Layers and Operators Revisited

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1. Introduction[1]

Perhaps Functional Grammar's most distinctive feature is its extensive use of the so-called *layered structure of the clause* (LSC). The LSC is used as both a descriptive and explanatory construct, dividing the linguistic world into various hierarchically related layers, each with concomitant operators and satellites. Since Hengeveld's original *Layers and Operators* article (1989), the principle of layering has come to permeate the entire grammatical model. For instance, Rijkhoff (1992) explores the application of layering to referring terms, noting the parallelism in this regard between the layering of terms and predicates.

However, there are two outstanding issues with respect to layering in FG: *the positional problem* and *the typological problem*.

1.1. The positional problem

The placement of satellites and operators in FG literature indicates that there is a lack of uniform practice as to their location in the LSC. There are two sides to this problem. On the one hand, the positions of the various operators and satellites are distributed over different positions. For example, in standard FG (Dik 1997a: 67), the LSC is presented as follows:

1. π_4 E_i: [π_3 X_i: [π_2 e_i: [π_1 [*pred*$_\beta$ $(\alpha)^n$] σ_1] σ_2] σ_3] σ_4

However, in Hengeveld (1990: 12), the LSC is presented with the predicate (σ_1) and illocution (σ_4) satellites in different locations (and as restrictors):

2. (E_i: [π_4 ILL:$\boldsymbol{\sigma_4}$ (S) (A) (π_3 X_i: [ ] (X_i): σ_3 (X_i))] (E_i): σ_5 (E_i))

π_2 e_i: [π_i pred$_\beta$:$\boldsymbol{\sigma_1}$ (Ωx_i: *pred*$_N$ (x_i))…(x_n)] (e_i): σ_2 (e_i)

On the other hand, any particular operator may appear in more than one layer: the progressive operator, for instance, is categorised as π_1 (Dik 1997a: 225) and π_0 (Vet 2001: 263). A more unusual example is found in Vismans (1994: 221). He suggests that Dutch modal particles distribute themselves as π_2, π_3, and π_4 operators. Yet he identifies all as reinforcing/mitigating operators.

1.2. The typological problem

There are also two sides to this problem. On the one hand, there is a notational disparity between operators and satellites. For example, the following sentence has a PAST operator and a temporal satellite:

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3. *John went to the park yesterday.*
   π_2-PAST e: [(f: *go*) (x: *John*) (x: *park*)$_{\text{Dir}}$] **σ_2-(x: *yesterday*)$_{\text{Tmp}}$**

Although the operator and the satellite both locate the designated state of affairs on a temporal axis, the operator is not sub-categorised as a temporal operator. Thus the shared conceptual unity of the operator and satellite is not represented. Instead, the operator/satellite distinction is used purely for differences in structural expression.

On the other hand, there is the difficulty of modes of expression that are intermediate between wholly grammatical (operators) and wholly lexical / phrasal (satellites), most commonly seen in verbal periphrases. For example, compare the representation of ingression in Hidatsa (Matthews 1965; quoted in Hengeveld 1990) and Biblical Hebrew:

4. *Wíra* *i* *ápáari* *ki* *stao* *wareac*
   tree it grow **INGR** REMPAST QUOT
   'They say the tree began to grow a long time ago'
   … π_2-REMPAST e: [**π_1-INGR** (f: *ápáari*) (x: *wíra*)]

5. *waj-jāḥel* *səʿar-* *rōʃ-ō* *lə-tsammēʿaḥ*
   and-**begin**.3.M.SG.PAST hair.GEN head-his to-grow
   'And the hair of his head began to grow' (Judges 16:22)
   … π_2-PAST e: [(f: ***ḥālal***) (f: *tsāmaḥ*) (x: *səʿar rōʃō*)]

The problem is clearly visible: the ingression is expressed grammatically by the free morpheme in Hidsata, but lexically (or periphrastically) by the verb in Biblical Hebrew. This situation is typologically rather unsatisfactory: the category of ingression is not even represented in the case of verbal complexes and the obvious grammaticalisation path from satellite to auxiliary to operator is not at all evident from the notation. Regrettably, this paper will only address the first of the two typological problems, as a solution to the second requires a detailed examination of syntax in FG.

The outline of this paper therefore is as follows: the first section provides a brief overview of the positional problem. The second section will present a solution to the positional problem, arrived at through a re-examination of Hengeveld's work on layers and operators. It will be argued that these two problems are symptoms of a more fundamental dilemma: the conflation in the layered structure of the clause (LSC) of both semantic and syntactic features (cf. Anstey fc). Through the process of disentangling semantics from these structural elements, a new *layered semantic structure* (LSS) emerges, one that largely resolves the positional and typological problems and leads to a new perspective on several issues. The third section will demonstrate that the remaining weaknesses with the layered semantic structure can only be answered with recourse to the cognitive dimension of the language faculty. The result is the presentation of a layered cognitive structure (LCS) which gives rise to a layered semantic structure (LSS) that takes the place of the traditional layered structure of the clause (LSC). The final proposal will be compared with Hengeveld's (Hengeveld fc) proposed Functional Discourse Grammar (FDG).

2. The Layered Structure of the Clause

As stated in the introduction, there are two sides to the positional problem of the LSC: its structure and the appearance of the same operator at different layers. This section briefly reviews the latter problem, postponing the former until a solution is suggested in the following section.

A version of the LSC is useful as a reference point in our discussions. Although variations have been presented[2], the majority of publications still follow closely either Dik's (1997a) or Hengeveld's (1990) models, presented above. The most important addition is the widespread use of the 'f' variable (Keizer 1992b; Hengeveld 1992) for predicates, with its concomitant π_0 and σ_0. Thus the following LSC is the basis for the descriptive survey following:

5. $\pi_4\ E_i\colon [\pi_3\ X_i\colon [\pi_2\ e_i\colon [\pi_1\ [(\pi_0\ f_i\colon \mathit{pred}_\beta\ \sigma_0)\ (\omega\ \alpha)^n]\ \sigma_1]\ \sigma_2]\ \sigma_3]\ \sigma_4$

The survey results in a tabular summary of operators and satellites from various sources, ignoring term operators. λ_n stands for π_n *OR* σ_n. I have not included satellites such as cause, reason, and so forth, often expressed with an intonation break, as it is widely regarded that these are expressions of separate moves in the discourse (Hengeveld 1997; Hannay 1998). The abbreviations used are as follows:

6.

A:	Dik (1997a; 1997b)	E:	Keizer (1992a)
B:	Mackenzie (1998)	F:	Hengeveld (1989) [3]
C:	Vet (2001)	G:	Vismans (1994)
D:	van der Auwera (2001)	H:	Cuvalay-Haak (1996)

Table 1. Operator and satellite positions in eight FG publications

Layer → / Specification ↓	λ_0	λ_1	λ_2	λ_3	λ_4
(im)perfective	E, F	A, H	C		
phasal aspect	C, E, F	A, H			
predicate negation	F	A			
manner	B	A			
speed	B	A			
beneficiary		A, B			
company		A, B			
instrument		A, B			
quality		A, B			
direction		A			
source		A			
path		A			
inherent modality		D			
locative		A	A		
perfect		C	A		
prospective		H	A, C		
quantifying			A, F		
habitual			A, F, H		
tense			A, F, H		
predication negation			A, F, H		
objective deontic modality			A, D, F		
objective epistemic modality			A, F, H	D	
subjective modality				A, F, H	
evidential modality				A, F, H	
proposition negation				A	
attitudinal				A	
reinforce		G	G	G	F, G
weaken		G	G	G	F, G
declarative					A, H
imperative					A
interrogative					A

What are we to make of these clear disagreements? To answer this question I shall return to the starting place of the LSC in FG theory: Hengeveld's (1989) *Layers and Operators* paper.

3. The Layered Semantic Structure

In order to unravel this knotty problem, I shall proceed in three steps. Firstly, I shall review Hengeveld's original proposal to illustrate an inherent tension in his presentation between the semantics

and syntax of operators. Secondly, I shall propose, in accordance with the priority of semantics over syntax advocated in FG, to redefine the layers in an exclusively semantic manner. There are many implications for this new approach, the most notable being the disappearance altogether of a layered *clause* structure. To address this unexpected situation, the final section will "rebuild" a layered semantic structure.

3.1. Hengeveld 1989

Hengeveld (1989) is the first major exposition of the LSC. He divides the clause into two basic layers: the *interpersonal*, which contains the *representational*. His LSC without satellites is as follows:

7. $(E_1: [\pi_4 \text{ ILL } (S) (A) (\pi_3 X_1: [\text{proposition}]^4 (X_1))] (E_1)$

$(\pi_2 e_1: [\pi_1{}^5 \textit{pred}_\beta (\alpha)^n] (e_1))$

The model contains four entity types as summarised in the following table:

Table 2. Hengeveld's entity typology

Variable	Restrictor	Clause Unit	Reference
x	predicate_N	(x: predicate_N (x))	individual
e	predication	(e: predication (e))	state of affairs
X	proposition	(X: proposition (X))	potential fact
E	clause	(E: clause (E))	speech act

Hengeveld understands each restrictor as referring (in the FG sense), following from the proposal of Vet (1986); however, he does point out that the 'E' variable refers to the speech event itself rather than to one of the entities referred to within that speech event. Hengeveld's LSC in tabular form is as follows:

Table 3. Tabular representation of Hengeveld (1989)

Specification → Layer ↓	λ_0	λ_1	λ_2	λ_3	λ_4
Hengeveld (1989)	π_1 / σ_1	ω	π_2 / σ_2	π_3 / σ_3	π_4 / σ_4
predicate	×				
term		×			
predication			×		
proposition				×	
illocution					×

Let us now review Hengeveld's understanding of operators. For each of the four operators, he provides three pieces of information, which help us piece together his overall view. As an example (1989: 131-132), let us consider predication operators (π_2):[6]

8. Operators (definitions)
   "Predication operators capture the grammatical means which locate the SoAs [State of Affairs, MPA] designated by a predication in a real or imaginary world and thus restrict the set of potential referents of the predication to the external situation(s) the speaker has in mind"
9. Operators (classification)

Semantic Domain	Grammatical Category
Time of occurrence	Tense
Frequency of occurrence	Quantificational Aspect
Actuality of occurrence	Objective Mood/Polarity

10. Operators (function)
    "π_2: Qualification of the SoA as a whole"

We can deduce from these statements that particular operators for Hengeveld are a minimal grammatical unit in a language representing a unitary semantic concept. Thus there is a one-to-one mapping from function to form. Accordingly, operators are grouped into four groups (π_1 to π_4) in two different ways—semantically *and* syntactically. So π_2 operators are grouped semantically as those operators concerning time, frequency, and actuality of occurrence, and morphosyntactically as those operators representing grammatical distinctions of tense, quantificational aspect, and objective mood/polarity.

This tight binding of semantics and syntax does the functionalist paradigm no favours. How does semantics have priority over syntax if the semantic distinctions are restricted to those with overt grammatical and lexical codings? And how does one explain those syntactical rules that are irreducible to semantic distinctions? Indeed, it could be argued that this amalgamation of semantics and syntax *undermines* the priority of semantics over syntax, since one may have a tendency to provide a semantic inventory for any particular language strictly according to its morphosyntactic distinctions.

A notable exception to such a tendency is Cuvalay-Haak's dissertation on the Arabic verb (1996). She carefully records the multitude of semantic (TMA) distinctions that can be expressed by two basic verb forms, a common phenomenon in Semitic languages. For example, Cuvalay-Haak (112-114) observes that (1) the same semantic operator can be represented by *either* verb form in particular contexts; (2) in some dialects such as Classical, Yemeni, and Najdi Arabic, a particular operator (typically *Past*) may be left unspecified in some contexts; (3) two different operators may be represented by the same verb form; and (4) the same verb form may represent operators from three or even four different layers. Clearly, there is a many-to-many mapping between function and form. In short, what is coded is opaque *per se* to what is meant. So it appears that even exceptions to the aforementioned tendency only further undermine the semantic-grammatical union found in Hengeveld's LSC.

Incidentally, it is worth considering why the grammatical and semantic domains coincide *at all* and why their co-incidence is not perfect. The functionalist's answer is that this is a reflection of the functional hierarchy of influence: (cognition >) pragmatics > semantics > syntax. Syntax reflects semantic distinctions, albeit imperfectly. Imperfection is to be expected since syntax is intermediate between semantics (non-linear and layered) and phonetics (linear and non-layered). Syntax ought to be then a combination of linearity and "layer-arity" as it were, which is precisely what it is.

3.2. Layers Redefined

Therefore, the first step towards a solution is a rigorous distinction between function and form. I propose in this case to define operators and satellites (or λ specifiers), then, not in terms of the layer they modify or the grammatical category they may express, but *in terms of the semantic domain to which their specification relates*. What precisely does this mean?

If we consider the specific semantic features of each domain, we observe that the semantic domains contain features of prototypical examples of the FG entity typology. For example, events, denoted by the 'e' variable are prototypically entities that *occur*. In Hengeveld's semantic domain of predication are the three categories of time, frequency, and actuality of occurrence. In addition, since events are "objective" in the sense that their (non)-occurrence is independent of opinion, the features of objective modality are in this domain. Propositions, denoted by the 'p' variable, are prototypically subjective opinions, and thus have features such as source of opinion, commitment to the opinion, and so forth.

What are the implications for this view? Firstly, let us consider the λ_0 domain. The *predicate* operators should specify features of prototypical *predicates* (represented by 'f'). What are these? A long tradition in linguistics views three properties as basic: telicity, dynamicity, and duration. That is, does the predicate "expire" or last forever (e.g., *The snow is melting* vs. *The snow is white*); does it change over time or is it static, and does it extend through time? In most languages, these properties are lexicalised, so there is no explicit marking for instance of Stative vs. Non-Stative. So prototypical π_0 operators are unusual. However, σ_0 satellites such as speed, degree, and manner are common. Mackenzie (1998) argues that speed and manner are σ_0 satellites because they modify the predicate and not the participants: they further specify features of prototypical zero-order entities.

Two other λ_0 features that have not received much attention in FG are *directionality* and *iteration* (for additional distinctions see Faber—Mairal Usón 1999: 145-176). Directionality only applies to properties of unspecified movement. An example is from the Tibeto-Burman language Qiang (Van Valin—LaPolla 1997: 42):

11. *təʁů*
'throw straight up'
λ_0-up f: *ʁů*

12. *ɦiaʁů*
'throw straight down'
λ_0-down f: *ʁů*

In Biblical Hebrew, reflexives used with verbs of motion tend to specify a movement backwards and forwards. This is seen most clearly when the same verb appears adjacent in reflexive and non-reflexive forms:

14.

waj-jōmer	*ləxū*	*hiθhalləxū*	*v-ā-ʾārets*
and-he.said	go.IMPV.2.MP	go.IMPV.2.MP.**REFL**	on-the-earth

'And he said, "Go and wander around on the earth".' (Zec 6:7)
IMP e: [f: *halax* (Ø)] & IMP e: [**λ_0-around** f: *halax* (Ø) (*vāʾārets*)$_{\text{Loc}}$]

Iteration is different from iterative aspect and other such event quantification λ_2 distinctions. In English this can be observed in λ_0 specification of restrictors.

13. *It was the **bi**-weekly meeting of the team.*
… e: *meeting*:(**λ_0:2x** f: *weekly*) (ds x: *team*)$_{\text{Ref}}$

More obvious are the cases where iterative and frequentative inflectional morphology modifies the predicate itself and not the event. Thus, in Biblical Hebrew there are pairs of verbs in plain and intensive forms:

16.

ʃāvar	*ʃibbar*
he.broke	he.broke.into.pieces
f: *ʃāvar*	**λ_0-iter** f: *ʃāvar*

17.

ʃāʾal	*ʃiʾēl*
he.asked	he.begged
f: *ʃāʾal*	**λ_0-iter** f: *ʃāʾal*

Cuvalay-Haak (1996: 46; quoting from Kristoffersen 1992: 162) suggests that the West Greenlandic Repetitive infix *–sar-* is a π_0 Repetitive marker. An example illustrates both event quantification ('every day') and property iteration ('thoroughly tested'):

14. *ullut* *tamaasa* *misilin-* *niqar-* *luar-* *tar-* *put*
day every test- PASS- well- **REP-** DECL.3.PL
'Every day they are thoroughly tested.'
… **λ_2-daily** e: [**λ_0-rep** f: *misilin*:(f: *luar*) (Ø)$_{Ag}$ ('they')$_{GoSubj}$]

Since words like "repetitive" and "iterative" are words used of event quantification, I shall use the term *predicate quantification* for these λ_0 specifiers.

There are two other candidates for π_0 status: (im)perfectivity and phasal aspect. For example, Keizer (1992a; summarised in Keizer 1992b) proposes that π_1 operators are π_0 operators. She writes (1992a: 128), "… I propose to furnish expressions at zero-level not only with their own variables, but also with their own set of operators. In the case of verbal predicates these would be the familiar predicate operators Perfective/Imperfective, Aspect, and Negation." For example, note how Keizer (1992b: 5) places the parentheses around the operator plus predicate:

15. *Ernest is sleeping and so is Jack*.
π_2:PRES e: [**(π_0:PROG f$_i$: *sleep*)** (*Ernest*)$_{Ø}$] & π_2:PRES e: [(Af$_i$) (*Jack*)$_{Ø}$]

However, it is arguable that (im)perfectivity is a prototypical characteristic of events, and not of properties. Only events (and not properties) can be viewed from either an external perspective as wholes (perfective) or an internal one as imperfective. This view is confirmed in literature on (im)perfectivity:

(a) Comrie (1976: 18,34) presents the perfective state of affairs as a "blob," a three-dimensional object considered as a single unit regardless of its internal complexity, while the imperfective is an internal view of the event.
(b) Bybee, Perkins, and Pagliuca (1994: 54) write: "Perfective is the aspect used for narrating sequences of discrete events in which the situation is reported for its own sake, independent of its relevance to other situations."
(c) Dahl (1985: 78) writes: "A perfective verb will typically denote a single event, seen as an unanalysed whole, with a well-defined result or end-state, located in the past. More often than not, the event will be punctual, or at least, it will be seen as a single transition from one state to its opposite, the duration of which can be disregarded."

Therefore I propose to reanalyse (im)perfectivity as belonging to the λ_2 layer.

From Dik's original list, this leaves us no π_1 operators and the following σ_1 satellites: beneficiary, company, instrument, quality, direction, source, path, and σ_1-locatives (as in 'He kissed Mary σ_1-on the cheek σ_2-at the station.'). But all of these satellites have something very significant in common: they all introduce additional participants into the state of affairs. They are all ways of optionally extending the number of "arguments" of the predicate, as it were. It is precisely this unique property of σ_1 satellites that led Mairal Usón and Van Valin (2001) to question the place of such satellites in FG. In RRG for instance, they are called *argument-adjuncts*, to distinguish them from arguments and adjuncts. Therefore I propose to reclassify σ_1 satellites as optional arguments.

The net result is the apparent elimination of λ_1 altogether, which is precisely what one would expect based on our new criteria: level one operators and satellites express semantic features of prototypical first-order entities, such as objects and substances. These are traditionally called term operators. By removing λ_1 from the predicate and predication layer, we have solved the long-standing problem of the lack of a variable for the nuclear predication[7] and the artificial division between nuclear and core predication. It also results in the grouping together in the one λ_2 layer all those distinctions pertinent to tense, aspect, and (objective) mood.

Moreover, if we continue our decision to characterise each semantic domain of specification as those semantic features pertinent to its corresponding prototypical denotation, then clearly the λ_1 level should contain object-like specifications. What are these features? Vossen (1995) has provided a comprehensive answer to this question. Some of the central semantic features Vossen uses to categorise nouns are (absence of-)shape, size, substance, and object-quantification. These are the crucial differentiating features of first-order entities.

In sum, the following table gives a listing of core features for the five basic entity types of traditional FG. Neither the semantic features, not the list of entity types is exhaustive, but it is sufficient for the

present purposes. Negation occurs in every domain but is not listed. Its effects on each domain are quite different from the other specifiers.

Table 4. FG entity types and their features

variable	layer	entity	prototypical semantic features
f	λ_0	property	telicity, dynamicity, duration, degree, phasal asp., directionals
x	λ_1	object/substance[8]	shape, size, substance, object quantification, location[9]
e	λ_2	event[10]	time, obj. modality, event quant., (im)perfectivity,
p	λ_3	proposition	subjective modality, commitment, evidence
a	λ_4	message	illocutionary force, politeness

Since these are prototypical features derived from prototypical entities, their *application* (or scope) is to denotations of that entity. Thus, λ_0 features are applied to properties, λ_1 to objects and substances, and so forth. This can be summarised in the following tabular reinterpretation of Hengeveld. The '×' indicates the specifier has scope over the signified.

Table 5. Tabular reinterpretation of Hengeveld (1989)

Specification → Signification ↓	λ_0	λ_1	λ_2	λ_3	λ_4
Hengeveld (1989)	π_1 / σ_1	ω	π_2 / σ_2	π_3 / σ_3	π_4 / σ_4
f	×				
x		×			
e			×		
p				×	
a					×

This table is a significant departure from traditional FG in that the scope of the operators and satellites is no longer over any element in the clause structure, but rather over a particular signification. The implications, which will be further explored below, are far-reaching. Two that are important to stress at this point as follows: firstly, since operators and satellites are categorised only according to their semantic domain (λ_n) and not according to any clausal layer, there is apparently no layered clause structure any more. Rather, there are only denotations. Where then does the layered structure come from? Rather than just assert its existence, I attempt below to derive the layered structure as a reflection of the general "layered" structure of social reality.

Secondly, the positional problem has been solved. Operators and satellites are fixed according to the criteria given and cannot appear in any other level. Accordingly, observations on the order of the *expression* of operators and/or satellites no longer count as *prima facie* evidence for either ascribing the layer at which an operator belongs or the presence of a structural/syntactic layer in the clause. If one believes that syntax iconically and imperfectly reflects semantics then languages will be expected to *reflect* the order of operators to various degrees, but not to *represent* it.

Before continuing, it is worth reviewing the proposed rearrangement of operators and satellites in tabular form. The proposed layer for each category has been highlighted and directionals and term operators have been added. The abbreviations are the same as previously. Level one satellites have been removed altogether, as they are now viewed as additional arguments in predicate frames. Furthermore, Decl, Int, and Imp are no longer operators, since they do not specify a further property of the illocutionary force but instead *provide* an illocutionary force. An analogy may help: there are many types of first-order entities: objects, substances, clusters, and so forth, which have particular values for features such as Size or Discreteness. But "object" is not an operator, any more than "activity," "event," or "proposition" are. Similarly, Decl, Int, and Imp are *types* of speech acts, having the property of illocutionary force. Thus they are not operators. This criterion should settle once the difference between Dik and Hengeveld regarding this matter, with Hengeveld's view being judged the correct one.

Inherent modality is removed as it is a lexical property. Finally, I have reordered the table for clearer presentation.

Table 6. Categorisation of operators and satellites according to semantic criteria

Layer → / Specification ↓	λ_0	λ_1	λ_2	λ_3	λ_4
predicate negation		A, F			
predicate quantification					
verbal aspect					
phasal aspect	C, E	A, F, H			
degree					
directionals					
manner	B	A			
speed	B	A			
object negation					
object quantification		A			
nominal aspect		A			
demonstrative		A			
definiteness		A			
event (predication) negation			A, F, H		
event quantification			A, F		
(im)perfective	E	A, F, H	C		
locative		A	A		
perfect (retrospective)		C	A		
prospective		H	A, C		
habitual			A, F, H		
tense			A, F, H		
objective deontic modality			A, D, F		
objective epistemic modality			A, F, H	D	
proposition negation				A	
subjective modality				A, F, H	
evidential modality				A, F, H	
attitudinal				A	
reinforce		G	G	G	F, G
weaken		G	G	G	F, G

3.3. The Layered Semantic Structure

In order to build a notation for FG that takes into account the proposal of the previous section, three ingredients are required: a basic notational format, a functionalist view of language, and a general view of the constitution of social reality.

Firstly, a specification λ_n has scope over the signification of its corresponding n^{th}-order entity, which I shall classify using τ_n, where τ_0 is a property 'f', τ_1 is an object/substance (an 'ensemble') 'x', and so forth. δ stands for denotation. Each denotation, however complex, contains an entity with a particular 'content' or sense. The content is the full inventory of meaning-contributing entities for that level: lexical, grammatical, and relational (such as X is an Agent in relationship to Y).[11] Thus we can represent denotation as follows:

16. $\delta_n = \lambda_n \tau_n$: *content*

Two clarifications are required: (a) I use the word "denotation" somewhat loosely since I would prefer a term to cover lexemes with denotation and sense ('cow'), with only sense ('unicorn'), and with neither sense nor denotation ('John'). Such a broader term is suggestively named *applicability* by Lyons (1977: 213), "for the admittedly rather ill-defined wider relationship that holds between language and the external world"; and (b) the variables are not "standing for" entities restricted in meaning by the '*content*', as in FG, but rather the whole δ_n "stands for" an entity type τ_n. The '*content'* of a δ_n contributes wholly or partly to the complete meaning.

Secondly, a functionalist view of language takes as its starting point the communicative use of language as a social phenomenon. Social factors are the driving force behind the way languages work. Clearly each member of a language community uses language, thus cognitive factors drive language at an individual level. Cognitively, the speaker is bound by the context of communication, thus the pragmatics of language exerts its all-pervasive influence over each conversation. The primary cognitive task inside this structured pragmatic discourse as it were is the representation and manipulation of meaning. However, the infinite complexities of meaning must be expressed by a finite, rapidly executable means, namely syntax, which in turn exerts its influence over the expression. This "chain of command" is represented in the functional hierarchy of influence (cf. Anstey fc; Bakker 2001: 29):

17. Social > Cognitive > Pragmatic > Semantic > Syntactic > Expression

Thirdly, I adopt the view of the social construction of reality from the philosophy of John R. Searle, presented concisely in his non-technical presentation: *Mind, Language, and Society* (1998). Searle argues that in all cases of human institution, reality is constructed through the assignment of a status function to entities by *collective intentionality*. For example, if I consider the physics of money, it has no function. It is assigned the status "currency" by the collective intentionality of a community. This assignment is represented in the format of a *constitutive rule*:

18. X counts as Y in context C

How then is *complex* reality constructed? By two means: (i) Y itself counts as something else in another context, thereby making assignment iterative; and (ii) the context C typically is itself the creation of an already created Y.[12]

Searle (1998: 129) provides the following helpful illustration of complex processes:

> I make noises through my mouth. So far, that is a brute fact: there is nothing institutional about noises as such. But, as I am a speaker of English addressing other English speakers, those noises *count as* the utterance of an English sentence; there are instances of the formula "X counts as Y in C." But now, in an utterance of that English sentence, the Y term from the previous level now functions as an X term at the next level. The utterance of that English sentence with those intentions and in that context counts as, for example, making a promise. But now that Y term, the promise, is the X term as the next level up. Making that sort of promise in those sorts of circumstances counts as undertaking a contract.

I will apply Searle's constitutive rule to the functional hierarchy, beginning at the bottom in order to build up from simplest to most complex.

We are now ready to proceed. Rather than try to spell out the entire fabric of the social construction of language (!), I shall focus on pragmatics and semantics. There is a multitude of functions ranging between the phonetic and syntactic levels, many of which are very important for higher levels. For example, words in various syntagmatic and paradigmatic combinations count as various syntactic structures in the context of speech production.

3.3.1. Basic Denotation

The most basic fact about language—what makes it the fundamental human institution—is what Searle calls "symbolisation," the human ability for one thing to stand for, or represent another. He writes (1998: 153), "the fundamental human institution in the sense that other institutions, such as money, government, private property, marriage, and games, require language, or at least language-like forms of symbolism, in a way that language does not require the other institutions for its existence." In a similar vein, Harder (1996b: 431) points out that the social functions that cause "expressions to survive" in a speech community entail that there is no "domain of meaning that is 'above' or 'prior to' functional

considerations." Thus the priority of pragmatics over semantics is maintained in such a conception of linguistic meaning.

Accordingly, we can assert that a (closed-class) word typically contributes to the content of a denotation in the context of an utterance. This is typically a zero- or first-order entity. In our format this equates to the following:

19. $\delta_n = \lambda_n \tau_n$: *word* where n=0 or 1

The appropriateness of Lyon's term *applicability* is more evident in this light: 'cow' contributes denotative information, 'unicorn' contributes sense, and 'John' contributes to the identification. Each lexeme (or larger unit) is applicable to its context.

There is however a notational problem here. In current FG, it is regularly suggested that reference to a first-order entity is achieved by the speaker referring to a general first-order entity 'x' of which a nominal property is predicated. So in referring to a dog, the speaker refers to a first-order entity 'x' and predicates the property 'dogginess' (f: *dog*) of it. This even extends to proper names (Hengeveld 1992: 11; Keizer 1992a: 349). Keizer gives this example:

20. *Linus is shy*.
Pres e: [f: *shy* **(ds x: f: *Linus*)**$_{Pat}$]

The subject is to be understood, then, as reference to a first-order entity such that it has the property "is a Linus". Although I can sympathise with the intention of introducing such notation to bring referential precision to FG, it would seem that both Keizer and Hengeveld have thrown out the denotationally-precise baby with the referentially-imprecise bathwater of traditional FG. With the separation of reference from denotation, this problem no longer exists, and I suggest returning to the denotationally precise notation presented here.[13]

Thus we can write for first- and zero-order denotations:

21. $\delta_0 = \lambda_0$ f: *word*
$\delta_1 = \lambda_1$ x: *word*

Now, it would seem that typically one or more δ_1s combined with δ_0 counts as the content of an event (δ_2) in the context of an utterance:

22. $\delta_2 = \lambda_2$ e: $[\delta_a \delta_b^n]$ where a = 0 and b = 1.

This notation leaves some problems. Firstly, a δ_0 ascriptive act in some cases can form an entire communicated content (e.g. *It is raining*). Secondly, a representation is more than the sum of its parts, it is a *state of affairs*, or an event in our typology. Thus it has its own λ_2 specifications. Therefore we can say that zero or more δ_1s combined with a δ_0 counts as the content of a δ_2 in the context of an utterance. But what do we mean by "combined with"? Simply that the entities referred to *participate* in the relation denoted by the predication and have a certain *relationship* or *semantic function* 'SF' with the predicate. Therefore we can propose the following:[14]

23. $\delta_2 = \lambda_2$ e: $[\delta_a (\delta_b)_{SF}^n]$ where a = 0 and b = 1.

Furthermore, this justifies the removal of σ_1 satellites from the δ_2 layer; they appear as additional participants in the state of affairs. The difference between arguments and satellites then boils down to one of conventional association of particular numbers and types of arguments with particular predicates. So for 'give' in English, in Searlian terms, three referential terms combined with the predicate 'give' in English often count as Agent, Recipient, and Gift in the context of an utterance (cf. Butler 2001). We can define the so-called σ_1 satellites this way: nonconventional arguments of a predicate. One consequence of this view is the replacement of verb-specific predicate frames with generalised construction templates (as also proposed in García Velasco—Hengeveld fc).

Let us proceed. As I noted above, events are independent of opinion, so we can suggest that an opinion (expressed as λ_3) about an event (δ_2) counts as the content of a proposition (δ_3) in the context of an utterance.

24. $\delta_3 = \lambda_3$ p: δ_2
$\delta_2 = \lambda_2$ e: $[\delta_a (\delta_b)_{SF}^n]$ where a = 0 and b = 1.

There is a problem here however. The notation implies that a δ_3 can only be expressed by operators and satellites (e.g. *probably*) that express an opinion. But what about verbs that lexicalise subjective modality, such as *to suggest*, *to seem*, and so forth. These verbs frame the event and have some (even if minimal) denotation. Thus δ_b can equal δ_2.

25. $\delta_3 = \lambda_3$ p: δ_2
$\delta_2 = \lambda_2$ e: $[\delta_a (\delta_b)_{SF}^n]$ where a = 0 and b = 1, 2.

Next, let us review Searle's view of a speech act. He notates it as follows (1998: 146):

26. F(p), where F marks the illocutionary force and p marks the proposition.

Searle considers how to determine the various types of speech acts. If speech act verbs alone are considered, we have *state, warn, command, promise*, and so forth. This leads on forever. The key point is that any speech act *counts as* a commitment to a particular type of action in a particular context. Searle calls such a type of action the *illocutionary point*. Thus, a declarative sentence typically counts as an assertive illocutionary point in the context of an utterance. So the question is, how many illocutionary points are there? Searle argues that there are only five: assertive, directive, commissive, expressive, and declaration (as in *I pronounce you man and wife*, not to be confused with 'declarative'). In effect, Searle is advocating the same distinction between form and function at the illocutionary level that I am advocating at every other level.

Thus we can say with Searle (1998: 147) that a particular speech act counts as a particular illocutionary point in the context of a particular utterance. It is now accepted in FG that the encoding of illocutionary point is outside the propositional content and since we are focussing on denotation, we shall not expand our notation to include speech acts.

We can therefore summarise our first version of the layered semantic structure (LSS):

27. $\delta_0 = \lambda_0$ f: *word*
$\delta_1 = \lambda_1$ x: *word*
$\delta_2 = \lambda_2$ e: $[\delta_a (\delta_b)_{SF}^n]$ where a = 0 and b = 1, 2 or 3.
$\delta_3 = \lambda_3$ p: δ_2

Thus the semantics of the proposition of a typical speech act would be as follows:

28. λ_3 p: λ_2 e: [λ_0 f: *word* (λ_1 x: *word*)$_{SF}$]

As an example:

29. *John cried*.
… p: λ_2-past e: f: *cry* (λ_1-ds x: *John*)$_{Ag}$

There is still a problem with this notation, which will be resolved in the following section: the treatment of verbal complexes. So in the following example the tight bond between *begin* and *lose* is not evident.

30. *Jo asserted that he wishes to begin to lose weight.*
… p: λ_2-past e: [f: *assert* (x: *Jo*)$_{Ag}$ (λ_2-pres e: [f: *wish* (x: *he*)$_{Ag}$ (e: [f: *begin* (e: [f: *lose* (x: Ø)$_{Ag}$ (x: *weight*)$_{Go}$])$_{Go}$])$_{Go}$])$_{Go}$

3.3.2. Extended Denotation

Despite our progress in creating and justifying a layered structure of the speech act, a rather large problem remains: prototypical discourse moves are the exception rather than the norm. This section will extend the previous notation to account for this and in so doing some more basic generalisations shall emerge from the model.

3.3.2.1. Restrictors

Any word that is introduced may have its denotation restricted. The λ-specifiers for that denotation then apply to the entire restricted word. In FG this is notated by the colon ':' as follows:

31. $\delta_n = \lambda_n \tau_n$: *word*:(restrictor)

Restrictors can be of any denotation, so that:

32. $\delta_n = \lambda_n \tau_n$: *word*:($\delta_n$)

However, restrictors tend to be such that there is a hierarchy of frequency (and maybe in some languages, availability):

33. $\delta_0 > \delta_1 > \delta_2 > \delta_3$

There is also the possibility of higher-order restrictors. In English they often appear in quotations and with hyphens between each word. The following rather elaborate example is from the novel *Shell Game* (Terman 1985: 225). Notice the definite article in front of the restrictor:

34. *'Our revered father looks troubled,' Porto said, palms pressed together. He flopped his fingers over and did the 'here-is-the-church-and-here-is-the-steeple – look-inside-and-see-all-the-people' routine.*

There is moreover a very significant role that δ_0 restrictors perform. Operators and satellites have been freed from any structural ties, defined instead as specifying additional characteristics applicable to instances of the entity type of which they are modifying. But properties are also what δ_0 restrictors denote. Thus we would expect δ_0 restrictors to represent all the types of property specification in all the layers, but with a freedom to apply to any entity at all ('an inappropriate rock,' 'a crimson laughter,' and so forth). This leads to a great flexibility in the language system and facilitates language change.[15]

3.3.2.2. Satellites and Arguments

The second issue to address is the status of satellites vis à vis arguments. It was stated above that the difference between the two is one of (non)-conventionality: non-conventionalised referential terms combined with a predicate count as additional participants in the event. However, this is a feature not only of events, but also of predicating and referring expressions:

35. *John is short **of money***.
… λ_2-pres e: [[f: *short* **(x: *money*)$_{\textbf{Ref}}$**] (λ_1-ds x: *John*)$_{\text{Zero}}$)]

36. *John is **Peter's** father*.
… λ_2-pres e: [[λ_1-ds f: *father* **($\boldsymbol{\lambda_1}$-ds x: *Peter*)$_{\textbf{Ref}}$**)] (λ_1-ds x: *John*)$_{\text{Zero}}$)

The predicate "to be short of" requires an argument, as do relational nouns such as "father". Mackenzie (1985; 1990; 1996), Keizer (1992a: 235-242) and Rijkhoff (1992) all argue that all non-obligatory additional arguments are better analysed as adnominal satellites rather than as restrictors. The main reason is that the heads of additional adnominal arguments, just like those of additional event satellites, exist in a *relationship* to the (restricted) head rather than as a restriction on the head. Thus 'the big man on the beach' expresses an additional non-obligatory relationship between the big man and the beach, such that the beach is the place where the big man is located.

However, I argued above that there are no σ_1 satellites because they do not specify further properties of the event but *introduce* new participants. Similarly, most adnominal satellites do not just specify further properties of the noun, but also introduce new participants. Just as the predicate combined with referring expressions constitutes an event, so a referent combined with other referring expressions constitutes *the* referent. For example,[16]

37. *John kissed **Mary's** sister **on the cheek at the station***.
… **$\boldsymbol{\lambda_2}$-(f: *at* (dsx: *station*)$_{\textbf{Ref}}$)$_{\textbf{Loc}}$** e: [f: *kiss* (dsx: *John*)$_{\text{Ag}}$ ([dsx: *sister* **(dsx: *Mary*)$_{\textbf{Ref}}$**])$_{\text{Go}}$
(f: *on* (dsx: *cheek*)$_{\textbf{Ref}}$)$_{\textbf{Loc}}$]

'Mary' is an argument of 'sister', 'on the cheek' is an argument of 'kiss' and 'at the station' is a level-two satellite, locating the event. Thus we need to change the notation to allow for associated arguments, assuming (incorrectly) for the moment that such arguments are only first-order entities:

38. $\delta_0 = [\lambda_0$ f: *word*:(δ_n) $(\delta_1)_{SF}^{n}]$
$\delta_1 = [\lambda_1$ x: *word*:(δ_n) $(\delta_1)_{SF}^{n}]$

Associated arguments of verbal predicates are observed in complex verb constructions that function as a single predicate. In North Australian languages such complex verb formations are ubiquitous. Schultze-Berndt (2000) has exhaustively described this phenomenon in one such language, Jaminjung (non-Pama-Nyungan). Here are two of her examples, using the LSS notation (123, 162):

39. *burrurrug* *gan-ijja-ny* \ *langiny-ni*
scatter(COVERB) 3SG:3SG-poke-PST wood-ERG/INSTR
'he scatter-poked it with a stick.'
"he poked it such that it scattered, with a stick"
… λ_2-past e: [[f: *-ijja* (f: *burrurrug*)$_{\text{Result}}$] (x: 3sg)$_{\text{Ag}}$ (x: 3sg)$_{\text{Go}}$]

40. *mulurru-ni* *gagawuli* *yurrg* *gan-karra-ny* *Gilwi-ni*
old.woman-ERG long.yam show(COVERB) 3SG:1SG-put-PST Gilwi-LOC
'The woman showed me yam in Gilwi'
… λ_2-past λ_2-(f: *ni* (x: *Gilwi*)$_{\text{Ref}}$)$_{\text{Loc}}$ e: [[f: *-arra* (f: *yurrg*)$_{\text{Ref}}$] (x: 3sg)$_{\text{Ag}}$ (x: *gagwuli*)$_{\text{Go}}$ (x: 1sg)$_{\text{Rec}}$]

The second example suggests that the complex predicate has three arguments. Schultze-Berndt (147-163) reviews the various theories as to whether these three arguments come from (1) the verb alone, (2) the coverb alone, (3) from the nondecomposable lexical unit the two verbs form as a whole, or, as Schultze-Berndt argues, (4) from a unification of semantic arguments contributed by both verbs.

Since the LSS has no syntactic information, all four possibilities can be represented by our notation, thereby giving it great flexibility and freeing it from any a priori commitment to predicate structure. The four LSS structures corresponding to these four options are as follows:

41. (1) e: [[f: *-arra* (f: *yurrg*)$_{Ref}$] (x: 3sg)$_{Ag}$ (x: *gagwuli*)$_{Go}$ (x: 1sg)$_{Rec}$]
(2) e: [f: *-arra* ([f: *yurrg* (x: 3sg)$_{Ag}$ (x: *gagwuli*)$_{Go}$ (x: 1sg)$_{Rec}$])$_{Ref}$]
(3) e: [f: *-arra yurrg* (x: 3sg)$_{Ag}$ (x: *gagwuli*)$_{Go}$ (x: 1sg)$_{Rec}$]
(4) e: [[f: *-arra* ([f: *yurrg* (x: 3sg)$_{Ag}$ (x: *gagwuli*)$_{Go}$ (x: 1sg)$_{Rec}$])$_{Ref}$] (x: 3sg)$_{Ag}$ (x: *gagwuli*)$_{Go}$]

Schultze-Berndt's argument for (her equivalent to) example (4) is that semantically the main verb – *arra* can only take two core arguments while the sentence has three. Therefore the third core argument (1SG 'me', the Recipient) has been contributed by the trivalent coverb. The semantic arguments are fused into syntactic arguments during expression.

The point is not whether Berndt-Schultze is right but that the LSS can represent all four possible analyses of Jaminjung verbal complexes.

3.3.2.3. Designating Non-First-Order Entities

Let us turn to the third issue: it is possible to designate non-first-order entities in the manner of first-order entities:

42. *The **meeting** was boring.*

The problem is that meeting is a second order entity and thus our notation would presumably be as follows:

43. *… λ_2-past e: [f: *boring* (**λ_2 e**: *meeting*)$_{SF}$)]

But can it take λ_2 specifiers? Even though the sense is of a second-order entity, the event has not been produced by combining referents and a predicate. Instead, reference is made to a second-order entity. Further properties of second-order entities can be specified, through attributive acts and satellites, as in:

44. *Yesterday's meeting was boring.*
*… λ_2-past e: [f: *boring* ([**λ_2 e**: *meeting* (f: *yesterday*)$_{Ref}$])$_{Zero}$)]

This is not a λ_2 specifier but an adnominal satellite—an unconventional argument of 'meeting'—since *yesterday* is designating a property. It just so happens that the property is a temporal property and thus is congruous with a second-order entity (i.e., **Yesterday's rock was boring*).

Moreover, λ_1 specifiers, such as size and object quantification all apply to 'meeting':

45. *Those three large meetings were all boring.*
… λ_2 e: λ_1-rem 3 *meeting*:(f: *large*)

In other words, what has happened is that the *objectivised content* of δ_n (where $n \neq 1$) *counts as* δ_1 in the context of an utterance. Objectivisation is the semantic precursor of nominalisation.

How then can we notate this? The point of non-first-order reference is that λ_1 specifiers (with some cognitive restrictions) apply to the designation. Thus I propose:

46. $\delta_1 = \lambda_1\ \tau_n$: *word*:($\delta_n$) $(\delta_1)_{SF}^{n}$

So our example above is to be notated as follows:

47. *Yesterday's meeting was boring*
… p: λ_2-past e: [f: *boring* ([**λ_1-ds e**: *meeting* (f: *yesterday*)$_{Ref}$])$_{Pat}$]

3.3.2.4. Non-verbal predication

The next obvious problem is that non-zero-order entities can predicate.

48. *Peter is happy*.
John is a writer of novels.
Jamboree 2000 is a meeting.

Thus we have the following:

49. … p: λ_2-pres e: [**f: *happy*** (λ_1-ds x: *Peter*)$_{\text{Zero}}$]
… p: λ_2-pres e: [**λ_1-is x: *writer*** (λ_1-ds x: *John*)$_{\text{Zero}}$]
… p: λ_2-pres e: [**λ_1-is e: *meeting*** (λ_1-is e: *Jamboree 2000*)$_{\text{Zero}}$]

In other words, there is often no adjustment in the case of non-verbal predicates in terms of the way they are specified. Do λ_2 specifications then still apply for non-verbal predications? Yes, and this accounts for copularisation: since a non-verbal predication, be it classifying or identifying, counts as something larger than the sum of its parts (that is, as an event about which opinions can be given), it counts as an event and takes λ_2 specifications. But since the predicate in the case of non-verbal predicates has no "place" (typically a verb) to receive verbally-inflected λ_2-specifications, one must be provided as a copula.

Associated arguments can be δ_0 also. A predicative optional argument is often an adpositional phrase (cf. Mackenzie 1992, 2001), as in the following:

50. *John hid under the table.*
… λ_2-past e: [λ_0 f: *hide* (λ_1 x: *John*)$_{\text{Ag}}$ **([λ_0 f: *under* (λ_1-ds x: *table*)$_{\text{Ref}}$])$_{\text{Loc}}$**)]

So we observe that obligatory and optional arguments can be δ_0 or δ_1, but we also noted that with events and propositions they could be δ_2 or δ_3. Thus arguments are simply $(\delta_n)_{SF}$ and notated as follows:

51. $\delta_2 = \lambda_2$ e: $[\delta_a (\delta_b)_{SF}{}^n]$ where $a \geq 0$ and $b \geq 0$.

3.3.2.5. Complex Constructions

We noted above some complex verb constructions of Jaminjung. An even more complex construction is possible in Jaminjung whereby the coverb not only forms a complex predicate with the verb but appears also as an argument of the verbal complex itself (Schultze-Berndt 2000: 189-191). The LSS can represent this situation:

52. *jalig* *jalug* *gan-unggu-m*
child be.lively(COVERB) 3SG:3SG-say/do-pres
'The child does "bouncing"'
"The child is bouncing happily"
…p: λ_2-pres e: [[f: *-yu(nggu)* (f: *jalug* (x: *jalig*)$_{\text{Ag}}$)$_{\text{Ref}}$] (x: *jalig*)$_{\text{Ag}}$ (f: *jalug*)$_{\text{Go}}$]

A different type of verbal complex occurs in Jaminjung when two coverbs combine with a single verb (Schultze-Berndt 2000: 203):

53. *ning'=biji* *yirri-ma* *gurunyung* *barr*
break.off=ONLY(COVb.) 1pl.excl:3sg-hit.PST head smash(COVb.)
'We just killed it by smashing its head'
… p: λ_2-past e: [f: *-ma* (f: *ning* (x: *gurunyung*)$_{\text{Pat}}$)$_{\text{Ref}}$ (f: *barr* (x: 1pl)$_{\text{Ag}}$ (x: *gurunyung*)$_{\text{Pat}}$)$_{\text{Manner}}$
(x: 1pl)$_{\text{Ag}}$ (x: 3sg)$_{\text{Go}}$]

Finally, if we consider our example from the previous section, we can now account for nested verbal complexes:

54. *Jo asserted that he wishes to begin to lose weight.*
… p: λ_2-past e: [f: *assert* (x: *Jo*)$_{Ag}$ (λ_2-pres e: [f: *wish* (x: *he*)$_{Ag}$ (e: [f: *begin* (f: *lose*)$_{Ref}$ (Ø)$_{Ag}$ (x: *weight*)$_{Go}$])$_{Go}$])$_{Go}$]

This notation is accurate in representing one speech act containing one proposition containing three events: Jo's 'asserting', 'wishing', and 'beginning to lose weight'.

Complex constructions can also be formed by the conglomeration of multiple events (δ_2) with or without linking words. This ranges from simple predicate coordination to complex serial verb constructions. Such combining occurs with all entity types so we can generalise by saying:

55. $\delta_n = (\{REL\}\ \delta_n)^m$ where $m \geq 1$

This states that each denotation may be optionally preceded by a 'word' relating it to some previous (non-)linguistic entity. It is important to note that the relator is not part of the denotation but does contribute some "sense" as to how distinct denotations relate to one another. Some simple examples are illustrative:

56. *5 gold and 3 silver*
… λ_1-5 x: *gold* **and** λ_1-3 x: *silver*

57. *He ran up and over the hill.*
… λ_2-past e: f: *run* (x: *he*)$_{Ag}$ (f: *up* **and** f: *over* (λ_1-ds x: *hill*)$_{Ref}$)$_{Loc}$

3.3.3. Types of Predications

Moreover, if we take the LSS as proposed—λ_3 p: λ_2 e: [δ_a (δ_b)$_{SF}^n$]—we can see what happens when we vary 'a' and 'b':

Table 7. Types of predicate and arguments

type	a	b	Example
δ_2-event	0	1 x	*John smiled*
δ_2-event	0	1 e	*The meeting dragged on*
δ_2-lexical λ_2	0	2	*The stars began to shine*
δ_3-proposition	0	2	*He seems to have lost his way*
δ_3-lexical λ_3	0	3	*He believes that the world was probably flat*
δ_2-identification	0	0	*Under the bridge is above the road*. (marginal, probably metonymic)
δ_2-identification	1 x	1 x	*The morning star is the evening star*
δ_2-identification	2	2	*To love is to listen*
δ_2-classification	0	1 x	*Happy am I*
δ_2-classification	0	1 e	*The meeting was boring*
δ_2-classification	1 x	1 x	*John is the ideal husband*
δ_2-classification	1 x	1 x	*Mary is a singer*
δ_2-classification	1 e	1 e	*Parliament is a meeting of sorts*
δ_3-classification	0	1 p	*His view was mistaken*

How do we explain the observation that in each case $b \geq a$? It appears that the degree of *predicability* of each denotation is significant. In Searle's terms: the most predicable denotation counts as the (primary) predicate, δ_a, in the context of an utterance containing two or more denotations. What is the order of predicable denotations?

58. $\delta_0 > \delta_1$ f $> \delta_1$ x $> \delta_2 > \delta_1$ e $> \delta_3 > \delta_1$ p
If both denotations are δ_1 τ_n, then definite > indefinite > non-specific
If equivalent, it is an identificational structure.[17]

In the case of two equivalent denotations, there is no predicate, rather both denotations count as referential acts (Keizer 1992a). In the case of two equivalent denotations and a third, less predicable denotation (e.g. *John is hiding under the bridge* or *John is under the bridge hiding*) normally the denotation that counts as the primary predicate act is the one that can function as a predicate act without any further measures being taken (Hengeveld 1992) or that *only* functions as a predicate. The word chosen in each denotation may influence the decision as to the most predicable element in the utterance.

This view of reference and predication is orientated toward the hearer. It is couched in terms of a task the hearer performs in interpreting a sentence. For some in FG, this is desirable, since reference in particular is viewed as something occurring *after* an utterance has occurred (see especially Harder 1989, 1992, 1996a).

However, there are nevertheless two provisos to a purely pragmatic approach to reference. Firstly, it is surely the case that by "collective intentionality" particular structures count as containing slots where predicate and referent(s) belong. So, in many languages a nominal phrase with a verb counts as an argument and a predicate in a default sentence type. So although I have advocated the removal of predicate frames, the information they contain should be retained in the lexicon as recognition of the conventional arrangements of arguments with predicates.[18]

Secondly, the speaker is also a "hearer" and internalises the constitutive rules of reference and predication in each language. The speaker's intention to communicate obviously involves a plan to predicate and to refer to various entities, and the execution of this plan usually works because of the knowledge that the speaker has about his/her language.

The view presented here of the movement from denotation to reference and predication achieves a severing of semantics and syntax, aptly illustrated in cases such as *John is the ideal husband*, where the definite non-specific noun phrase is predicative and not referential. Another illustrative case is found in languages with very few nouns, such as Tuscarora (Mithun Williams 1976; quoted in Hengeveld 1992):

59. *ra-kwaiths* *wa-hr-Ø-atkahto-?* *ka-teskr-ahs*
SUBJ-young TENSE-SUBJ-OBJ-look_at-ASP SUBJ-stink-ASP
'The boy looked at the goat'
("he is young, he looks at it, it stinks")
… p: **λ_2-tense-asp e**: [f: *atkahto* ([**e:** f: *kwaiths* ('he')$_{Pos}$])$_{Ag}$ ([**λ_2-asp e**: f: *teskr* ('it')$_{Pos}$])$_{Go}$]

Irrespective the degree to which Tuscarora is a head-marking language, we can still assert that a basic configuration for a state of affairs is:

60. λ_3 p: λ_2 e: [δ_0 (δ_2)$_{SF}$ (δ_2)$_{SF}$]

The speaker *refers* to first-order entities by using states of affairs. The Tuscarora people have collectively agreed that a δ_2 counts as a referential act in the context of an utterance with a (primary) predicate.[19] So although different language communities may distribute 'a' and 'b' in quite different combinations, the LSS is still just as applicable. Thus it is typologically adequate.

Another unusual case is found with Nootka (Fortescue fc) where λ_2 operators attach obligatorily to the first word, regardless of its "part of speech":

61. *mu:k^w-i:ɬ* *ʌuɬ* *Xapac*
four-make nice canoe
'He made four nice canoes.'
… p: e: [f: *-i:ɬ*(λ_1-4 x: *Xapac*:(f: *ʌuɬ*))$_{Go}$]

Fortescue argues that *-i:ɬ* is a verbalising suffix thus making the quantifier *mu:k^w* '4' the predicate (that is, e: [f: *mu:k^w* (f: *-i:ɬ*)$_{Ref}$ (x: *Xapac*:(f: *ʌuɬ*))$_{Go}$]). In my proposal, however, predicate status is based on denotation and not expression. What we find in Nootka is that the morphosyntax has a greater disparity with semantic structure than in English and many other languages.

Therefore, we have completed the derivation of the layered semantic structure (LSS), free from all clausal vestiges. In a single line it is as follows:[20]

62. λ_3 p: λ_2 e: [δ_a (δ_b)$_{SF}^n$] where b ≥ a

It is worth reminding ourselves of the origin of these layers. Layering, if Searle is correct, is a general feature of the construction of social reality, whereby something comes to have a status in one context, and this status itself comes to have another status in another context. From this simple procedure, starting with the sense of words, we have built from the bottom-up the layered structure of the content of the basic communicative act. From the perspective of the functionalist, this is an extremely satisfying result, as the layered structure of language is congruent with the layered structure of our collective socio-cultural life.

It is vital to realise that in "constructing" the layered structure from the bottom-up was a methodological process only, not a reflection of a "bottom-up" view of speech production. Speech production, I suggest, *works* as a top-down process *only because* the collective process of bottom-up construction of language as a human institution has already occurred. We also mentioned that the speaker has knowledge of the rules of the construction of the LSS, since the rules that create this are established by collective intentionality. What is universal about grammar, then, is the constitutive rules that allow us to build up complex meanings from simple components. The expression of these complex structures in syntax—or "poor man's semantics" as Levelt (1999) calls it—is also determined by Searlian constitutive rules, but as predicted and as observed, this varies tremendously among languages, as there are many ways of expressing the same thing. In other words, the strong typological claim for this model, is that all languages "institute" a LSS in the same manner, but that variation of expression will be great.

We can summarise the LSS as follows:

63. λ_3 p: λ_2 e: [δ_a (δ_b)$_{SF}^n$] where b ≥ a
$\delta_0 = \lambda_0$ f: *word*:(δ_n) (δ_n)$_{SF}^n$
$\delta_1 = \lambda_1$ τ_n: *word*:(δ_n) (δ_n)$_{SF}^n$
$\delta_2 = \lambda_2$ e: δ_a (δ_b)$_{SF}^n$
$\delta_3 = \lambda_3$ p: δ_2
δ_n = ({REL} δ_n)^m where m ≥ 1

Finally, despite superficial similarities, the LSS notation is not a type of predicate calculus with concomitant variables, restrictors, predicates, and so forth, as in traditional FG. This is in accord with the arguments (Harder 1992; Fortescue fc) that emphasize the inappropriateness of a predicate calculus in the FG model.

3.3.4. The Order of Operators

There is an outstanding issue with regard to operators: what order do they take *within* a particular layer. I will not delve into this issue at length, but only sketch a basic proposal. Put simply, the various features within a layer are in a complex set of relationships with one another, such that the value of one feature implies or rules out possible values of another. In other cases two different features both imply each other. Some pairs of features are neutral with respect to each other's scope. The claim is that the operators are ordered in a way that reflects these relationships.

Such a claim is nothing original and is in fact quite well known particularly in the area of verbal aspect (λ_0). Thus only the presence of dynamicity allows the presence of telicity (and speed) and only telicity allows momentaneousness (Dik 1997a: 112).

For λ_1 there are many interactions (cf. Vossen 1995). Only discreteness allows countability and more than one count allows degrees of counting (e.g. *many, less, few*). Only non-discreteness allows portioning (e.g. *little, much*). Definiteness also allows for locatability. Thus we can imagine deriving something similar to Dik's or Rijkhoff's (1992) order of term operators λ_1-def > λ_1-loc > λ_1-quant. > λ_1-nominal aspect. However, unlike Rijkhoff, no layered structure of the term is suggested.

The most complex areas of the order of operators within a domain would probably be tense-aspect-(objective-)modality in λ_2. I only make a few observations: (i) perfectivity should come inside the scope of absolute tense, since for an event to be viewed as a whole it must have occurred at some time; (ii) we

would expect perspectival aspect (and relative tenses) also to come inside the scope of absolute tenses, since they can be parasitic on the reference time of an absolute tense; (iii) non-past tenses are intimately bound up with modal uses, and tend to imply one another, so we would not expect strict ordering between tense and objective modality; (iv) event quantification comes inside the scope of tense, since for an event to occur at all, it must occur at some time. It seems to have scope over perfectivity, as quantified events can be viewed either way; and (v) Verstraete (fc) demonstrates that (subjective) deontic modality is incompatible with tense. Thus we can tentatively suggest, in accordance with traditional FG, the order λ_2-tense and/or λ_2-modality > λ_2-perspectival aspect > λ_2-event quantification > λ_2-(im)perfectivity.

Finally, we would expect negation ($\lambda_{0\text{-}3}$) and quantification ($\lambda_{0\text{-}2}$) to have unique behaviours, since they modify the sense of expressions in unique ways.

These brief comments should demonstrate the potential at least for determining a universal ranking of specifiers within each level based on cognitive and logical constraints and implicatures. The formal expression of specifiers, particularly grammatical operators expressed as discrete bound morphemes, is expected to reflect to some degree both the inter- and intra-layering orders of specifiers.

4. The Layered Cognitive Structure

The construction of the LSS obviously involves the manipulation of unitary "contents" as we have put it, symbolised most concretely by words, but also by combinations of other contents in the formation of events, propositions, and speech acts. But in the use of proforms, which are said to have *cosignificance*, how is it that they arrive in the layered structure at all, since the proform does not *have* a content to manipulate but is *connected* to a content, often but not always previously mentioned in the utterance? More problematic is research (Schmitt—Meyer—Levelt 1999) that indicates that proforms activate the words they stand for in speech production, even their phonological forms (in addition to semantic and syntactic information). If words are activated by some content, then the mind must be manipulating the content behind proforms. This makes sense, since in saying, *He thanked her*, we do not conceptualise a 'he' and a 'her' but actual people.

Thus, the LSS is a *reflection* or *product* of a cognitive construction of meaning that manipulates the so-called contents directly, and then converts this to a layered structure, substituting with words, proforms, ellipsis, and so forth to produce a LSS that is the input to the grammatical parser. The LSS does not only "underlie" syntax, but also "overlays" cognition. The basic intention to communicate in some way is organised by the formulation of discourse moves that contain one or more speech acts, each of which typically contains a proposition. Once formed, this cognitive construct is converted into the LSS, with concepts being replaced by words, proforms, metonyms, and so forth.

What about our entity-typology of properties, substances, events, and so forth? Clearly they are conceptual primitives and not linguistic ones. Should they then also be removed from the LSS as acts and intentions have been? To answer this question let us consider the semantics-syntax interface.

The "vocabulary" of syntax includes terms such as verbs, nouns, morphemes, function words, phrases, clauses, agreement, inflection, morphology, word order, and the like. We can call these the primitives of the syntactic module. They are basic to syntax. But what if syntactic operators are sensitive to conceptual information? The classic cases are grammatical gender and number: gender agreement rules in many languages are often overridden by the conceptual gender of an entity, as documented in psycholinguistic literature (Vigliocco—Butterworth—Semenza 1995; Vigliocco et al. 1996; Vigliocco—Franck 2001).

Thus, the LSS is best viewed as semantics *at the service* of syntax and so *inherits* various conceptual distinctions, such as entity type, in order for syntax to work properly. This has been the central claim of FG from its inception, that semantics influences syntax in substantive ways. So although the vocabulary of syntax does not include objects, events, and the like, it is sensitive to these features of the semantic content of the speech act. Thus our denotation-typology can safely appear in both cognitive and semantic modules.

But then have we not come full circle and returned to the dilemma of the LSC (Hengeveld 1989) in that the LSS represents grammatical semantics? No, because we have shifted *what is meant* to the cognitive layer (see below) thereby freeing the LSS in tandem with the syntax to represent *what is coded*. Many-to-many mapping between function and form is coherently and plausibly accounted for. This two-level approach to meaning—long established in pragmatics (Chapman 2001)—has been recently demonstrated as psychologically valid in the research of David Kemmerer (Kemmerer 2000a; 2000b;

Kemmerer—Wright 2002). Harder (fc-a), working within the functionalist paradigm, also advocates the "prising apart" of "linguistic meaning" and "mentally represented intended content."

The move (or leap of faith some would say!) to introduce cognition into FG has had many proponents (Nuyts 1985, 1992, fc; Keizer 1992a; van den Berg 1998; Harder 1998; Gómez-González fc). Those who have been reticent have perhaps thought that the introduction of cognition leads to a lack of formalisation and/or a lack of constraint. Anstey—Hengeveld (fc) address both of these concerns at length in the process of developing a complete model incorporating cognition. Therefore, I only wish to briefly demonstrate how the notation for the LSS naturally lends itself to a means for modelling (some aspects of) the cognitive representation of knowledge and a few implications of this.

4.1. Towards a Notation

The naïve way to constrain a cognitive representation of discourse construction is to "reverse engineer" the LSS: determine what is needed to generate the LSS and simply make this the cognitive precursor to grammar. As a first approximation, this method works well, but as more issues are addressed, many refinements are necessary. In this paper, this basic first approximation is all that will be introduced. It must be stressed that I am only considering the cognitive precursor to the representation of event-containing propositions.

We start with the LSS:[21]

64. λ_3 p: λ_2 e: [δ_a (δ_b)$_{SF}^n$] where b ≥ a
$\delta_0 = \lambda_0$ f: *word*:(δ_n) (δ_n)$_{SF}^n$
$\delta_1 = \lambda_1$ τ_n: *word*:(δ_n) (δ_n)$_{SF}^n$
$\delta_2 = \lambda_2$ e: [δ_a (δ_b)$_{SF}^n$]
$\delta_3 = \lambda_3$ p: δ_2
δ_n = ({REL} δ_n)^m where m ≥ 1

We observe that the fundamental task inside the speech act is the composition of the proposition, be that an opinion about an event or just an event. Duplicating this notation downwards from Δ_3 to Δ_0 and replacing '*word*' with CONCEPT, we can write the following:

65. $\Delta_0 = \Lambda_0$ f: CONCEPT:(Δ_n) (Δ_n)$_{SF}^n$
$\Delta_1 = \Lambda_1$ τ_n: CONCEPT:(Δ_n) (Δ_n)$_{SF}^n$
$\Delta_2 = \Lambda_2$ e: [Δ_a (Δ_b)$_{SF}^n$]
$\Delta_3 = \Lambda_3$ p: Δ_2
Δ_n = ({REL } Δ_n)^m

I have changed λ, representing π *OR* σ, to Λ, representing the cognitive activity of specification. Linguistic content (δ_n) is replaced by cognitive content (Δ_n). Moreover, I retain the entity variables for the reasons given above. Thus Δ_n is similar of δ_n, except that the mind manipulates concepts rather than words; operators and satellites replace Λ_n; and variables in the LSS are inherited from the LCS.

Another modification of the LCS concerns the issue of binding. How do we account for binding rules that allow *John washed himself* but disallow **Himself washed John*? In many theories, FG included, binding is accounted for at the lexical/grammatical level by assigning indices to entities, such as *John*$_i$ *washed himself*$_i$. Prohibitions are then couched in terms of constraints on the locations of coreferential terms in the morphosyntactic structure. However, Jackendoff (1997: 67-82) goes to great lengths to demonstrate that binding (and quantification) are fundamentally conceptual in nature and not syntactic. One example he gives concerns quantification over elided elements. For example,

66. *John fed his dogs but nobody else did.*

The problem is that *did* must be bound at conceptual level to either the concept of 'nobody else fed John's dogs' or 'nobody else fed their own dogs.'

I shall adopt Jackendoff's suggestion and place subscripted indices in the LCS but as a general principle not in the LSS. If there are syntactic rules sensitive to binding, then, like entity variables, the

LSS may inherit indices as necessary. This proposal is in accord with Cornish's (2000) proposal to remove indices from FG's LSC due to the fact that anaphors do not refer linguistic expressions (antecedents) but to a mental representation of an evoked entity (discourse referent).

We can also note that satellites also have the semantic format of δ_n so can represent the conversion from a cognitive specifier to a semantic operator or satellite as follows:[22]

67. $\Lambda_{n\text{-feature}} \Rightarrow \lambda_n$
    $\lambda_v = \pi_n$-<name> *OR* σ_n-δ_n where
    <name> is an abstract semantic distinction expressed syntactically

Therefore we now have derived a *layered cognitive structure* (LCS):

68. $\Lambda_3\ p_i$: $\Lambda_2\ e_i$: $[\Delta_a\ (\Delta_b)_{SF}{}^n]$ where $b \geq a$
    $\Delta_0 = \Lambda_0\ f_i$: CONCEPT:$(\Delta_n)\ (\Delta_n)_{SF}{}^n$
    $\Delta_1 = \Lambda_1\ \tau_{n\text{-}i}$: CONCEPT:$(\Delta_n)\ (\Delta_n)_{SF}{}^n$
    $\Delta_2 = \Lambda_2\ e_i$: $[\Delta_a\ (\Delta_b)_{SF}{}^n]$
    $\Delta_3 = \Lambda_3\ p_i$: Δ_2
    $\Delta_n = (\{REL\}\ \Delta_n)^m$ where $m \geq 1$

Let us now compare LSC (Dik), LSS, and LCS, where 'she' stands for 'Mary':

69. *She is wet because it's raining.*

    LSC:
    … p: π_2-pres e: [f: *wet* ('she')$_{Zero}$] σ_2-(π_2-pres e: [π_1-prog f: *rain*])$_{Cause}$

    LCS:
    … p_i: $\Lambda_{2\text{-}Tns}$-pres e_i: [$\Lambda_{0\text{-}Prog}$-prog f_i: RAIN] CAUSES … p_j: $\Lambda_{2\text{-}Tns}$-pres e_j: [f_j: WET (x_i: $MARY_{Pos}$)]

    LSS:
    … p: π_2-pres e: [f: *wet* (x: *she*)$_{Zero}$] *because*… p: π_2-pres e: [π_0:prog f: *rain*]

Note that MARY has been replaced with a proform, that the two Λ specifiers are expressed as an operator and satellite, no special symbol is used for term (first-order operators), and the LSS has ordered the two cognitive ideas as a_2 *because* a_1.

4.1.1. Words and Concepts

The various CONCEPTS that appear in the LCS do not constitute a universal metalanguage. They are rather like words in that they stand for the sense of the lexical item that will be selected to represent them. Harder (fc-a), however, correctly shows that what a CONCEPT stands for and what the equivalent 'word' stands for are distinct, since we can not (and should not) assume that the individual's inner language links up seamlessly with the speech community's outer language: "What I argue is that language straddles the internal/external divide … such that if elements of language did not have the interactive, functional status they have, neither would they have the cognitive status that they must necessarily also have." Moreover, Harder provides the functional explanation for why this internal/external divide does not render communication impossible: "speakers use words in the expectation that they represent not only their own but the 'right' way of talking about things." In Searlian terms, we can state that there is a critical feedback mechanism occurring in each speech event: the speaker's positive assessment of the listener's successful interpretation in the context of a conversation counts as an *affirmation* to the speaker that the (collective, external) concept represented by a particular word *corresponds* to the (individual, internal) concept represented by the inner CONCEPT.

4.1.2. Cognitive Layers

We observed previously that semantic layers are justified on the recursive property of the creation of institutional reality as expounded by Searle. But what about cognitive layers? I have simply assumed an internal reflection of layers in the LCS to mirror the external layers of the LSS. I propose basically that the bridging work of language outlined in the previous applies not only from CONCEPT to *word* but to the other elements (cognitive specifier Λ to semantic specifier λ, etc). There is a cognitive correlate in the LCS to each linguistic feature of the LSS. In other words, it is not enough to have words and concepts linked (albeit imperfectly), since it is their paradigmatic and syntagmatic combinations in the code that provide the necessary cognitive instructions to the listener.[23]

4.1.3. Pragmatics

One question that is unanswered regarding the LCS and LSS is the place of pragmatics and other elements of cognitive knowledge. This section shall briefly explain my understanding of these two pertinent issues.

In the production of speech, a great many cognitive activities are undertaken, many of which are quite resistant to formalisation and all of which continue to be intensely studied by many researchers. If one imagines the sum total of all of this cognitive activity as a funnel, the LSS I propose is at the very last stage of this process, a layer of cognition immediately available as it were to the semantic(-syntactic) language processing stage. The cognitive module therefore is not based on predicate-argument structure but that at a final pre-verbal stage such a structure has heuristic value with respect to modelling language. Thus, just as the LSS is semantics at the service of syntax—grammatical semantics—the LCS is to be interpreted as cognition at the service of semantics—*semantic cognition* by analogy. The funnel metaphor can be represented diagrammatically as follows.

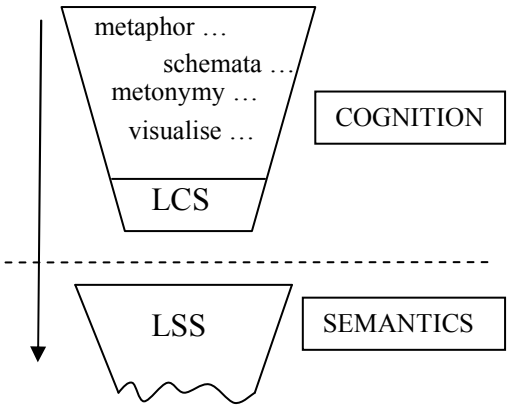


Figure 1. Cognition and the LSS and LCS

The funnel metaphor is appropriate for each of the stages of speech production in that it represents that in the transition from one (meta-)module to the next—cognition to semantics to syntax to phonology, and so forth—a large amount of information in one module must be reduced and translated into a format appropriate for the next. The funnel however "opens up" again because each module introduces new information and processes unique to itself. Each is "autonomous" in a restricted sense of the word (Harder 1996b).

Between each module is a sophisticated translation process. For example, further below we shall briefly note that a while a multitude of participant roles exist at a cognitive level, probably in the conversion from LCS to LSS only two or three macroroles are necessary.

Pragmatics (at least, many of its substantive tasks) can be understood as the translation from cognitive information to grammatical semantic information. It is the cognitively-managed (that is, preverbal) translation that results in the discrepancy between speaker meaning and sentence meaning and precisely such discrepancies are central to the task of pragmatics (Levinson 1983: 1-53).[24]

While this view leaves some issues unaccounted for (such as conversational implicature), it delimits pragmatics in such a way that allows its formalisation, discreteness, and logical priority over semantics to be modelled in the version of FG presented in this paper. Thus it is hoped that the LCS offers a way to represent speaker meaning and the LSS to represent sentence meaning.

By understanding pragmatics in this way, the hierarchy of cognition > pragmatics > semantics is represented by the model. What is not included in this paper is a model of the interpersonal aspects of communication, so in the final section I shall consider the integration of the LCS and LSS with Hengeveld's FDG.

4.2 Some Applications

I will conclude this section with three phenomena that now receive a more satisfactory treatment with the introduction of the LCS: head- vs. dependent-marking, semantic and syntactic functions, and predicate formation rules.

4.2.1. Head vs. Dependent Marking

A recurrent problem in FG has been the so-called *pro-drop* phenomenon (de Groot—Limburg 1986; Dik 1997a; Siewierska 2001). The problem is that FG rules out deletions of any sort, but in a pro-drop language, the "dropped" pronoun is supposedly required to ensure correct agreement. Thus Dik and de Groot—Limburg suggest that in a pro-drop language the verbal person markers are the arguments of the predicate in all cases and that if full (pro)nominals appear outside the verb they are in apposition to the true arguments on the verb. For example, Classical Greek is a pro-drop language:

70. *ho* *ophis* *ēpatēsen* *me* *kai* *ephagon*
DEF.M.SG snake.M.SG deceive:3.SG.PST me and eat:1.SG.PST
'The snake deceived me and I ate.'

According to Dik and de Groot—Limburg, the arguments of each verb are the 3.SG and 1.SG verbal markers respectively. The first verb has an additional term in apposition, *ho ophis*, which is cross-referenced with the verb. If the verbal markers are derived from information about the noun, then when there is no noun for the second verb a dropped pronoun ('*egō*') must have provided this information. It is this dropped pronoun that FG cannot tolerate.

Sierwierska (2001) has challenged this view. She claims that there are three types of verbal person markers. In a head-marking language such as Mohawk the verbal markers are full arguments, which she calls *anaphoric*, since they (co-)refer. In a dependent-marking language with obligatory free (pro)nominals, such as English, the verbal markers are strictly *grammatical* markers in agreement with the argument(s). And for pro-drop languages, Siewierska calls the verbal person markers *ambiguous*. When free nominals are present the verbal markers are grammatical and when absent they are anaphoric. So for our Greek example the 3.SG morphology on *ēpatēsen* is an agreement marker but on *ephagon* it is anaphoric.

What then of free nominals in a head-marking language? Siewierska agrees that they (mostly) are in an appositional relationship to the verbal markers, but whether this relationship is clause-internal (akin to NP non-restrictive appositions) or clause external (akin to dislocated topics) is variable for (or even within) different languages.

What does this issue look like in the light of the LCS and LSS proposals? Let us start with the LCS for *ephagon* (from *esthiō*), 'I ate':

71. … p_i: Λ_2-past e_i: [f_i: EAT (Λ_1-ds x_i: SPEAKER)$_{Ag}$]

We can assume that the speaker intended to refer to herself. The speaker is faced with a choice in the translation to LSS: to use a free pronominal (as a focus strategy) or not. *In either case*, the LSS needs to retain 1.SG information for the argument in order to for the syntax to correctly inflect the verb. And since there is no syntactic information whatsoever in either the LCS or the LSS, *at this stage* of the derivation issue of head- vs. dependent-marking is irrelevant. It is a matter of morphosyntactic expression.

Siewierska (2001: 234), moreover, says that the pro-drop analysis is psychologically "unattractive" but under our analysis there is no pronoun dropped *and* the fully-specified referent is present in the LCS—a psychologically attractive proposal.

Let us return to our example from Tuscarora from the previous section:

72. *ra-kwaiths* *wa-hr-Ø-atkahto-?* *ka-teskr-ahs*
SUBJ-young TENSE-SUBJ-OBJ-look_at-ASP SUBJ-stink-ASP
'The boy looked at the goat'
("he is young, he looks at it, it stinks")
…p: π_2-tense-asp e: [f: *atkahto* (e: [f: *kwaiths* (x: 'he')$_{Pos}$])$_{Ag}$ (π_2-asp e: [f: *teskr* (x: 'it')$_{Pos}$])$_{Go}$]

What is the LCS of this structure? It seems only plausible to suggest that the speaker had in mind the "he is young" and the "it stinks" as arguments. The trick is to work out the cognitive precursor to both SUBJ markers *ra* and *ka*. If the denotation X of the argument bound to YOUNG *is* the denotation of the (objectivised) event YOUNG (X) then we have a paradox: X = YOUNG (X). Thus I suggest that *ra* denotes something like *person* and *ka* something like *non-person* (or animal). So the secondary gloss is misleading and should be more like "person is young, he looks at it, non-person stinks" Therefore the LCS is proposed to be as follows:

73. … p_i: Λ_2-tense-asp e_i: [f_i: LOOK AT (e_j: [f_j: YOUNG (Λ_1-s x_j: PERSON)$_{Pos}$])$_{Ag}$
(Λ_2-asp e_k: [f_k: STINK (Λ_1-s x_k: NON-PERSON)$_{Pos}$])$_{Go}$]

The LSS is revised to be:

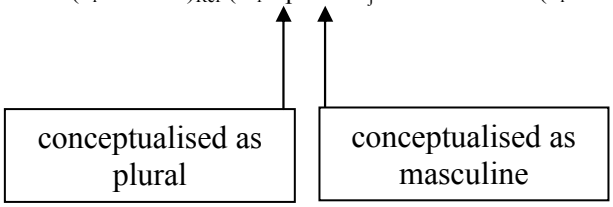
74. … p: π_2-tense-asp e: [f: *atkahto* (e: [f: *kwaiths* (x: *ra*)$_{Und}$])$_{Act}$ (π_2-asp e: [f: *teskr* (x: *ka*)$_{Und}$])$_{Und}$]

Again, it seems that the LSS provides sufficient semantic information for the syntax to do its job. In a head-marking language, the two fully-specified arguments may be expressed as dislocated topics or as appositional NPs or as whatever. The predicate will receive the correct proforms that will show morphosyntactic properties of arguments in the language.

Thus there is a cognitive and semantic unity underlying head- vs. dependent-marking languages. The deviation is in the expression. The LCS and LSS capture this cognitive-semantic unity *and* provide sufficient information for the syntax to do its job without—in the case of pro-drop languages—having to create a pronoun and then delete it.

This severing of semantics from syntax allows us to explain two more difficulties with this phenomenon, as seen in Biblical Hebrew. Firstly, as mentioned above, grammatical agreement with conceptual gender and/or number can override lexical gender. For example, a grammatical feminine argument, if used to refer to a masculine referent, may co-occur with masculine verbal person markers occasionally. This is a case where the LSS *inherits* gender information about the denotation, which overrides grammatical gender information stored in the (mental) lexicon of the user.

79. *ū-mōlaðt-əxā* *lə-xā* *jihjū*
and-offspring.**F.SG**-PRO.2.MS to-PRO.2.MS COP.3.**M.PL**.NONPAST
'And your offspring (f.sg) will be (m.pl) yours' (Genesis 48:6)
… p_i: Λ_2-nonpast e_i: [f_i: BELONG (x_i: ADDR)$_{Ref}$ (Λ_1-dp msc x_j: OFFSPRING (x_i: ADDR)$_{Pos}$)$_{Ag}$]



The translation of this to LSS would be as follows:

80. … p: π_2-nonpast [e: f: *lə* (x: -*xā*)$_{Ref}$ (π_1-d**p msc** x: *mōleðet*$_{N\text{-}\mathbf{fem\text{-}sg}}$ (x: -*xā*)$_{Pos}$)]

To represent this correctly I have had to enrich both the LSS and the LCS to include conceptual gender information. The singular is due to the lexical specifications for this particular word. The disagreement between verb and noun is now generated by the verb agreeing with the conceptual information but the noun retaining its lexical features.[25]

This conceptual override raises doubts about Siewierska's ambiguous account, for it seems that the verbal person marking has cosignification with the conceptual sense, despite the presence of a free nominal.

More problematic for her ambiguous proform theory is a peculiar phenomenon of Biblical Hebrew: Waltke—O'Connor (1990: 110) note that cases of discord such as given above are far more common when the verb comes before the subject. Being a dead-language, it is hard to draw conclusions. But if this asymmetry was found to be the case in modern pro-drop languages, why does the order of processing in speech production influence the degree of conceptual override? If the verb "gets in first" it may have a higher chance of being overridden, presumably because, as the first potential referring expression, its reference *counts more* than when it does after a referent has been introduced.

Siewierska's position seems to imply that in the case of verb before subject the very same verbal person marker starts as anaphoric and when the subject appears it becomes an agreement marker. This is clearly counter-intuitive to say the least. Therefore, if grammatical discord were demonstrated to be asymmetric between V S and S V, I would propose that all verbal person markers are anaphoric but that what varies is the *strength* of the reference. On the one hand, a free nominal, as it were, has taken all the available "space" for making a denotation thus leaving nothing for the verbal proform to contribute. On the other hand, a verbal proform by itself has to fill in all the denotative space by itself and thus is strongly referring. Ambiguous proforms would no longer be ambiguous between agreement and anaphor[26] but rather have a variable referential strength. And even in a head-marking language with compulsory anaphoric verbal person markers, I would still contend that if free nominals occur, regardless of how dislocated they are, they still win out as the strongest referring expression.

In terms of notation, I have placed the feature of gender as a Λ_1 specification. This is in accord with our proposal since conceptual gender (and animacy) is a prototypical feature of many first-order entities.

4.2.2. Semantic and Syntactic Functions

Thus far, no mention has been made of semantic, syntactic, and pragmatic functions that also appear in the LSC of traditional FG. What are we to make of these?

Keizer (1992a: 173) has already contended that semantic functions are assigned at the cognitive level first: "terms are assigned semantic functions on the basis of a knowledge representation at the pre-verbal conceptual level". There is also strong psycholinguistic evidence available that language users make use of an extensive array of semantic functions. McRae and Ferretti (McRae—Ferretti—Amyote 1997; Ferretti—McRae—Hatherell 2001) show that speakers are sensitive to differences between sentences such as *The policeman arrested the robber* and *The robber arrested the policeman*. The second sentence seems to violate the following conventional pattern:

75. e: [f: ARREST $(\ldots)_{\text{Arrester}}$ $(\ldots)_{\text{Arrestee}}$]

This approach to semantic functions would lead at the conceptual level to a proliferation of semantic functions, as is the case in RRG which postulates functions such as light-emitter, sound-emitter, locus, desire, and so forth (Van Valin—LaPolla 1997: 127). However, in RRG it is claimed that these various thematic roles have no significance for syntax; rather, syntax is content to collapse these various roles into two macroroles: actor and undergoer (although in RRG macroroles appear "between" the semantic and syntactic structures). This seems to be a good principle to follow; after all, syntax must dramatically reduce the complexity of cognitive structures in order to package them into the finite number of syntactic phrases and clauses that each language has. We can moreover adapt the principle of macroroles without committing ourselves to the precise number deemed necessary for syntax to do its job.

Thus in accord with our suggestion that the LSS is semantics at the service of syntax, I propose to leave FG's semantic functions in place in the LCS but have the translation process from LCS to LSS funnel these into two or more macroroles. Since these macroroles apply to arguments in δ_2, I propose to call them e-macroroles.

I propose that a similar principle may be at work in associating arguments at the δ_1 level, x-macroroles (and possibly f-macroroles at the δ_0 level). An example of a δ_1 x-macrorole is perhaps seen with genitives. In many languages (e.g. Germanic, Semitic), a genitive-type construction expresses a multitude of semantic relationships between the genitive and its head. In Biblical Hebrew, Kroeze (1997) found over ninety different relationships. But all of these relationships collapse into a single grammatical category: the genitive. Thus I propose a single x-macrorole of *associator* for this particular grouping of semantic relationships.[27] In English, there may also be an x-macrorole of *causer* (or *agent*?) that produces *death by poisoning* rather than **death of poisoning*.[28] Finally Barker—Dowty (1993), working within a different linguistic framework, have proposed the nominal thematic relations *proto-part* and *proto-whole*.

Thus I propose to change the LSS to the following:

76. $\delta_0 = \lambda_0$ f: *word*:(δ_n) $(\delta_n)_{\text{f-MR}}{}^n$
$\delta_1 = \lambda_1\ \tau_n$: *word*:$(\delta_n)$ $(\delta_n)_{\text{x-MR}}{}^n$
$\delta_2 = \lambda_2$ e: $[\delta_a\ (\delta_b)_{\text{e-MR}}{}^n]$

Turning to syntactic roles, Dik's original definitions very much sound like cognitive perspectives on the state of affairs. The speaker presents a particular event from a point of view, like a photographer standing at different locations around a scene (Dik 1997a: 247-254). Thus I propose to place Subject and Object in the LCS but to rename them as Primary Perspective and Secondary Perspective. The LCS is then as follows:

77. $\Lambda_3\ p_i$: $\Lambda_2\ e_i$: $[\Delta_a\ (\Delta_b)_{\text{SF,PERSP}}{}^n]$ where $b \geq a$

How is perspective translated into the LSS? One possibility is to place Subject and Object in the LSS and leave it at that. An alternative is to omit them altogether (as in RRG), since the setting of different perspectives automatically changes the LSS (for instance, macroroles adjust for passive constructions in response to arguments being bound in different ways to the primary predicate). A third alternative is to translate perspectives into Subject and Object, but not in the LSS but into a particular structural template that would unify with the LSS to produce a morphosyntactic representation (this would be possible with some adjustment in Bakker's FG model, see Bakker 2001). Until a clearer consensus emerges in FG about such matters, we cannot make any definite proposals. Thus I shall simply leave Subject and Object in the LSS as automatic translations from primary and secondary perspectives in the LCS:

78. ... λ_3 p: λ_2 e: $[\delta_a\ (\delta_b)_{\text{e-MR,SynF}}{}^n]$ where $b \geq a$

Similarly, pragmatic functions would be assigned in the LCS, with the LSS inheriting these as appropriate.

4.2.3. Predicate Formation Rules

It may be noted that the proposed LCS and LSS remove the need for predicate formation rules for non-verbal predicates. Denotations, any at all, *count* as predicates when they are the most predicable denotation in an utterance, usually easily identified from conventionalised morphosyntactic expression formats. An entity does not become a predicate due to the processing of some rule *ex nihilo* but rather due to the associative act 'B' that selects the primary predicate and binds arguments to it.

Similarly, predicate formation rules that adjust the valency and/or the semantic functions of arguments are no longer needed, since there is no predicate frame in the first place to adjust. For example, consider the LCS for a causative construction:

79. *John caused Mary to approach.*
… p_i: λ_2-past e_i: f_i: CAUSE (x_i: JOHN)$_{Causer,PrimP}$
(e_j: f_j: APPROACH (x_j: MARY)$_{Causee}$)$_{Caused}$

According to traditional FG, this sort of structure cannot be base-generated, since the verb "approach" would bring a particular structure—its predicate frame—to the LSC, thus necessitating the manipulation of this predicate frame *prior* to insertion in the LSC. This approach is particular problematic in situations requiring multiple predicate formation rules. Van Schaaik (2001) shows that for Turkish passive causatives, FG is committed to use two predicate formation rules for such verbs to move from the base form to the passive causative. The causative rule adds an argument and the passive rule takes one away.

But in the LCS, passives, causatives, reflexives, causative passives, and so forth are conceptualised directly as such. Predicate frames, or more precisely, the information they represent, are an emergent property of the LSS after conversion from the LCS.

The strongest argument in favour of this view is that it is psycholinguistically inefficient for people to have to access a word with a particular predicate frame, only to discard it in the process of formulating the "correct" predicate frame. There is simply no good reason to postulate such a processing pathway, but FG has been committed to this perspective on speech production due to its omission of a cognitive module and the concomitant proliferation of predicate formation rules.

4.3. Functional Discourse Grammar

We are now in a position to compare the LSS derived above with Hengeveld's latest model (fc), presented in part as follows:

80. (M_i: (A_i: ILL $(P_1)_S$ $(P_2)_A$ (C_i: ...(T_i) (R_i)...) INTERPERSONAL LAYER

(p_i: (e_i: (f_i) (x_i) (e_i)) (p_i)) REPRESENTATIONAL LAYER

This approach is characterised by a separation of reference as an act of the speaker from denotation (or signification) as the properties of lexemes. In classical terms, people refer, words denote. Reference prototypically occurs when a speaker presents some communicative content 'C', formulated by the performance of referential 'R' and ascriptive 'T' acts. This content is part of a discourse act 'A', one or more instances of which combine together to form a discourse move 'M'. I interpret Hengeveld's discourse act as Searle's (1998: 136) illocutionary act: "the minimal complete unit of human linguistic communication."[29]

How do the LSS and LCS structures relate to this proposal? Hengeveld is clear in asserting that both the interpersonal layer (IL) and the representational layer (RL) model what is coded in language and not what is meant. Thus the LCS must be positioned prior to both the IL and RL. Moreover, the IL models non-representational aspects of communication, such as illocution, mitigation, and so forth. Since the LSS is appears to be equivalent to the RL, a comparison could be construed as follows:

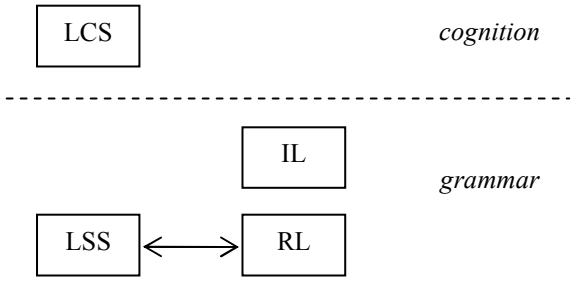


Figure 2. Comparison between FDG and LCS/LSS

Hengeveld is also clear, moreover, that any single linguistic element may appear in both the IL and RL. More precisely, the IL and RL offer two complementary perspectives on a single unit. Thus the noun phrase 'the dog' may be R-(*the dog*) in the IL and (dsx: *dog*) in the RL.

However, there seems to me to be a problem in the representation of performative (and other sentences):

81. *I promise you many rewards.*

This sort of performative sentence seems to have a communicated content 'C' of 'many rewards'. The verb *to promise* would presumably be in the IL, since it is a linguistic code for an interpersonal intention. It is sentences such as this, where a purely "semantic" representation fails to reveal the full import of the utterance, that motivates Hengeveld's partition into IL and RL levels. The problem I think arises from Hengeveld's definition of C as "the information transmitted in the discourse act." Does the "information" include the sense of the whole sentence, including the word "promise" or is it purely the content of the promise itself? For if the RL only contains the content of the promise then how is its argument structure (its binding with 'I', 'you' and 'many rewards') represented? The basic activities outlined above in the formation of a LSS, such as denoting, specifying, restricting, associating arguments, and the like, appear to apply equally as well to "He followed him" as to "He questioned him." Thus I propose that there are strictly speaking two different contents. One is the content of the entire sentence, and the other is the content of performative and illocutionary verbs.

My point is that the RL/LSS, unlike in FDG, must contain the content of the entire sentence. In some cases this is equivalent to C and in other cases C is inside the RL. C is ultimately part of the IL perspective on the sentence whose meaning is represented by the RL/LSS.

There are also interpersonal perspectives on a sentence that can be found *inside* C, such as the choice of honorific proforms. Thus, what is needed is a parallelism between IL and RL, where IL captures the entire coded, interpersonal dimension to a sentence and the RL/LSS captures the entire holistic combination of meaning-contributing elements of the same sentence. Thus there are two complementary perspectives of interaction and meaning on *every* linguistic unit of a sentence. However, the complete "meaning" of a sentence in this sense is more than a proposition, as it may contain speech-act verbs and mitigators and reinforcers of the illocutionary force. There must be fourth-order entity 'a' which is a message. A message, by definition has as its '*content*' everything else in it, namely δ_3, except that which modifies the message by specification (λ_4). Thus we can extend the LSS and LCS as follows:

82. $\delta_4 = \lambda_4$ a: δ_3
$\Delta_4 = \Lambda_4$ a_i: Δ_3

Returning to our original proposal regarding layers and operators (Section 3.2. p. 5), we must ask about the prototypical features of a message. The most basic seems to be illocutionary force (potential). Thus λ_4 specifiers modify the force of the message and are typically called mitigators or reinforcers (Vismans 1994).[30]

Although this fourth level is predominately interpersonal, its lexical and linguistic units that combine to form a message still have some semantic substance, just as ultimately, all representational units have an

interpersonal dimension. That is, the respective importance of the interpersonal and representational perspectives on the components of a message varies conversely in proportion to the entity typology:

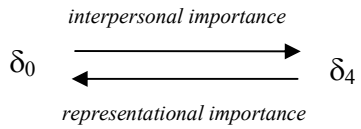


Figure 3. Importance of interpersonal and representational layers to linguistic role of entity types

Just as there is a cognitive precursor to the RL/LSS, there must be a cognitive precursor to the IL. This is the cognitive task of message formation. Graphically, this can be illustrated by renaming the LSS as cLSS, for "cognitive LSS," and the IL as the LIS for "layered interpersonal structure"[31] and its cognitive precursor to cLIS for "cognitive LIS." Thus I propose the following revised amalgamation of LCS/LSS with FDG:

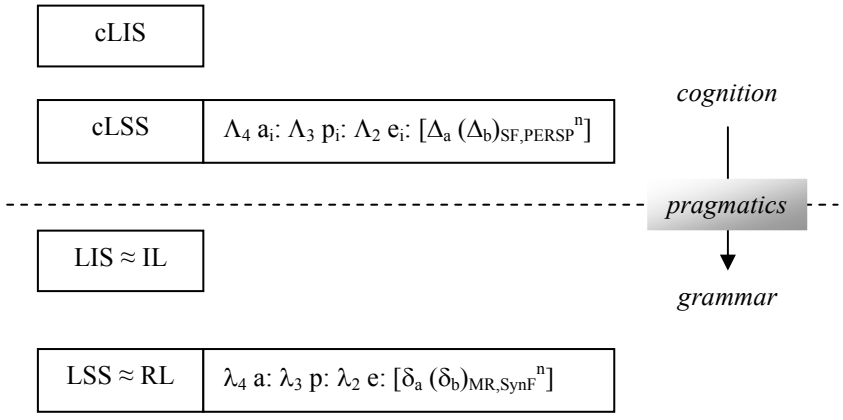


Figure 4. Proposed amalgamation of LSS/LCS with FDG

I have indicated that the LIS and LSS are approximately equal (≈) to IL and RL respectively. The key difference is as outlined above: the representational layer should contain all the sentence meaning, part of which contains the communicated content.[32]

5. Conclusion

5.1 Further Questions

This proposal raises many questions. The main ones are as follows:

a. Lexical – how is the lexicon structured and how should conventionalised predicate arguments be represented without granting them "building-block" status?
b. Incrementality – can the LCS and LSS be adapted to model incremental speech production?
c. FDG – can this proposal be integrated with Hengeveld's FDG and what would such a synthesis look like?
d. Cognitive – is the LCS too unconstrained? Should further entity types, such as time, place, manner, and so forth, be introduced at the cognitive and/or semantic layers?

e. Morphosyntactic – does the LSS provide sufficient information for the FG expression component, be it the traditional expression rules or Bakker's (2001) dynamic rules?

5.2. Summary

This article began with the observation of two recurrent problems in Functional Grammar and has ended with a rather substantial overhaul of the mechanics and representation of the layered structure of the clause, resulting in its abolition and replacement by layered semantic and layered cognitive structures.

In summary, I have presented the following:

(i) the formal representation of the LCS:

$\Lambda_4\ a_i$: $\Lambda_3\ p_i$: $\Lambda_2\ e_i$: $[\Delta_a\ (\Delta_b)_{SF,PERSP}{}^n]$ where $b \geq a$

$\Delta_0 = \Lambda_0\ f_i$: CONCEPT:$(\Delta_n)\ (\Delta_n)_{SF}{}^n$

$\Delta_1 = \Lambda_1\ \tau_{n\text{-}i}$: CONCEPT:$(\Delta_n)\ (\Delta_n)_{SF}{}^n$

$\Delta_2 = \Lambda_2\ e_i$: $[\Delta_a\ (\Delta_b)_{SF,PERSP}{}^n]$

$\Delta_3 = \Lambda_3\ p_i$: Δ_2

$\Delta_4 = \Lambda_4\ a_i$: Δ_3

$\Delta_n = (\{REL\ \}\ \Delta_n)^m$ where $m \geq 1$

(ii) the formal representation of the LSS:

λ_4 a: λ_3 p: λ_2 e: $[\delta_a\ (\delta_b)_{MR,SynF}{}^n]$ where $b \geq a$

$\delta_0 = \lambda_0$ f: *word*:$(\delta_n)\ (\delta_n)_{f\text{-}MR}{}^n$

$\delta_1 = \lambda_1\ \tau_n$: *word*:$(\delta_n)\ (\delta_n)_{x\text{-}MR}{}^n$

$\delta_2 = \lambda_2$ e: $[\delta_a\ (\delta_b)_{x\text{-}MR,SynF}{}^n]$

$\delta_3 = \lambda_3$ p: δ_2

$\delta_4 = \lambda_4$ a: δ_3

$\delta_n = (\{REL\}\ \delta_n)^m$ where $m \geq 1$

(iii) the LCS and LSS structures obviate the need for predicate formation rules for non-verbal predications. The primary predicate of any proposition is the most predicable entity in the LSS, according to the following scale of predicability:

$\delta_0 > \delta_1$ f $> \delta_1$ x $> \delta_2 > \delta_1$ e $> \delta_3 > \delta_1$ p

If both denotations are $\delta_1\ \tau_n$, then definite > indefinite > non-specific

If equivalent, it is an identificational structure.

In addition, the following table summarises the postulated placement of Λ specifications according to their layer:

Table 8. Summary of layers and their features

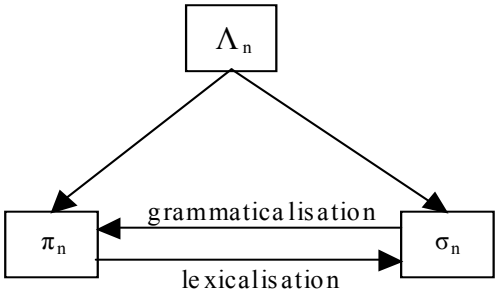
Layer	Features
Λ_0	predicate negation, predicate quantification, verbal aspect, phasal aspect, degree, directional, manner, speed
Λ_1	object negation, object quantification, nominal aspect, location, definiteness, gender, number, status
Λ_2	event negation, event quantification, (im)perfectivity, event location, perspectival aspect, tense, objective modality
Λ_3	proposition negation, subjective modality, evidentials, attitudinals
Λ_4	message negation, mitigation, reinforcement

Notes

1. I would like to thank J. Lachlan Mackenzie, Kees Hengeveld, and Peter Harder for their comments on earlier drafts. The impetus for this paper arose from ongoing research into the development of the model of FG (Pérez Quintero 2001; Anstey—Hengeveld fc). Developments of traditional FG (Dik 1997a, 1997b) are more clearly elaborated and justified in these articles.
2. For example, Cuvalay-Haak's LSC (1996: 68) is:
   π_5 E_i: π_4 C_i: π_3 X_i: extended predication (X_i):σ_3 (X_i) (C_i):σ_4 (C_i) (E_i):σ_5 (E_i)
   $\overbrace{\pi_2\ e_i\text{: }\pi_1\ c_i\text{: }\pi_0\ f_i\text{: }(x_1),(x_2)\ldots(x_n)\ (f_i)\text{: }\sigma_0\ (f_i)\ (c_i)\text{: }\sigma_1\ (c_i)\ (e_i)\text{: }\sigma_1\ (e_i)}$
   The 'E' variable is for 'expression', 'C' is for 'clause', and 'c' is for core predication, defined as "a situational or core concept (see Vet 1990: 280), defined by the projection of a Event [state of affairs, MPA] (with its own internal temporal structure as designated by the nuclear predication) on a point or interval in time, henceforth referred to as the *event frame*" (Cuvalay-Haak 1996: 59-60). For an overview of the historical evolution of the LSC see Anstey (fc).
3. Hengeveld (personal communication) notes that he always understood the predicate operators to restrict the predicate ('f' in subsequent FG) and not 'x'. So although in Hengeveld (1989) he uses π_1 in table one Hengeveld's 'F's are under λ_0 and not λ_1.
4. Anstey (fc) points out that Hengeveld (1990: 4) subsequently corrects his terminology to 'predication' in this notation since the 'proposition' is actually π_3 X_1: … (X_1).
5. See endnote 3.
6. According to Hengeveld (1989: 132), the other layer's semantic domains are as follows: layer one represents internal temporal constituency or presence/absence of property expressed by the predicate, layer three indicates source or commitment to a proposition, and layer four indicates a weakening or strengthening of the illocutionary force.
7. Cuvalay-Haak recognised this problem but fixed it by adding a 'c' variable (see endnote 2). I propose to solve it by removing the "layer" altogether.
8. Vossen points out that there are two basic denotations in first order nouns—object and substance—which FG collapses under the single 'x' variable, thereby leading to the storing in the lexicon for every noun its "discreteness of denotation" (1995: 43). Strictly speaking, therefore, FG's first-order entity type is not an object or substance but a more abstract "ensemble" (Dik 1997a).
9. By location I mean proximate or distal. The place of the full range of deictics in a denotational representation is not discussed in this paper.
10. Just as first-order entities divide into two major types, this is quite possibly the same for events, since so-called time-less, or gnomic, sentences (e.g. *Time flies*), do not seem to *occur* in any normal sense, cannot be quantified, do not begin or end, and so forth. Verstraete (fc) demonstrates that tensed vis à vis tenseless states of affairs is criterial in differentiating subjective epistemic from subjective deontic modality.
11. The content of a level can include the contents of another level, as in the case of a proposition that contains the contents of an event.
12. Harder (fc-a) further explores the appropriation of Searle's philosophy of language in a functionalist framework. He suggests some important modifications to the 'X counts as Y in context C' view of the social construction of language.
13. Such a proposal effectively eliminates nominal predicates in FG—but not the ability of nominal expressions to function predicatively—because words do not restrict the possible values of the entity-variable. I take this to be the conclusion to be drawn from Harder's (1992) discussion of the semantics of nounhood.
14. Note that in the case where n=0, $\delta_2 = \lambda_2$ e: $[\delta_0]$—precisely the semantic structure of 'It is raining' where tense and other λ_2 specifiers can apply.
15. It would seem that δ_1 restrictors tend to function also like δ_0 restrictors. For example, 'a paper box' seems to specify the substance the box is made from. If there is an adjectival predicate available,

as in 'a wooden box', there is no need for 'a wood box'. But for a specific type of wood, one would again tend to say, 'a sycamore box' rather than 'a sycamorian box'.

16. The prepositions are taken to be predicates (cf. Mackenzie 1992; 2001).
17. Some may argue that in the case of an identificational statement $\delta_2 = \lambda_2$ e: [δ_a δ_b], since δ_b appears to have no semantic function. But the point can still be made that even an identificational statement is more than the sum of its parts (in this case, more than the juxtaposition of δ_a and δ_b. For example, for 'the morning star' 'the evening star' to become 'The morning star is the evening star' there must be a constitutive rule that states that precise equivalence of predicability *counts* as identification in the context of an utterance. It is the *counting as*, the association of δ_b with δ_a that constitutes identification. Thus I think that this notation also represents identificational statements.
18. The point of García Velasco—Hengeveld's (fc) proposal is that these conventional arrangements are systematically related to the *meaning definitions* of the predicates, another insight gained by demoting them from their privileged position as predication builders.
19. The same phenomenon is observed with languages with nominalisations with λ_2-specifiers, such as perfective nominalisations in Russian.
20. It is clear that this structure will give rise to all possible complementation patterns (Dik—Hengeveld 1991; Dik 1997b: 93-119) and verbal periphrases, since the argument associated with any predicate can be an event, proposition or speech act. Thus we expect to find the following:
    λ_3 p: λ_2 e: [δ_0 (λ_2 e: [δ_0 (δ_b)$_{SF}^{n}$)$_{SF}$]]
    λ_3 p: λ_2 e: [δ_0 (δ_1)$_{SF}$ (λ_2 e: [δ_0 (δ_b)$_{SF}^{n}$])$_{SF}$]
    λ_3 p: λ_2 e: [δ_0 (δ_1)$_{SF}$ (λ_3 p: λ_2 e: [δ_a (δ_b)$_{SF}^{n}$])$_{SF}$]
21. Some may want to argue that just as there is no reference without denotation, there is no proposition without an opinion, justifying the contention of many (Hengeveld 1990; Moutaouakil 1996; Verstraete fc) that 'p' is only present in the LSS when subjective modality, that is, opinion, is present.
22. The translation from LCS to LSS for Λ-specifiers can be represented as follows:



23. Nuyts (fc) disputes this. In contrast, he argues that layering is a conceptual but not a linguistic primitive. Layering, where present in grammar, is an effect of conceptual layering and not an inherent feature as such. In response, I would suggest that there are two types of layering. Grammatical layering emerges as the result of the speech community's construction of reality. Conceptual layering emerges as the result of the cognitive organisation of mental information. Layering is inherent to both and is essential for the internalist/externalist bridging that language achieves.
24. This view of pragmatics is not new to FG. Nuyts (1983: 380) suggested much the same almost twenty years ago: "The psychological and social functions … do not constitute the content of language directly, but rather they give it its proper shape: they are reflected in structural concepts such as intonation, surface-structure organisation …, selection of informatively 'synonymous' lexical items with different argument places or different connotations, etc. If this is adequate, pragmatics has to be situated before the utterances are verbally shaped."
25. There is an alternate explanation: particular words such as *mōleðet* are marked in the lexicon as invoking plural verb agreement. But how would this arise in the first place? The lexicon in this case is simply reflecting conventionalised patterns that have arisen because of the sort of clash between conceptualisation and inflectional morphology reflected in the notation given.

26. For even in English we can say 'The government was/were mistaken', which surely reflects two different conceptualisations, mediated to the hearer *by the verbal person markers*.
27. I recognise that this is a different idea to macroroles in RRG, which is one reason why the idea is only tentative. The question is: what semantic distinctions matter to syntax in the formation of nominal compounds and are these distinctions the same or different from cognitive distinctions?
28. The choice between 'by' and 'of' for nominalisations, however, is usually predicted by the semantic transitivity of the corresponding verbal predicate.
29. However, for the speaker to form a state of affairs requires more than making an ascriptive act T and a referential act R. What counts is the *combining* or *binding* of the arguments to the predicate. This act of association seems to be more basic, in that it *uses* ascriptive and referential acts and combinations thereof (and also non-referential "mentions") to create something greater than the sum of its parts. Let us call this basic process an *associative act* 'B'. The associative act is what happens when δ_a δ_b becomes e: $[\delta_a (\delta_b)_{SF}]$. Keizer (1992a: 143-147) also argues persuasively for "taking argument status as a necessary criterion for referentiality." That is, a denotation can only be used to refer 'R' when it is bound 'B' to an ascriptive predicate 'T'. The associative act forms a critical bridge between denotation and meaningful communication. That is, a language community agrees that particular combinations of denotations in particular morphosyntactic structures *count as* structured wholes, as propositions containing an association of arguments with a predicate. It is this moving from 'give', 'boy', 'gift' to the singular event—more than the sum of its parts—'the boy gave the gift' that gives a meaningful content to the proposition of each (and almost every) speech act. And it is only the existence of coherent speech acts that can count as having an illocutionary point that makes the acoustic blasts *a language*.
30. According to this view of λ_4 specifiers, Decl, Int, Imp and other such illocutionary operators are not operators at all, since they are types of speech acts and/or expression modes. I am undecided as to whether Hengeveld's illocutionary frame belongs in the LIS and/or LSS and/or the expression component.
31. However, I have not explored why or in what way the interpersonal perspective is "layered."
32. The restriction that both the IL/LIS and RL/LSS only contain linguistically coded information explains the difference between the two readings of the much-discussed English '*I am afraid that John is ill*' which has two expressions in Spanish '*Me temo que Juan esté enfermo*' and '*Me temo que Juan está enfermo*' (Harder fc-b; Hengeveld fc). The difference is that although in both languages there is clearly a cognitive difference between the sentences, in the translation to grammatical semantics (LSS/RL) and grammatical interactions (LIS/IL) English collapses both readings into the same sentence while Spain codes the difference. Thus I disagree with Harder who has an extensive, differing IL for each the English examples. This information I would want to place in the cLIS. Any difference in English between the intonations of the two utterances *could* be assigned to the interpersonal level, but I would be interested in pursing the possibility of imposing yet another perspective on the sentence: the prosodic. The prosodic pattern would also be chosen in the pragmatic translation from cognitive to grammatical, or perhaps in this case, phonological modules.

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