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Functional Discourse Grammar

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Abstract: Functional Discourse Grammar (FDG) is a typologically based structural-functional theory of language. It has a top-down organization to achieve psychological adequacy, and takes the Discourse Act as its basic unit of analysis to achieve pragmatic adequacy. Although itself strictly a model of grammar, FDG is designed to interact with Conceptual, Contextual, and Output Components, so as to enhance its compatibility with a wider theory of verbal interaction.

Keywords: Functionalism, Language Typology, Discourse Act, Top-Down architecture, Pragmatics, Semantics, Syntax, Morphology, Phonology

1. Introduction¹

This chapter introduces Functional Discourse Grammar (FDG), a typologically based model of language structure. After a general outline of the model and its place as the grammatical component of a wider theory of verbal interaction in Section 2, Section 3 will situate the model within the field of grammatical theories at large. Section 4 will deal with the details of the four levels of linguistic organization (interpersonal, representational, morphosyntactic, and phonological) inside the grammar proper, giving examples of the potential of each. Section 5 will give an impression of how both the interaction of the grammar with surrounding components and the interaction between the various levels within the grammatical component help explain a wide range of linguistic phenomena. After a detailed analysis of a worked example in Section 6, we will discuss some further applications of FDG in Section 7.

¹ For a full account of FDG see Hengeveld & Mackenzie (2008).

2. Outline of the model

2.1. FDG and verbal interaction

As shown in Figure 1, FDG is conceived of as the Grammatical Component of an overall model of verbal interaction in which it is linked to a Conceptual Component, an Output Component and a Contextual Component. These three non-grammatical components interact in various ways with the Grammatical Component, more specifically with the operations of Formulation and Encoding. Formulation concerns the rules that determine what constitute valid underlying pragmatic and semantic representations in a language. Encoding concerns the rules that convert these pragmatic and semantic representations into morphosyntactic and phonological ones. FDG assumes that both Formulation and Encoding are language-specific, i.e. no universal pragmatic, semantic, morphosyntactic or phonological categories are postulated until their universality has been demonstrated through empirical research.

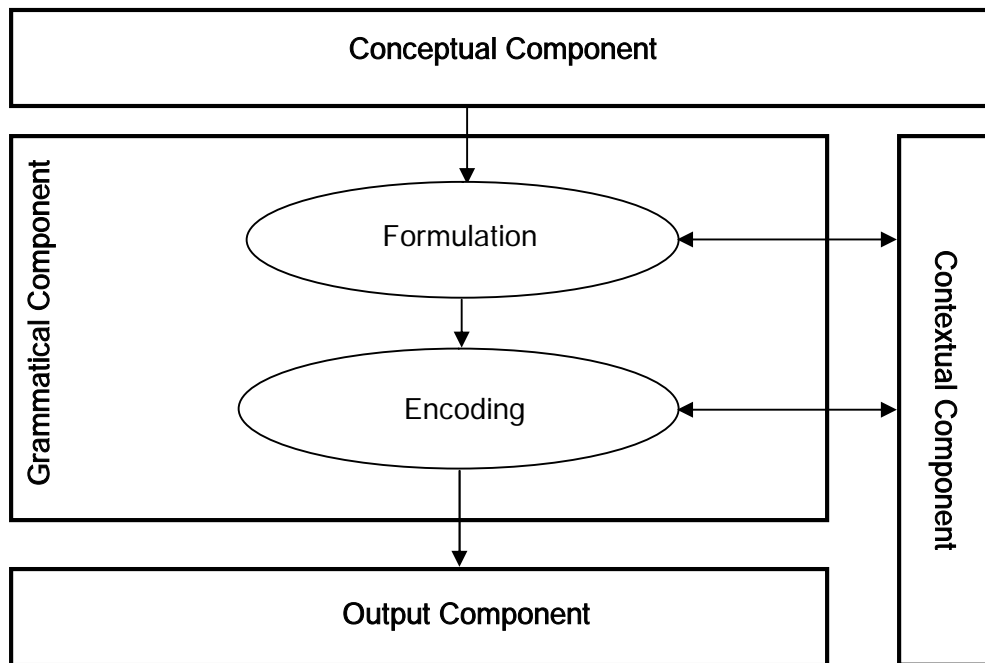


Figure 1. FDG as part of a wider theory of verbal interaction

The Conceptual Component is responsible for the development of both a communicative intention relevant for the current speech event and the associated conceptualizations with respect to relevant extra-linguistic events, and is thus the driving force behind the Grammatical Component as a whole. The Output Component generates acoustic or signed expressions on the basis of information provided by the Grammatical Component. Its function may be seen as translating the digital (i.e. categorical, opposition-based) information in the grammar into analogue (i.e. continuously variable) form. The Contextual Component contains a description of the content and form of the preceding discourse, of the actual perceivable setting in which the speech event takes place, and of the social relationships between Participants. This type of information is relevant to many grammatical processes, such as narrative chaining, reflexives, and passives.

2.2. The architecture of FDG

The general architecture of FDG itself, in relation to the components that flank it, may now be represented as in Figure 2, in which the Grammatical Component is presented in the centre, the Conceptual Component at the top, the Output Component at the bottom, and the Contextual Component to the right.

A distinguishing feature of FDG shown in Figure 2 is its rigorous top-down architecture: FDG starts with the speaker's intention and works down to articulation. This is motivated by the assumption that a model of grammar will be more effective the more its organization resembles language processing in the individual. Psycholinguistic studies (e.g. Levelt 1989) clearly show that language production is indeed a top-down process. The implementation of FDG reflects this process and is organized accordingly. This does not mean, however, that FDG is a model of the speaker: FDG is a theory about grammar, but one that tries to reflect psycholinguistic evidence in its basic architecture. The top-down organization of the grammar has far-reaching consequences at all levels of analysis, as we will show in Section 4.

In Figure 2 ovals contain operations, boxes contain the primitives used in operations, and rectangles contain the levels of representation produced by operations. We will discuss all of these in more detail in Section 4, and here limit ourselves to describing the general top-down process on the basis of a simple example, given in (1), produced in a context in which the Addressee wants to enter a field that hosts a bull:

(1) There's a bull in the field!

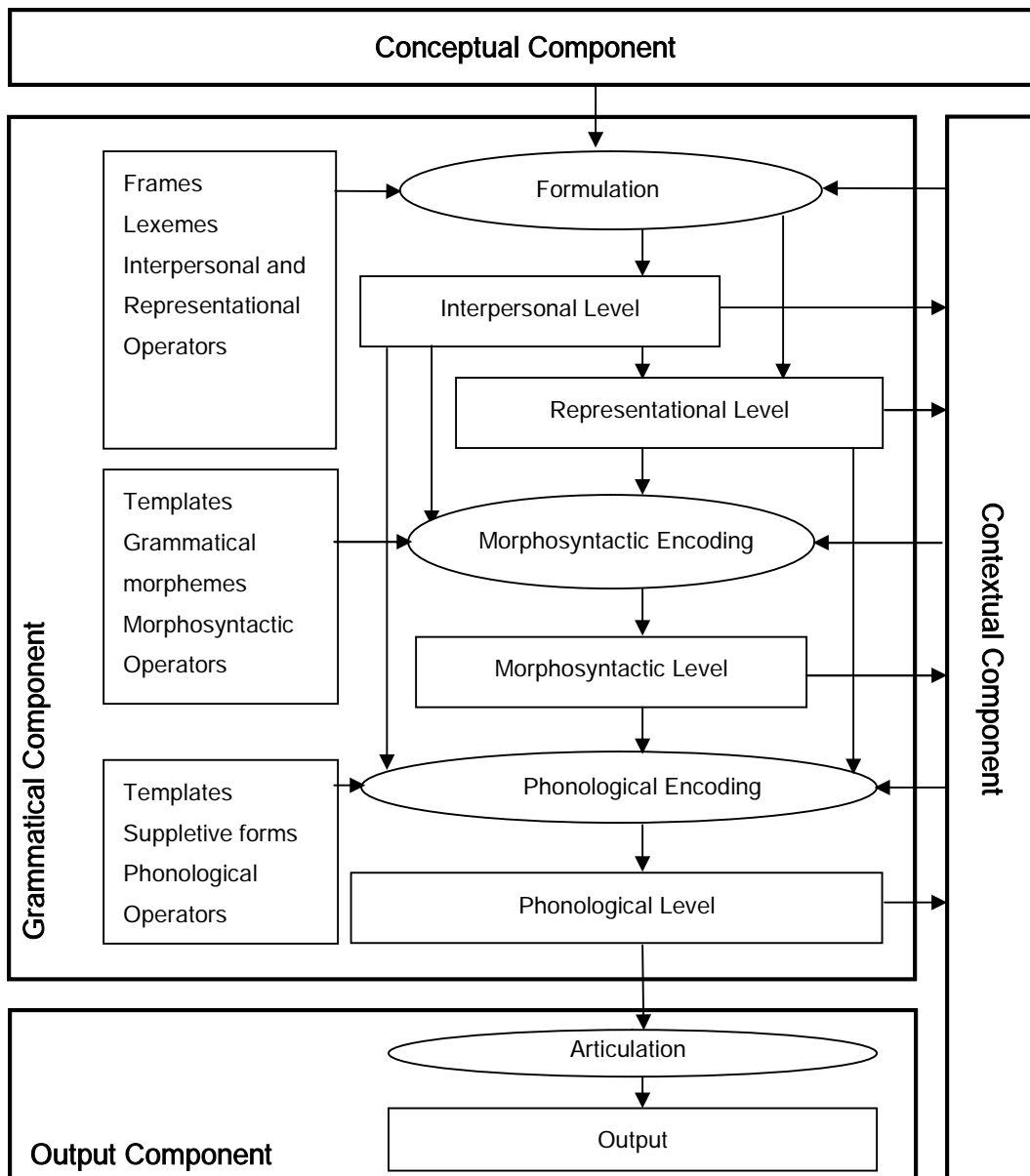


Figure 2. General layout of FDG

In the prelinguistic Conceptual Component a communicative intention (issuing a warning) and the corresponding mental representations (of the event causing danger) are relevant. The operation of Formulation translates these conceptual representations into pragmatic and semantic representations at the Interpersonal and the Representational Levels respectively.

Warnings are not a separate illocutionary category in English, but the Speaker solves this problem by selecting a Declarative Illocution combined with an Emphatic operator at the Interpersonal Level. The entity causing danger is furthermore characterized as a Focal Topic at this Level. At the Representational Level the Speaker chooses to designate the entity causing danger as part of a locative predication frame. The configurations at the Interpersonal and the Representational Levels are translated into a morphosyntactic structure at the Morphosyntactic Level through the operation of Morphosyntactic Encoding. In (1) this involves, for instance, the word order characteristic of existentials, the insertion of dummy *there*, etc. Similarly, the structures at the Interpersonal, Representational and Morphosyntactic Levels are translated into a phonological structure at the Phonological Level. In this case, for instance, the selection of the declarative illocution combined with an emphatic operator is responsible for the overall intonation contour with a high fall on the Focal Topic *bull*. By organizing the Grammatical Component in the way illustrated here, FDG takes the functional approach to language to its logical extreme: within the top-down organization of the grammar, pragmatics governs semantics, pragmatics and semantics govern morphosyntax, and pragmatics, semantics and morphosyntax govern phonology.

The Phonological Level of representation is the input to the operation of Articulation, which contains the phonetic rules necessary for an adequate utterance. Articulation takes place in the Output Component, outside the grammar proper.

The various levels of representation within the grammar feed into the Contextual Component, thus enabling subsequent reference to the various kinds of entity relevant at each of these levels once they are introduced into the discourse. The Contextual Component feeds into the operations of Formulation and Encoding, so that, for instance, the availability of antecedents may influence the composition of (subsequent) Discourse Acts.

Having seen something of the architecture of FDG let us now place it in its broader context.

3. Theoretical Background

The main goal of Functional Discourse Grammar is to give an account of morphosyntactically and phonologically codified phenomena in languages, either as correlated with pragmatic or semantic aspects of Formulation or as displaying inherent properties of Encoding. In the former

case, the phenomenon is functionally motivated; in the latter case, it is arbitrary. As the name of the theory suggests, the emphasis in FDG work is strongly on the former. The functionalist stance entails the hypothesis that a wide range of formal categories can be insightfully explained if they are brought into correspondence with semantic and pragmatic categories rooted in human cognition and interhuman communication; only if no such correlation can be found will FDG countenance the option of arbitrariness. In fact, languages can be shown to vary in the extent to which their formal properties reflect pragmatic or semantic categories or neither (cf. Hengeveld & Mackenzie 2008).

This position situates FDG halfway between radical formal and radical functionalist approaches. Radical functionalist positions tend to deny the existence of linguistic structure and see linguistic form as an ephemeral manifestation of the language user's attempt to achieve his/her communicative purposes. Radical formal positions contend that the utterances in an actual text or transcript of speech reflect (quite imperfectly, it is said) an underlying system that is governed by rules predicting the form taken by idealized linguistic units and limits linguistic study to the investigation of this covert system, totally independent of the uses to which it is put. FDG is a structural-functional theory (Butler 2003) in focusing on the correlation between function and structure, modelled as Formulation and Encoding respectively.

Two other structural-functional theories of language closely allied to FDG are Role and Reference Grammar (RRG; Van Valin & LaPolla 1997, Van Valin 2005, this volume) and Systemic-Functional Linguistics (SFL; Halliday & Matthiessen 2004, Caffarel this volume); see Butler (2003) for detailed comparison. FDG appears to occupy a position intermediate between SFL, which stands closer to radical functionalism in taking the text to be the central object of linguistic investigation, and RRG, which stands closer to radical formalism in seeing itself as first and foremost a theory of syntax (Van Valin 2001: 172). FDG has nothing to say about texts, but is very much concerned with the impact of textuality on the form of linguistic units; and FDG is not primarily interested in syntax, but does see morphosyntactic organization as one important aspect of linguistic encoding. With Simpler Syntax (Jackendoff & Culicover 2005, Culicover this volume) it shares the desire to give semantics its rightful place in linguistic theory and to integrate linguistics with cognitive, acquisitional and language-biological work; it differs *inter alia* in giving equal weight to semantic and pragmatic factors.

FDG sees the language user as having knowledge of both functional and formal units and of the ways in which these units may be combined. This knowledge has a large degree of stability, such that it can be compared across languages, revealing universal trends in linguistic

structure, as studied in language typology. This knowledge of units and their combination is instrumental in interpersonal communication and has arisen as a result of historical processes: formal and functional distinctions that have served human beings well through the ages have sedimented into the repertory now available to them. The forms that are at language users' disposal are variable across languages, but do not vary without limits. Rather, the limits are set by the range of communicative purposes displayed by all language users and by the cognitive constraints they are subject to.

This is the primary motivation behind the intimate relationship between FDG and linguistic typology. FDG is a theory that is capable of providing a framework for the enunciation and comparison of language universals (both absolute and statistical) and of offering a coherent model for the kind of language description that feeds into typological investigations. With its multi-layered structures of Formulation and Encoding, which define a space within which linguistic activity is constrained to operate, FDG permits more reliable comparisons of language systems. For example, FDG can readily accommodate the functionalist assumption that, *ceteris paribus*, the relative order of morphosyntactic elements will iconically reflect the scope relations holding among underlying pragmatic and semantic notions.

FDG offers a structured framework within which linguistic hypotheses can be enunciated and tested. At the same time, it provides a framework for the description of linguistic phenomena, and in this way can be involved in the entire cycle of research: from observation to prediction, to the testing of predictions through further observation, back to new predictions, and so on. FDG cannot in itself provide explanations, in the sense of rules of cause and effect. However, as we showed in Section 2, it is linked to a Conceptual, a Contextual and an Output Component, which themselves encompass all the linguistically relevant aspects of cognition, memory and articulation; it is through these links that the extent of linguistic variation and its limitations can be made intelligible as reflecting general human mental and physical capacities.

4. Four levels of linguistic organization

4.1. Levels and layers

Each of the levels of representation distinguished within the Grammatical Component in Figure 2 is structured in its own way. What all the levels have in common is that they have a hierarchically

ordered layered organization. In its maximal form the general structure of layers within levels is as follows:

$$(2) \quad (\pi v_1: [\text{head } (v_1)_\Phi]: [\sigma (v_1)_\Phi])$$

Here v_1 represents the variable of the relevant layer, which is restricted by a (possibly complex) head that takes the variable as its argument, and may be further restricted by a modifier σ that takes the variable as its argument. The layer may be specified by an operator π and carry a function Φ . Heads and modifiers represent lexical strategies, while operators and functions represent grammatical strategies. The difference between operators and functions is that the latter are relational, holding between the entire unit and other units at the same layer, while the former are not, applying only to the unit itself.

Not all relations between units are hierarchical. In those cases in which units together form a non-hierarchical (equipollent) configuration, they are enclosed between square brackets, as exemplified in (2), where the relationship between a head and its argument and a modifier and its argument is indicated by square brackets.

The levels differ as regards the nature of the distinctions that are relevant to each. Since the levels are purely linguistic in nature, only those distinctions are provided that are actually reflected in the grammar of the language involved. We will review the four different levels one by one, in the order that follows from the top-down organization of the model.

4.2. The Interpersonal Level

The Interpersonal Level captures all distinctions of Formulation that pertain to the interaction between Speaker and Addressee. These cover, at the higher layers, rhetorical notions of the overall structuring of discourse, to the extent that they are reflected in linguistic form, and at the lower layers, the pragmatic distinctions that reflect how Speakers mould their messages in view of their expectations of the Addressee's state of mind, again only to the extent that these are grammatically relevant. The hierarchical structure arises through the application of an appropriate set of frames from those available to the Speaker. The following shows the hierarchical relationships that apply at the Interpersonal Level:

(3)	(πM_1: [	Move
	(πA_1: [	Discourse Act
	(πF_1 : ILL (F_1): $\Sigma (F_1)$)	Illocution
	(πP_1 : ... (P_1): $\Sigma (P_1)$) _S	Speaker
	(πP_2 : ... (P_2): $\Sigma (P_2)$) _A	Addressee
	(πC_1: [	Communicated Content
	(πT_1 : [...] (T_1): $\Sigma (T_1)$) _Φ	Ascriptive Subact
	(πR_1 : [...] (R_1): $\Sigma (R_1)$) _Φ	Referential Subact
	] (C_1): $\Sigma (C_1)$) _Φ	Communicated Content
	] (A_1): $\Sigma (A_1)$) _Φ	Discourse Act
	] (M_1): $\Sigma (M_1)$)	Move

We will now say something about each of the layers in turn.

The Move (M_1) is the largest unit of interaction relevant to grammatical analysis. It may be defined as an autonomous contribution to the ongoing interaction: it either calls for a reaction, or is itself a reaction. The complexity of a Move may vary enormously, from silence through to a lengthy stretch of discourse. Where linguistic material is present, the Move will always take the form of one or more Discourse Acts. Its general frame is thus as follows:

$$(4) \quad (\pi M_1: [(A_1) \dots (A_{1+N})] (M_1): \Sigma (M_1)), \text{ where } N \geq 0$$

The relationship between the Discourse Acts may be one of equipollence or of dependence. Prominent relationships of dependence, indicated as a rhetorical function on the dependent Discourse Act, are Motivation, Concession, Orientation and Correction. In the following move:

(5) Watch out, because there will be trick questions in the exam.

the second (intonationally distinct) Discourse Act with a Declarative Illocution serves to indicate the Speaker's motivation for uttering an Imperative Illocution in the first Discourse Act.

The representation of a Discourse Act will show only those components that have actually been deployed by the Speaker, minimally the Illocution (F_1) and the Speaker (P_1)_S him/herself. Three kinds of Discourse Acts are distinguished:

- (6) Expressives, which give direct expression to the Speaker's feelings
 e.g. *Ouch!* (A_i: [(F_i: /aʊtʃ/_{Int} (F_i)) (P_i)_S] (A_i))
 Interactives, which consist of invariable, often ritualized lexical material
 e.g. *Congratulations!* (A_i: [(F_i: /kɒŋgrætju: 'leɪfɪnz/(F_i)) (P_i)_S (P_j)_A] (A_i))
 Contentives, which involve a Communicated Content and either a lexical or abstract
 Illocution (F₁)
 e.g. *I promise to be there tomorrow* (A_i: [(F_i: /'prɒmɪs/v (F_i)) (P_i)_S (P_j)_A (C_i)] (A_i))
I'll be there tomorrow (A_i: [(F_i: DECL (F_i)) (P_i)_S (P_j)_A (C_i)] (A_i))

Discourse Acts can be modified lexically, for example by an expression indicating the style of the Act (*briefly*). They may also be subject to operators, such as those for emphasis, irony and mitigation.

The head of the Illocution may be either lexical or abstract, as already illustrated in (6). This also applies to Vocative Illocutions, for example allowing an analysis of the epistolary salutation *Dear John* as:

- (7) (A_i: [(F_i: /dɪə/ (F_i)) (P_i)_S (P_j: /dʒɒn/ (P_j))_A] (A_i))

Typical modifiers of Illocutions are illocutionary adverbs such as *honestly*, as in:²

- (8) *Honestly*, I don't like you.
 (9) (M_i: [(A_i: [(F_i: DECL (F_i): -honestly- (F_i)) (P_i)_S (P_j)_A (C_i: -I don't like you- (C_i))] (A_i))] (M_i))

The two Participants in an interaction, (P₁) and (P₂), alternate as Speaker and Addressee; these roles are therefore indicated as functions. The head may be abstract (and left unexpressed) or may be lexical, as in (10) and (11):

- (10) *The company* hereby undertakes to replace any can of Doggo-Meat that fails to please, with no questions asked. (Levinson 1983: 260)

² Note that in cases in which not all details are necessary for the analysis of the phenomenon at hand, we use the symbol '-' to indicate the beginning and the end of a fragment that is not further analysed in detail.

- (11) Japanese (Hinds 1986: 257)
 Iroiro-to *suwan san ni shitsumon shimasu.*
 various Swan Ms REC question do
 'I'd like to ask you a variety of questions, Ms Swan.'

The Communicated Content (C₁) contains the totality of what the Speaker wishes to evoke in his/her communication with the Addressee. Communicated Contents have their distinctive operators and modifiers. One operator that has received attention in FDG is the reportative, which must be distinguished from the evidential operators of the Representational Level. Each (C₁) contains one or more Subacts, so called because they are hierarchically subordinate to Discourse Acts. Subacts bear pragmatic functions, and the frames for Communicated Contents ('content frames') are shown as configurations of these pragmatic functions, e.g. as thetic, categorical, etc.

FDG recognizes three pragmatic functions, which are assigned only when relevant (i.e. where they have an impact on linguistic form). The Focus function signals the Speaker's strategic selection of new information, either to fill a gap in the Addressee's information or to correct that information. The segment of (C₁) not assigned the Focus function constitutes the Background. The Topic function is assigned to a Subact which has a special function within the Discourse Act, that of signalling how the Communicated Content relates to the gradually constructed record in the Contextual Component. The segment not assigned the Topic function constitutes the Comment. It is typically the Focus and/or Topic that are encoded in languages; formal expression of Background and Comment is rare. Languages may lack the Topic function, or permit multiple Topic and/or Focus. A third pragmatic function is Contrast (as opposed to Overlap), which signals the Speaker's desire to bring out the differences between two or more Communicated Contents or between a Communicated Content and contextually available information. The three functions may in principle be combined with each other, and indeed we find Focus/Contrast combinations in English cleft constructions, Topic/Contrast in Korean NPs marked by *-nun* (Lee 1999) and Focus/Topic in such presentative constructions as French (12):

- (12) Il est arrivé trois trains.
 it AUX.PRS.3.SG arrive. PTCP.SG.M three trains
 'There arrived three trains.'

There are two types of Subact: an Ascriptive Subact (T_1) is an attempt by the Speaker to evoke a property, while a Referential Subact is an attempt by the Speaker to evoke a referent. In certain languages, e.g. Samoan (Mosel & Hovdhaugen 1992) and Tagalog (Himmelman fc.), the (T) or (R) status of Subacts is marked explicitly. The head of a (T_1) is in principle empty (the Property being indicated at the Representational Level), but it may be modified by items such as *allegedly, fortunately, really* and/or may be subject to an approximative operator, expressed in English as *sort-of*, typically /sɔ:də/. The head of an (R_1) is typically itself an Ascriptive Subact (as in *the hat*), but may be a Proper name (*Mary*) or an abstract head (realized as a pronoun or affix). Among the modifiers of Referential Subacts are forms such as *poor* in (*No-one cares about poor me*); and the principal operators are those for specificity ($\pm s$) and identifiability ($\pm id$). A special case is the combination $\{+id, -s\}$, which may be associated with Evans's (2003) notion of the ignorative, where the referent is assumed identifiable for the Addressee but not for the Speaker.

4.3. The Representational Level

The Representational Level deals with the semantic aspects of a linguistic unit. Whereas the Interpersonal Level takes care of evocation, the Representational Level is responsible for designation. The use of the term 'semantics' is thus restricted to the ways in which language relates to the possible worlds it describes. The layers relevant at the Representational Level are defined in terms of the semantic categories they designate. Semantic categories are the language-specific linguistically relevant manifestations of ontological categories. They are hierarchically organized as indicated in (13):

(13)	(π p_1 :	Propositional Content
	(π ep_1 :	Episode
	(π e_1 :	State-of-Affairs
	(π f_1 :	Configurational Property
	[
	(π f_1 : \blacklozenge (f_1): [σ (f_1) $_{\Phi}$])	Lexical Property
	(π x_1 : \blacklozenge (x_1): [σ (x_1) $_{\Phi}$]) $_{\Phi}$	Individual
	...	
	] (f_1): [σ (f_1) $_{\Phi}$])	Configurational Property
	(e_1) $_{\Phi}$: [σ (e_1) $_{\Phi}$])	State-of-Affairs
	(ep_1): [σ (ep_1) $_{\Phi}$])	Episode
	(p_1): [σ (p_1) $_{\Phi}$])	Propositional Content

Propositional Contents (p), the highest units at the Representational Level considered here, are mental constructs, such as pieces of knowledge, beliefs, and hopes. Propositional contents may be factual, as when they are pieces of knowledge or reasonable belief about the actual world, or non-factual, as when they are hopes or wishes with respect to an imaginary world. Given their nature, Propositional Contents are characterized by the fact that they may be qualified in terms of propositional attitudes (certainty, doubt, disbelief) and/or in terms of their source or origin (shared common knowledge, sensory evidence, inference). Propositional Contents (p) are not identical to Communicated Contents (C), which were discussed in the previous section. Communicated Contents constitute the message contents of Discourse Acts, and are not necessarily propositional in nature. Thus, though the Communicated Content of an act may correspond to a Propositional Content, it is not identical to it. A major difference between Communicated Contents and Propositional Contents is that the former are Speaker-bound, whereas the latter are not, at least not necessarily. This means that Propositional Contents can be attributed without problems to persons other than the Speaker:

(14) Jenny believed that/hoped that/went home because *maybe her mother would visit her*.

In all these examples the embedded Propositional Content is attributed to the Individual *Jenny* introduced in the main clause. The propositional nature of the parts in italics in (14) shows up in the fact that it may contain elements expressing a propositional attitude, such as *maybe*.

Propositional Contents contain Episodes (ep), which are sets of States-of-Affairs that are thematically coherent, in the sense that they show unity or continuity of Time (t), Location (l), and Individuals (x). In various languages the semantic category of Episodes is very manifestly present in the grammatical system, for instance in those that exhibit Tail-Head linkage. But we also need it for English sentences like the following one, adapted from Givón (1995, see also Wanders in prep.):

- (15) Coming out, stopping to check the mailbox, taking a look at the driveway and pausing to adjust his hat, he walked to his car.

Here a series of concatenated non-finite narrative verb forms, together with a final finite verb form, together describe an Episode within a larger story. The example at the same time shows an important aspect of Episodes: they are located in absolute time, while States-of-Affairs are located in relative time. Thus, while all the clauses in (15) represent States-of-Affairs, absolute location in time occurs only once for the series as a whole.

States-of-Affairs (e) include events and states and are characterized by the fact that they can be located in time and can be evaluated in terms of their reality status. States-of-Affairs can thus be said to '(not) occur', '(not) happen', or '(not) be the case' at some point or interval in time. The following example shows once more that absolute time, a feature of Episodes, may combine very well with relative time, a feature of States-of-Affairs:

- (16) Yesterday Sheila went out before having dinner.

The absolute setting provided by the adverb *yesterday* holds for the two States-of-Affairs contained within (16) as they form part of the same Episode. The adposition *before* specifies the relative temporal relation between the two.

Some languages systematically mark this distinction in their grammatical systems. The following example is from Swahili (Ashton 1944: 133). In this case the first verb form provides the absolute temporal setting, while subsequent narrative verb forms indicate relative chronological subsequence:

- (17) Ni-li-kwenda soko-ni, ni-ka-nunua ndizi sita,
 1.SG-PST-go market-LOC 1.SG-SUBS-buy banana six,
 ni-ka-la tatu, ni-ka-mpa mwenz-angu tatu.
 1.SG-SUBS-eat three 1.SG-SUBS-give companion-1.SG.POSS three
 'I went to the market, and bought six bananas; I ate three and three I gave to my
 companion.'

After indicating that the first State-of-Affairs in the series occurred in the past by using the prefix *li-*, the remaining States-of-Affairs within the Episode can be marked as having taken place subsequent to the last-mentioned State-of-Affairs by means of the prefix *ka-*.

A State-of-Affairs is characterized by a Configurational Property (f), which is compositional in nature and contains a combination of semantic units that are not in a hierarchical relationship with respect to each other. Configurational Properties constitute the inventory of predication frames relevant to a language. Languages may differ markedly in the nature and number of predication frames that are allowed with respect to both their quantitative and their qualitative valency. As for quantitative valency, there may for instance be restrictions on the maximum valency that a language allows in combination with a single predicate. In many serializing languages the maximum valency of a verb is 2, and serialization is required to expand that valency indirectly, as in the following example from Mandarin Chinese (Li & Thompson 1981: 366):

- (18) Wǒ gěi nǐ dào chá.
 1 give you pour tea
 'I'll pour you some tea.'
 "I pour tea give you."

Qualitatively speaking, languages may, for instance, differ as regards the division of labour between semantic functions. Thus in Tariana no distinction is made between the formal encoding of ablative, essive, and allative (Aikhenvald 2003: 148):

- (19) Na-pidana uni-se.
 3.PL.go-REM.PST.REP water-LOC
 'They went into water.'

- (20) Nawiki pa:-putfita-se nehpani-pidana.
 people one-CL-LOC 3.PL.work-REM.PST.REP
 'People were working on a clearing.'
- (21) Hī wyaka-se ka-nu-karu dhuma-naka waku-nuku.
 DEM.ANIM far-LOC REL-come-PST.REL.F 3.SG.F.hear-PRS.VIS 1PL.speech-TOP
 'She who came from far away understands our speech.'

Configurational Properties are built up using semantic categories that are in a non-hierarchical relationship with one another. These semantic categories may be of various types, and include Individuals (x), i.e. concrete objects that can be located in space, and Lexical Properties (f), which have no independent existence and can only be evaluated in terms of their applicability to other types of entity. Further semantic categories may be relevant to the grammar of an individual language and enter into the constitution of a Configurational Property, such as Location (l), Time (t), Manner (m), Reason (r), and Quantity (q). In all cases, only those semantic categories are postulated for a language that trigger formal processes within the grammar of that language. By way of example, consider the English nominalization strategies exemplified in Table 1.

Table 1. Derived nominal expression of basic semantic categories

Entity type	Examples
p	<i>hope-Ø, wish-Ø, belief-Ø</i>
e	<i>explora-tion, deci-sion, deple-tion</i>
f	<i>mean-ness, kind-ness, false-ness</i>
x	<i>writ-er, employ-er, sing-er</i>
l	<i>bak-ery, brew-ery, eat-ery</i>

English has distinct nominalization processes that create nouns designating Propositional Contents, States-of-Affairs, Properties, Individuals, and Locations. The postulation of these semantic categories within the grammar of English is thus warranted on formal grounds.

4.4. The Morphosyntactic Level

The Morphosyntactic Level deals with the structural aspects of a linguistic unit. Together with the Phonological Level, it takes care of the encoding of interpersonal and representational distinctions. In view of this function, much of what happens at the Morphosyntactic Level is functionally motivated: ordering principles are motivated by iconicity, domain integrity, and the preservation of scope relations. At the same time, morphosyntax has its own principles of organization, as for instance in the arbitrary imposition of a basic constituent order pattern, which in itself cannot be argued to be functionally motivated. FDG does not make a distinction between a syntactic and a morphological level of analysis, as the principles used in the formation of words are the same as those used in the formation of phrases and clauses.

The layers relevant at the Morphosyntactic Level are listed in (22):

(22)	(Le ₁ :	Linguistic Expression
	(Cl ₁ :	Clause
	(Xp ₁ :	Phrase
	(Xw ₁ :	Word
	(Xs ₁)	Stem
	(Aff ₁)	Affix
	(Xw ₁)	Word
	(Xp ₁)	Phrase
	(Cl ₁)	Clause
	(Le ₁)	Linguistic Expression

A Linguistic Expression is any set of at least one morphosyntactic unit; where there is more than one unit within a Linguistic Expression, these will demonstrably belong together in their morphosyntactic properties. The units combining into a Linguistic Expression may be Clauses, Phrases, or Words. The following German example illustrates a combination of Phrases:

(23)	Je	kürzer	desto	besser.
	CORR	short.COMPV	CORR	good.COMPV
	'The shorter the better.'			

Here we have two mutually dependent Adjective Phrases linked by the correlative pair *je ... desto*, thus illustrating a Linguistic Expression which does not contain a Clause:

- (24) (Le_i: [(Ap_i: [(Gw_i: je (Gw_i)) (Aw_i: kurz-Compv (Aw_i))] (Ap_i)) (Ap_j: [(Gw_j: desto (Gw_j)) (Aw_j: gut-Compv (Aw_j))] (Ap_j))] (Le_i)

By introducing Linguistic Expressions as the highest category in its morphosyntax, FDG creates a possibility of dealing straightforwardly with holophrases and non-sentential utterances.

A simple Clause is a grouping of one or more Phrases and possibly (grammatical) Words and is characterized, to a greater or lesser extent, by a template for the ordering of those Phrases and, also to a greater or lesser extent, by morphological expressions of connectedness (notably government and agreement); in addition, the Clause may operate as a domain for several morphosyntactic processes. While for each language analysed, the identification of Clauses will be dependent upon language-specific criteria, we believe that it is justified to posit the Clause as a universal category of morphosyntactic structure.

A Phrase (Xp) is headed by a lexical item that is passed on from the Interpersonal Level or the Representational Level. There is no necessary one-to-one correspondence between the lexeme classes recognized in a language and the Phrase types and corresponding Word classes recognized within that same language. A language with a highly flexible lexeme class may have a variety of Phrase types. Consider the following example from Mundari (Evans & Osada 2005: 354-355):

- (25) Buru=ko bai-ke-d-a.
 mountain=3PL make-COMPL-TR-PRED
 'They made the mountain.'
- (26) Saan=ko buru-ke-d-a.
 firewood=3PL mountain-COMPL-TR-PRED
 'They heaped up the firewood.'

The lexeme *buru* can be used as the head within a Referential Subact (25) and as the head within an Ascriptive Subact (26), and can thus be characterized as a flexible lexeme. Yet the morphosyntax of Mundari makes a clear distinction between the Phrase expressing the

Ascriptive Subact and the one expressing the Referential Subact, traditionally called 'Verb Phrase' and 'Noun Phrase':

(27) (N_{pi}: (N_{wi}: buru_{Cont} (N_{wi})) (N_{pi}))

(28) (V_{pi}: (V_{wi}: buru_{Cont} (V_{wi})) (V_{pi}))

The Nominal and Verbal Word templates will then be different as regards their possibilities for suffixation.

The Word itself (X_w), especially in incorporating languages, can be highly complex. Apart from the fact that it may consist of Stems (X_s) and Affixes (Aff), in some languages it may, just like any other layer of morphosyntactic analysis, embed higher layers such as phrases and clauses, obeying full recursivity. Consider the following example from Chukchee (Skorik 1961: 103, discussed in Mattissen 2006: 290):

(29) Tə-[tor-taŋ-pəlwəntə-pojgə]-pela-rkən.

1.SG.ABS-new-good-metal-spear-leave-PRES.1.SG>3.SG

'I am leaving a good, new, metal spear.'

In this example a Noun Phrase, including its modifiers, is incorporated as a whole within the Verbal Word and is crossreferenced on the verbal word itself. Together these facts point to the phrasal status of the incorporated noun and its modifiers, as represented in (30):

(30) (V_{wi}: [(Aff_i: tə (Aff_i)) (N_{pi}: -tortanpəlwəntəpojgə- (N_{pi})) (V_{si}: pela (V_{si})) (Aff_j: PRES (Aff_j))] (V_{wi}))

Each internally complex layer of morphosyntactic analysis is built up in a number of steps. The linear order of elements is considered from two different perspectives. As we argued earlier, the Interpersonal and Representational Levels are partially organized hierarchically and partially configurationally. Linear ordering starts out with the hierarchically higher elements and works down to the lower ones, in line with the top-down organization of the model as a whole. This initial step implements the fact that hierarchical scope relations are reflected in linear order. Interpersonal and representational units that are in a configurational relationship cannot be ordered in this way. In order to determine how these should be placed with respect to each other the alignment system of the language now comes into play. Alignment may be based on

interpersonal, representational, or morphosyntactic triggers, or a combination of these. All linear ordering is done dynamically, by making use of a number of absolute positions (maximally Initial, Second, Medial, and Final). Once these have been filled, positions relative to them become available.

Obligatory positions in templates of any layer for which no material is available from the Interpersonal and Representational Levels are filled with syntactic or morphological dummies in a process that is called coercion. Thus, in many languages the insertion of a non-verbal constituent in the predicate slot will trigger the insertion of a copula. In others, the insertion of a basically transitive lexeme in an intransitive predication frame will trigger a detransitivizing affix.

Once all the positions in a template have been filled, a number of copying operations may be necessary in order to account for the expression of agreement, sequence of tenses, and the like.

4.5. The Phonological Level

The Phonological Level is responsible for every aspect of Encoding not covered by the Morphosyntactic Level. It receives input – some of it already in phonemic form – from all three other levels and provides input to the Output Component. Whereas the latter deals with such ‘analogue’ matters as formant frequency, intensity, duration and spectral characteristics, the Phonological Level – being within the grammar – is ‘digital’, containing representations in phonemes that are ultimately based in binary phonological oppositions. In other words, the Phonological Level does not show the “melody” of the Intonational Phrase, but provides a number of indications at each layer which the Output Component converts into a smoothly flowing result.

The primitives with which the Phonological Level operates include (i) the prosodic patterns that apply at each layer of analysis; (ii) an inventory of segmental sequences (the “grammatical lexicon”) expressing particular configurations of morphemes or placeholders introduced at other levels; and (iii) a set of tertiary operators which will have their ultimate effect in the Output Component.

Just like the other levels, phonological representations are hierarchical in nature (as in the tradition of Prosodic Phonology initiated by Nespor & Vogel 1986). Here too, FDG makes the assumption that not all layers are active in every Utterance or indeed are relevant to every

language system. And as at the Morphosyntactic Level, FDG does not exclude the possibility of recursion at certain layers. The maximum layering of the Phonological Level is as follows:

(31)	(π U ₁: [	Utterance
	(π IP ₁: [	Intonational Phrase
	(π PP ₁: [	Phonological Phrase
	(π PW ₁: [	Phonological Word
	(π F ₁: [	Foot
	(π S ₁) ^N	Syllable
	] (F ₁))	Foot
	] (PW ₁))	Phonological Word
	] (PP ₁))	Phonological Phrase
	] (IP ₁)	Intonational Phrase
	] (U ₁))	Utterance

We will now say something about each of the layers in turn.

The Utterance (U₁) is the largest stretch of speech covered by the Phonological Level. A Speaker will tend to use more substantial pauses to separate Utterances than Intonational Phrases; these longer pauses will also never be interpreted by the Addressee as hesitations (Hayes 1989: 219). An Utterance may in addition display pitch distinctions called paratones which help to mark it off as a self-contained group of Intonational Phrases (Brown & Yule 1983: 101); FDG represents these as operators on the (U)-variable. The Output Component may react to an Utterance boundary by introducing such phenomena as “final F0 lowering, segmental lengthening, creaky voice, amplitude lowering, long pauses, stylized ‘finality’ contours, etc.” (Venditti 2005: 191).

The Intonational Phrase is characterized by a nucleus, i.e. a pitch movement localized on one or more Syllables which is essential to the interpretation of the Intonational Phrase as a whole; FDG represents this global pitch movement as an operator – (f)alling, (r)ising – on the IP variable, cf. (31b) below. One Intonational Phrase is typically separated from another by a pause (shorter than that between Utterances); in the Output Component there may be additional rhythmic or durational indications. The gradual integration of Discourse Acts within a Move may be reflected in the loss of (IP) boundaries within the Utterance. In (31), the amalgamation of an

Orientation and a Nuclear Discourse Act in, as in (31b), induces an analysis with a single Intonational Phrase, as in (31c) (a French example inspired by Di Cristo 1998: 211):

- (31) a. Mon voisin il est toujours malade.
 1SG.POSS neighbour 3SG.M be.PRS.3SG always ill
 'My neighbour, he's always ill; or: My neighbour is always ill.'
 b. ((U_i: [(fIP_i: /mɔ̃vwazɛ̃/ (IP_i)) (fIP_j: /ilɛtuʒuʁmalad/ (IP_j))] (U_i))
 c. ((U_i: (fIP_i: /mɔ̃vwazɛ̃ilɛtuʒuʁmalad/ (IP_i)) (U_i))

The Phonological Phrase in stress languages contains one Syllable that is more strongly stressed than the others; this Nuclear Syllable is typically also the primary location for the global fall or rise within the Intonational Phrase. In tone languages, in which pitch movement is used for lexical distinctions, Phonological Phrases have a different *raison d'être*, namely as the domain of tone sandhi. In the stress language English, both DECL and IMP Illocutions are characterized by a globally falling pitch at the layer of the Intonational Phrase (fIP_i). However, the fall on the Nuclear Syllable tends to be much more marked with the IMP Illocution; this is indicated by assigning an additional falling tertiary operator to the (PP₁) containing the Nuclear Syllable. The Output Component interprets such a double indication of fall as entailing a larger pitch movement downwards. Pitch height (as opposed to movement) within the Phonological Phrase – (h)igh, (m)id, (l)ow -- is in very many languages associated with the expression of pragmatic functions; see 5.2.3 for an example.

The Phonological Word (PW₁), for those languages in which such a category needs to be recognized, is a slice of phonological structure which displays at least one criterial characteristic, which may relate to the number of segments, to prosodic features or to the domain of phonological rules. Its complex relation to the Morphosyntactic Word will be treated in Section 5.2.6. One of the principal tasks of the Phonological Level is to convert all placeholders from other levels into phonological form and to integrate them into a Phonological Word. To achieve this, the Phonological Level has a store of primitives at its disposal which provide phonemic material with which to replace the placeholders in the input. This store of primitives constitutes the 'grammatical lexicon' of the language under analysis. An example is the English comparative, where the form depends on the phonological characteristics of the Adjective (number of syllables and stress placement): the lexical item *more* therefore appears as a

placeholder at the Representational and Morphosyntactic Levels, the final choice between the Phonological Word /mɔ:/ and the Syllable /-ə/ being determined at the Phonological Level.

Phonological Words are divided into Syllables, which in stress languages (i.e. those with stressed and unstressed Syllables) group into Feet. Stress is indicated by the operator 's' on the Syllable variable. Non-accentual tone (e.g. in Thai), tone accent (e.g. in Swedish) and accentual tone (e.g. in Japanese) similarly involve operators – i.e. the position π – on (πs_1).

5. Interplay between the components and levels

5.1. Relations between components

5.1.1. Introduction

As was made clear in Section 2, the Grammatical Component described in Section 4 is part of a wider theory of verbal interaction. The architecture proposed for this theory in FDG work is strongly inspired by the extensive research into the processes of speech production detailed in Levelt (1989). His model distinguishes three fundamental modules: the Conceptualizer, the Formulator and the Articulator. Very roughly, these correspond to our Conceptual Component, Grammatical Component and Output Component respectively; to these FDG has added a Contextual Component. We will discuss the interactions between these components one by one.

5.1.2. Interplay between the Grammatical and Conceptual Components

The Conceptual Component is the driving force behind the workings of the Grammatical Component. It is here that is represented the ideational and interactive material that motivates Discourse Acts and the Moves in which they occur. The Conceptual Component does not include every aspect of cognition but only those that reflect the immediate communicative intention. For example, a Speaker may conceive the desire to impart some bad news to the Addressee and concurrently to show sympathy. In English, the Conceptual Component can trigger the operation of Formulation to structure this as a Move with two Discourse Acts, one with

a Declarative Illocution, the other containing an appropriate Interactive formula at the Interpersonal Level:

- (32) (M_i: [(A_i: [(F_i: DECL (F_i)) (P_i)_S (P_J)_A (C_i: [(T_i) (R_i)] (C_i))] (A_i)),
 (A_J: [(F_J: /aɪmə'freɪd/(F_J)) (P_i)_S (P_J)_A] (A_J))
] (M_i))
 'John's ill, I'm afraid.'

In (32), the distinct ideational and affective-interactive elements (cf. Butler 2008) are reflected in separate Discourse Acts. An alternative is for the Conceptual Component to trigger a single Move, as in *I'm afraid John's ill*, a Move with only one Discourse Act which is simultaneously a Declarative and an expression of sympathy. Here *I'm afraid* will appear as a Modifier of the Discourse Act:

- (33) IL: (M_i: [(A_i: [(F_i: DECL (F_i)) (P_i)_S (P_J)_A (C_i: [(T_i) (R_i)] (C_i))] (A_i): (F_J: /aɪmə'freɪd/(F_J)) (A_i))] (M_i))
 'I'm afraid John's ill.'

Although the Conceptual Component is ancillary to the Grammatical Component, it does not cover the same as Slobin's (1996) notion of 'thinking for speaking'. Whereas that notion is language-specific and involves "picking those characteristics of objects and events that (i) fit some conceptualization of the event, and (ii) are readily encodable in the language" (Slobin 1996: 76), the Conceptual Component is pre-linguistic. The kind of examples Slobin gives, e.g. the witnessed/non-witnessed opposition in Turkish or the perfective/imperfective distinction in Spanish, are in FDG grammatical choices that are determined through the operation of Formulation.

5.1.3. Interplay between the Grammatical and Contextual Components

Just as the Conceptual Component is limited in its compass, so the Contextual Component, too, does not aim to represent the entire ongoing discourse, but rather to house just those aspects of the context that impinge upon the workings of the Grammatical Component. Thus it contains all the information from the grammar that is relevant to the form taken by subsequent utterances;

and it stores longer-term information about the current interaction that is relevant to Formulation and Encoding in the language being used. As examples of the latter, consider the fact that in languages like Spanish knowledge of the sex of the speech act participants and the social relation between them is essential for interaction. In (34), the choice of the forms *pálida* (rather than *pálido* 'pale-M.SG') and *estás* (rather than *está* 'COP-IND.PRS.2.SG.POL') reflects specifications in the Contextual Component:

- (34) ¡Qué pálido-a est-ás!
what pale-F.SG COP-IND.PRS.2.SG.FAM
'How pale you look!'

For an account of the grammatical properties of the corresponding utterance in English, as in the translation of (34), no such specification is required.

As examples of grammatical phenomena that presuppose the first-mentioned function of the Contextual Component, consider reflexives, anaphora, and instances of narrative chaining. In languages with logophoric pronouns, for example, the Contextual Component will have to keep track of the status of (typically human) entities as belonging to a particular embedded discourse domain or not. Similarly, according as a language permits reflexive pronouns to apply across larger or smaller stretches of discourse, the Contextual Component will be adjusted to make particular possible antecedents available. The Contextual Component keeps track not only of the results of Formulation but also from those of Encoding, since anaphoric reference is possible not only to pragmatic and semantic constructs but also to sections of the actual morphosyntactic structure of linguistic expressions and the phonological structure of utterances.

5.1.4. Interplay between the Grammatical and Output Components

The function of the Output Component in speech may be seen as translating the digital (i.e. opposition-based) information in the grammar into analogue (i.e. continuously variable) form. An Utterance boundary at the PL will accordingly yield a pause of so many milliseconds in the Output Component; or a Syllable with a "falling" operator will bring about a decline in the fundamental frequency of the corresponding stretch of the output. The Output Component is also the location for long-term settings, such as the tempo at which an individual's speech is carried out: *allegro* forms attributable to fast speech are among the phenomena treated here.

As an example of the effect of the Output Component, consider degemination (cf. Booij 1995: 68-69, 151). In Dutch (but not for example in English), there is a requirement that two identical adjacent consonants (or consonant clusters like /st/) be reduced to one. This can apply within lexical compounds, such as *kunststuk* 'objet d'art' /'kœnstœk/; cf. *kunst* 'art' /kœnst/ and *stuk* 'piece' /stœk/; the lexical entry already shows the effect of degemination. It can also apply to the result of morphosyntactic processes, for example with the sequence /zit/+t/ 'sit + 3.SG.PRES' being realized as /zit/ at the Phonological Level (*/zit:/). However, chance adjacencies can also happen inside Intonation Phrases, as for example within the Phonological Phrase in the analysis of (35):

(35) zit-Ø te werk-en
 sit-3S.PRES CNJ work-INF
 'is working.'
 (PP_i: (PW_i:([(SS_i: /zit/ (S_i)) (S_j: /tə/ (S_j))]) (PW_i)) (PW_j:([(SS_k: /ʊɛɪ/ (S_k)) (S_i: /kə/ (S_i))]) (PW_i))] (PP_i))

Here it is the Output Component that imposes the degemination, yielding an output transcribable as [zitəʊɛɪkə].

5.2. Relationships between Levels of the Grammatical Component

5.2.1. Introduction

Even a glimpse at the layered hierarchies of the four grammatical levels suggests that there is a high degree of correspondence among them, and there are indeed default correlations between, for example, Discourse Act, State of Affairs, Clause and Intonational Phrase, or between Subact, Property/Individual, Phrase and Phonological Phrase. These correlations are far from perfect, however, and differ across languages as well. In the following subsections, we will briefly consider the relations across the various layers.

5.2.2. Relationship between the Interpersonal and Representational Levels

Every linguistic item is analysed at the Interpersonal Level: as we saw in Section 3.1, even Expressives, despite not being other-directed, involve a Speaker and an Illocution. Only if the Interpersonal Level contains a Communicated Content does the Representational Level also come into play. In these cases, the two Levels share responsibility for Formulation. In an example such as (36), *Mary*, its Modifier *poor* and *really* originate at the Interpersonal Level, while the Representational Level introduces *like* and *seem* into appropriate frames and embeds the units encoded as the extraposed Subject of *seem* and the infinitive complement of *like*:

(36) It seems poor Mary really likes to suffer.

Although Ascriptive Subacts (T_1) typically correspond to Properties (as in Turkish (37)), the (T_1) in English (38) is an Individual at the RL:

(37) Erkek öğretmen-Ø-Ø.

man teacher-PRES-3SG

'The man is a teacher.'

IL: C_1 T_1 R_1

RL: $(p_i - (e_i [(f_i: \text{öğretmen}_N (f_i)) (x_i: (f_j: \text{erkek}_N (f_j)) (x_i))_\emptyset] (e_i)) - (p_i))$

(38) The man is a teacher.

IL: C_1 T_1 R_1

RL: $(p_i - (e_i [(x_i: (f_i: \text{teacher}_N (f_i)) (x_i)) (x_j: (f_j: \text{man}_N (f_j)) (x_j))_\emptyset] (e_i)) - (p_i))$

5.2.3. Relationship between the Interpersonal and Morphosyntactic Levels

The distinctions drawn at the Interpersonal Level are encoded at either the Morphosyntactic or the Phonological Level. Let us consider the encoding of the pragmatic function Focus assigned to Subacts. Although Focus is in many languages associated with prosodic effects at the Phonological Level, it can also be encoded morphosyntactically. For example, in Tariana (Aikhenvald 2003: 139), the suffix *-nhel-ne* is applied to Subjects in Focus (to simplify a little);

other languages have markers for Focus alone, cf. Wambon *-nde* (de Vries 1985: 172). Another way of marking Focus morphosyntactically is by assigning a special syntactic position to the Focus element: in Aghem (Watters 1979: 144) it is the immediately post-verbal position, in Hungarian (Kenesei et al. 1998: 166) the immediately pre-verbal position. Finally, many languages indicate Focus with a special Focus construction: where this takes the form of a cleft construction, this strategy involves the Representational Level as well, dividing the content into two segments, with one part (the one corresponding to the Focus element) being predicated of the other.

5.2.4. Relationship between the Interpersonal and Phonological Levels

Although they are maximally separated in the model, the relationship between the Interpersonal and Phonological Levels is very close. As was mentioned in 4.2, Focus is in many languages – iconically – associated with phonological prominence, as are the other pragmatic functions. Illocutionary distinctions also tend to be expressed phonologically, especially if there is no morphosyntactic indication: in Portuguese, for example, the distinction between Declarative and Interrogative is signalled only through an opposition between a falling and rising operator, respectively, on the Intonational Phrase: these have their effect on its final Phonological Phrase.

In English, the syntax of the Clause is usually geared to ensuring Clause-final placement for the element associated with Focus assignment; the default effect on the Phonological Level is for the final Phonological Phrase to indicate both the Illocution and the placement of the Focus, as in (39):

- (39) a. I saw [a heron]_{Foc}.
 b. (fIP_i: [(PP_i: /aɪ'sɔ:/ (PP_i)) (PP_j: /ə'herən/ (PP_j))] (IP_i))

In an example such as (40), the entire Communicated Content is in Focus:

- (40) a. [[The train] arrived]_{Foc}.
 b. (fIP_i: [(PP_i: /ðə'treɪn/ (PP_i)) (IPP_j: /ə'raɪvd/ (PP_j))] (IP_i))

The f-operator on (IP_i) would normally induce a falling intonation on the Syllable /raɪvd/; however, this is rendered impossible by the presence of the l(ow)-operator on (PP_j). The Output Component will therefore apply a fall to the preceding (PP), and the pitch will continue low.

5.2.5. Relationship between the Representational and Morphosyntactic Levels

The relationship between the Representational and Morphosyntactic Levels is guided by the principle that, everything else being equal, scope relations at the Representational Level are reflected in the relative ordering of the corresponding units at the Morphosyntactic Level. That said, the relationship is heavily influenced by the morphosyntactic typology of the language under description. In an isolating language, the relationship is maximally straightforward, with a one-to-one relation between simple words at the Morphosyntactic Level and units at the Representational Level. In an agglutinating language, the same applies, but now to morphemes. Consider the following example from Turkish:

(41) Anlı-y-abıl-ecek-miş-im.

understand-CONN-ABIL-IRR-INFER-1.SG

'I gather I will be able to understand.'

Representational Level: (infer p_i: (ep_i: (irr e_i: [(abil f_i [(f_j: anlı_V (f_j)) (1x_i)_A] (f_i)) (e_i)_U]) (ep_i)) (p_i))

Morphosyntactic Level: (Le_i: (Cl_i: (Vp_i: (Vw_i: [(Vs_i: anlı (Vs_i)) (Aff_i: Abıl (Aff_i)) (Aff_i: EcEk (Aff_i)) (Aff_i: mış (Aff_i)) (Aff_i: Im (Aff_i))] (Vw_i)) (Vp_i)) (Cl_i)) (Le_i))

In fusional languages, where one affix corresponds to several elements at the Representational Level, the final form cannot be given until the Phonological Level: at the Morphosyntactic Level, we find a placeholder (cf. 5.2.7 below). In polysynthetic languages we find little isomorphism between the Representational and Morphosyntactic Levels; the relationship may be further complicated by incorporation (of Words, Phrases or Clauses), as demonstrated in Section 6.

5.2.6. Relationship between the Representational and Phonological Levels

Certain features of the Representational Level are realized phonologically. Consider the following example from Scottish Gaelic:

- (42) a. Tha an nighean math air bruidhinn.
 COP.PRS DEF girl good at talking
 'The girl is good at talking.'
- b. Tha an nighean mhath air bruidhinn.
 COP.PRS DEF girl good ASP talking
 'The good girl has been talking.'

In (42a), *math* 'good' does not belong to the Individual unit headed by *nighean* 'girl' and retains its lexical form /ma/, introduced at the Representational Level; in (42b), however, it functions as a modifier of the feminine head *nighean*, which induces lenition of the first consonant, yielding /ṽa/ at the Phonological Level.

Many ideophones (cf. Voeltz & Kilian-Hatz eds 2001) exemplify Representational Level units that are transferred directly to the Phonological Level, bypassing the Morphosyntactic Level (since they undergo no morphosyntactic processes). For an example, see Section 6.

5.2.7. Relationship between the Morphosyntactic and Phonological Levels

As has been implicit in the preceding discussion, languages differ in whether a particular distinction in Formulation corresponds to effects at the Morphosyntactic or Phonological Level. There appears to be a certain trade-off between the two Encoding levels, such that a distinction that is encoded at one level need not also be encoded at the other. Thus in Garo (Burling 2004: 67), the "intonation of questions formed with a question word is not much different from the normal statement intonation", but if the final particle *-ma* or *-ni* is omitted, however, then a rising intonation is required to distinguish the intended Illocution. Rialland & Robert (2001) have shown the non-tone language Wolof not to have any intonational marking of Contrast. The Contrast element is placed in Clause-initial position, followed by a marker (here *laa*) inflected in agreement with the Subject of the following Vp:

- (43) Lekkuma mburu mi, ceeb bi laa lekk.
 eat.NEG.1SG bread DEF rice DEF CONTR.1SG eat
 'I didn't eat the bread, it was the rice I ate.'

This 'focus', as the authors call it, "has no effect on the melodic contour of the sentences" (2001: 899).

One important function of the Phonological Level is to provide phonemic form for placeholders introduced at the Morphosyntactic Level. In Spanish, for instance, the placeholder 'indpastpf1sg' (corresponding to the interpersonal and representational operators Decl, Past, Perf and a '1sg' argument) appears at the Phonological Level as /e/ in a stressed syllable after verbs of one class and as /i/ after verbs of other classes.

6. A worked example

Let us now illustrate the four-level analysis outlined above by applying it to a concrete example. The example is from the Australian language Bininj Gun-Wok, more specifically from the Manyallaluk Mayali variety. The example is taken from Bishop & Fletcher (2005: 350), where it is given a prosodic analysis. For the morphosyntactic analysis we rely on Evans' (2003) description of the language:³

- (44) Ba-rri-ø-yaw-gurrme-ng, wotjbirr
 3.SUBJ(PST)-PL-3.SG.OBJ-child-put-PST.REAL.PF 'smack'
 'They put the child down, smack!'

Bininj Gun-Wok has a number of features, illustrated in this sentence, which make it interesting for our purposes, such as its highly synthetic nature, as manifested in the presence of incorporation and crossreference marking, the existence of ideophones used "to represent sounds accompanying actions in the narrative" (Evans 2003: 627), its primitive-secundative alignment system, and the occurrence of cumulation in the area of inflection, i.e. the expression of more than one inflectional category in a single morpheme.

³ We are indebted to Nick Evans for his kind help in analysing this example.

Starting our analysis at the Interpersonal Level, we note that the speaker chooses to evoke a single State-of-Affairs in two different Acts, one in which the State-of-Affairs is evoked in terms of a description, and one in which it is evoked in terms of the sound its occurrence provoked. Each of these Acts is Declarative in nature, and the two together constitute a Move. The latter two facts are expressed prosodically, each Declarative Act having a falling contour (Bishop & Fletcher 2005: 335), and the second one falling more pronouncedly, which we assume indicates that it constitutes the closing Act within the Move. The initial Interpersonal Level analysis may thus be given as in (45):

(45) (M_i: [(A_i: [(F_i: DECL (F_i)) (P_i)_S (P_J)_A (C_i)] (A_i))
 (A_j: [(F_j: DECL (F_j)) (P_i)_S (P_J)_A (C_j)] (A_j))
] (M_i))

Note that the indices for the Participants do not change, since there is no shift in participant roles, P_i being the Speaker, P_J the Addressee in both acts.

The Communicated Content of A_i consists of an Ascriptive Subact, evoking the property expressed by the verb *gurrme*, and three Referential Subacts, one evoking the entity corresponding to the Actor of the State-of-Affairs designated, and two corresponding to the Undergoer, i.e. two Referential Subacts target a single semantic unit. This latter observation may come as somewhat of a surprise, but reflects the fact that Bininj Gun-Wok is a pronominal argument language. The pronominal prefix on the verb is by itself referential in nature, and need not co-occur with a lexically expressed Undergoer argument, as shown by the optionality of the lexical Undergoer in the following example (Evans 2003: 425-426):

(46) Al-ege daluk gaban-du-ng (bedda).
 F-DEM woman 3.SBJ>3.PL.OBJ-SCOLD-NONPST them
 'That woman is scolding them.'

This means that in the case of example (44) the Undergoer is referred to twice, in two Referential Subacts, one corresponding to the referential pronominal prefix (in this particular case a zero morpheme), and one to the incorporated argument expression. Note that the incorporated noun *yaw* in (44) must indeed be considered referential, since it would otherwise

not be crossreferenced in the portmanteau prefix on the verbal complex. Incorporation can thus be said to be syntactic, not lexical (Smit 2005), and leaves the transitive nature of the verb intact.

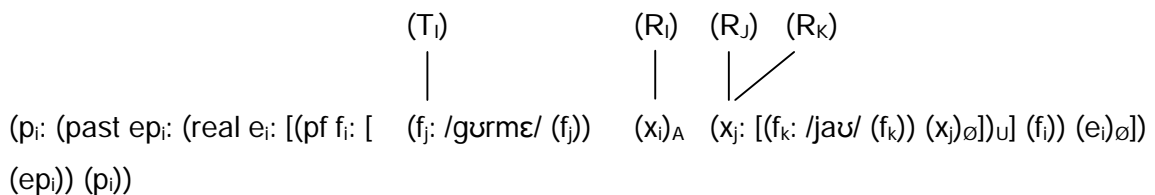
The Communicated Content of (A_i) contains a single Ascriptive Subact, evoking the sound represented by the ideophone *wotjbirr* that characterizes the State-of-Affairs evoked in (A_i).

Incorporating these observations, we arrive at the more elaborate Interpersonal Level representation in (47):

- (47) (M_i: [(A_i: [(F_i: DECL (F_i)) (P_i)_S (P_J)_A (C_i: [(T_i) (R_i) (R_J) (R_K)] (C_i))] (A_i))
 (A_J: [(F_J: DECL (F_J)) (P_i)_S (P_J)_A (C_J: [(T_J)] (C_J))] (A_J))
] (M_i))

Turning now to the Representational Level, the semantic counterpart of (A_i) may be represented as in (48), which additionally shows the alignment with the Interpersonal Subacts discussed above:

- (48) Barri-yaw-gurrme-ng
 3.subj.pl(pst)>3.sg.obj-child-put-pst.real.pf
 'They put the child down.'



Within the predication frame at the Representational Level, there is a configuration with a Property (f_j) as the nucleus, and two Individuals (x_i) and (x_j) as the dependents. The Individual (x_i) is not lexically realized, but expressed by means of the pronominal prefix. Its identity has to be retrieved from the Contextual Component on the basis of its index. As argued above, the Individual (x_j) is realized twice, once lexically, and once by means of the pronominal prefix. This does not affect the semantic representation, though, just the pragmatic representation.

Semantically speaking, the noun to be incorporated must be a head, since incorporated nouns can take external modifiers in Bininj Gun-Wok, as illustrated in (49) (Evans 2003: 452):

The Morphosyntactic Level has the following representation for the counterpart of (A_i):

(51) (Cl_i: [(Vw_i)] (Cl_i))

Though the example consists of a single word, we need the clausal layer in (51) so as to allow for the addition of external modifiers. The template for the verbal word is given in (52):

(52) (Vw_i: [(Aff_i: /baɪ/ (Aff_i)) (Ns_i: /jaʊ/ (Ns_i)) (Vs_i: /gʊrmɛ/ (Vs_i)) (Aff_j: 138 (Aff_j))] Vw_i))

The selection of portmanteau pronominal prefixes in Bininj Gun-Wok depends on the way in which the Subject and Object function are distributed, and is, with third person Subjects only, furthermore dependent on the tense of the verb. The relevance of the Subject function shows up in the fact that there is neutralization of Actor and Undergoer arguments of intransitive predicates, and in the fact that only Subjects can control reflexives and reciprocals, as shown in (53) (Evans 2003: 390):

(53) Barri-marne-ganj-ginje-rr-inj.
 3.SUBJ.PL(PST)-BEN-meat-cook-COREF-PST.REAL.PF
 'They cooked the meat for each other.'

The relevance of the Object function is apparent in the primitive-secundative alignment system of the language, which means that there is neutralization between two-place Undergoers and three-place Recipients and Beneficiaries, as shown in (54) (Evans 2003: 390), in which Object agreement is with the Beneficiary rather than with the Undergoer:

(54) Bandi-marne-ganj-ginje-ng.
 3.SUBJ.PL(PST)>3.PL.OBJ-BEN-meat-cook-PST.REAL.PF
 'They cooked the meat for them.'

The prefix can thus only be selected after the Subject and Object function have been assigned by the Morphosyntactic Encoder. This is a straightforward process, as there is no true passive voice available in the language (Evans 2003: 574). The tense information necessary for the

selection of the appropriate form of the prefix can be retrieved directly from the Representational Level.

The form of the tense suffix is, among other things, dependent on the last syllable of the preceding verbal stem or on the reflexive/reciprocal suffix that may be attached to it (Evans 2003: 323), as is shown contrastively in the examples (53)-(54). This means that the actual form of the suffix can only be selected at the Phonological Level. For this reason a placeholder, here arbitrarily '138', occupies the relevant affix slot.

The ordering of the various components of the verbal word may be represented as in (55):

	P ^I	P ^{F-2}	P ^{F-1}	P ^F
(55)	(Vw _i : [(Aff _i : /baɪ/ (Aff _i))	(Ns _i : /jaʊ/ (Ns _i))	(Vs _i : /gʊɾmɛ/ (Vs _i))	(Aff _j : 138 (Aff _j))] Vw _i)

The morphological possibilities of a Biniŋ Gun-Wok word are very rich, as shown in Evans (2003: 318), and only partly exploited in the current example. Every verbal word obligatorily contains an initial pronominal complex, usually a portmanteau morpheme, necessarily in the leftmost position, a TMA suffix in the rightmost position, and a (potentially derived) verbal stem immediately preceding the TMA suffix. If there is an incorporated noun, it immediately precedes the (potentially derived) verbal stem. In the process of hierarchical ordering, the TMA suffix is located in P^F. In the process of configurational ordering, the verbal nucleus is placed right in front of the TMA-suffix, and the incorporated noun in the next position available left to it. The pronominal portmanteau expression is placed in P^I.

The complex relationships between the Representational and Morphosyntactic Levels may now be shown as in (56):

(56)	<p>(past ep_i: (real e_i: [(pf f_i: [(f_j: /gʊɾmɛ/ (f_j)) (x_i)_A (x_j: [(f_k: /jaʊ/ (f_k)) (x_j)_∅]]_U (f_i) (e_i)_∅] (ep_i))</p> <p>(Vw_i: [(Aff_i: /baɪ/ (Aff_i)) (Ns_i: /jaʊ/ (Ns_i)) (Vs_i: /gʊɾmɛ/ (Vs_i)) (Aff_j: 138 (Aff_j))] Vw_i)</p>
------	---

What this representation shows is that there is a one-to-one relation between lexical elements at the representational level and stem slots within the morphosyntactic word template, but a many-to-one relationship between non-lexical elements at the representational level and affix slots at

the morphosyntactic level, the latter point clearly showing the cumulative nature of the inflectional affixes in Bininj Gun-Wok. It furthermore shows that independent units at the semantic level enter into the internal constitution of a single morphosyntactic word.

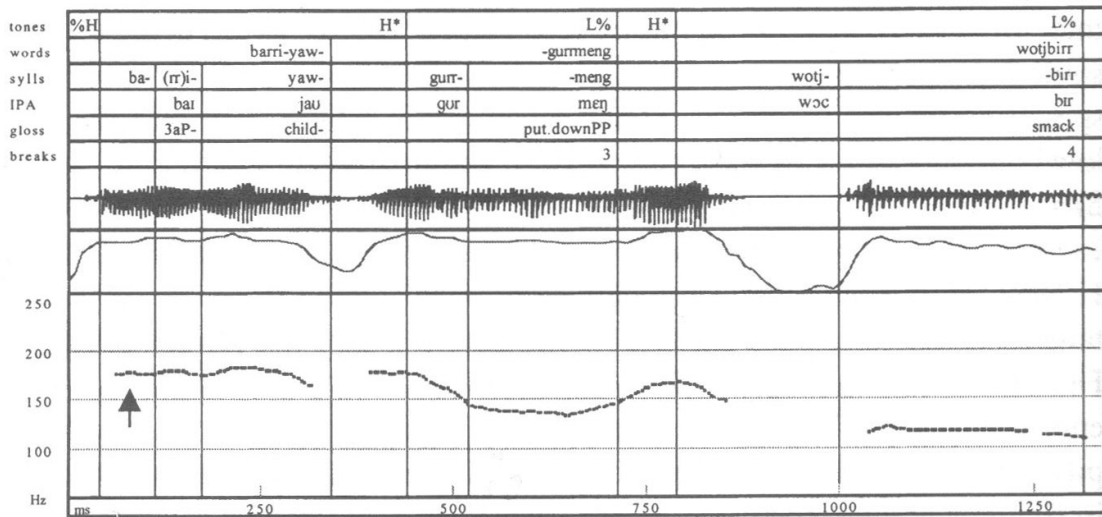
The morphosyntactic counterpart of A_J is straightforward:

(57) (Iw_i: (I_s: /wɔcbɪr/ (I_s)) (Iw_i))

Given that the class of ideophones constitutes a special word class in Bininj Gun-Wok, we use the category (Iw) to account for them. This is furthermore a good example of an Act corresponding to a single word, i.e. a holophrastic expression.

The formalization at the Phonological Level of example (44) is as in (58). The spectrogram, shown below the formula, is taken from Bishop & Fletcher (2005: 350), on which our argumentation is based.

(58) (f U_i: [(f IP_i: [(f PP_i: [(h F_i: [(s S_i: /baɪ/ (S_i)) (S_j: /jau/ (S_j))] (F_i)) (F_j: [(s S_k: /gur/ (S_k)) (S_l: /mɛŋ/ (S_l))] (F_j))] (PP_i)) (IP_i)) (f IP_j: (f PP_j: [(F_k: [(s S_m: /wɔc/ (S_m)) (S_n: /bɪr/ (S_n))] (F_i)) (PP_j)] (IP_j))] (U_i))



Bishop & Fletcher (2005: 358) indicate that the pause between *barriyawgurrmeng* and *wotjbirr* has the index 3, indicating an utterance-medial break between intonational phrases, hence the two IPs within the utterance U_i (for further detail on break indices, see Bishop & Fletcher 2005: 352-354). Each of the IPs corresponds to an Act at the Interpersonal Level. That there is one utterance (u) here is supported by the final pause with break index 4, which indicates an

utterance boundary (Bishop & Fletcher 2005: 358). The utterance as a whole corresponds to a Move at the Interpersonal Level.

Both IPs have a falling contour, as shown by their f-operators, which expresses their declarative nature. The recording shows that the second IP has a particularly clear fall from /wɔc/ to /bɪr/, which we interpret as a paratone effect indicative of the end of a Move, and indicated by an f-operator on U_i . The first IP has a high initial foot ($h F_i$), reflecting Bishop & Fletcher's (2005: 350) identification of this example as having, in their terms, an "initial high boundary tone" (%H).

In the example each IP contains one PP, and in another Bininj Gun-Wok dialect it is known that PPs have a falling contour ("tonally marked (with a low tone) at its right edge", Bishop & Fletcher 2005: 341). Bishop & Fletcher surmise that this is true of the Manyallaluk Mayali dialect, too. This is indicated by the f-operator on the PPs.

The Bininj Gun-Wok IP has a single nuclear accent and the "boundary tone" is signalled on the last or the penultimate and last syllables of the IP (Bishop & Fletcher 2005: 342). This is reflected in the analysis: each IP has a falling operator, which the Articulator will attribute to the final stressed syllable of each, namely /gɪr/ and /wɔc/. The following syllables /mɛŋ/ and /bɪr/ are correspondingly produced at a lower pitch than the preceding syllables.

The level of the phonological word (PW) has not been found necessary for a description of Bininj Gun-Wok intonation (Bishop & Fletcher 2005: 339) and has accordingly not been included here.

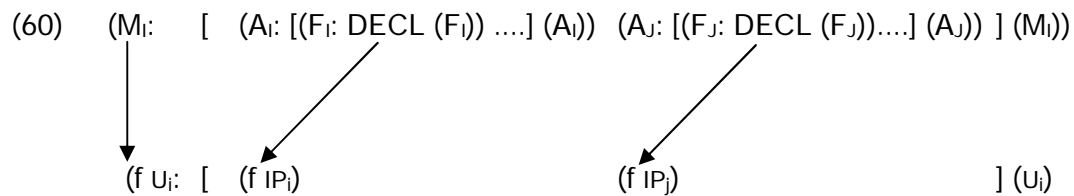
In each foot (F), it is the first syllable that is stressed (as always in Bininj Gun-Wok; Bishop & Fletcher 2005: 340 point out that the foot is "trochaic and unbounded", giving an example of a foot with three unaccented syllables: *gorlomomo* 'fresh water crocodile'). This is indicated by means of the s-operators on the first syllables within each foot. Foot F_i , which corresponds to the morphosyntactic structure *barriyaw* could alternatively be analysed as having three syllables, again with stress on the first. In this case s_i in (58) would be expanded as in (59):

(59) (s s_i : /ba/ (s_i)) (s_{i+1} : /rɪ/ (s_{i+1}))

Then the collapsing of the first two into one syllable in the actual realization of the utterance would have to be left to the Articulator, possibly as a feature of *allegro* speech.

Of the various prosodic features manifested by this example, we can thus say that those that apply at the level of the Utterance and the Intonational Phrases are meaningful, in the sense that they express distinctions relevant at the Interpersonal Level, while the other ones

correspond to default settings. The overall correspondences between the Interpersonal Level and the Phonological Level may then be indicated as in (60), where we leave out the intermediate Representational and Morphosyntactic Levels for the sake of readability:



7. Dynamic variation

Our argumentation in the preceding sections was based on static synchronic data, from both a language-specific and a typological perspective. FDG, however, also aims to offer a framework for the analysis of dynamic data, be these concerned with language acquisition and language loss, or language genesis and language change. We can only touch upon these issues briefly here.

The FDG framework offers, as noted by Butler & Taverniers (fc.), two major predictions as regards dynamic variation: one concerns the variational step between the Representational and the Interpersonal Levels, the other the variational steps between the various hierarchically ordered Layers at each Level. In both cases, the actual manifestation of variational steps will be at the Morphosyntactic and Phonological Levels.

As an example of the step between the Interpersonal Level and the Representational Level, consider the status of adverbial conjunctions in English. Hengeveld & Wanders (2007) show that a basic distinction can be made in English between lexical and grammatical conjunctions: the former can be modified, while the latter cannot, as shown in (61)-(62):

(61) He arrived **three hours** before she left.

(62) *He continued walking around **three hours** until the meeting began.

Both types of conjunction do, however, admit modifiers that have scope over the entire conjunctive phrase, as shown in (63)-(64):

- (63) He arrived **exactly** three hours before she left.
(64) He continued walking around **exactly** until the meeting began.

The conjunctions shown in (61)-(64) are all operative at the Representational Level. Conjunctions at the Interpersonal Level admit neither type of modification, as illustrated in (65):

- (65) *He is a nice guy, **exactly** while she is a rather unpleasant character.

This point is particularly evident in cases in which a conjunction can be used at both Levels, as in (66)-(67):

- (66) *Watch out, **exactly because** there is a bull in the field.
(67) Providing food assistance is not easy **exactly because** the infrastructure is lacking.

In (66) the causal clause motivates a discourse act at the Interpersonal Level, but in (67) it provides the reason for a State-of-Affairs at the Representational Level. From facts like these one may derive the conclusion that the grammaticalization of conjunctions goes hand in hand with their developing an interpersonal function from their originally representational function.

The variational steps between the various hierarchically ordered Layers at one specific level may be illustrated by the acquisition of operator categories at the Representational Level. Drawing on a wealth of data from English child language acquisition, Boland (2006) shows that operators from lower layers are acquired earlier and/or more rapidly than operators from higher layers. More specifically, she shows that aspectual operators (Property layer f) are acquired more rapidly and earlier than tense operators (State-of-Affairs layer e), which in turn are acquired before operators expressing a propositional attitude (Propositional Content layer p). She furthermore shows that this observation holds for the acquisition of a wide range of typologically different languages, and is paralleled by the diachronic developments in this domain.

8. Conclusion

This concludes our overview of the FDG model, a structural-functional theory of language with a strong typological basis. Its defining characteristics can be summarized as follows: (i) FDG has a top-down organization; (ii) FDG takes the Discourse Act rather than the sentence as its basic unit of analysis; (iii) FDG is designed as the grammatical component of a wider theory of verbal interaction in which it is connected to Conceptual, Contextual, and Output Components; (iv) FDG contains Interpersonal, Representational, Morphosyntactic, and Phonological Levels. This architecture is applied to both static and dynamic data.

Abbreviations

1	first person	DEM	demonstrative
2	second person	F	feminine
3	third person	FAM	familiar
ABIL	ability	FDG	Functional Discourse Grammar
ABS	absolutive	IND	indicative
ANIM	animate	INF	infinitive
ASP	aspect	INFER	inferential
AUX	auxiliary	IRR	irrealis
BEN	beneficiary	LOC	locative
CL	class	M	masculine
CNJ	conjunction	NEG	negation
COMPL	completive	NONPST	nonpast
COMPV	comparative	OBJ	object
CONN	connective	PF	perfective
CONTR	contrastive	PL	plural
COP	copula	POSS	possessive
COREF	coreference	PRED	predicative
CORR	correlative	PRS	present
DECL	declarative	PST	past
DEF	definite	PTCP	participle

REAL	realis	SG	singular
REC	recipient	SUBJ	subject
REL	relative	SUBS	subsequent tense
REM	remote	TOP	topic
REP	reportative	TR	transitive
RRG	Role and Reference Grammar	VIS	visual
SFL	Systemic Functional Linguistics		

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