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**Conceptualisation and Formulation in the Generation of the Verb Phrase
in English and Welsh within Functional Discourse Grammar**

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1. Introduction¹

In Functional Discourse Grammar (FDG) as proposed by Hengeveld and Mackenzie (2008), the generation of linguistic expressions involves a series of levels and processes, as outlined in Table 1. The first process is Conceptualisation, which consists in the formation of a prelinguistic intention to communicate; and following Connolly (2013: 133), we shall here work on the assumption that the outcome of this process is a Conceptual Level Representation (CLR), which serves as input to the process of Formulation. The latter maps the CLR into two underlying linguistic representations: the Interpersonal Level Representation (ILR) and the Representational Level Representation (RLR). These, in turn, act as input to the process of Encoding, which maps them into a Morphosyntactic Level Representation (MLR), and then uses the latter to produce a Phonological Level Representation (PLR).

Table 1: *Levels and inter-level mapping processes*

PROCESS	OUTCOME
Conceptualisation	Conceptual Level Representation (CLR)
Formulation	Interpersonal Level Representation (ILR) <i>and</i>
	Representational Level Representation (RLR)
Encoding	Morphosyntactic Level Representation (MLR) <i>and</i>
	Phonological Level Representation (PLR)

In FDG to date, comparatively little work has been done on the Conceptual Component, though some basic proposals are to be found in Hengeveld & Mackenzie (2008: 7-8, 12, 47-48) and in Connolly (2013). Valuable relevant discussion is also found in Butler (2008: 238-243, 2012). These works, and in particular Connolly (2013), will serve as the starting-point of the present paper, which addresses the question of how to deal with the generation of the Verb Phrase (Vp) at the Conceptual and Representational Levels, within the dynamic model of FDG envisaged by Hengeveld & Mackenzie (2008: 294). This question will be discussed in relation to English and Welsh, in view of the fact that there are some significant differences in the grammar of the Vp in these two languages. The treatment will focus on modally neutral Vps, within Discourse Acts containing only one State-of-Affairs. It will involve (i) extending the CLR as compared with Connolly (2013), (ii) addressing some issues that arise in the formulation of the structures underlying the Vp within the two languages concerned and (iii) suggesting how those issues may be resolved.

¹ A preliminary version of this paper was presented at the Third International Conference on Functional Discourse Grammar, held at the University of Jaén in September, 2014. Thanks are due to fellow-participants at that conference for their comments, which have led to improvements in the paper.

In conformity with the fundamental architecture of the FDG model, we shall adopt the theoretical position that in the process of generating any particular Discourse Act (DA), the grammatical options within the systems of tense and aspect are selected on the basis of the underlying communicative intentions formed at the Conceptual Level (CL). In other words, the Grammatical Component does not act (entirely) autonomously in this process. Rather, the formulation of a linguistic expression has to be constrained by the need to reflect what an Author (a Speaker or Writer) intends to communicate.

2. The Conceptual Level

2.1. Parameters

Let us begin by postulating that in order to support the temporal and aspectual distinctions recognised by Hengeveld and Mackenzie (2008: 163-166, 210-211) in relation to the Representational Level (RL), the underlying prelinguistic conceptualisations need to be based on a limited number of parameters. These parameters involve the notion of ‘events’ and ‘sub-events’ (i.e. phases within events; see further 3.2 below). An ‘event’ may be either a dynamic process, such as ‘go(-ing)’, or a static process, such as ‘stay(-ing)’. The action of producing the DA itself counts as an instance of a dynamic process.

The parameters in question are as follows:²

- (1) Distribution of an event in time:
 - (a) **Extension** (as opposed to transience) along the time axis (underlying the opposition between Momentaneous and Non-momentaneous aspect).
 - (b) **Protraction** along the time axis (underlying the distinction between Habitual and Non-habitual aspect); see Comrie (1976: 26-30).
- (2) Relationship between events or sub-events:
 - (a) **Sequence** (underlying the opposition between Past, Present and Future tense, and also phasal aspect).
 - (b) Degree of **displacement** along the time axis (underlying, for instance, the opposition between remote and recent past).
 - (c) **Superposition** (the overlapping or disjunction of events or sub-events, relevant to the choice of tense and aspect).
 - (d) **Alignment** along the time axis (relevant to, for instance, the relationship between the present standpoint and a past event that characterises the Perfect or Resultative aspect).
- (3) The **angle** or viewpoint (internal or external) from which an event is regarded (relevant to the opposition between Perfective and Non-perfective aspect as defined in Hengeveld and Mackenzie (2008: 211)).

The CL parameters in (1) and (2) all pertain to the time axis and will therefore be termed the parameters of **temporality**. Tense derives from the parameters in (2), whereas aspect relates to all three of the sets (1-3), which suggests that aspect is conceptually more heterogeneous than tense.

² The treatment of verbal meaning in Quirk et al. (1985: ch. 4) was helpful in arriving at the set of parameters presented here.

2.2. Representation

The question of how to represent prelinguistic intentions is a difficult one, given the current state of knowledge. Hengeveld and Mackenzie (2008: 8) speak of ‘conceptual configurations’ in this regard, but do not provide much in the way of detail about these. However, Hengeveld and Mackenzie (forthcoming) contend that modelling conceptualisation involves taking into account factors such as the distribution of the Author’s message between language and gesture, the Author’s emotional state and other contextual factors. Consequently, they are doubtful as to whether all the relevant prelinguistic information can be contained within CLR’s of the kind proposed in Connolly (2013). However, the CLR’s presented there, and also the present paper, are not intended to carry all pertinent information. Indeed, the model proposed in Connolly (2013: 129) contains, besides the Conceptualiser itself, a Settings Register that makes provision for a certain types of contextual factor to influence the processes within the Grammar. Clearly, however, the Conceptual Component requires a great deal of further research before an adequately secure model can be developed.

In the meantime, we have two options. One is to postpone the problem of offering a detailed method of representing prelinguistic information. The major difficulty that stems from this is that, in the absence of a well-defined input, it is impossible to formalise the process of Formulation, which is of course a core part of FDG. In this situation, the aim, expressed in Hengeveld and Mackenzie (2008: 26), of achieving an ‘explicit and highly formalised’ account of language is thwarted. The alternative adopted in Connolly (2013) and in the present paper is to make use of a formal representation (however provisional and partial) in order to allow the process of Formulation to be described in a formal manner. This approach is computationally inspired and accordingly offers the additional advantage of being capable of implementation on a computing system.

The method of representing prelinguistic intentions at the CL put forward in Connolly (2013) involves treating those intentions as items of information (in a very general sense of that term). Such items of information are, following Devlin (1991: 22), considered to be relational in nature. Our approach also draws on some features of the FunGramKB Conceptual Ontology and language-independent Lexical Resource; see further Mairal Usón and Perrián-Pascual (2009), Perrián-Pascual and Arcas-Túnez (2010), Butler (2012) and Connolly (2013: 130-132). The FunGramKB contains, *inter alia*, an Ontology (a hierarchical catalogue of concepts) and an Onomasticon (a repository of information about particular individuals and events). Each concept in the Ontology is assigned to one or other of three maximally broad metaconcepts, namely ‘entity’, ‘event’ or ‘quality’; see Mairal Usón and Perrián-Pascual (2009: 222).

As an example of our notation, consider the DA in (4a), whose underlying CLR is given in (4b):

- (4) (a) David hired a van.
(b) ((EVENT:HIRE_222#1 (_223#2) (ENTITY:VAN_224_UPDATE#3) #4)
(QUALITY:TEMPORALITY#5 (#4) (QUALITY:PRIOR#6) #7)
_INFO-PRESENTATION)

The fundamental purpose of the first line of (4b) is to establish that there is a relation of ‘hiring’ between an individual named David and a particular instance of the concept ‘van’. (In the case of a dynamic event such as ‘hiring’, we make it a notational convention that the agent be listed first.) Let us now briefly deal with the details of the notation.

The DA in (4a) contains two contentive lexical items, ‘hire(d)’ and ‘van’; and in the first line of (4b) the corresponding denotative concepts are represented (in small capitals) as

HIRE (classified as a type of EVENT) and VAN, classified as a type of ENTITY. The part of the CLR corresponding to the non-contentive word ‘David’, however, simply takes the form of the symbol ‘\’, indicating that it does not denote a concept. (It will, however, be assumed that information relating to the person concerned is to be found in the Onomasticon.)

When an Author intends to apply a concept to an individual event, entity or quality, this intention is represented in the notation by means of an underscore symbol ‘_’ followed by an integer, such as ‘224’. The underscore indicates that what immediately follows it constitutes utterance-specific information; and when it is followed by an integer, the latter designates an individual application of the concept preceding the underscore. (The actual integers, such as 224, used in the examples in the present paper are selected arbitrarily, for purely illustrative purposes.)

A CLR such as (4b) generally contains a series of predication-style structures, each of which is called a **relation-description** (RD), consisting of a **relation-identifier** (RI) followed by one or more arguments. Accordingly, the first line of (4b) is an example of an RD, with ‘EVENT:HIRE’ being the RI. With a view to facilitating cross-referencing, each item within an RD is numbered in sequence, designated by means of a hash symbol ‘#’ followed by an integer. (Again, the actual values chosen in the present paper are purely illustrative.) Accordingly, EVENT:HIRE is enumerated as #1, and so on. For convenience, entire RDs are also included in the numbering sequence, as for instance in the case of #4 in our example, which designates the RD whose components are #1, #2 and #3.

Hengeveld and Mackenzie’s (2008: 7) take the view that the Conceptual Component should accommodate both ideational and interpersonal material; see further Butler (2008: 240-243). An example of interpersonal information being included in a CLR is seen in the first RD within (4b), in the form of the ‘UPDATE’ instruction to the Addressee. This instruction motivates the assignment of the Focus function in languages like English and Welsh; cf. Hengeveld and Mackenzie (2008: 89). In our notation it is preceded by an underscore and written in small capitals, italicised to distinguish it from a concept, which would have been written in plain text. Another example is ‘INFO-PRESENTATION’ in the last line of (4b), which applies to the whole CLR and indicates that the intention is to present or offer information rather than, for example, to request it.

The second RD in (4b) supplies information about the temporality of the occurrence described in the first RD (#4). What it establishes is that the temporality of #4 is prior to the moment of utterance. (Both TEMPORALITY and PRIOR³ are classified as belonging to the metaconcept of QUALITY.) Clearly, this second RD is of particular relevance to the theme of the present paper.

Now, in order to develop our notation so as to enable it to handle the generation of Vps, we need to make a slight modification, by adding the facility to refer to particular points in time, such as the present moment. For this purpose we shall adopt the following notation:

- (5) (a) •0 refers to the present moment.
- (b) •1, •2, ..., refer to other specified points in time, as appropriate.

Using this notation, conceptual representations such as QUALITY:PRIOR, found in the second RD of (4b), will be expanded into QUALITY: PRIOR(•0), meaning ‘prior to the present moment’, with ‘•0’ (read: ‘point nought’) being notated as an argument to the term PRIOR. Other examples will appear during the course of the paper.

³ The term PRIOR is used here at the CL, in preference to the term ANTERIOR employed in Connolly (2013), in order that we may now reserve the term ‘Anterior’ for the treatment of relative tense (see 3.1 below), a matter that was not considered in Connolly (2013).

In order to simplify the exposition, we shall treat the present moment as being equivalent to the moment of utterance. We recognise, of course, the existence of complications such as the Historic Present tense, but these will not be considered within the present paper.

3. The Representational Level

3.1. Tense

Let us now turn to the RL treatment of the Vp in FDG. A distinction is drawn in FDG between an Episode (Ep) and a State-of-Affairs (SoA); see Hengeveld and Mackenzie (2008: 133, 139, 142, 150, 157, 166). The basic difference lies in the principle that an Episode can be specified in relation to its *absolute* location in time, whereas a State-of-Affairs can be specified in terms of its *relative* time. Moreover, it is possible for an Episode to contain more than one State-of-Affairs, as in the following example:

- (6) At noon on Christmas Day, 1950, Ann sat down to lunch, having first drunk two glasses of sherry.

In this Episode there are two States-of-Affairs, one involving Ann sitting down to lunch and the other involving her drinking two glasses of sherry. As is apparent, the Episode is temporally located at noon on Christmas Day, 1950, which is an absolute location in time. The State-of-Affairs involving Ann sitting down to lunch is simultaneous with this absolute temporal location, whereas the State-of-Affairs involving her drinking two glasses of sherry is anterior to it. Clearly, the descriptions ‘simultaneous’ and ‘anterior’, applied to the two States-of-Affairs, are both relative to the time of the Episode.

As is very well known, in many (though by no means all) languages, an indication of absolute tense is given by the actual form of the verb. According to Hengeveld and Mackenzie (2008: 164-165), the fundamental distinction within the verbal systems of such languages is between Past and Non-past. However, in a number of languages the verbal tense system further distinguishes between Present and Future; and in some instances distinctions may also be drawn in terms of the proximity versus the remoteness of past and/or future events.

English, of course, is a language in which the expression of absolute tense is supported by the verbal system. However, Leufkens (2013: 202-203) states that in English, all main clause tenses are actually *combinations* of absolute and relative tense. An example is supplied by the preterite form ‘sat’ in (6), which places the event (of Ann sitting down to lunch) at a point in the past that is simultaneous with the absolute temporal location of the Episode indicated by the adverbial expressions at the beginning of the clause (‘At noon on Christmas day, 1950’).

On the other hand, according to Leufkens, subordinate clause tenses in English can be simply relative, this being the case when the Vp is non-finite. In FDG, three relative tenses are recognised: Anterior (ant), Simultaneous (sim) and Posterior (post). An example of the use of Simultaneous tense within a subordinate clause is seen in (7b), that of an Anterior tense in (7a) and that of a Posterior tense in (7c):

- (7) (a) Robert retired in 2010, having worked for many years.
(b) Robert retired in 2010, being 60 years old.
(c) Robert is the favourite to win the competition.

In (7a) and (7b), the absolute tense is the Past (with an adverbial expression indicating more precisely the time concerned, namely the year when Robert retired). In the subordinate clause of (7a) ('having worked for many years'), the relative tense is Anterior to the location in time of Robert's retirement, while in the subordinate clause of (7b) ('being 60 years old') the relative tense is Simultaneous with that absolute temporal location. In (7c) the absolute tense is the Present, while the subordinate clause ('to win the competition') has a relative tense which is Posterior to the Present, as the winner of the competition is not yet decided.

Leufkens further demonstrates that the absolute-relative tense combinations which are associated especially with main clauses cover, and differentiate among, a wide range of the available verbal forms. The three relative tenses just mentioned, combined with the three absolute tenses of Past Present and Future, generate a total of nine absolute-relative pairings. These may be illustrated with the help of the following examples, in which the pertinent verbal expressions are underlined:

- (8) (a) *Past Anterior:*
By 1970 Claire had spent three years at University.
- (b) *Past Simultaneous:*
In 1969 Claire spent some time in France.
- (c) *Past Posterior:*
From 1975 onward, Claire would spend more of her time in Germany.
- (d) *Present Anterior:*
Claire has now spent some time in Italy.
- (e) *Present Simultaneous:*
Claire now spends her time at leisure.
- (f) *Present Posterior:*
Claire is now going to spend some time in Spain.
- (g) *Future Anterior:*
Claire will soon have spent three years as secretary of the committee.
- (h) *Future Simultaneous:*
Claire will soon spend some time learning Spanish.
- (i) *Future Posterior:*
Claire will soon be about to spend a day in London.

Two comments are called for in relation to (8). Firstly, the Present Posterior combination exemplified in (8f) is not recognised by Leufkens; yet there seems to be no reason to exclude it. Secondly, although verbal forms in the Perfect describe past events, the Present Perfect exemplified in (8d) is taken to be Present in terms of absolute tense (reflecting the temporal location of what Quirk et al. (1985: 190) call the 'point of current relevance' as being the present moment), while the retrospective status of the event itself is dealt with through the Anterior nature of the relative tense.

3.2. Aspect

Aspect is treated by Hengeveld and Mackenzie (2008: 20, 210-211) as applying to States-of-Affairs, within which they are represented as Operators. Two basic kinds of aspectual contrast are recognised. The first is the distinction between Perfective (pf), where a State-of-Affairs is regarded from an external viewpoint as an integral whole, and Non-perfective (non-pf), where a State-of-Affairs is regarded from an internal viewpoint. An example of the

Perfective is seen in (9a) and one of the Non-perfective in (9b). (Both are Past Simultaneous in terms of tense.)

- (9) (a) Ann read her newspaper.
(b) Ann was reading her newspaper.

As for phasal aspect, let us first postulate that it is possible in many instances to analyse an event into a succession of three sub-events or phases, namely:

- (10) (a) The anticipatory phase of the event, during which the event is construed as prefigured, anticipated, preordained or prearranged.⁴
(b) The hub of the event, within which it may be useful to recognise:
(i) The inception of the event.
(ii) The core of the event.
(iii) The completion of the event.
(c) The retrospective phase of the event, during which the contextual impact of the event remains a foreground rather than a background effect.⁵

In FDG, the categories available for the description of phasal aspect are those listed in (11) and (12). As will be apparent, these relate to the subdivisions within (10).

- (11) (a) Prospective, centred upon the anticipatory phase of event.
(b) Progressive, centred upon the hub of the event.
(c) Resultative, centred upon the retrospective phase of the event.
- (12) (a) Ingressive, centred upon the inception of the event.
(b) Egressive, centred upon the completion of the event.

In this paper we shall confine our attention to (11).

An example of the Prospective aspect is given in (13a) and one of the Resultative aspect in (13b). (We shall come to the Progressive aspect shortly.)

- (13) (a) Ann is about to leave.
(b) Claire has left.

(As regards tense, (13a) is Present Posterior and (13b) Present Anterior.)

A question arises at this point in connection with verbal forms whose relative tense is Anterior. The Past Perfect, Present Perfect and Future Perfect forms of the verb, as illustrated respectively in (8a), (8d) and (8g) above, are all Resultative in aspect. So, too is the Future Perfect in the Past form, illustrated in (14), which will be dealt with in 4.4 below.

- (14) Ann would soon have finished.

However, they are also distinguished from the Non-perfect verbal forms by their characterisation Anterior. This means that, in the interests of avoiding redundancy within the notation, the RLRs of the verbal forms exemplified in (8) need only contain the tense specification. This is an interesting consequence of drawing the distinction in FDG between absolute and relative tense.

⁴ This does not necessarily have to be *immediately* before the event.

⁵ This does not necessarily have to be *immediately* after the event.

(The fact that we are able to dispense with phasal aspectual categories here should not be taken to imply that other authors who might find them useful should refrain from employing them. However (and for present purposes this is crucial), the algorithmic procedure to be presented in the next section does not depend on them.)

Similar considerations apply to verbal forms whose relative tense is Posterior, as exemplified in (8c), (8f) and (8i). Although these may be considered to be Prospective in aspect, it is not essential to include the aspectual category in the actual RLRs, as the Posterior tense categorisation is sufficient to differentiate the verbal forms concerned from the Non-prospective forms.

With regard to the Progressive aspect, Hengeveld and Mackenzie (2008: 210) exemplify this by means of an example from Welsh, drawn from Awbery (1976: 13):

(15) Mae'r dyn yn gweld y ci.

This may be glossed as follows:

(16) Mae 'r dyn yn gweld y ci.
is the man *particle* seeing the dog

(The particle 'yn' serves to indicate a relationship of predication.) Awbery translates this as:

(17) The man sees the dog.

This is an appropriate, idiomatic translation, but clearly, it does *not* make use of the Progressive form of the verb. On the other hand, the translation offered by Hengeveld and Mackenzie is:

(18) The man is seeing the dog.

Although this is also a possible translation, it would normally indicate an intended Future event, or else a regularly occurring Non-past event which, however, is *not* necessarily actually happening at the moment of utterance. Example (15), which is the only illustration of the category 'Progressive' offered in Hengeveld and Mackenzie (2008: 210), is thus somewhat problematic. The authors claim to have taken it not directly from Awbery, but indirectly from Dik (1997). However, I have been unable to find it in Dik (1997), and am therefore unable to discover where exactly the discrepancy arose.

But in any case, as was pointed out above in relation to example (9), repeated here as (19), the contrast between pairs such as the following can be regarded as one of Perfectivity:

(19) (a) Ann read her newspaper.
(b) Ann was reading her newspaper.

By adopting such an approach we can actually avoid employing the category of Progressive within the present paper.

However, we shall need to make use of two further aspectual categories:

(20) (a) Momentaneous
(b) Habitual

The Momentaneous category, which is mentioned briefly in Hengeveld and Mackenzie's treatment of aspect (2008: 211), is often considered a special case of the Perfective, applicable in cases where the event is very short-lived, as for example in (21a):

- (21) (a) The fuse in the cooker suddenly blew.
 (b) Throughout his working life, Bill used to spend his summers in Greece.

The Habitual, on the other hand, is widely regarded as a special case of the Non-perfective, and applies to cases where the event is protracted and possibly iterated; see Comrie (1976: 30). An example is found in (21b). Cf. also Keizer (2015: 144).

4. Generating Verb Phrases in English FDG

4.1. Levels and Rules

We are now in a position to consider the process of generating Vps in English. Let us return for a moment to example (4a,b) in section 2.2, repeated here as (22a) and (22e), with the notational addition of '(•0)'. Of course, there are also three intermediate levels of representation: the MLR given in (22b), the RLR in (22c) and the ILR in (22d):⁶

- (22) (a) David hired a van.
- (b) $(Le_2 (Cl_2: P^{M-1} [(Np_1 (Nw_4: /derɪd/ (Nw_4)) (Np_1))_{Sbj} P^M (Vp_1 (Vw_2: [(Vs_2: /haɪə/ (Vs_2)) (Aff_3: Pst (Aff_3))] (Vw_2)) (Vp_1)) P^{M+1} P^1 P^{1+1} (Np_2: [(Gw_3: /ə/ (Gw_3)) (Nw_5: /van/ (Nw_5))] (Np_2))_{obj} (Cl_2)) (Le_2))$
- (c) $(p_2: (past\ sim\ ep_2: (e_2: (pf\ f_3: [(f_4: hire\ (f_4)) (x_3)_A (x_4: (f_5: van\ (f_5)) (x_4))_U] (f_3)) (e_2)) (ep_2)) (p_2))$
- (d) $(M_2: (A_2: [(F_2: DECL (F_2)) (P_1)_S (P_2)_A (C_2: [(T_3) (+id\ R_3: David\ (R_3)) (-id\ R_4)_{FOC} (C_2))] (A_2)) (M_2))$
- (e) $((EVENT:HIRE_222\#1 (_223\#2) (ENTITY:VAN_224_UPDATE\#3) \#4) (QUALITY:TEMPORALITY\#5 (\#4) (QUALITY:PRIOR(\bullet 0)\#6) \#7) _INFO-PRESENTATION)$

In accordance with the approach advanced in Connolly (2012, 2013), the generation of all the linguistic (as distinct from prelinguistic) levels is to be accomplished by rule-based algorithms. In what follows, we shall be particularly concerned with the CLR and with the

⁶ The indexing here does not begin at 1, as the DA is presumed not to be discourse-initial.

part of the Formulation algorithm that delivers the RLR. From now on, therefore, examples of underlying representations will, in almost all cases, include only what is directly pertinent to the Vp. Furthermore, for the sake of simplicity, the use of index numbers (#1, #2, ...) will be reduced to a minimum.

4.2. Present and Past

The Present Simultaneous tense in English is exemplified in (23a) and (24a), the former being Non-perfective and the latter Perfective:

- (23) (a) David is servicing his car.
 (b) (p₁ (pres ep₁ (sim e₁ (non-pf f₁: [(f₂: service (f₂)] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:OVERLAP(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:INTERNAL))
- (24) (a) David services his car.
 (b) (p₁ (pres ep₁ (sim e₁ (pf f₁: [(f₂: service (f₂)] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:OVERLAP(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

The first RD within the CLRs in (23c) and (24c) states that a relation of temporality exists between the hub of event #4 and the moment of utterance •0, such that, in terms of the parameter of **superposition**, #4 overlaps with •0. (In accordance with the notational conventions, OVERLAP, like TEMPORALITY, is shown as belonging to the superordinate category of QUALITY.) The second RD within (23c) deals with the Non-perfective aspect of (23a), by stipulating that the presentation of the event #4 is to be from an angle or standpoint that is internal to the event. However, in (24c), the aspect is Perfective; hence the angle is external rather than internal to the event.

In order to generate the requisite representations at the RL, the Formulator will take the respective CLRs as its input and will deliver the appropriate RLRs as its output. Thus, the RLR underlying (23a) will be formulated as (23b), and the RLR underlying (24a) as (24b).

In (23b) the RLR indicates that Episode is Present in absolute tense and that the State-of-Affairs is Simultaneous in relative tense and Non-perfective (non-pf) in aspect, while in (24b) the State-of-Affairs is Perfective (pf). (The other elements of the clause (the Subject and Object) have been omitted for ease of exposition.) These representations will then be passed to the Encoder for further processing.

It is proposed in Connolly (2013) that the Formulator should operate on the basis of a rule-based algorithm. Accordingly, in the present paper, an algorithmic procedure will be presented for handling tense and aspect when converting CLRs into the corresponding RLRs. The algorithmic rules required to deliver the RLRs in (23b) and (24b), as well as some further examples to be presented below, are (25a), (26) and (27):

- (25) (a) If the CLR specifies the TEMPORALITY of any phase of an event as OVERLAP(•0) then insert the operator ‘pres’ into the corresponding Episode in the RLR.
 (b) If the CLR does not specify the TEMPORALITY of any phase of an event as OVERLAP(•0) and if the CLR specifies
 the TEMPORALITY of the hub of the event as PRIOR(•0)
 or the TEMPORALITY of any phase of the event in relation (ultimately) to a temporal reference point PRIOR to •0
 then insert the operator ‘past’ into the corresponding Episode in the RLR.
- (26) If the CLR does not specify the TEMPORALITY of the RETRO phase or the ANTE phase of an event as overlapping with any other point in time and if the hub of the event is not specified as SUBSEQUENT to another temporal reference point •1 then insert the operator ‘sim’ into the corresponding State-of-Affairs in the RLR.
- (27) (a) If the CLR specifies the ANGLE of an event as INTERNAL then insert the operator ‘non-pf’ into the Configurational Property layer within the corresponding State-of-Affairs in the RLR.
 (b) If the CLR specifies the ANGLE of an event as EXTERNAL then insert the operator ‘pf’ into the Configurational Property layer within the corresponding State-of-Affairs in the RLR.

(The terms used in (26) will be explained in 4.3 and 4.4 below.)

In English, the distinction in tense between Present and Past is a matter of temporal **sequence**. Whereas in examples (23) and (24), which are in the Present tense, the temporality of the described event and the moment of utterance overlap, in (28) the hub of the event of ‘servicing’, #4, is specified as being prior to the moment of utterance •0, as is indicated in (28c):

- (28) (a) David serviced his car.
 (b) (p₁ (past ep₁ (sim e₁ (pf f₁: [(f₂: service (f₂))] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

The RLR derived from (28c) is shown in (28b). Example (28) is Perfective, whereas the corresponding Past Non-perfective version is dealt with in (29).

- (29) (a) David was servicing his car.
 (b) (p₁ (past ep₁ (sim e₁ (non-pf f₁: [(f₂: service (f₂))] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:INTERNAL))

The algorithmic rules required to deliver the RLRs in (28b) and (29b), as well as some further examples below, are (25b), (26) and (27).

4.3. Perfect

As discussed in 3.1 and 3.2 above, in FDG the Perfect forms of the verb are handled at the RL in terms of the Anterior tense, as illustrated in (30):

- (30) (a) David has serviced his car.
 (b) (p₁ (pres ep₁ (ant e₁ (pf f₁: [(f₂: service (f₂)] (f₁) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (RETRO(#4)) (QUALITY:OVERLAP(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

At the CL we represent this situation with the help of the term RETRO, denoting the retrospective phase of the event, as shown in (30c). What the second RD within (30c) states is that the retrospective phase of the event #4 overlaps with the moment of utterance •0. This is the way in which the apparatus of FDG is able to capture, in a straightforward way, the ‘current relevance’ of the Perfect. It involves the parameters of both **sequence** and **alignment**, the latter being manifested in the correspondence between •0 and the retrospective phase of #4. Following formulation, the RLR is as shown in (30b), where the operator ‘pres’ indicates that the Episode, and hence the point of current relevance, is located in the present, while the operator ‘ant’ indicates that the hub of the actual State-of-Affairs is located earlier in time. The corresponding Non-perfective version is dealt with in (31):

- (31) (a) David has been servicing his car.
 (b) (p₁ (pres ep₁ (ant e₁ (non-pf f₁: [(f₂: service (f₂)] (f₁) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (RETRO(#4)) (QUALITY:OVERLAP(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:INTERNAL))

The following additional rule is required to deliver the RLRs in (30b) and (31b):

- (32) If the CLR specifies the TEMPORALITY of the RETRO phase of an event as overlapping with another point in time
 then insert the operator ‘ant’ into the corresponding State-of-Affairs in the RLR.

In (33a) the Vp is in the form traditionally known as the Past Perfect or Pluperfect:

- (33) (a) David had serviced his car.
 (b) (p₁ (past ep₁ (ant e₁ (pf f₁: [(f₂: service (f₂)] (f₁) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (•1) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (RETRO(#4)) (QUALITY:OVERLAP(•1)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

Here the hub of the event #4 is described in relation to a reference point in the past. This is represented in the notation in the second RD within (33c) by the symbol ‘•1’, which is stated to be PRIOR to the moment of utterance. In the third RD within (33c) the retrospective phase of #4 is stated to overlap with that past reference point. (With reference to rule (25b), this means that the temporality of one of the phases of #4 is specified in relation to a temporal reference point (•1) prior to •0.) In the RLR in (33b), the operator ‘past’ indicates that the

Episode, and hence the point of current relevance, is located in the past, while the operator ‘ant’ indicates that the actual State-of-Affairs is located even earlier in time. The corresponding Non-perfective version is given in (34):

- (34) (a) David had been servicing his car.
 (b) (p₁ (past ep₁ (ant e₁ (non-pf f₁: [(f₂: service (f₂))] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (•1) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (RETRO(#4)) (QUALITY:OVERLAP(•1)))
 (QUALITY:ANGLE (#4) (QUALITY:INTERNAL))

No additional rules are required in order to handle (33) and (34).

4.4. Futurity

As for the expression of future time in English, we may begin with a relatively simple example, involving the use of the auxiliary ‘will’:

- (35) (a) David will service his car.
 (b) (p₁ (fut ep₁ (sim e₁ (pf f₁: [(f₂: service (f₂))] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:SUBSEQUENT(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

In the CLR given in (35c), the event #4 is shown to take place at a time subsequent to the moment of utterance. In (35b) the RLR indicates that Episode is Future in absolute tense and that the State-of-Affairs is Simultaneous in relative tense and Perfective in aspect. The Non-perfective counterpart is given in (36):

- (36) (a) David will be servicing his car.
 (b) (p₁ (fut ep₁ (sim e₁ (non-pf f₁: [(f₂: service (f₂))] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:SUBSEQUENT(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:INTERNAL))

Somewhat more complicated is the Future Perfect, exemplified in (37a):

- (37) (a) David will have serviced his car.
 (b) (p₁ (fut ep₁ (ant e₁ (pf f₁: [(f₂: service (f₂))] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (•1) (QUALITY:SUBSEQUENT(•0)))
 (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•1)))
 (QUALITY:TEMPORALITY (RETRO(#4)) (QUALITY:OVERLAP(•1)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

As indicated in (37c), the event is considered in relation to a reference point •1 which is subsequent to the moment of utterance. Moreover, the retrospective phase of the event #4 is shown to overlap with that future reference point. The RLR is given in (37b). This indicates that the Episode, and hence the point of current relevance, is temporally located in the future, while the operator ‘ant’ indicates that the actual State-of-Affairs is located at an earlier point in time than that. The corresponding Non-perfective version is seen in (38):

- (38) (a) David will have been servicing his car.
 (b) (p₁ (fut ep₁ (ant e₁ (non-pf f₁: [(f₂: service (f₂)] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (•1) (QUALITY:SUBSEQUENT(•0)))
 (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•1)))
 (QUALITY:TEMPORALITY (RETRO(#4)) (QUALITY:OVERLAP(•1)))
 (QUALITY:ANGLE (#4) (QUALITY:INTERNAL))

Our next two examples illustrate the form of the verb known traditionally as the ‘Future in the Past’. In (39) the event is described from a point of reference in the past (denoted by •1), but occurring subsequently to that point:

- (39) (a) David would service his car [e.g. later that day].
 (b) (p₁ (past ep₁ (post e₁ (pf f₁: [(f₂: service (f₂)] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (•1) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (#4) (QUALITY:SUBSEQUENT(•1)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

In (39c) the point of reference •1 is duly shown as prior to the present moment and the hub of the event #4 as subsequent to that reference point. (In terms of rule (25b), this means that the temporality of one of the phases of #4 is specified in relation to a temporal reference point (•1) prior to •0.) In (39b) the absolute tense of the Episode is represented as being Past, the State-of-Affairs as being Posterior to (later than) that past point and the aspect as Perfective. The Non-perfective equivalent is given in (40):

- (40) (a) David would be servicing his car.
 (b) (p₁ (past ep₁ (post e₁ (non-pf f₁: [(f₂: service (f₂)] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (•1) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (#4) (QUALITY:SUBSEQUENT(•1)))
 (QUALITY:ANGLE (#4) (QUALITY:INTERNAL))

Most complicated of all is the ‘Future Perfect in the Past’, illustrated in (41):

- (41) (a) David would have serviced his car.
 (b) (p₁ (fut|past ep₁ (ant e₁ (pf f₁: [(f₂: service (f₂)] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (•1) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (•2) (QUALITY:SUBSEQUENT(•1)))
 (QUALITY:TEMPORALITY (RETRO(#4)) (QUALITY:OVERLAP(•2)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

In (41c) it is established that this time there are two temporal reference points in addition to the moment of utterance, designated as •1 and •2. As shown in (41c), •1 is prior to the moment of utterance, while •2 is subsequent to •1. In addition, the retrospective phase of the event itself, #4, is described as overlapping with •2. In (41b) the absolute tense of the Episode is represented as ‘fut|past’ (read: ‘Future, given Past’, i.e. future in relation to a past standpoint). Accordingly, there are two points of current relevance here, one of which is a point in the past (corresponding to •1 in the CLR), where the narrative is set, and from which we look forward to the second, later point of current relevance (corresponding to •2 in the CLR), from which perspective the event itself is retrospectively viewed. Both the Future and

the Past references are necessary in order to establish the absolute tense of the Episode. The relative tense is Anterior and the aspect is Perfective.

The Non-perfective counterpart to (41) is (42):

- (42) (a) David would have been servicing his car.
 (b) (p₁ (fut|past ep₁ (ant e₁ (non-pf f₁: [(f₂: service (f₂))] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (•1) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (•2) (QUALITY:SUBSEQUENT(•1)))
 (QUALITY:TEMPORALITY (RETRO(#4)) (QUALITY:OVERLAP(•2)))
 (QUALITY:ANGLE (#4) (QUALITY:INTERNAL))

The following additional rules are required to deliver the RLRs in (35b), (36b), (37b), (38b), (39b), (40b), (41b) and (42b):

- (43) If the CLR does not specify the TEMPORALITY of any phase of an event as OVERLAP(•0) and if the CLR does not specify the TEMPORALITY of the ANTE phase of an event as overlapping with any point in time and if the CLR specifies that
 the TEMPORALITY of the hub of an event is SUBSEQUENT(•0)
 or any phase of the event overlaps with a temporal reference point •1 that is SUBSEQUENT to •0
 or any phase of the event overlaps with a temporal reference point •2 that is SUBSEQUENT to another temporal reference point •1
 then insert the operator ‘fut’ into the corresponding Episode in the RLR.
- (44) If the hub of an event is SUBSEQUENT to a temporal reference point other than •0 then insert the operator ‘post’ into the corresponding State-of-Affairs in the RLR.

With regard to the simple Future in (35) and (36), the ‘fut’ operator is triggered by the fact that the hub of the event is subsequent to •0, and the ‘sim’ operator by the fact that neither the retrospective nor the anticipatory phase of the event is specified as overlapping with any other point in time. However, with reference to the Future Perfect in (37) and (38), the ‘fut’ operator is inserted because the retrospective phase of the event overlaps with a temporal reference point (•1) subsequent to •0, while the ‘ant’ operator is inserted because, as stipulated in rule (32), the CLR specifies the temporality of the retrospective phase of the event as overlapping with another point in time (•1).

As regards the Future in the Past in (39) and (40), the CLR shows that the temporality of the hub of the event is specified in relation to a temporal reference point (•1) which is itself prior to the present moment. Thus, the temporality of the hub of the event is ultimately specified in relation to a temporal reference point prior to •0. Consequently, by rule (25b), the ‘past’ operator is inserted into the RLR, while the ‘post’ operator is inserted by rule (44) because the hub of the event is subsequent to •1 and the latter is obviously distinct from •0.

As for the Future Perfect in the Past in (41) and (42), the CLR shows that the retrospective phase of the event overlaps with a temporal reference point (•2) that is subsequent to another temporal reference point (•1). Hence, the operator ‘fut’ is inserted into the RLR by rule (43). Moreover, the temporality of the retrospective phase of the event is specified in relation to a reference point (•2) which is subsequent to another reference point (•1) that is prior to •0. This means that the temporality of that phase of the event is specified

ultimately in relation to a temporal reference point prior to •0, thus triggering the additional insertion of the operator ‘past’ into the RLR, in accordance with rule (25b). The operator ‘ant’ is triggered by rule (32), in the same way as in the Future Perfect.

Next, let us consider the expression of futurity by means of the ‘going to’ construction. This is one of the ways of expressing the future, noted in (10a) above, in which the event is construed as prefigured. This prefiguring will be represented in the CLR by specifying that the anticipatory phase of the event concerned overlaps with •0 or some other temporal reference point. (This may be seen as complementary to the use of the retrospective phase in characterising the Perfect.) Consider the following examples:

- (45) (a) David is going to service his car.
 (b) David was going to service his car.
 (c) David has been going to service his car.
 (d) David had been going to service his car.
 (e) David will be going to service his car.
 (f) David will have been going to service his car.
 (g) David would be going to service his car.
 (h) David would have been going to service his car.

The multi-level description of (45a) is as follows:

- (46) (a) David is going to service his car.
 (b) (p₁ (pres ep₁ (post e₁ (pf f₁: [(f₂: service (f₂))] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:SUBSEQUENT(•0)))
 (QUALITY:TEMPORALITY (ANTE(#4)) (QUALITY:OVERLAP(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

In (46c) the anticipatory (ANTE) phase of the event is shown to overlap with •0. In (46b) the absolute tense is classed as Present and the relative tense as Posterior, as indicated by the operators ‘pres’ and ‘post’.

Example (45b) is essentially the same as the Future in the Past, which was dealt with in relation to (39) and (40) above. With regard to (45d), the multi-level description is as follows:

- (47) (a) David had been going to service his car.
 (b) (p₁ (past ep₁ (post|ant e₁ (pf f₁: [(f₂: service (f₂))] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (•1) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (•2) (QUALITY:PRIOR(•1)))
 (QUALITY:TEMPORALITY (ANTE(#4)) (QUALITY:OVERLAP(•2)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

In (47b) the absolute tense is shown to be Past, while the relative tense is described as ‘post|ant’ (read: ‘Posterior, given Anterior’). The combination of Past and Anterior is also found in the Pluperfect, as we saw above in relation to (33), where it captures the presentation, from a standpoint in the past (•1), of an event whose hub occurred earlier than that standpoint. Here, however, what occurs earlier than •1 is not the hub of the event but a further temporal reference point (•2). The anticipatory phase of the event overlaps with •2, and so the hub of the event occurs later than •2. This is reflected at the RLR where we have a Posterior tense, in relation to an Anterior standpoint.

In order to handle (46) and (47) we need to introduce two further rules:

- (48) If the CLR specifies the TEMPORALITY of the ANTE phase of an event as overlapping with another point in time then insert the operator ‘post’ into the corresponding State-of-Affairs in the RLR.
- (49) If the CLR specifies the TEMPORALITY of a temporal reference point •2 in relation to another temporal reference point •1 such that •2 is PRIOR to •1 then insert the operator ‘ant’ into the corresponding State-of-Affairs in the RLR.

With reference to (46), the ‘pres’ operator is triggered by rule (25a) and the ‘post’ operator by rule (48), given the overlap between the anticipatory phase of the event and •0. With regard to (47), the ‘past’ operator is inserted by rule (25b), as the temporality of a phase of the event is specified ultimately in relation to a temporal reference point (•1) prior to •0, while the ‘post’ operator is inserted by rule (48) and the ‘ant’ operator by rule (49).

The Non-perfective counterparts of (46) and (47) are as follows:

- (50) (a) David is going to be servicing his car.
 (b) (p₁ (pres ep₁ (post e₁ (non-pf f₁: [(f₂: service (f₂))] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:SUBSEQUENT(•0))
 (QUALITY:TEMPORALITY (ANTE(#4)) (QUALITY:OVERLAP(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:INTERNAL))
- (51) (a) David had been going to be servicing his car.
 (b) (p₁ (past ep₁ (post|ant e₁ (non-pf f₁: [(f₂: service (f₂))] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (•1) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (•2) (QUALITY:PRIOR(•1)))
 (QUALITY:TEMPORALITY (ANTE(#4)) (QUALITY:OVERLAP(•2)))
 (QUALITY:ANGLE (#4) (QUALITY:INTERNAL))

As for (45c,e,f,g,h), these are all marginal in my judgment (despite the fact that (45e) instantiates a type recognised by Leufkens), and they will therefore not be further considered here.⁷

4.5. Habituality and Continuity

In 4.4 we noted the use of the auxiliary ‘would’ in the formation of the Future in the Past. Of course, ‘would’ has other uses as well. It can be a modal auxiliary; and in this capacity it can be employed within conditional constructions. However, as made clear above, modality falls outside the scope of the present paper. On the other hand, ‘would’ has another temporal use, to indicate a habitual event in the past, as in (52a):

⁷ The examples in question are marginal in the sense that it is difficult to think of contexts in which they might occur and sound natural rather than contrived. Of course, it would be possible to devise multi-level descriptions for them if one really wished to do so.

- (52) (a) David would service his car [e.g. every six months, over a period].
 (b) (p₁ (past ep₁ (sim e₁ (non-pf hab f₁: [(f₂: service (f₂)] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (#4) (QUALITY:PROTRACTED))
 (QUALITY:ANGLE (#4) (QUALITY:INTERNAL))

The repeated nature of the event, which is thus spread out over time, is characterised in the second RD within (52c) as protracted, and the aspect is given as Habitual (hab) in (52b). (**Protraction** is, of course, one of the parameters identified in (1) above.) In order to handle this, an additional rule is needed:

- (53) If the CLR specifies the TEMPORALITY of an event as PROTRACTED
 then insert the operator ‘hab’ into the corresponding State-of-Affairs in the RLR.

4.6. Remoteness and Adjacency

Another auxiliary that can be used for expressing the past habitual in English is ‘used to’. Thus, (52a) may be paraphrased as (54a):

- (54) (a) David used to service his car [e.g. every six months, over a period].
 (b) (p₁ (past rem ep₁ (sim e₁ (non-pf hab f₁: [(f₂: service (f₂)] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (#4) (QUALITY:DISTANT(•0)))
 (QUALITY:TEMPORALITY (#4) (QUALITY:PROTRACTED))
 (QUALITY:ANGLE (#4) (QUALITY:INTERNAL))

However, a constraint on the employment of ‘used to’ is that it should not be applied to recent events. Hence, in the second RD within (54c) it is specified that the event should be distant from the moment of utterance. In (54b) the tense is given as the Remote (rem) past, on the understanding that, in relation to English, this simply means the non-recent past. The following additional rule will handle this eventuality:

- (55) If the CLR specifies the TEMPORALITY of an event as DISTANT
 then insert the operator ‘rem’ into the corresponding Episode in the RLR.

At the other end of the scale of the parameter of **displacement**, English has a construction for expressing the very recent past, using the Perfect form of the verb together with ‘just’, as exemplified in (56a):

- (56) (a) David has just serviced his car.
 (b) (p₁ (pres ep₁ (ant adjc e₁ (pf f₁: [(f₂: service (f₂)] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (RETRO(#4)) (QUALITY:OVERLAP(•0)))
 (QUALITY:TEMPORALITY (#4) (QUALITY:PROXIMATE(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

Within (56c) the second RD indicates that the event is proximate to the moment of utterance, and in (56b) the tense is represented as Adjacent (adjc). Conversely, it is possible to express the very near future, using the Present form of ‘be’ together with ‘about’ followed by the infinitive of the main verb, as in (57):

- (57) (a) David is about to service his car.
 (b) (p₁ (pres ep₁ (post adjc e₁ (pf f₁: [(f₂: service (f₂)] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:SUBSEQUENT(•0)))
 (QUALITY:TEMPORALITY (ANTE(#4)) (QUALITY:OVERLAP(•0)))
 (QUALITY:TEMPORALITY (#4) (QUALITY:PROXIMATE(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

The indication of a proximate event (this time subsequent rather than prior) is to be found in the second RD within (57c), and in (57b) the tense is duly specified as Adjacent. The inclusion of the ‘adjc’ operator serves to distinguish (57) from the rather similar Discourse Act based on ‘going to’, seen in (46) above.

In order to handle these phenomena, we need an additional rule:

- (58) If the CLR specifies the TEMPORALITY of an event as PROXIMATE
 then insert the operator ‘adjc’ into the corresponding State-of-Affairs in the RLR.

5. Generating Verb Phrases in Welsh FDG

5.1. An Additional Past Tense

In Welsh, comparable verbal constructions exist in respect of all those considered above in relation to English.⁸ However, there are also differences between the two languages, and it is of interest to pay some attention to these.

First of all, there is a past tense form in Welsh that does not occur in English. Consider the following examples:

- (59) (a) Siaradais i â Gwen ddoe.
 spoke I to Gwen yesterday
 (b) Bues i ’n siarad â Gwen ddoe.
 was I *particle* speak to Gwen yesterday
 (c) Ro’n i ’n siarad â Gwen ddoe.
 was I *particle* speak to Gwen yesterday

(The particle in (59b) and (59c) is an abbreviated form of ‘yn’, which, as explained in 3.2 above, serves to indicate a relationship of predication.) Examples (59a) and (59b) can both be rendered in English as ‘I spoke to Gwen yesterday’, while (59c) translates as ‘I was speaking to Gwen yesterday’. However, (59a) and (59b) do not have identical meanings, since (59a) would be appropriate if the Speaker spoke only briefly with Gwen, whereas (59b) would be appropriate if the conversation was extended. Hence, (59a) might be rendered as ‘I had a word with Gwen yesterday’, and (59b) as ‘I spent some time speaking with Gwen yesterday’.

The differences in meaning within (59) are related to their grammatical composition. The form ‘siaradais’ in (59a) is the Past (or Preterite) form of the verb ‘siarad’ (*speak*), whereas in the other two sentences the verbal element comprises a form of the verb ‘bod’ (*be*) followed by the uninflected form of ‘siarad’. In (59c) we see the Imperfect form of ‘bod’ (namely ‘ro’n’), combining with the main verb to form the Past Non-perfective. On the other

⁸ For an outline of the verb system of Welsh, written in English, see for instance Uned Iaith Genedlaethol Cymru CBAC (2012).

hand, in (59b) we find the Preterite form of ‘bod’ (namely ‘bues’) followed by the main verb to make what looks like an alternative version of the Past tense of ‘siarad’. However, the stative meaning of ‘bod’ must also be taken into account in the interpretation of (59b), which means, in effect, ‘I was in a state of being speaking to Gwen yesterday’.

How should we handle this in FDG? Example (59c), which is Non-perfective, may be treated as follows:

- (60) (a) Ro’n i’n siarad â Gwen ddoe. (= 59c)
 (b) (p₁ (past ep₁ (sim e₁ (non-pf f₁: [(f₂: siarad (f₂))] ... (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:INTERNAL))

This is comparable to the English example (29) above. However, the difference between (59a) and (59b), both of which are Perfective, lies in the parameter of **extension** along the time axis, with (59a) constituting a transient process, whereas in (59b) the process is extended in time. In terms of FDG, this may be handled at the RL by treating (59a) as representing the ‘Momentaneous’ (‘mo’) Aspect, while (59b) represents the Non-momentaneous Aspect. At the CL, we may, correspondingly, expand the notation by adding the descriptors TRANSIENT and EXTENDED to our terminological apparatus. Hence, (59a) may be expanded into (61) and (59b) into (62):

- (61) (a) Siaradais i â Gwen ddoe. (= 59a)
 (b) (p₁ (past ep₁ (sim e₁ (pf mo f₁: [(f₂: siarad (f₂))] ... (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (#4) (QUALITY:TRANSIENT))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))
- (62) (a) Bues i’n siarad â Gwen ddoe. (= 59b)
 (b) (p₁ (past ep₁ (sim e₁ (pf non-mo f₁: [(f₂: siarad (f₂))] ... (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (#4) (QUALITY:EXTENDED))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

In English TRANSIENT and EXTENDED are not needed, as the Momentaneous/Non-momentaneous distinction is not indicated by any specific grammatical device.

5.2. Classificatory and Identificational Constructions

Secondly, in English the verb ‘be’ may be used to indicate either what Hengeveld and Mackenzie (2008: 191-194) term a ‘classificatory’ relationship, as in (63a), or an ‘identificational’ relationship, as in (63b):

- (63) (a) Gwen is a teacher.
 (b) Gwen is the headmistress.

Likewise, in Welsh the verb ‘bod’ (*be*) can be used to indicate either relationship, but the syntactic structure is different in the two cases, as illustrated in (64):

- (64) (a) Mae Gwen yn athrawes.
 is Gwen *particle* teacher
 (Gwen is a teacher.)
 (b) Gwen yw 'r brifathrawes.
 Gwen is the headmistress

In (64a) the verb 'mae' (*is*) stands first and is followed by the Subject 'Gwen', whereas in (64b) it is the Subject that is placed first, while the verb 'yw' (*is*) comes second. (The complement in (64b) is an expression containing the word 'brifathrawes', which is a mutated form of the noun 'prifathrawes' (*headmistress*), feminine nouns being subject to mutation after the definite article in Welsh.) Now, if we wish to re-express (64a) in the Perfect, then we may do so straightforwardly, using the Perfect particle 'wedi', as shown in (65):

- (65) Mae Gwen wedi bod yn athrawes.
 is Gwen *perf* be *particle* teacher
 (Gwen has been a teacher.)

However, 'wedi' cannot be used in the identificational construction, and so there is no precise Welsh equivalent of:

- (66) Gwen has been the headmistress.

Instead, we would need to find some inexact circumlocution, such as (67):

- (67) Gwen oedd y brifathrawes unwaith.
 Gwen was the headmistress once

This situation has consequences for the CLR and RLR. The pertinent underlying representations of the Vps in (64-65) are given in (68-70), which draw upon the exposition in Hengeveld and Mackenzie (2008: 204-206):

- (68) (a) Mae Gwen yn athrawes.
 (b) (p₁ (pres ep₁ (sim e₁ (pf f₁: [... .._U] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:OVERLAP(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))
- (69) (a) Gwen yw'r brifathrawes.
 (b) (p₁ (pres ep₁ (sim e₁ (pf f₁: [... ..] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:OVERLAP(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))
- (70) (a) Mae Gwen wedi bod yn athrawes.
 (b) (p₁ (pres ep₁ (ant e₁ (pf f₁: [... .._U] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (RETRO(#4)) (QUALITY:OVERLAP(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

In (68b) and (70b), which are classificatory, the second argument in the RLR (namely Gwen) bears the semantic function of Undergoer (U), since Gwen is undergoing classification (as a teacher) here, whereas in (69b), which is identificational, it does not. In Welsh the lack of an

aspectually Perfect identificational construction means that, in the RLR, the ‘ant’ operator cannot occur if the arguments within the associated State-of-Affairs bear no semantic function. This in turn means that the type of CL that would give rise to the ungrammatical RLR also needs to be prevented from arising when the target language is Welsh (though not English). Accordingly, suppose that (71b) constitutes the full CLR of the English DA (71a), with ‘ \leftrightarrow ’ denoting the concept of ‘identification’ in the intended sense:

- (71) (a) Gwen has been the headmistress.
 (b) ((QUALITY: \leftrightarrow _120#1 (_121#2) (ENTITY:HEADMISTRESS_122#3) #4)
 (QUALITY:TEMPORALITY#5 (#4) (QUALITY:PRIOR(\bullet 0)#6) #7)
 (QUALITY:TEMPORALITY#8 (RETRO(#4))#9 (QUALITY:OVERLAP(\bullet 0)#10) #11)
 (QUALITY:ANGLE#12 (#4) (QUALITY:EXTERNAL#13) #14)
 _INFO-PRESENTATION)

For Welsh, on the other hand, we would need impose the following constraint on CLRs:

- (72) If a relation ρ is founded on \leftrightarrow
 then RETRO(ρ) is disallowed.

This would have the effect of forcing the Conceptualiser to generate an alternative CLR, giving rise to a circumlocution such as (67), repeated here as (73a), for which a possible CLR, clearly distinct from (71b), is given in (73b):

- (73) (a) Gwen oedd y brifathrawes unwaith.
 Gwen was the headmistress once
 (b) ((QUALITY: \leftrightarrow _120#1 (_121#2) (ENTITY:PRIFATHRAWES_122#3) #4)
 (QUALITY:TEMPORALITY#5 (#4) (QUALITY:PRIOR(\bullet 0)#6) #7)
 (QUALITY:ANGLE#8 (#4) (QUALITY:EXTERNAL#9) #10)
 (QUALITY:TEMPORALITY#11 (#4) (ENTITY:TIME_123#12) #13)
 (QUALITY:TEMPORALITY#14 (#12) (QUALITY:PRIOR(\bullet 0)#15) #16)
 _INFO-PRESENTATION)

Within the fourth and fifth RDs in (73b) the expression ‘unwaith’ (*once, one time*) has here been treated as a reference to a TIME #12 which, just like #4 (the identification of Gwen with the headmistress), is prior to the moment of utterance.

6. Some Matters Meriting Further Consideration

6.1. The Status of Conceptual Level Representations

The treatment of Welsh identificational constructions in section 5.2 above raises the question of how closely shaped are CLRs by the expressive power of the language that they underlie. It will be apparent that in section 5.2 we have adopted the stance that they are sensitive to the language involved, to the extent that they are subject to expressibility constraints imposed by the language concerned. Thus stance calls for some discussion.

Basically there are two possible approaches to the content of the CL. One approach is to adopt the view that there is a universal system of conceptualisations (or language of thought) which applies equally in relation to all natural languages. However, this is not the stance taken in FDG. Rather, the FDG approach is based on examining particular languages

and groups of related languages, and determining what representations to postulate in the light of such investigations. It is not denied that they may be some universal concepts, such as those pertaining to the logical relations of ‘and’ and ‘or’. Nevertheless, FDG does not presuppose that by any means all concepts are universal. Indeed, Butler (2012: 624) contends that ‘a truly universal ontology is doomed to failure’.

Having said that, Hengeveld and Mackenzie (2008: 7-8) state that ‘thinking for speaking’ is not the function of the Conceptual Component. In other words, they reject the idea that conceptual representations should be closely determined by the grammatical properties of individual languages, and stipulate that one of the requirements of the process of Formulation is that it should accommodate the details of what can, and what must, be expressed in a given tongue. On the other hand, they describe conceptual representations as immediate prelinguistic *communicative intentions*. And clearly, it would be perverse for any CLR to imply that an Author had the ‘intention’ of communicating something that was inexpressible within the language chosen to convey it. Consequently, a limited amount of what we might term ‘thinking in *preparation* for speaking’ (or ‘thinking *towards* speaking’) would seem to have a legitimate place within the final stages of Conceptualisation.

Accordingly, it is necessary to achieve a judicious balance between CLRs that are too inextricably bound to individual languages and CLRs that are too non-specific. Butler (2012: 624) cites a personal communication by J.L. Mackenzie to the effect that the Conceptual Component of FDG may function as ‘an interface between the language-neutral, ‘deeper’ level and the specifics of the language chosen for use’. This proposal seems to offer a promising way forward. What we have done in this paper is to interpret this interface as lying sufficiently close to those specifics as to avoid being accused of inconsistently suggesting that Authors conceive communicative intentions while at the same time harbouring the knowledge that they cannot be communicated in the selected language.

A further relevant consideration is that the synthesis of a prelinguistic intention is a *process*. Although not much has been written about the details of this process within FDG, it seems reasonable to suppose that it goes through a number of stages (as, of course, does the generation of language itself). It may well be that Authors first form some kind of general communicative intention, and then choose both the semiotic modes (language, images, ...) and, as appropriate, the specific language to deploy. This communicative design process may well involve a certain amount of trial and error. This would be consistent with García Velasco’s view (2007: 183) that the Conceptual Component provides specifications that are ‘subject to revisions or validations’. As for the CLRs presented in the present paper, these represent the very end-point of the prelinguistic communicative design process, right at the interface with the Formulator.

6.2. *Alternative Realisations*

When the CLR is delivered as input to the Grammar, there is certainly plenty of work left to do. This is particularly apparent when we consider that some CLRs can underlie more than one possible Linguistic Expression. In some cases, the variants are generated by the Encoder. For instance, in (57b), repeated here as (74c), the final expression may surface as either (74a) or (74b).

- (74) (a) David is about to service his car.
 (b) David is on the point of servicing his car.
 (c) (p₁ (pres ep₁ (post adjc e₁ (pf f₁: [(f₂: service (f₂)] (f₁)) (e₁)) (ep₁)) (p₁))

In other cases, however, the variants are produced by the Formulator. For example, in (75c), the CLR establishes that the temporality of the event is prior to the moment of utterance and distant; and on the basis of rule (55), repeated here as (76), the operator ‘rem’ (‘remote’) is inserted into (75b). The resulting Linguistic Expression is (75a):

- (75) (a) David used to live in Aberystwyth.
 (b) (p₁ (past rem ep₁ (sim e₁ (non-pf hab f₁: [(f₂: service (f₂)] (f₁)) (e₁)) (ep₁)) (p₁))
 (c) (QUALITY:TEMPORALITY (#4) (QUALITY:PRIOR(•0)))
 (QUALITY:TEMPORALITY (#4) (QUALITY:DISTANT(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:INTERNAL))

- (76) If the CLR specifies the TEMPORALITY of an event as DISTANT then insert the operator ‘rem’ into the corresponding Episode in the RLR.

However, in a DA like (77), we see an acceptable alternative realisation of the content in (75c):

- (77) (a) David lived in Aberystwyth [e.g. many years ago].
 (b) (p₁ (past ep₁ (sim e₁ (non-pf hab f₁: [(f₂: live (f₂) ...] ... (f₁)) (e₁)) (ep₁)) (p₁))

This suggests that rule (76) is optional, at least in certain contexts. In this way, the source of the variants lies in the Formulator. Defining the set of contexts in which the rule is optional rather than mandatory is, however, less than straightforward, and will be left as a matter for further research.

Another case of variant realisations with the same RLR is seen in the following examples, all of which exhibit the Posterior tense:

- (78) (a) David is to service his car [e.g. on Thursday].
 (b) David is servicing his car [e.g. on Thursday].
 (c) David is going to service his car [e.g. on Thursday].

The same RLR and CLR are applicable to all three of (78a), (78b) and (78c), namely (79a) and (79b):

- (79) (a) (p₁ (pres ep₁ (post e₁ (pf f₁: [(f₂: service (f₂)] (f₁)) (e₁)) (ep₁)) (p₁))
 (b) (QUALITY:TEMPORALITY (#4) (QUALITY:SUBSEQUENT(•0)))
 (QUALITY:TEMPORALITY (ANTE(#4)) (QUALITY:OVERLAP(•0)))
 (QUALITY:ANGLE (#4) (QUALITY:EXTERNAL))

(The use of the present participle in (78b) and (78c) does not appear to indicate the Non-perfective Aspect in examples such as these.)

The difference between (78a), (78b) and (78c) is a matter of modality, as they communicate slightly decreasing levels of certainty. Because of this, it would seem that the differences between them ought to be related to some underlying distinctions. However, it is not clear at the moment how exactly this should be treated. Hence, we shall leave this question as another topic for further research.

7. Conclusion

In the present paper we have seen how it is possible to generate modally neutral Vps at the Conceptual and Representational Levels in English and Welsh, on the basis of a small set of parameters that are available for inclusion in CLR. We have also seen how, within the dynamic model, it is possible to employ explicit, algorithmic rules to take those CLR as input and formulate the appropriate RLRs as output.

We have also considered the status of CLR. We have argued that these must be, to some extent, tailored towards the language selected for communication, and that they are subject to expressibility constraints relative to that language. Accordingly, the process of Conceptualisation, although itself prelinguistic, needs to have some regard towards the target language.

As ever, of course, there are questions that remain unresolved and which require further research. These include:

- (80) (a) The process of generating CLR.
- (b) The handling of variant expressions arising from a given CLR.
- (c) The treatment of modally marked Vps.
- (d) The treatment of multiple Vps within the same Discourse Act or Move. (Leufkens (2013) provides some relevant material here, but the scope of the treatment needs extending to the Conceptual Component.)

Nevertheless, we have now seen enough to appreciate the advantage of having a formalised Conceptual Level within the FDG model. By including the CLR within our linguistic description, we gain a clearer idea of the source of tense and aspect as far back as the prelinguistic intentions; and by formalising the CL, we also find ourselves in a position to formalise the process of linguistic Formulation, as well as the process of Encoding. This, in turn, opens the way to producing an algorithm to act as a foundation for the dynamic model of FDG. Accordingly, we may have some confidence in hoping that future work on Conceptualisation and Formulation within the dynamic model of FDG will bring further benefits.

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