of *áttsi* in Blackfoot – we have an analysis of the relevant affixes as secondary lexical elements. Again this will be dealt with by means of partially instantiated frames of the type Keizer (this issue) has shown to be necessary for the treatment of idioms in English, but in this case the lexical form of the affix will be inserted in a position appropriate for lexemes rather than operators. Jansen proposes to order the elements combined by his “lexical operations” left-to-right in accordance with their expressions as prefixes or suffixes. However, since ordering is imposed at the Morphosyntactic Level, we prefer an analysis in which the semantic relationship is clarified in formulation and ordering is postponed till encoding. For example, the partially instantiated frame for properties involving the secondary lexical element *-ec* (as in *bon-ec-o* ‘good-property-noun’, ‘goodness’) takes the form (40):

(54) $(f_1: [(f_2: (\$_{m|} /ets/c) (f_2)) (f_3: \blacklozenge_C (f_3))_{Ref}] (f_1))$ where C = Contentive

The relationship between primary and secondary grammatical elements is relevant for the analysis of spatial adpositions. Keizer (2007: 44) has argued that adpositions such as *under* in English are borderline secondary grammatical elements. For reasons to be clarified below, however, we contend that these spatial adpositions must be regarded as full lexemes (primary lexical elements) in formulation; it is only at the Morphosyntactic Level that they display properties shared with the forms that express semantic functions such as (a) preceding a Np (*at the tree/under the tree*) to form a Prepp; (b) governing the objective case (*to her/near her*); (c) stranding (*the tree I’m at/the tree I’m under*). This should not mislead us into regarding them as (even secondarily) grammatical in formulation.

How, then, does FDG determine whether an element is lexical or not? Lexical status entails the possibility of occurrence as a head within a structure at the Representational or Interpersonal Level; this in turn entails the possibility of modification by another lexical unit, from which a test can be derived. Only those elements that are susceptible to modification can be fully lexical. This clearly applies to full verbs, nouns, adjectives and adverbs. What about adpositions? The modification test shows that only lexical adpositions can be modified: **well at the tree/✓well under the tree*. As for lexical auxiliaries like *parar de* ‘stop’ in Spanish, it can be observed that modifiers cannot single out *parar*: in *Paró inmediatamente de llover* ‘It immediately stopped raining’, it is the stopping-raining that is modified. As for the lexical affixes of Esperanto and Blackfoot, these cannot be modified by themselves: given the presence of other arguments

for their lexical status, their non-modifiability qualifies them as, in line with Jansen's claims, secondary lexical elements.

It is perhaps worth emphasizing, to conclude this section, that the distinctions between grammatical and lexical and between primary and secondary are distinctions that obtain purely within the Grammatical Component. As Genee (this issue) repeatedly stresses in her discussion of causative constructions, there are no necessary connections between conceptual and grammatical distinctions. Much will depend upon the typological characteristics of the language under analysis.

6 Conclusion

In this article we have drawn inspiration from the preceding contributions to this special issue in coming to a number of conclusions which in our view are relevant to the further development of FDG's treatment of lexical matters.

First of all, on the basis of the available psycholinguistic evidence we conclude that the assumption in FDG that frames are selected first and that lexemes are inserted afterwards is warranted. This fits in with a two-stage development of the Message, the first stage concerning the overall strategic choices, the second one concerning the details of the Message. From the various contributions to this volume it has also become clear that frames may be partially instantiated, a point made most explicitly in Keizer (this issue).

Secondly, we have argued that meaning definitions and selection restrictions are not part of the grammar, but come about in the process of mapping, through Formulation, of elements of the Conceptual Component to lexical entries within the Grammatical Component. As such, we have argued that meaning definitions should be inverted: the (conceptual/experiential) message serves as a pointer to the use of the appropriate lexeme within the grammar, possibly in the form of attribute-value pairs as proposed by García Velasco (this issue). This poses an important challenge to the development of an FDG lexicon, as it requires further reflection on the Conceptual Component.

Thirdly, we have argued that parts of speech are assigned within the grammar proper, and do not play a role in the Conceptual Component. Languages may differ substantially in the way they divide propositional functions (Croft 2001) across lexeme classes. Furthermore, these (pragmatically and semantically based) lexeme classes may be put to use in word classes in syntax that show a different functional distribution.

Fourthly, we have tried to show that the processes of derivation and composition can be subdivided into grammatical and lexical. The

contributions to this volume have led us to apply this distinction more rigorously, using separate variables for properties (f) within the grammar, and primitives (\$) within the lexicon, following Smit and van Staden (2007). The result of this is, among others, a new treatment of endocentric and exocentric lexical compounds within FDG.

Finally, as regards the distinction between lexical and grammatical elements, several contributions to this special issue show that phenomena that have traditionally been accounted for as cases of compounding or derivation may be better analyzed as involving dependent lexical roots, rather than derivational affixes. This opens up potential new analyses of a range of phenomena in a wide variety of languages, especially those of the polysynthetic type, where many Words at the Morphosyntactic Level coincide with multiple lexical elements at the Interpersonal and Representational Levels.

Acknowledgements: We are indebted to Inge Genee and Evelien Keizer and to an anonymous reviewer for comments on an earlier version of this article.

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