Information Structure in Georgian

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Abstract

INFORMATION STRUCTURE IN GEORGIAN

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In this thesis I investigate the realisation of information-structural categories in Georgian and propose novel accounts of how they are expressed syntactically and prosodically. On the basis of my findings I present a first detailed model of the relationships between syntax, prosody and information structure in Georgian in the Optimality-Theoretic and Lexical-Functional Grammar frameworks. The proposed accounts are situated within an original approach to the relationship between information structure and sentence form, according to which information-structural features cross-linguistically are reflected most closely in the association of individual words with the heads of prosodic phrases, permissible configurations of which are in addition articulated in terms of novel prominence-structural constraints. In addition to Georgian, I show that this approach is compatible with data, both from other 'stress' languages like English, and from 'alignment' languages such as French.

The accounts presented engage with a number of studies, and varying analyses, of the syntactic and prosodic reflexes of information structure in Georgian presented in recent years. Whilst the new syntactic account presented captures a range of available evidence not fully reflected in previous models, the prosodic account is based on new data from a production experiment which employs an alternative methodology to those of previous studies. In addition to supporting the compatibility of Georgian with the prominence-based approach, these indicate that ip phrase heads in Georgian associated with discourse-prominence are aligned with their right boundary, rather than with the left, as recently proposed by Féry (2013).

The proposed prominence-based account is reflected in the formal models presented, within which I accommodate both the Georgian and data from other languages. In the case of the LFG model, modifications are proposed to the architecture, including to p(rosodic)-structure to permit the representation of and reference to the heads of prosodic phrases.

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Abbreviations

1PSG	1st person singular	MAS	masdar
2PSG	2nd person singular	NARR	narrative case
3PSG	3rd person singular	NEG	negative
AOR	aorist	NOM	nominative case
CONTR	contrastive particle	OPT	optative
DAT	dative	PFPT	perfect participle
DO	direct object	PL	plural
EMPH	emphatic	PRS	present
GEN	genitive	PST	past
IO	indirect object	REL	relative conjunction

Transliteration

The following system of transliteration is used:

ა	a	ს	s
ბ	b	ტ	ṭ
გ	g	უ	u
დ	d	ფ	p
ე	e	ქ	k
ვ	v	ღ	g̣
ზ	z	ყ	q̣
თ	t	შ	š
ი	i	ჩ	č
კ	ḳ	ც	c
ლ	l	ძ	ẓ
მ	m	წ	c̣
ნ	n	ჭ	č̣
ო	o	ხ	x
პ	p̣	ჯ	j
ჟ	ž (in pitch tracks and diagrams, zh)	ჰ	h
რ	r		

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For my parents.

1. Introduction

This thesis is an investigation of the relationship between information structure and sentence form in Georgian, a South Caucasian or Kartvelian language with some 6 million speakers (Hewitt 1995). The role of information structure in grammar has often been confined to one of accounting for constructions of a somewhat peripheral nature which do not fit with the 'basic' models of sentence structure. This thesis follows the position of Lambrecht (1994) that:

'Just as there are no sentences without morphosyntactic and phonological structure, there are no sentences without information structure.'

(Lambrecht 1994:16)

On the basis of data from the literature and my own production experiments, I investigate the syntactic and prosodic realisation in Georgian of a range of information-structural features, the expression of which has received varying analyses in the literature, and propose novel accounts of each. On the basis of these accounts I present a first detailed formal model of the relationships between syntax, prosody and information structure in Georgian in the Optimality-Theoretic and Lexical-Functional Grammar frameworks, the latter of which permits an explicit articulation of the role played by each aspect of sentence form in the expression of information-structural features.

The accounts proposed are situated within a novel approach to the relationship cross-linguistically between information structure and sentence form, according to which information-structural features are most closely reflected in the association of items bearing them with the heads of prosodic phrases. This account is demonstrated to be preferable, both to accounts based on the membership of larger accented syntactic phrases, and to accounts based on the alignment of discourse items with the boundaries of prosodic phrases. In addition to Georgian, this account is shown to be compatible with data from various other languages. The proposed prosodic prominence-based approach is articulated in the Optimality-Theoretic framework using a novel set of constraints, and in the LFG framework using a modified version of p(rosodic)-structure and annotations to it which permit reference to the heads of prosodic phrases. In addition to Georgian, the compatibility of the proposed models with data from other languages is demonstrated in both frameworks.

The thesis is structured as follows. I begin in chapter 2 by introducing the set of information-structural categories proposed by Lambrecht (1994), and in particular the pragmatic roles focus and topic and the pragmatic states discourse-active and discourse-inactive. Examining accounts of how discourse relations are realised in sentence form, I argue that an account based on the association of items with prosodic phrase heads is preferable to alternatives based on projection within syntactic phrases and alignment with the boundaries of prosodic phrases in accounting for data from a range of languages.

I then turn in chapters 3 and 4 to an examination of the available literature on the relationship between information structure, syntax and prosody in Georgian. In chapter 3 I discuss the evidence as to the interaction between syntax and prosody. Introducing several recent models of this relationship, I show that these do not fully capture the available evidence, and set out those aspects of this interaction in need of articulation, concluding that syntax plays only a limited role in identifying information-structural features in Georgian. In chapter 4 I turn to the evidence concerning the relationship in Georgian between information structure and prosody. Whilst this indicates that prosody plays the key role in identifying information-structural features in sentence form in Georgian, proposed analyses of this relationship attribute the realisation of information-structural features to varying prosodic mechanisms. Discussing the assumptions informing the methodologies of these studies, I conclude that the collection of additional data is desirable using a methodology informed by my discussion of the relationship between information structure and sentence form in chapter 2.

The discussions of available evidence from the literature in chapters 3 and 4 form the basis for new syntactic and prosodic production experiments, the results from which I present in chapter 5. These data support new accounts of the relationships in Georgian between information structure, syntax and prosody consistent with the prosodic prominence-based approach proposed in chapter 2, which I model with novel sets of constraints within the Optimality-Theoretic framework.

In chapter 6 I present a first detailed model of the relationships between information structure, prosody and syntax in Georgian in the Lexical-Functional Grammar framework, which permits a more explicit account of the role of different aspects of sentence form in expressing information-structural relations, together with several modifications to the LFG architecture to permit an articulation of the proposed prominence-based approach. After presenting the model for Georgian, I then show again how, with some modifications, data from other languages can be captured using the same approach.

Finally in chapter 7 I summarise my findings together with those areas identified in which further research is desirable.

2. Information Structure and Sentence Form

In this chapter I introduce the theoretical assumptions concerning information structure and its place in grammar which underpin the remainder of this thesis. I begin in *2.1* by introducing the key information-structural categories of focus, topic, discourse-inactive and discourse-active as defined by Lambrecht (1994). As with the other information-structural categories proposed by Lambrecht, these categories, whilst crucially evoked in sentence form, characterise propositional units and do not have straightforward correspondents in terms of formal features. In *2.2* I turn to the question of what component or components of sentence structure most closely reflect the categories focus, topic, discourse-inactive and discourse-active cross-linguistically. In *2.2.1* I consider some proposals, including those of Lambrecht (1994), Selkirk (1995) and Rochemont (2013), which characterise focus chiefly with reference to membership of larger accented or unaccented syntactic phrases, which are themselves attributed focal or non-focal status. Noting that such theories in some cases invoke a strategy of appealing to the hearer to pragmatically accommodate items as discourse-active as a means of accounting for apparent exceptions, I argue that such an account can be extended to permit all unaccented items to be characterised as discourse-active. Combined with additional arguments that the vertical projection of information-structural features to syntactic phrases is better replaced with their projection to propositional components, this proposal permits a simplified approach to the relationship between accentuation and information-structural status. In *2.2.2* I then consider proposals which make reference to a richer prosodic structure, including those of Steedman (1991) and Calhoun (2007). Whilst I conclude that attempts to identify information-structural with prosodic phrase domains are problematic, I argue that Calhoun's (2007) differentiation of the informational roles associated with prosodic prominences according to their position within prominence structure can be combined with the arguments from the preceding subsection to yield an approach in which the informational status of discourse items is most closely reflected in sentence form by their association with the heads of prosodic phrases.

Finally in *2.2.3* I compare focus-as-prominence (FP) approaches of the kind proposed in the previous subsection to Féry's (2013) recent proposals for an alternative focus-as-alignment (FA) approach. With reference to a range of focus structures, I argue that the distribution of prosodic phrasings amongst these as posited in the literature is better accounted for in terms of the alignment of phrasal boundaries with phrasal heads rather than directly with focus, both in 'stress languages' like English and German and in 'alignment languages' like French and Italian. Furthermore, I argue that the notion of 'stress-alignment' employed in both FA and FP proposals faces several problematic cases, and identify an alternative constraint on the configuration of phrasal heads which I show provides an account of boundary alignment in both types of language.

2.1 Information-Structural Relations

The distinction key to Lambrecht's (1994) theory of information structure between its proposition-based categories and their expression in sentence form is reflected in the definition provided in [**1**].

1) INFORMATION STRUCTURE: that component of sentence grammar in which propositions as conceptual representations of states of affairs are paired with lexicogrammatical structures in accordance with the mental states of interlocutors who use and interpret these structures as units of information in given discourse contexts.

(Lambrecht 1994:5)

Information structure, under this definition, is concerned with how lexicogrammatical structures are used as units of information. These structures serve as such by expressing propositions with which they are paired in accordance with the mental states of interlocutors. In Lambrecht's framework, it is in the form of propositions which are pragmatically structured in accordance with the mental states of interlocutors that information resides, and the correspondence between information-structural categories which are components of pragmatically structured propositions and components of the lexicogrammatical structures used to express these propositions, although crucial in order for information structure to qualify as a component of sentence grammar, is quite indirect in nature.

In a quantity of work on information structure, including Jackendoff (1972) and Selkirk (1984), the 'new information' associated with a sentence produced in a given discourse context is identified with a specific subpart of the sentence which is given the label *focus*. Jackendoff (1972:230) defines 'the focus of a sentence' as 'the information in the sentence that is assumed by the speaker not to be shared by him and the hearer' (1972:230), whilst Selkirk (1984:206) describes a focused constituent as contributing 'new information' to the discourse. Under these characterisations, the focus in the reponse in [**2**] would be identified as *the movies*.

2) Q: Where did you go last night?
   A: I went to the movies.

(Lambrecht 1994:47)

Lambrecht's framework likewise identifies 'the movies' in this example as the focus of the sentence, but does not characterise this as the new information associated with it; under his approach, the 'new information' consists, not in a subpart of, but rather in the full proposition which is added to the propositions constituting a hearer's knowledge by an informative utterance. This proposition is considered informative, and ‘known’ by the hearer subsequently to being uttered, simply if the hearer has a mental representation of it, whether or not the proposition is found subsequently to be true. Lambrecht terms this proposition the *pragmatic assertion* and gives it the definition in [**3**].

3) PRAGMATIC ASSERTION: The proposition expressed by a sentence which the hearer is expected to know or take for granted as a result of hearing the sentence uttered.

(Lambrecht 1994:52)

An informative utterance may express nothing but a pragmatic assertion, as it does in [**4**]. Sentences such as these may be uttered ‘out of the blue’, with no relationship to any preceding discourse.

4) It is raining.

(Lambrecht 1994:140)

As most information is imparted in relation to something already known, however, so most sentences express, in addition to the pragmatic assertion, a set of propositions considered by the speaker to be known already to the hearer. This set is the pragmatic presupposition, defined in [**5**].

5) PRAGMATIC PRESUPPOSITION: The set of propositions lexicogrammatically evoked in a sentence which the speaker assumes the hearer already knows or is ready to take for granted at the time the sentence is uttered.

(Lambrecht 1994:52)

Under Lambrecht’s proposals, the pragmatic presupposition expressed by the response in [**2**] is also expressed by the question that precedes it, and can be formulated as ‘I went to x’. The pragmatic assertion expressed by the response, in which the new information consists, is not the complement of the pragmatic presupposition, *the movies*, but is rather the full proposition ‘x = the movies’, which is ‘superimposed’ upon and contains the pragmatic presupposition (Lambrecht 1994:58). From this point of view, *the movies* cannot constitute new information in isolation, but does so only in ‘filling in the gap’ left by the presupposed open proposition ‘I went to x’. As the complement of the pragmatic presupposition, the focus of a sentence instead has the definition in [**6**]. The focus does not in itself constitute new information, although in presuppositionless examples like [**4**] it is coextensive with the pragmatic assertion.

6) FOCUS: The semantic component of a pragmatically structured proposition whereby the assertion differs from the presupposition.

(Lambrecht 1994:213)

This definition of focus is likewise distinct from definitions of focus as ‘new’ in the sense of ‘not previously mentioned’. In the mini-discourse in [**2**], ‘the movies’ as an entity might likewise be identified as the focus on these grounds. That focused constituents need not be previously unmentioned in order to contribute to a pragmatic assertion is demonstrated in examples like [**7**]. Here, *the RESTAURANT* is a familiar discourse referent, by virtue of its previous mention, yet is part of the focus of the sentence and contributes to the new information as the complement of the pragmatic presupposition ‘I went to x’.

7) Q: Where did you go last night, to the movies or to the restaurant?
A: We went to the RESTAURANT.

(Lambrecht 1994:211)

The notion of identifiability to the hearer is treated by Lambrecht as a separate parameter, in the form of the pragmatic states identifiable and unidentifiable. Just as a proposition is described as presupposed, and part of the pragmatic presupposition, if the hearer has a mental picture of it, so a discourse referent is considered to be part of the knowledge of the hearer, and hence identifiable to him, simply if a representation of it exists in his mind, whether or not the referent is believed to exist as an entity in the real world. In this sense, propositions which are presupposed are simultaneously identifiable discourse referents.

Once identifiable, discourse referents are permanent members of the discourse register, the set of referents assumed to be identifiable to both speaker and hearer in a discourse. Referents which are not members of the discourse register have the pragmatic status of being unidentifiable. [**7**] demonstrates that identifiable referents may likewise be part of the focus of a sentence just like unidentifiable referents. In contrast with discourse referents which are in focus, referents which have the pragmatic role of topic, defined in [**8**], must have the pragmatic state of being identifiable.

8) TOPIC: A referent is interpreted as the topic of a proposition if in a given situation the proposition is construed as being about this referent, i.e. as expressing information which is relevant to and which increases the addressee's knowledge of this referent.

(Lambrecht 1994:131)

The notion of 'topic' as an entity which the sentence is 'about' has a long history in the literature, and has been employed by Chomsky (1977), Dik (1978) and Reinhart (1982), among others. In one sense, all participants in a discourse qualify as entities which a sentence is about. In the narrower sense employed by Lambrecht (1994), a proposition is considered to be 'about' a topic if it can be described as having the purpose of expressing information about that topic. For this condition to obtain, the topic must be considered by the speaker to have a particular presence in the mind of the hearer at the point at which the sentence in which it appears as a topic is uttered. Specifically, a potential topic must be a discourse referent which is in the pragmatic state of being identifiable to the hearer. That only discourse referents which are identifiable may be topics and felicitously have new information predicated of them is illustrated by examples like [**9**]:

9) *A boy is tall.

(Perlmutter 1970:238, cited in Lambrecht 1994:167)

'A boy' in [**9**] is new to the discourse and an unidentifiable referent; no mental picture of the boy in question is assumed by the speaker to exist in the mind of the hearer.

Unidentifiable referents are rendered identifiable, and hence possible topics, once they have been introduced to the discourse. In the first sentence in [**10**], the wizard in question is introduced to the discourse as an unidentifiable referent. Having been introduced by this sentence, the wizard is an identifiable referent, and available as a topic in the following sentence. The identifiability of the wizard as a discourse referent is marked in the second sentence by use of the pronominal form.

10) Once there was a *wizard*. *He* was very wise, rich and was married to a beautiful witch. They had two sons. The first was tall and brooding, he spent his days in the forest hunting snails, and his mother was afraid of him. The second was short and vivacious, a bit crazy but always game. Now *the wizard*, *he* lived in Africa.

(Lambrecht 1994:177)

Neither is topichood restricted to referents with any specific grammatical relation, or in any specific sentential position. This freedom with respect to topic expression breaks with a tradition of identifying topic with sentence subject, or with sentence-initial arguments, as done for example by the Prague School, who identified topic as the leftmost item in the sentence (see for example Firbas (1966)). Under the approach employed by Lambrecht, even entities which do not appear as sentential arguments may be topics. This admits to the class of potential topics referents which are dislocated to the left or the right of the sentence, and also for example adverbial clauses, which may serve as ‘scene-setting’ topics, as in [**11**].

11) After the children had gone to school, John went to work.

(Lambrecht 1994:121)

A necessarily identifiable topical referent is further characterised as being in either of two pragmatic states with respect to a final parameter: that of activation. Although a referent, once identifiable, remains so from one discourse to the next, its availability for participation in the exchange of new information is subject to short term memory constraints, and may vary within a single discourse. Lambrecht characterises this availability of discourse referents as a matter of the assumed consciousness of the addressee with respect to them, which he classifies using Chafe's (1987) three states of activation: active, semi-active/accessible and inactive. Under Chafe's (1987) definitions, an active referent is one that is 'currently lit up, a concept in a person's focus of consciousness at a particular moment', whereas an accessible/semi-active is 'in a person's peripheral consciousness, a concept of which a person has a background awareness, but one that is not being directly focused on.' An inactive concept, on the other hand, is one 'that is currently in a person's long-term memory, neither focally nor peripherally active.' (Chafe 1987:22ff, cited in Lambrecht 1994:94). These concepts are adopted by Lambrecht with some modifications. Under his proposals, a discourse-active referent is one whose pragmatic role in the discourse as a topic is established, whereas a discourse-inactive referent is one whose pragmatic role in the discourse is not established, whether or not it is assumed to have a representation in the hearer's long-term memory. With reference again to [**10**], the use of the pronominal form in the second sentence to refer to the wizard as a discourse-active topic with its role established can be contrasted with use of the full lexical form together with a left-dislocation construction in the final sentence, at which point the wizard has become discourse-inactive due to the intervening discussion of his sons, and must have its topic role newly established by these means. Read aloud, the former would not require a prosodically prominent realisation, whereas the latter would. As focused referents, these are both necessarily discourse-inactive regardless of mention in the preceding discourse, as it is in the establishment of their focus pragmatic role that the pragmatic assertion and hence the new information are communicated.

In the context elicited by the question in [**12**], both *the dog* and *the cat* are potential arguments for each of the propositions in the response; as such, neither has had its role as topic established at the time of utterance, even though both have been introduced into the discourse recently by the preceding question. Each must therefore be accented together with the focused constituents *parents* and *outside*.

12) Q: What are you going to do with the DOG and the CAT while you're away?
A: I'll leave the DOG with my PARENTS and the CAT can stay OUTSIDE.

(Lambrecht 1994:332)

The accentuation of topical and focal constituents which are already familiar from the preceding discourse has been explained in other frameworks (for example by Chafe (1976)) as marking their status as contrastive topics and foci. Contrastiveness is defined by Halliday (1967:206) as 'contrary to some predicted or stated alternative'. Lambrecht however points out that sentences like [**13**] and [**14**] are formally indistinguishable in terms of accentuation from others in which the accented foci and topics have non-contrastive interpretations.

13) RONALD made the hamburgers.

14) I saw Mary and John yesterday. SHE says HELLO, but HE's still ANGRY at you.

(Lambrecht 1994:291)

In the light of this identity of form, which Lambrecht instead explains as the result of the need to render an item discourse-active in order for it to be associated with a pragmatic role of either topic or focus, he proposes that contrastiveness, rather than being a formal category of information structure, is a pragmatic inference triggered in particular contexts. Athough he argues for the absence of a formal contrastive feature in the cases discussed above, however, evidence has elsewhere been presented for formally encoded distinctions between contrastive and non-contrastive foci and topics in several languages, including English. Vallduví and Vilkuna (1998) present evidence for the distinctive encoding of rhematic focus (corresponding to Lambrecht's (1994) definition of focus) and kontrast, which they define as a separate category of focus uniting various concepts of contrast and identificationality in denoting a set of alternatives in several languages. In Hungarian, rhematic focus occupies an unmarked postverbal slot, whereas kontrast is identified with the focus position to the left of the verbal string, as illustrated in [**15**]. Vallduví and Vilkuna (1998) point out that [**15b**] is in fact the preferred response to the question 'where did he put the book?', and that the rhematic response is the more expected for a question like 'how did the book get to be greasy?', which does not elicit a range of alternative locations for the book.

15) What did Peter do?/ Where did Peter put the book?

a) Péter letette a könyvet a POLCRA.
Peter put.down the book the shelf.onto
'Peter put down the book on the shelf.'

b) Péter a POLCRA tette le a könyvet.
'It is the shelf that Peter put the book down on.'

(Vallduví and Vilkuna 1998:92-93)

In this section I have introduced the set of information-stuctural categories defined by Lambrecht (1994), and in particular the notions focus, topic, discourse-inactive and discourse-active. These are propositional categories which crucially are expressed in sentence form, although this expression is not a straightforward one. In the next section I will introduce Lambrecht's and others' characterisations of how these are formally represented, and argue that a simpler, more direct characterisation of their expression in sentence form is available.

2.2 Information Structure and Sentence Form

2.2.1 Syntax

Together with the information-structural categories of pragmatic presupposition, pragmatic assertion and identifiability introduced above, the pragmatic relations topic and focus are characterised as components of the pragmatically structured proposition which do not have a straightforward correspondence to components of sentence form. With respect to topic, and to [**10**], the unidentifiable status of this referent is formally marked with the indefinite article. As with the categories pragmatic presupposition and pragmatic assertion, however, the correspondence between identifiability and sentence form is not straightforward; Lambrecht (1994:167) points out that the indefinite article may also be used with generics, which are identifiable and may have new information predicated of them as topics, as in [**16**].

16) A boy wants to be tall.

(Lambrecht 1994:167)

Lambrecht (1994) draws a further distinction between topic as defined in [**8**], and topic expression, as defined in [**17**].

17) TOPIC EXPRESSION: A constituent is a topic expression if the proposition expressed by the clause with which it is associated is pragmatically construed as being about the referent of this constituent.

(Lambrecht 1994:131)

The necessity of separating topic from parts of sentence form used to express it is illustrated in [**18**]. In this example, both the expressions ‘he’ and ‘himself’ have the same referent, ‘Felix’, which is topical in the discourse. However, whereas ‘he’ is a topic expression in this example, ‘himself’ is in focus, and falls within the pragmatic assertion. It is the topic expression ‘he’ which serves to tell us who the assertion provides new information about.

18) Who did Felix praise? He praised HIMSELF.

(Adapted from Reinhart (1982:72) in Lambrecht 1994:129)

A distinction is likewise drawn between focus as the complement of the pragmatic presupposition, defined in [**5**], and focus domain, defined in [**19**].

19) FOCUS DOMAIN: The syntactic domain in a sentence which expresses the focus component of the pragmatically structured proposition.

(Lambrecht 1994:214)

Two arguments in particular can be drawn from Lambrecht (1994) for the characterisation of the syntactic focus domain as the most appropriate unit for capturing how focus is expressed in sentence form. The first of these is that a response to a question focusing particular discourse referents must minimally form a syntactic constituent, whether or not this constituent is coextensive with that part of the pragmatically structured proposition which is in focus. Whereas a minimal felicitous response to the question in [**2**] would be the noun phrase *the movies*, in which focus and the lexical items are coextensive, the minimal response in [**20**] is again a noun phrase, but obligatorily includes the referent *one*, which is not focused but instead a topic. Similarly in [**21**], the minimal response to a question eliciting an equivalent focus, ‘what did you do when you’d finished talking about the pigs?’, is not the preposition *to*, but rather the verb phrase *talked to the pigs*.

20) Which shirt did you buy?
    a) I bought the GREEN one.
    b) The GREEN one.
    c) *GREEN.

(Adapted from Lambrecht 1994:216)

21) And then, when we'd finished talking about pigs, we started talking TO the pigs.

(Lambrecht 1994:215)

Lambrecht proposes an explanation for the necessity of the syntactic domain, given in [**22**], which appeals to the propositional basis of his definition of focus.

22) It follows from my definition of 'focus' that focus domains must be constituents whose denotata are capable of producing assertions when added to presuppositions...such denotata are either PREDICATES or ARGUMENTS (including adjuncts), or else complete PROPOSITIONS. This entails that focus domains must be PHRASAL categories (verb or adjective phrases, noun phrases, prepositional phrases, adverbial phrases, and sentences). Focus domains cannot be LEXICAL categories. This is so because information structure is not concerned with words and their meanings, nor with the relations between the meanings of words and those of phrases or sentences, but with the pragmatic construal of the relations between entities and states of affairs in given discourse situations. Entities and states of affairs are syntactically expressed in phrasal categories, not in lexical items.

(Lambrecht 1994:215)

The second argument made in favour of the syntactic focus domain is that the discourse status of some referents is best understood, not with reference to the realisation of the corresponding lexical item in isolation, but with reference to the accentuation of larger syntactic constituents of which it is a member. This is discussed by Lambrecht with reference to the sentences in [**23**].

23) a) Who saw Bill? - JOHN saw Bill/him.
b) Who did Bill see? - Bill/he saw JOHN.
c) What did Bill do? - He saw JOHN

(Adapted from Lambrecht 1994: 297/Comrie 1981:57)

In all three responses, the focal status of *John* is indicated by prosodic prominence on the word itself, and the non-focal, discourse-active status of *Bill* is clear in all three from the lack of prosodic prominence of the noun or pronoun. This regularity in the formal expression of discourse-active referential expressions is captured by Lambrecht's (1994) Discourse Condition on Unaccented Constituents, defined in [**24**].

24) DISCOURSE CONDITION ON UNACCENTED CONSTITUENTS: A referential constituent is unaccented if and only if the speaker assumes: i) that a mental representation of the referent is active in the addressee's mind (or can be accommodated by the addressee as such); and ii) that the addressee expects this referent to be a topic in the proposition at the time of utterance.

(Lambrecht 1994:324)

By contrast, Lambrecht argues that this condition does not hold for non-referential expressions. The verb is unaccented in all three responses, although in [**23c**] it is in focus. Taken in isolation, the realisation of the verb is not therefore informative as to its discourse status in the same way as is the realisation of a referential expression. Instead, the closest indicator of the verb's discourse status is whether or not the verb phrase of which it is part contains an accent; if the preceding subject, but not the verb phrase, is accented, the verb is not in focus but has a discourse-active interpretation, whereas if the verb phrase carries an accent, the verb may or may not be in focus, depending upon the accompanying context. Lambrecht claims that the same applies when the verb carries an accent, as in [**25**]; rather than indicating the focal status of the verb, this is argued by Ladd (1978) to be an example of default accent placement, resulting from the active topical status of *books*, which would otherwise bear the focus accent, rendering it unaccentable.

25) Q: Has John read Slaughterhouse Five?
A: No, John doesn't READ books.

(Lambrecht 1994:248, from Ladd 1978:81)

It is on the basis of observations such as these that Lambrecht (1994) identifies three 'focus structures' cross-linguistically according to the accentuation of syntactic subject and predicate domains. Each focus structure is named to reflect 'the conventional association between the structure of the sentence and the focus construal of the proposition expressed by it' (Lambrecht 1994:336). Predicate-accented forms of the kind in [**23b**], [**23c**] and in [**25**] are labelled 'predicate focus' or 'topic-comment' structures, and are associated with a reading in which all or part of the predicate is in focus; in part for the reasons discussed above[1], the extent is not always clear from the sentence form alone. This argued context-dependency of meaning in verb predicate-focus forms is articulated in the *Principle of Predicate-Focus Interpretation*, which is defined in [**26**].

26) 'THE PRINCIPLE OF PREDICATE-FOCUS INTERPRETATION. Sentences whose verb phrases carry an accent have predicate-focus structure. The predicate-focus structure is the unmarked focus structure and allows for alternative focus readings. Such alternative readings are contextually determined.'

(Lambrecht 1994:304)

The context-dependency of predicate-focus structures is contrasted with 'argument focus' structures as exemplified in [**23a**], in which, as discussed above, the unaccented verb phrase is interpreted as part of the presupposition and only the accented subject has a focus interpretation. The third variety of focus structure identified by Lambrecht is the so-called 'sentence focus' structure, exemplified in [**27**]. Like argument focus structures, sentence focus structures in English feature an accented subject and an unaccented verb phrase, but are argued to be further identified as sentence focus structures by lexical features, as only a restricted number of predicates may participate in this structure.

27) Q: What happened?
A: My CAR broke down.

(Adapted from Lambrecht 1994:223)

The focus readings associated with each focus structure are summarised in Table 1 below.

[1] This posited indirect relationship between accentuation and the discourse-status of verbs is not the only source of context-dependency of focus reading in predicate-accented sentence forms; in addition to the topic-comment focus reading in the above examples, in which the subject is interpreted as a topic and all or part of the verb phrase is in focus, Lambrecht (1994) argues that verb phrase-accented sentence forms in which the subject is also accented may also have readings in which either the entire sentence or only the subject is interpreted as being in focus; these will be discussed further in section *2.2.2* below.

Table 1: Pragmatic articulation of the three focus-structure categories (Lambrecht 1994:236)

	Argument in focus	Predicate in focus
Predicate focus	-	+
Argument focus	+	-
Sentence focus	+	+

It is in this way that reference to accented syntactic focus domains is argued by Lambrecht to better capture how focus is realised in sentence form than reference to the realisation of individual lexical items in isolation. The possibility of an approach to the relationship between accentuation and focus closer to the latter is however suggested by Lambrecht's account of examples like [**28a**]. Unlike [**28b**], and the other examples discussed up to this point (with the exception of sentence focus example in [**27**]), in which the syntactic domain focused by the eliciting question bears an accent in the response, the predicate in [**28a**] bears no accent, although only *pencil* is discourse-given, and only the subject is accented; this is an apparent exception to the focus structure predictions.

28) Where's my pencil?
   a) JOHN took it.
   b) JOHN STOLE it.

(Lambrecht 1994:281)

Rather than treat [**28a**] as an exceptional case of a focused but unaccented predicate, however, Lambrecht treats it as an argument focus structure produced in response to a predicate-focus question; according to his account, the speaker does this because he assumes that the hearer is able and willing to accommodate the predicate *take* as discourse-active, owing to its availability in the context despite lack of explicit previous mention.

The predicate *steal*, by contrast, is less available in the context at hand and cannot so easily be accommodated as discourse-active, with the result that [**28b**] is produced with a predicate-focus structure in which the predicate is accented. The same is proposed by Bolinger (1972) to account for the accentuation differences in the sentence pairs in [**29**].

29) a) I have a POINT to make. / I have a point to EMPHASIZE.
b) The end of the chapter is reserved for various PROBLEMS to solve/COMPUTERIZE.

(Bolinger 1972:633, cited in Rochemont 2013:59)

Pragmatic accommodation is invoked in the case of [**28a**] in order to account for an exception to the accent distribution patterns by which focus structures are characterised. It is unclear, however, why its application should not be extended to unaccented predicates which, like that in [**23c**], occupy an accented VP in a response to a VP focus question. The unaccented predicate *see* in [**23c**] certainly does not appear unexpected in the accompanying context. That a less easily accommodated predicate is more likely to require accentuation in the same position, albeit of a weaker kind preceding the final, nuclear accent, can be seen by contrasting the realisations of the predicates from [**28**] in this position, as in [**30**].

30) Has John got anything to write with?
1) He took my PEN.
2) He STOLE my PEN.

Conversely, the plausibility of extending the pragmatic accommodation account to unaccented predicates in examples like [**23c**], which Lambrecht and others use in the literature to illustrate the need for a syntax-based account of accent distribution, can be seen by recasting them in structures like [**31a**], in which they likewise are or can be unaccented and an appeal to pragmatic accommodation is required, in contrast with predicates which are less easy to accommodate like that in [**31b**].

31) Does anybody know where Bill is?
   a) JOHN saw him. / ?JOHN SAW him.
   b) JOHN ATTACKED him / #JOHN attacked him.

Such an extension of the pragmatic accommodation account has the benefit that the Discourse Condition on Unaccented Constituents defined in [**24**] can be adapted to characterise both referential and non-referential items, with the result that the discourse status of both kinds of item can be characterised on the basis of their individual accentual properties, with no reference required to the accentual status of larger syntactic phrases of which they are members.

An apparent obstacle to such a characterisation is presented by examples like [**27**] of Lambrecht's sentence focus structure, more of which are provided by Rochemont (2013) in [**32**]. Whereas a pragmatic accommodation account of the kind invoked above may be used to account for the unaccented predicates in [**32b**] and [**32f**], this appears problematic for the remaining examples, in which the event expressed by the unaccented predicate is of a more unexpected nature.

32) a) My WIFE walked out.
   b) A PACKAGE arrived.
   c) Our DOG's disappeared.
   d) My WALLET is missing.
   e) Your COAT's on fire.
   f) Some SOLDIERS marched by.

(Includes examples adapted from Faber (1987:348), Gussenhoven (1983:391), and Schmerling (1976:21-22); in Rochemont 2013:52)

A solution to the problem of these constructions, which again makes use of pragmatic accommodation, is however put forward by Rochemont (2013) as a component of his own account of focus and accentuation. His proposal, provided in [**33**], is that, in those constructions in which 'less expected' predicates are deaccented, the speaker's appeal for pragmatic accommodation serves the purpose of focusing the hearer's attention on the appropriate reaction or action to be taken, rather than on some other possible intent of the utterance which a predicate-accented realisation may convey.

33) In general, participants will be willing to accommodate GIVENness only to the extent that the required accommodation does not seriously disrupt this shared understanding. Since NEW phrases must generally be accented, deaccenting a NEW phrase will be accommodated only if such deaccenting is unobjectionable given the participants' shared understanding of the discourse in its current state. This explains why some NEW predicates are readily deaccented with one subject but not with another, as in the contrast between The BABY's crying and #The MAN's crying. As a function of world knowledge, participants are very likely to accommodate crying as GIVEN in the case of a baby but much less likely to do so in the case of a man. Similarly, in an example like Your COAT's on fire, the speaker S presents the predicate as GIVEN not because it is predictable or unremarkable (presumably it is not), but because she wishes the addressee to take it as GIVEN (and readily confirmed) and to act accordingly.

(Rochemont 2013:58)

A combination of Rochemont's application of pragmatic accommodation to examples like those in [**32**] with the extended application of it proposed above yields a simplified account of the relationship between the accentuation of words and their discourse status. In what follows I will make the argument that such an approach is preferable to Rochemont's own account of sentence accentuation, which combines his proposed treatment of sentence focus constructions by means of pragmatic accommodation with an account based on a distinction between the notions focus-as-new and focus-as-alternatives.

Rochemont's account of the relationship between focus and sentence accents is based on a distinction between two notions of focus: focus-as-new, which refers to a word or phrase which is 'newly introduced to the discourse', and focus-as-alternatives, which, following Krifka's (2008) definition, refers to focus which 'indicates the presence of alternatives that are relevant for the interpretation of linguistic expressions' (Krifka (2008:247), cited in Rochemont 2013:38). Rochemont applies the label FOCUS only to those words or phrases fitting the latter description. If a syntactic FOCUS constituent contains no further FOCUS constituents, sentence stress within it is distributed according to a neutral stress mechanism. Based on the model of focus projection proposed by Selkirk (1995), this mechanism distributes stress within phrasal domains in a way that reflects syntactic constituency, avoiding constituents which are GIVEN, as a result of previous mention in the discourse but not themselves in FOCUS, in preference of NEW constituents which correspond to the former definition of focus-as-new and are neither FOCUS nor GIVEN. If, however, a FOCUS constituent contains additional FOCUS constituents, these receive the sentence stress within a particular phrasal domain in preference to any NEW constituents occupying the same domain. These proposals address examples of sentence accentuation which are problematic for the account of focus accentuation proposed by Selkirk (1995). Similarly to Lambrecht's (1994) focus domain, focus as defined by Selkirk (1995) is a syntactic constituent, which must be the same constituent focused by a corresponding question, as defined in [**34**].

34) FOC Interpretation:
 'A wh-question expression focuses a constituent, and an appropriate answer to a wh-question must focus the same constituent.'

(Selkirk 1995:553)

As defined in [**35**], the focus in the appropriate answer is derived from the distribution of sentential accents within it via the projection of F-markers from the accents up to the focused constituent. This projection proceeds either directly from the F-marked head of the focused constituent, if this bears an accent, or indirectly from an F-marked internal argument of the focused constituent via its head to which the internal argument projects F-marking. As defined in [**36**], focus is then the topmost F-marked constituent. Projection of F-marking to the focused constituent from its head is termed vertical focus projection, whereas projection of F-marking from an internal argument to the head is termed horizontal focus projection.

35) Basic Focus Rule

An accented word is F-marked.

(2) Focus Projection2

a. F-marking of the head of a phrase licenses F-marking of the phrase
(henceforth: vertical focus projection)

b. F-marking of an internal argument of a head licenses the F-marking of the head
(henceforth horizontal focus projection)

(Selkirk 1995:555)

36) Focus of a sentence (FOC):

An F-marked constituent not dominated by any other F-marked constituent.

(Selkirk 1995:555)

In addition to defining constituents not dominated by another F-marked constituent as the focus of the sentence, Selkirk's (1995) proposals also define the discourse properties Given and New, as stated in [**37**].

37) F Interpretation:

a. F-marked constituent but not FOC: new in the discourse
b. constituent without F-marking: Given
(c. FOC: either Given or New)

(Selkirk 1995:555)

Rochemont (2013) contrasts the 'liberal' distribution of F-marking according to Selkirk's (1995) model in [**38a**] and [**39a**] with its 'conservative' distribution in [**38b**] and [**39b**] according to his proposals. In [**38a**] and [**39a**], F-marks are projected from the accented words, via the verbal head in the case of the VP, to the VP constituent in the former case and the entire sentence in the latter case. In [**38b**] and [**39b**], F-marking applies only to focus-as-alternatives, which in this case corresponds to the constituent under question.

38) VP focus: What did John do? He quit his JOB.

a) He [quit$_F$ his JOB$_F$]$_F$ (liberal)
b) He [quit his JOB]$_F$ (conservative)

39) IP focus: What happened? Mary ran into the house to get her keys.

a) [MARYF [ran$_F$ [into the HOUSE]$_F$]$_F$ [to get her KEYSF]]$_F$ (liberal)
b) [MARY ran into the HOUSE to get her KEYS]$_F$ (conservative)

(Rochemont 2013:40)

In Rochemont's proposals, sentences stress in these examples targets NEW constituents, which are not F-marked. Stress here is distributed according to a similar mechanism to that proposed by Selkirk (1995), according to which '*every (extended) phrase must bear phrase stress and within such phrases stress must appear within an internal argument to the head, if there is one, and barring that on the head of the phrase itself*' (Rochemont 2013:41). These proposals are able to deal with two types of accent distribution which are problematic for Selkirk's (1995) framework. The first kind, discussed for example by Büring (2006), are examples in which projection of F-marking to constituents focused by a preceding question appears to proceed, not from the head of the constituent, which cannot be F-marked due to its given status from previous mention in the discourse, but either directly from the argument of a head, or from a non-argument. In [**40a**], *convertible* is given in the preceding discourse and cannot felicitously be accented and F-marked, so that projection to the NP focused by the question must proceed from the F-marked adjective *blue*. Similarly in [**41a**], projection to the focused VP proceeds, not via the NP head, which is again given, but from the determiner *all*, which is a minor category.

40) I know that John drove Mary's red convertible. But what did Bill drive?
a) He drove her BLUE convertible.
b) He drove his MOTORCYCLE.

(Büring 2006:326)

41) Q: Your competitor has lowered the prices on every other model. What do you plan to do to answer that?
a) A: We will [lower the prices on ALL models.]$_{\text{FOC}}$
b) A': We will [emphasize the quality of our SERVICE.]$_{\text{FOC}}$

(Büring 2006:331)

In examples of the second kind of accent distribution, F-marking to the focused constituent must again proceed, not from the head, which is unaccented and cannot be F-marked, but from a different F-marked element. The difference in this case is that the unaccented head is not explicitly given in the preceding discourse. In [**42**], which may be felicitously uttered in an ‘out-of-the-blue’ context in which the entire sentence is in focus, the former NP head *farmer*, by which f-marking would proceed to talking, the VP head, and to the full sentence, is unaccented despite not having been mentioned in the preceding discourse. Similarly, in the response in [**43**], *music* is elided and then unaccented despite not having previously been mentioned.

42) An AMERICAN farmer was talking to a CANADIAN farmer.

(Rochemont 2013:44, from Rooth (1992:80))

43) Q: What do your friends like?
A: Ramon likes CUBAN and Malte prefers ARGENTINIAN music.

(Adapted from Rochemont 2013:45, from Féry and Samek-Lodovici (2006:143))

In order to accommodate examples of the first kind, Rochemont (2013) employs elements of Selkirk’s (1995) model, not as an account of the projection of F-markers to focused constituents, which have FOCUS status as the alternative focused by the question, but rather as the basis of a neutral stress mechanism which determines the placement of accents within larger constituents. F-marks are replaced in this way with accentuation according to GIVEN/NEW status. Without the requirement to project F-marking to larger constituents via heads, this mechanism is able to account for accent distribution within [**38**] and [**39**] as well as in [**40**] and [**41**], in which it accounts for the differentiation between GIVEN and NEW constituents. Examples like [**42**] and [**43**], which do not involve explicit givenness, are handled as instances of a larger FOCUS constituent containing smaller FOCUS constituents which, under Rochemont’s definition, are alternatives-based; this is handled in [**42**] as the explicit contrasting of *American* and *Canadian* and in [43] as the contrasting of *Cuban* and *Argentinian*. In accordance with Rochemont’s (2013) claim, as the FOCUS constituents *American* and *Argentinian* are accented, the NEW heads *farmer* and *music* cannot be.

Whilst the distinction between focus-as-new and focus-as-alternatives provides a convincing account of the exceptions to Selkirk's account of accent distribution discussed above, Rochemont's use of this distinction as an account of accentuation in other examples is less convincing. Discussing the cases of VP focus in [**44**], Rochemont points out that, under Selkirk's (1995) proposals, [**44a**] and [**44b**] cannot be differentiated, as in both the finite verb bears an F-mark. By contrast, his proposals provide both verb, object and VP with marking as alternative foci in [**45a**], as an example of 'dual contrastive focus', whereas only the VP is marked as an alternative focus in [**45b**].

44) {I know that John cited Mary, but what did Bill do?}
    a) He DISSED SUE.
    b) He dissed SUE.

(Rochemont 2013:43, based on Schwarzschild (1999:170))

45) a) He [DISSED$_F$ SUE$_F$]$_F$
    b) He [dissed SUE]$_F$

(Rochemont 2013:43)

Rochemont's marking of a distinction between [**44a**] and [**44b**] is dependent upon a characterisation of [**44a**] as involving a contrastive focus-as-alternatives reading both of *DISSED* and of *SUE*. It is not clear, however, that this construction requires a specifically contrastive interpretation on either word distinguishable from the interpretation of the accent on *SUE* in [**44b**]. It may equally occur in a context eliciting no clear contrast, as in [**46**]. This is in fact the more felicitous realisation of the verb in any context in which it is not given as a result of previous mention, to which the realisation in [**44b**] is more restricted. This indicates that, in this case, the proposed pragmatic accommodation account is more successful.

46) What did Bill do?
    He DISSED SUE.

The same argument can be made with respect to his account of 'superman' sentences, as first discussed by Neeleman and Szendröi (2004) like that in [**47b**]. Similarly to the analysis of these proposed by Féry and Samek-Lodovici (2006), Rochemont argues in this case that a FOCUS accent on *SUPERMAN* prevents the accentuation of *some kid* as NEW.

47) a) Father: What happened?
b) Mother: You know how I think our children should read decent books. Well, when I came home, rather than doing his homework, Johnny was reading SUPERMAN to some kid.
c) [Johnny [was reading SUPERMAN$_{f3}$ to some kid]$_{f2}$]$_{f1}$

(Adapted from Neeleman and Szendröi (2004:149), in Rochemont 2013:45)

Rochemont also points out, however, that *some kid* is similar in function the pronominal indefinite someone, and might therefore be deaccented in any case, in contrast to an alternative expression which must bear phrase stress because of being NEW in the same context. In [**48**], this is the case for *the NANNY/his SISTER*. This however contradicts the proposed account according to which the marking of a FOCUS prevents the prosodic marking of NEW.

48) Well, when I came home, rather than doing his homework, Johnny was reading SUPERMAN to the NANNY/his SISTER.

(Adapted from Rochemont 2013:45)

Furthermore, the accentuation in [**47b**] also seems acceptable in contexts in which SUPERMAN is not explicitly contrasted with an alternative, as for example in [**49**].

49) You'll never guess what. When I came come, Johnny was reading SUPERMAN to some kid.

In this case again, therefore, a pragmatic accommodation approach provides a more satisfactory account of the data than one which posits that a distinction between two varieties of focus is responsible. The pragmatic accommodation approach can however be extended further still, to provide an account of those sentences in [**42**] and [**43**] in which the influence of an alternatives-based focus interpretation is more evident. Under this approach, the deaccenting of the subject and object nominals in these examples can be understood, not as the denial of accentuation to discourse-new items, but instead as an appeal to the listener to accommodate these items as discourse-given, as part of a pragmatic strategy to maximise the prominence of the contrastive foci. In this way, the pragmatic accommodation approach offers a unified account of all the examples discussed above, without the need to appeal to a separate mechanism.

In addition to appealing to the contrastive nature of focus-as-alternatives, Rochemont also presents arguments based on the non-focal nature of accent distribution in focus-as-new. He claims that, in [**50**] and [**51**], the terminal constituent bearing the phrase stress licensing FOCUS on the containing subject noun phrase is not itself conceivably focused in either of his posited senses, which therefore supports the existence of a neutral distribution of accentuation within phrases which also accounts for the accentuation of NEW items.

50) {The success of our VENTURES depends upon the mood of the MARKETS, and} [the mood of the MARKETS]$_F$ depends upon [the state of the ECONOMY]$_F$.

51) {John has applied for a job at the University. I know that the person who requested he apply has talked to Human Resources about hiring him. But who talked to John?}
[The person who requested he APPLY]$_F$ talked to John.

(Rochemont 2013:42)

Contrary to Rochemont's characterisation, under Lambrecht's (1994) definitions, which I have adopted in this thesis, *APPLY* in [**50**] is in focus, as that part of the pragmatically structured proposition whereby the assertion differs from the presupposition, within which the remainder of the subject noun phrase 'the person (who requested he) x' is contained. The stressed *MARKETS* in [**51**] can under Lambrecht's assumptions be defined as a discourse-inactive topic, which is assigned this role in place of the preceding topic *VENTURES*. This provides an alternative to the characterisation of these items as stressed as the result of a neutral accentuation mechanism. Discourse-inactive topics likewise provide an alternative account of the contrasting interpretations of [**52**], which Rochemont again explains in terms of the distinction between focus-as-new and focus-as-alternatives, as shown in [**53**]. Under this alternative account, the non F-marked accented arguments in [**52a**] and [**52b**] can each be attributed discourse-inactive topic interpretations. It can furthermore be pointed out that Rochemont's proposed account violates his stipulation that a focus-as-alternatives accent prevents any other items within the same domain from bearing a focus-as-new accent.

52) {Did John do anything odd at the reception?} Yes -- He only introduced BILL to SUE.
a) . . . He didn't introduce anyone else to Sue.
b) . . . He didn't introduce Bill to anyone else.
c) . . . He didn't make any other introductions.
d) . . . He didn't do anything else.

53) a) He only [introduced BILL_{F} to SUE].
b) He [only [introduced BILL to SUE_{F}].
c) He only [introduced BILL_{F} to SUE_{F}].
d) He only [introduced BILL to $\text{SUE}]_{\text{F}}$.

(Rochemont 2013:44)

The mechanism of pragmatic accommodation invoked by Rochemont (2013) to account for the deaccenting of predicates in sentence focus constructions can therefore successfully be extended to a unified account, both of these and of the other data discussed by Rochemont[2], which he appeals to a separate distinction between focus-as-new and focus-as-alternatives to explain. Under the proposed approach, any unaccented word can be treated as discourse-active, either as a result of explicit previous mention, or because it is assumed that the listener is able and willing to accommodate it as discourse-active, and because the speaker has one of several pragmatic motives in appealing to them to do so. There is no need to account for the discourse status of deaccented words by making reference to different varieties of focus, or to a mechanism of horizontal focus projection within syntactic phrases like that in Lambrecht's (1994) and Selkirk's (1995) proposals.

[2] Rochemont (2013:46) notes of an additional set of examples that he discusses that the judgements involved in his account are subtle and not agreed with by all speakers.

This simplified account of the relationship between information structure and sentence form is the one that I will adopt in the remainder of this thesis.

In addition to those arguments presented above for eliminating reference to horizontal focus projection within syntactic phrases, further arguments can be made for eliminating reference to syntactic focus phrases altogether, by dispensing with reference to vertical focus projection from accented terminal constituents to the larger constituents containing them. An obstacle to doing so is presented by the first of Lambrecht's (1994) arguments for the syntactic focus domain discussed above, exemplified in [**20**] and [**21**]; that a response to a question focusing particular discourse referents must minimally form a syntactic constituent, whether or not this constituent is coextensive with that part of the pragmatically structured proposition which is in focus. This characterisation is an obstacle to Lambrecht's own characterisation of the response in [**28a**], repeated in [**55a**], as an argument-focus structure licensed as a response to a VP-focus question by the contextual availability of *take* for pragmatic accommodation. Whereas, as shown in [**54b**], in a 'standard' argument focus structure the presupposed portion of the proposition may be elided, this is not possible in the context of [**55**].

54) Who saw Bill?
   a) JOHN saw Bill/him.
   b) JOHN.

55) Where's my pencil?
   a) JOHN took it.
   b) #JOHN.

Similarly, although [**56**] shows that the discourse-active verb may be elided in the context of an NP question, in [**57**] the verb, which is part of the presupposition in the proposed approach, may not be elided in the context of a VP question.

56) Who did Bill see?
   a) Bill/he saw JOHN.
   b) JOHN.

57) What are you doing?
   a) Playing FOOTBALL.
   b) #FOOTBALL.

Even if the information-structural status of words can be characterised with reference only to their own accentual properties, therefore, it appears still to be necessary to acknowledge a syntactic focus domain containing them. Applying to these examples Lambrecht's characterisation in [**22**] of focus domains as phrasal categories to which propositional categories capable of producing an assertion obligatorily correspond gives us the syntactic focus domains in [**58**]. In [**58a**], the focus domain takes the form of a full proposition, which corresponds to a sentence phrase, and in [**58b**], the form of a predicate, which corresponds to a verb phrase.

58) a) [JOHN$_F$ took it.]$_F$
   b) [playing FOOTBALL.$_F$]$_F$

If, on the other hand, following Lambrecht (1994), the necessity of the verb phrase as a syntactic focus domain is to be explained in terms of its correspondence to propositional predicates capable of producing assertions, it is unclear why a realisation like [**59**] should be unavailable for [**55a**]; here, the focus domain reflects a propositional SV predicate which produces an assertion when combined with the topical object, which may be elided, like the object in [**54b**]. The same can be said of the unavailability of a realisation like that in [**60b**] to reflect a propositional V predicate.

59) *[JOHN took]$_F$ (it).

60) What's John doing with that pen?
   a) STEALING it.
   b) #STEALING.

Non-VP realisations reflecting an SV predicate like that in [**59**] are however possible in languages like Polish, as shown in [**61b**], as are realisations reflecting a V predicate like that in [**62**].

61) a) To UKRADŁ JAKIŚ FACET.
it steal.PST.3SG some guy
'Some guy stole it.'

b) JAKIŚ FACET UKRADŁ (to).
'Some guy stole it.'

62) (On) KRADNIE (to).
He steal.PRS.3SG it
'He's stealing it.'

Examples like these suggest that the explanation for the obligatory presence of the given object in [**55b**] and [**60a**] lies, not in the verb phrase being the universal corresponding phrasal category for propositional predicates, but instead in a constraint in English against the elision of objects. This yields a reduced focus domain for the SV and V predicates shown in [**63**] which does not correspond to syntactic phrasing but comprises only those words which are marked as foci by accentuation.

63) a) [JOHN$_F$ STOLE$_F$]$_F$ it.
b) John [STOLE$_F$]$_F$ it.

As shown in [**64**], in contrast with the topical object, it is not possible in Polish to elide the unaccented verb in either of the contexts in [**55**] and [**57**]. This suggests that a similar language-specific constraint on elision is unavailable as an explanation for its presence in English.

64) a) #JAKIŚ FACET (ukradł to).
b) #(Gram) w piłkę nożną.
play.PRS.1SG at football
'I'm playing football.'

An explanation for the obligatory presence of the verb in these contexts is however once again available from the process of pragmatic accommodation invoked to explain their deaccentuation. In deaccenting the predicates in the examples discussed, a speaker appeals to a listener to accommodate them as part of the presupposition, with whatever motivation, on the basis of their contextual availability. For this appeal to be made, it is necessary for the predicate to be included in the sentence form; this prevents confusion with alternative candidates which may likewise be deaccented due to their availability for accommodation. As shown in [**65**], once fully part of the presupposition these predicates may be elided.

65) a) John took it, and James your pencil.
b) I'm playing football, and John squash.

These alternative ways of accounting for the obligatory inclusion of deaccented material in the examples discussed suggest that the notion of vertical projection to larger syntactic domains can be dispensed with, and the relationship between information structure and sentence form simplified considerably to a matter of the relationship between the information-structural features of words and their individual realisation. It is however unclear how, under such an approach, examples such as the Russian sentence in [**66**] can be accounted for, which are consistent with topicalisation of the non-finite VP.

66) mne [otpustit' Katju odnu] kažetsja, čto bylo by bezumiem.
Me.DAT let.go.INF Katja.ACC alone seem.PRS.3SG that would be insane
'It seems to me that it would be insane to allow Katja to go alone.'

(Dalrymple 2001:62)

The necessity of associating information-structural features with domains larger than individual words is likewise indicated by the examples in [**50**] and [**51**] of English complex noun phrases containing a single accent. Discussing similar examples, Lambrecht (1994:274) points out in the case of these that, in accordance with his definition of focus, not only the accented word, but also the entire discourse referent of which it is part, counts as that element by which the presupposition and assertion differ. The same can be seen to apply to the discourse-inactive topic interpretation of the subject-internal accented word in [**50**]. That such projection of information-structural features does not occur only within syntactic phrases is however indicated by examples of discontinuous constituency constructions like those in [**67**].

67) a) The man came in with the long BEARD.
    b) The person talked to John who requested he APPLY.

(Adapted from Rochemont and Culicover 1990:1)

Vertical syntactic projection in cases like these is, at least in non-transformationalist theories of syntax, unable to account for the focus interpretation of the individual in addition to the accented word. This indicates that projection of information-structural features must instead be modelled on a non-syntactic, propositional level of sentence organisation. Examples like [66] may then be treated as a syntactic reflex of this propositional version of projection, rather than as exemplifying its restriction to syntactic domains. As such, it is possible to retain the proposed approach to the relationship between information structure and sentence form, which requires reference only to those syntactic units corresponding to individual words. In chapter 3 I will discuss similar data from Georgian in support of such a proposal. In chapter 6, I will include an articulation of such a version of projection in the Lexical-Functional Grammar framework, which makes reference to f(unctional)-structure and to s(emantic)-structure.

In this section I have discussed the relationship between information structure and syntax, and proposed a simplified approach to it which extends the notion of pragmatic accommodation invoked by Rochemont (2013) and others in more specific cases to a treatment of all unaccented words as discourse-active in Lambrecht's (1994) terms, and which dispenses with the notions of horizontal and vertical syntactic projection of discourse features. In the next section I will consider the information-structural properties of sentence accents within frameworks employing a richer prosodic structure.

2.2.2 Prosody

Lambrecht (1994) provides the unified account of sentence accentuation, which is found both on foci and on discourse-inactive topics, given in [**68**].

68) THE DISCOURSE FUNCTION OF SENTENCE ACCENTS: A sentence accent indicates an instruction from the speaker to the hearer to establish a pragmatic relation between a denotatum and a proposition.

(Lambrecht 1994:325)

As discussed, the pragmatic role of focused denotata, whether these are familiar from the preceding discourse or not, is unestablished at the time of utterance because it is in the establishment of this role that the pragmatic assertion, and hence the new information, is communicated; hence focused denotata are accented whether or not these denotata are already familiar from the preceding discourse. Similarly, topical constituents may bear an activation accent even if the topical referent has been recently introduced. An example of this is the sentence repeated in [**69**]. In the context elicited by the question, two referents, *the dog* and *the cat*, are both potential arguments for each of the propositions in the response; as such, neither has had its role as topic established at the time of utterance, and each must be accented together with the focused constituents *parents* and *outside*.

69) Q: What are you going to do with the DOG and the CAT while you're away?
A: I'll leave the DOG with my PARENTS and the CAT can stay OUTSIDE.

(Lambrecht 1994:332)

This principle can be seen to apply to sentence forms featuring a second accented entity within the predicate, such [**70a**]. As Lambrecht points out, such sentences are compatible with at least two focus construals. In the first, the accented *BOOK* is interpreted as being in focus together with the rest of the predicate. In the second, *BOOK* is interpreted as a discourse inactive topic entity. This contrasts with the obligatory interpretation of *book* in [**70b**] as discourse-active.

70) a) She sent a BOOK to MARY.
    b) She sent a/the book to MARY.

(Lambrecht 1994:331)

The context-dependent focus construals available for the predicate-accented sentence forms in [**69**] and [**70**] have in common the topicality of the subject and the focal status of the predicate, and are thus focus construals of the topic-comment type conventionally associated with this sentence form. As Lambrecht points out, however, some predicate-accented sentences may also be compatible with focus construals inconsistent with a topic-comment description, as in [**71**].

71) What happened? – BILL went straight HOME.

(Adapted from Lambrecht 1994: 297/Comrie 1981:57)

The sentence form of the response is compatible with either of the focus readings in [**72**].

72) a) $_{\text{TOP}}$[BILL] $_{\text{FOC}}$[went $_{\text{FOC}}$[straight HOME]].
    b) $_{\text{FOC}}$[BILL went straight HOME].

(Lambrecht 1994:298)

The two focus construals available for this sentence form again reflect the possible indeterminacy of accented referential expressions which don't bear the phrasal accent with respect to focus interpretation. In the case of [**72b**], the interpretation of the subject as part of the focus results in the entire sentence and not just the predicate being interpreted as in focus. A second example of a non-topic-comment focus construal for a predicate-accented sentence is given in [**73c**].

73) a) (Ils TRAVAILLENT pour NOUS) mais c'est le GOUVERNEMENT qui PAYE.
b) (Die ARBEITEN für UNS) aber BEZAHLEN tut die REGIERUNG.
c) (They work for US) but the GOVERNMENT PAYS.

(Lambrecht 1994:279)

The second clause in [**73c**] is predicate-accented, but has not a topic-comment but rather an argument-focus construal; here, the subject is in focus, whilst the predicate, which represents a presupposed open proposition, bears an activation accent. This alternative focus construal is unavailable in the case of [**73a**] due to the use in the French construction of 'c'est' which marks the subject as being in focus, and in [**73b**] due to the fronting of the object in German which marks it as a discourse-inactive topic.

Lambrecht's (1994) uniform characterisation of all sentence accents as having only the function of indicating the discourse-inactiveness of words with respect to their pragmatic role is at odds with analyses which make reference to a more complex prosodic structure. One example is the analysis of English information structure proposed by Steedman (1991) within the Autosegmental-Metrical (AM) theory of intonational phonology, which has its origins in the theses of Liberman (1975), Bruce (1977) and Pierrehumbert (1980). The AM theory analyses the tonal contours associated with sentences into a linear sequence of tonal events associated with particular parts of the string it accompanies, linked by transitions which are of no linguistic significance and are phonologically unspecified. The discrete tonal events which make up tonal contours are in turn decomposable in the AM framework into level tones: H (a high tone) and L (a low tone). These tones are the components of two major types of tonal event: pitch accents and boundary tones. The notion 'pitch accent' (coined by Bolinger 1958) is defined by Ladd (2008:48) in [**74**].

74) *'(A pitch accent is) a local feature of a pitch contour – usually but not invariably a pitch change, and often involving a local maximum or minimum – which signals that the syllable with which it is associated is prominent in the utterance.'*

(Ladd 2008:48)

Pitch accents may be simple, consisting of a single tone, or complex, consisting of two tones. In the case of complex pitch accents, the tone most closely associated with the nucleus of the accented syllable is annotated with an asterisk (which also accompanies single pitch accents) and the other tone is labelled the leading or trailing tone, depending on it position relative to the nuclear tone. Edge tones in Pierrehumbert's (1980) analysis are divided into phrase accents and boundary tones. Unlike pitch accents, which are associated with stressed syllables of words in utterances, edge tones are associated with the boundaries of prosodic phrases. Boundary tones are associated with the end, or the beginning, of an intonational phrase, and phrase accents, which Pierrehumbert (1980) find to occur between a final pitch accent and the boundary tone, with a lower-level intermediate phrase (under the revisions of Beckman and Pierrehumbert (1986)), such that a minimal tonal contour in English consists of a sequence of pitch accent, phrase accent and boundary tone. Like pitch accents, edge tones may likewise be simple or complex. Edge tones are taken to provide crucial cues to the presence and nature of prosodic phrases.

These tonal types can be illustrated with reference to Steedman's (1991) proposed account of the relationship between information structure and sentence form, according to which elements of the former correspond much more closely to elements of the latter than argued by Lambrecht (1994). This account is based on the observation that the prosodic phrasing of a sentence is often not coextensive with its syntactic constituent structure. Based on the observations of Pierrehumbert and Beckman (1990), Steedman (1991) proposes that constituents of English surface structure, which vary from the set of syntactic constituents traditionally attributed to English, are differentiated in terms of their discourse function by their accompanying prosodic contour. An L+H* LH% contour consists of a complex L+H* pitch accent, an L phrase accent marking the boundary of an intermediate phrase (ip), and an H% boundary tone, marking the boundary of a larger intonational phrase (IP). This contour marks a thematic constituent, which corresponds approximately to Lambrecht's (1994) presupposed portion of the proposition. By contrast, an H*L (L%) contour consists of a complex H*L pitch accent followed by an L phrase accent and, if this is clause-final, an L% intonational phrase boundary tone. This contour marks a rhematic constituent, which corresponds approximately to Lambrecht's focused portion of the proposition. In [**75**], the focused constituent *FRED* is marked with an H* pitch accent and the rhematic ip phrase in which it appears with an L phrase accent. The thematic ip phrase is marked with an L phrase accent followed by an H% boundary tone, and the topical constituent *(the) BEANS* with a complex L+H* pitch accent. This contrasts with [**76**], in which the order of theme and rheme constituents is reversed. As such, the sentence accents borne by *FRED* and *BEANS* are, in contrast to Lambrecht's characterisation of sentence accents discussed above, differentiated according to their associated information-structural features.

75) Well, what about the BEANS? Who ate THEM?
    A: (FRED) (ate the BEA-NS).
    H* L L+H*LH%

(Steedman 1991:274)

76) Q: Well, what about FRED? What did HE eat?
    A: (FRED ate) (the BEANS).
    L+H*LH% H* LL%

(Steedman 1991:274)

Although Steedman's (1991) approach posits a close degree of coextensiveness between information-structural and prosodic domains, he acknowledges that the correspondence is not a perfect one. As he points out, responses to the question in [**77**] may include the non-prominent topic *they* in the same prosodic phrase as the focused portion of the proposition.

77) What about legumes?

(They are a good source of VITAMINS)
H*LL%
(They are a good source of) (VITAMINS)
(They are) (a good source of VITAMINS)
(They) (are a good source of VITAMINS)

(Steedman 1991:285)

Steedman's assertion that accented material in thematic and rhematic domains in English is differentiated by pitch accent type (L+H* and H* respectively), which is also made by Jackendoff (1972), Büring (2003) and others, is challenged by Calhoun (2007), who presents data indicating that themes and rhemes are differentiated, not by pitch accent type, but instead by relative prosodic prominence[3]. First discussing existing studies on the nature of these pitch accents, Calhoun points out that these reach conflicting conclusions as to whether the two should be treated as separate. She then presents her own data from complementary production and perception experiments designed to test the claim that theme and rheme are differentiated by distinct intonational contours, which do not support this hypothesis. These data instead indicate that, rather than being distinguished by pitch accent or boundary tone type, the *f0* (pitch) peaks of thematic accents are consistently lower than those of rhematic accents; this finding is supported further by data from two additional experiments. The second of these compares the prosodic realisation of theme-rheme (BA) rheme-theme (AB) orders using sentences like those in [**78**] and [**79**]. The data from these revealed a greater fall in *f0* following the first accent in rheme-theme order compared to that identified between the accents in theme-rheme order.

[3] Prominences may be realised cross-linguistically in the form of pitch accents as well as by other tonal and/or non-tonal features (Ladd 2008).

78) Q: You're going to see Amanda tomorrow, right?
A: No, [I'm seeing Amanda] [on Monday], [I' 11 see] [Norma] [tomorrow].
theme *rheme* *rheme* *theme*

(Calhoun 2007:126)

79) Q: You're going to see Amanda tomorrow, right?
A: No, [I'm seeing Norma] [tomorrow], [I'll see] [Amanda] [on Monday]
rheme *theme* *theme* *rheme*

(Adapted from Calhoun 2007:276)

On the basis of these experimental data, Calhoun presents an alternative analysis, according to which theme and rheme accents in English, rather than being distinguished by pitch accent type, are instead distinguished by their relative prosodic prominence, as shown in the possible branching prominence structures for the constructions in [**78**] and [**79**] in Figure 1[4]. According to this analysis, the marking of prominence relations is asymmetric, with the effect that, of accents of a similar height, the second will be perceived to be more prominent, or nuclear, whereas post-nuclear prominences are either deaccented within the same phrase, or realised with a much lower accent in a separate phrase, with the effect that they are perceived as less prominent. As shown in Figure 1, whereas, in theme-rheme order, theme and rheme are analysed as forming part of the same prosodic phrase, in the case of a rheme accent, analysed as nuclear, followed by a theme accent, the two are dissociated with a phrase break; Calhoun (2007) posits that it is the presence of this phrase break which allows the final theme to bear an accent, rather than having to be deaccented in postnuclear position and be realised without a pitch movement, and for the theme or rheme to be more closely grouped with other prosodic material surrounding it.

[4] Prominence structure is represented here using the 'binary tree' format (Liberman 1975, Liberman and Prince 1977), in which prominences are represented in terms of binary s(trong) and w(eak) relationships.

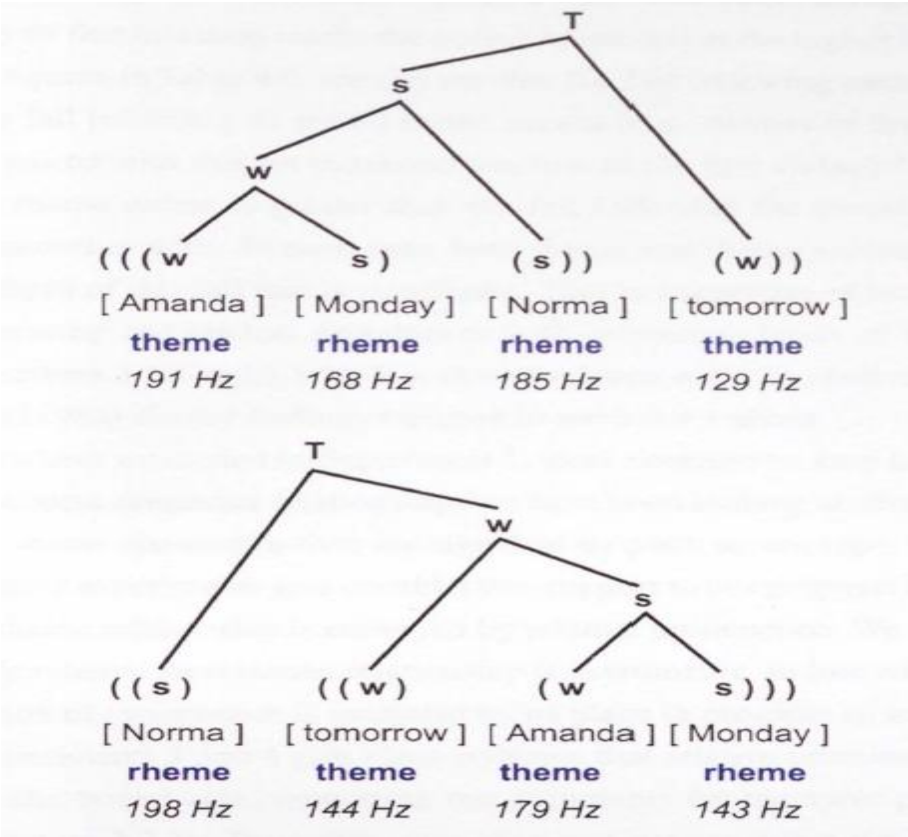

Figure 1: Possible metrical structure showing prominence relationships between thematic and rhematic items with phrasing and average f0 at the accent peak (H) of each item (Calhoun 2007:133)

On the basis of this evidence for a differentiation between theme and rheme within prominence structure, Calhoun (2007) proposes an alternative account of the relationship between focus and sentence accentuation in which focus projects, not via syntactic structure, but instead via metrical structure, from thematic and rhematic nuclear prominences upwards. Figure 2 shows metrical structures for broad and narrow focus. Under the proposed approach, the range of focus readings available in the former case results from projection of focus upwards from the nuclear rhematic node on *Porsche*, either to the level of the immediately dominating s-node, accounting for the VP focus reading, or to the top of the structure, accounting for the sentence-focus reading. Similarly, projection of focus from the nuclear rhematic accent on *Arun* to the top of the structure in the latter case, permitting focus scope over the entire phrase, accounts straightforwardly for examples problematic to Selkirk's (1995) F-marking account of sentence accentuation such as [**40a**] discussed above.

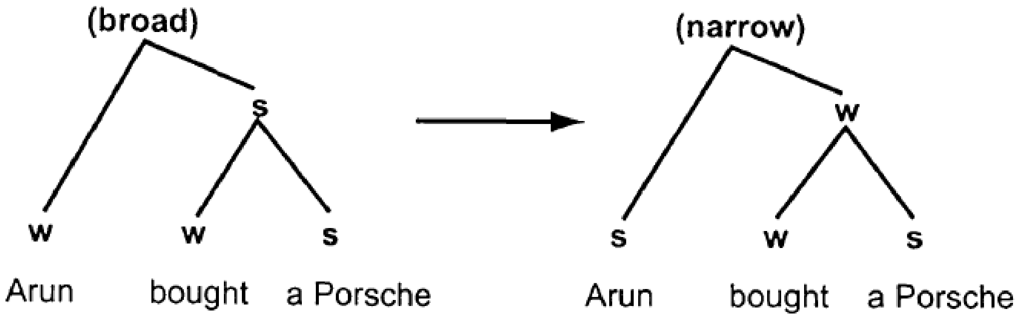

Figure 2: Focus projection via prominence structure (Calhoun 2007:70)

The more complex example in Figure 3, produced in the context in [**80**], further demonstrates the mismatch between prosodic structure and syntactic structure, projection from which would be unable to account for the shared focus status of the second conjoined VP and the direct object of the first (Calhoun 2007:237).

80) A: But see, we don't even push the fact, to the high school kids, that there's other means of education out there rather than college... to go either as an apprentice, which they do in other countries ...
B: Why not APPRENTICE out to a, a COMPANY and learn from down on the BOTTOM?

(Calhoun 2007:235)

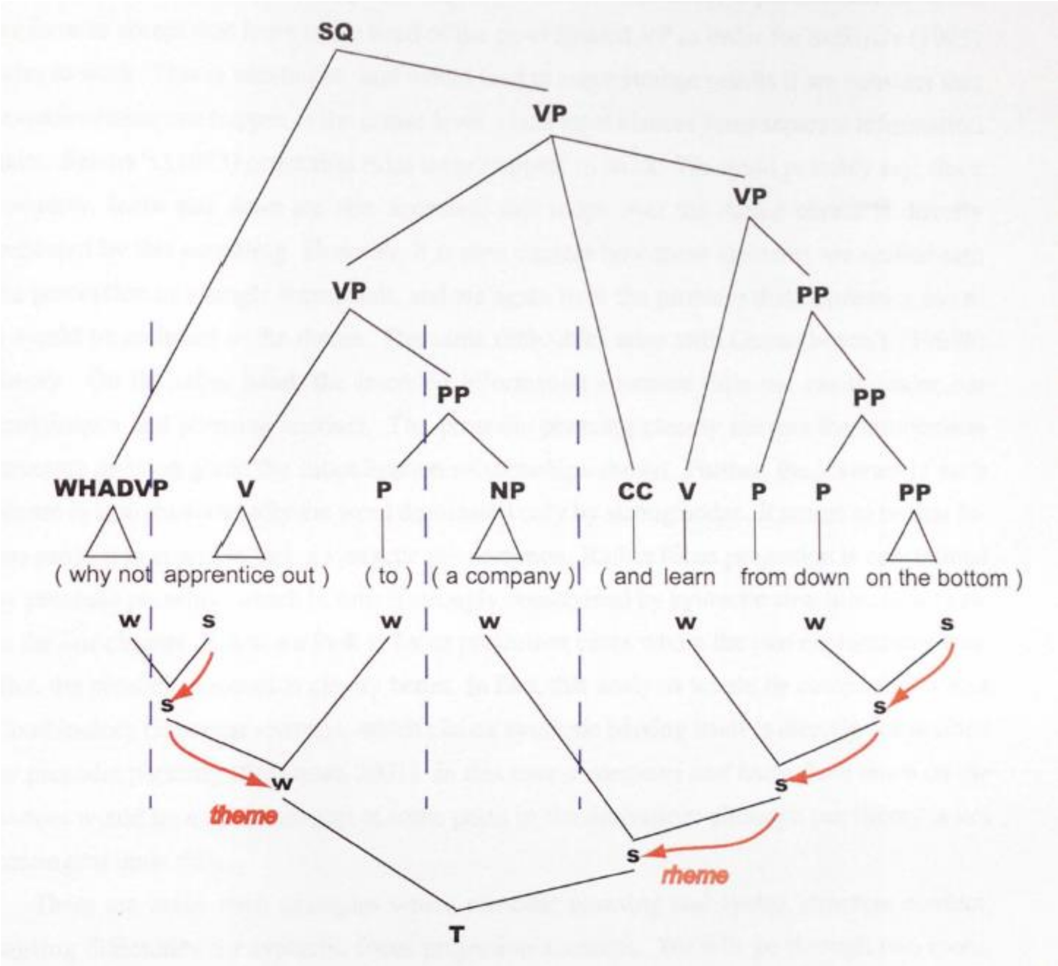

Figure 3: Projection from prosodic structure showing mismatch with syntax (Calhoun 2007:237)

An alternative representation of prominence structure to the binary tree format employed by Calhoun (2007) is the 'phrase head' format employed by Truckenbrodt (1995), Büring (2009) and others. In this format, prominences are represented as the heads, manifested in higher-level phrases in the form of pitch accents or other prosodic features, of prosodic phrases of different sizes As shown in Figure 4, the nuclear sentence stress corresponds to the head of the largest sentence or clause-level Intonational Phrase (IP), whereas smaller sentence-level stresses correspond to the heads of intermediate or prosodic phrases (ips/Pps). Smaller lexical stresses can in turn be represented as the heads of smaller prosodic word (PWd) phrases. Heads here are designated using the + symbol and non-heads using the – symbol.

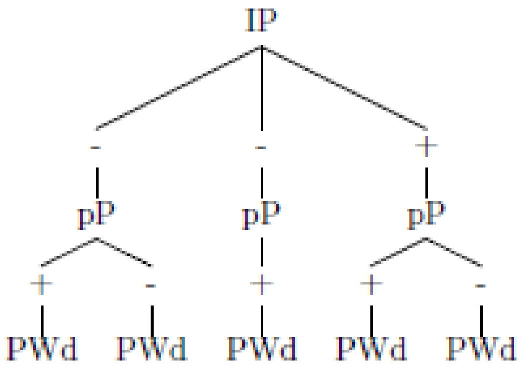

Figure 4: Arrangement of prosodic heads within phrases (Büring 2009:180)

Within this format, the difference in realisation between theme-rheme and rheme-theme orders in English according to Calhoun's analysis can be represented using the equivalent grid-style representation in [**81**] and [**82**]. The phrase break identified between a rhematic and a following thematic accent is consistent with the realisation, shown in [**81**], of the rheme and theme within separate IP phrases, which permits the rheme to be rightmost within the smaller IP phrase and the theme to be realised with a postnuclear accent corresponding to the head of a smaller Pp rather than being deaccented, and realised as the head maximally of a PWd. By contrast, a thematic followed by a rhematic accent is consistent with a realisation, shown in [**82**], within a single IP, of which the final, nuclear accent aligned with the rheme is the head. With the exception of the head of the uppermost IP phrase, the other heads are likewise rightmost within their respective phrases. Within this representation, Calhoun's proposed projection of discourse features via prominence structure can be characterised as progressing via heads of prosodic phrases to the material containing them.

*			IP
*			IP
*		*	pP
*	*	*	PWd

81) $[[[[\text{NORMA's}]_{PWd}]_{pP}]_{IP}[[[[\text{coming}]_{PWd}[\text{TOMORROW}]_{PWd}]_{pP}]_{IP}]_{IP}$

		*	IP
*		*	pP
*	*	*	PWd

82) $[[[\text{NORMA's}]_{PWd}]_{pP}\ [[[\text{coming}]_{PWd}\ [\text{TOMORROW}]_{PWd}]_{pP}]_{IP}$

As discussed above, Calhoun’s (2007) prominence-based projection, like the proposals of Rochemont (2013) and others discussed in the previous section, is posited as a solution to problems faced by Selkirk’s (1995) account of horizontal and vertical syntactic focus projection. The same arguments made in the previous subsection for the elimination of horizontal and vertical focus projection in syntactic phrases can be applied in this case, removing the necessity of projection as an account of the discourse-status of deaccented words. In this case, the proposed projection-free approach to characterising all deaccented words as discourse-active has the advantage of deaccentuation being a more easily perceptible cue than prosodic phrasing, which as Steedman (1991) acknowledges may not divide thematic from rhematic material in all cases. Calhoun’s prominence-structure based differentiation between prenuclear, nuclear and postnuclear accents can instead be captured within an extension of the proposed projection-free account. According to this simplified approach to the relationship between information structure and sentence form, the discourse features of individual words are most consistently signalled by their association with the heads of prosodic phrases. A word aligned with the head of a sentence or clause-level IP phrase, corresponding to the nuclear sentence prominence, is associated with a focal interpretation. By contrast, a word aligned maximally with the head of a small, word-level prosodic phrase PWd, corresponding to a deaccented word, is associated with a discourse-active interpretation. Finally, a word aligned with the head of an intermediate-level ip or pP phrase is marked as discourse-inactive (hence either a discourse-inactive topic or a focus) if prenuclear, or as a discourse-inactive topic if postnuclear. This approach has the benefit of not requiring the discourse-status of non-nuclear accents to be determined by projection from nuclear rhematic and thematic accents within a shared prosodic phrase. Such an account is problematic for examples like [**83**], in which clausal accents are not divided into contiguous thematic and rhematic groups as they are in **Fig. 3**.

83) A: I was just reading about BETTING SHOPS.
B: You know what I heard? A [PRIEST]$_F$ opened a [BETTING SHOP]$_T$ on an [AIRLINER]$_F$.

(Adapted from Allerton 1978:137)

As deaccented predicating expressions may be treated as discourse-active in the same way as deaccented referents, accented predicates may be treated in the same way as accented referents, whether they are aligned with a prenuclear, nuclear or postnuclear prominence.

In this section I have discussed the proposals of Steedman (1991) and Calhoun (2007), which make reference to a richer prosodic structure in characterising the relationship between information structure and sentence form than the accounts considered in the previous section. I have shown that that Calhoun's (2007) finding that thematic and rhematic accents are distinguishable in terms of prominence structure can be combined with the unified characterisation of unaccented items proposed in the previous section to yield an approach according to which the information-structural features of discourse items are most closely reflected by the prosodic phrase heads with which they are associated. This approach, which does not require reference to the projection of information-structural features via prominence structure, is more intuitive and better able to cope with examples of interspersed discourse-inactive topics and foci. In the next section I will show that this novel prominence-based approach compares favourably with an alternative alignment-based one.

2.2.3 Prominence and Alignment

In the previous section I introduced the representation of prosodic prominence structure employed by Büring (2009) (see Figure 4). Büring further specifies that the heads of prosodic phrases to which prominences correspond are constrained to be either leftmost or rightmost within their respective phrases. Such constraints on the alignment of prosodic phrase heads are used to account for cross-linguistic variation in the alignment of focused constituents. As shown in [**84**], the nuclear accent in Italian is obligatory clause-final, both in sentence focus [**84a**] and in subject focus contexts [**84b**], with the result that the focused subject is linearised clause-finally, in violation of Italian's canonical SVO word order. These data are captured by Samek-Lodovici (2005) in the Optimality-Theoretic framework as the effect a constraint STRESS-FOCUS, according to which focus must associate with nuclear sentence stress, in combination with a constraint HEAD-ι-R, according to which the head of the clause-level ι-phrase[5] must align with its right boundary.

84) a) {What happened?}
(Gianni ha RISO$_F$)ι
Gianni have.PRS.3SG laugh.PSTP
'Gianni laughed.'
b) {Who has laughed?}
(Ha riso GIANNI$_F$)ι
c) {Who has laughed?}
??(GIANNIF ha riso)ι

(Féry 2013:694, based on Samek-Lodovici 2005:688)

More recently, Féry (2013) proposes that theories of focus as prominence (FP) of the kind proposed by Truckenbrodt (1995), Büring (2009), Samek-Lodovici (2005) and others can be replaced with a theory of focus as alignment (FA). The FA approach, which is also articulated in the Optimality-Theoretic framework, dispenses with reference to prominence, whether concrete, in the sense of increased duration or intensity, or abstract,

[5] This corresponds to Buering's IP phrase

and claims that focus prosody in a majority of languages discussed can be modelled using the constraints in [**85**], according to which foci themselves must be aligned with the edge of a prosodic boundary[6].

85) ALIGN-FOCUS
   a) ALIGN-FOCUS R, I-PHRASE R (ALIGN-FOC-ι-R):
      Align a focus with the right boundary of an intonation phrase.
   b) ALIGN-FOCUS L, I-PHRASE L (ALIGN-FOC-ι-L):
      Align a focus with the left boundary of an intonation phrase.
   c) ALIGN-FOCUS R, P-PHRASE R (ALIGN-FOC-Φ-R):
      Align a focus with the right boundary of a prosodic phrase.
   d) ALIGN-FOCUS L, P-PHRASE L (ALIGN-FOC-Φ-L):
      Align a focus with the left boundary of a prosodic phrase.

(Féry 2013:691)

In a language like French, for example, which Féry (2013:696) argues does not make use of lexical stress for focus-marking purposes, she argues that focus marking in the structures in [**86**] is instead achieved by alignment of the focus directly with the right edge of an ι-phrase boundary.

86) a) Agent correction (cleft-sentence)
   {{…} does a woman push the car?}
   Non, ((c'est un hommeF)ι (qui pousse la voiture)ι)ι
   no it-is a man who pushes the car
   'No, a man pushes the car.'

   b) Patient new (SVOF)
   {What does the man carry?}
   ((L'homme)Φ (porte une femmeF)Φ)ι
   the-man carries a woman
   'The man carries a woman.'

(Adapted from Féry 2013:697-698)

To capture this system in Optimality-Theoretic terms, Féry (2013) proposes the constraint ALIGNFOC-ι-R, that foci must be aligned with the right boundary of an ι-phrase, together with the constraints CWO (canonical word order) and SUBJECT (adopted from Hamlaoui (2009a,b), that subjects in French are obligatorily realised in sentence-initial position. The

[6] Féry (2013) makes reference in her paper to the intonation phrase (ι) and to the prosodic phrase (Φ), which are equivalent to the intonation phrase (IP) and intermediate phrase (ip) respectively.

optimal candidate [**a**] in Table 2, marked ☞, satisfies both the inviolable constraints SUBJECT and ALIGNFOC-ι-R, violating only the weaker CWO constraint. By contrast, each of the losing candidates [b] and [c] violates one of the inviolable constraints.

Table 2: Proposed constraints for French (Féry 2013:698). Reprinted by permission from Springer Nature, *Natural Language and Linguistic Theory*, Focus as Prosodic Alignment, Caroline Féry, 2013. https://doi.org/10.1007/s11049-013-9195-7

Un homme pousse la voiture (Foc = un homme)	SUBJECT	ALIGN-FOC-ι-R	CWO
a. ☞((C'est un hommeF)ι (qui pousse la voiture)ι)ι			*
b. ((Pousse la voiture)Φ (un homme$_F$)Φ)ι	*!		*
c. ((Un homme)Φ (pousse la voiture)Φ)ι		*!	

Féry (2013) does not discuss the prosodic realisation of other focus structures in French, with the exception of eventive cleft sentences, which she mentions have an alternative realisation within a single ι-phrase (Féry 2013:697). This would presumably be the same 'default' phrasing attributed to [**86b**]. Such a phrasing for this focus structure however involves a violation of the proposed ALIGNFOC-ι-R constraint, as the subject, which is arguably in focus in this structure in addition to the predicate, is not aligned with the right edge of an ι-phrase, but only with the right edge of a Φ-phrase. It could be argued that, in such eventive examples, the entire sentence forms a single focused syntactic constituent which is aligned as per the ALIGNFOC-ι-R constraint. The same phrasing however presumably applies to clearer cases of 'double focus' such as [**87**], in which it is unclear in what respect the subject and verb together form a syntactic constituent which is in focus and which excludes the post-focal adjunct, the right-dislocation and realisation of which in a separate ι-phrase is argued to motivated by the *ALIGNFOC-ι-R* constraint[7].

[7] Note that, if eventive or double focus clefts were alternatively realised within two ι-phrases like their subject-focus counterparts exemplified in [**86a**], it is unclear how the different focus structures would then be formally distinct without reference to prominence in addition to alignment.

87) *The text originally presented here cannot be made freely available via ORA for copyright reasons. The text was sourced at Lambrecht, K. (2010). Constraints on subject-focus mapping in French and English: A contrastive analysis. In C. Breul and E. Göbbel (Eds.),* Comparative and Contrastive Studies of Information Structure*, Linguistik Aktuell/Linguistics Today, vol. 165. 77, p.86.*

In the account proposed by Féry (2013) of alignment of focus to the right of an ι-phrase boundary, we would expect this focus structure to instead have the double ι-phrase realisation attributed to subject focus in [**86a**]; in this case, both foci would be aligned with the right edge of an ι-phrase, as the constraint *ALIGNFOC-ι-R* requires. It does not therefore appear, with reference to examples such as these, that the distribution of prosodic phrasings to focus structures in French can be straightforwardly accounted for in terms of alignment constraints applying directly to information-structural relations. By contrast, reference to alignment constraints on the heads of the prosodic phrases involved permits this distribution to be explained in a straightforward manner: whilst [**86a**] contains a single focus and [**87**] two, in both examples the single nuclear prominence of the sentence, which in [**87**] is associated with the rightmost focus, is aligned with the right boundary of an ι-phrase. This indicates that it is prominences which are subject to alignment constraints, whereas foci are constrained only to associate with prominences.

Féry's (2013) application of 'stress alignment' as proposed by Truckenbrodt (1995) to capture alignment in languages like German, English and Dutch is similarly problematic. Unlike French, in which Féry (2013) claims that prominence does not play a role at all, these 'stress' languages are argued to achieve focus alignment indirectly by deaccenting postnuclear material, so that the head of the ι-phrase, with which the focus is associated, is aligned to the right of its boundary in the sense of bearing the final pitch accent or stress in the phrase (see [**88**]). Féry (2013) proposes a formalisation of this system using the constraints H-ι-R, according to which the head of an ι-phrase must be aligned with its right boundary, and DESTRESS-GIVEN (DG), according to which a postnuclear given phrase is prosodically non-prominent. As shown in Table 3, DESTRESS-GIVEN outranks both H-ι-R and ALIGN-FOC-ι-R.

88) a) {…what is the man kicking?}

x i-phrase
x x p-phrase
x x x word
((Der MANN)φ (tritt einen STUHL)φ)ι.
the man kicks a chair
'The man is kicking a chair.'

b) {…is a woman cutting the watermelon?}

x i-phrase
x p-phrase
x x x word
((Ein MANN)φ (schneidet die Melone)φ)ι.
a man cuts the melon
'A man is cutting the melon.'

(Adapted from Féry 2013:718)

Table 3: Proposed constraints for German (Féry 2013:719). Reprinted by permission from Springer Nature, *Natural Language and Linguistic Theory*, Focus as Prosodic Alignment, Caroline Féry, 2013. https://doi.org/10.1007/s11049-013-9195-7

Ein Mann schneidet die Melone (Focus=ein Mann)	DG	H-ι-R	ALIGN-FOC-ι-R
a. ☞ ((ein MANN)Φ(<schneidet die Melone>)Φ)ι		*	*
b. ((ein MANN)Φ (schneidet die MELONE)Φ)ι	*!		*

As pointed out in the case of French, a problem is posed for the notion of indirect focus alignment by eventive and double focus structures, which are again attributed the same 'default' prosodic phrasing within a single ι-phrase shown in [**88a**] (see for example Féry 2011). In prosodic realisations such as these, the focused subject does not achieve indirect alignment of the kind described above; instead, it is aligned only with the head of a Φ-phrase, and its associated pitch accent blocked from alignment with the right boundary of the ι –phrase by the pitch accent of the subsequent focus, which is aligned with the ι –phrase head. Again as pointed out for French, unlike the two foci, the single nuclear prominence of the sentence is aligned, in this case by deaccenting, in both cases. These data therefore again indicate that prominence alignment accounts better for prosodic phrasing in these languages than direct alignment of information-structural relations.

Even as an account of prominence alignment alone, however, the deaccenting approach proposed by Féry (2013) faces two problematic cases in which additional stresses intervene between the head of an ι –phrase and its right boundary. The first case is exemplified by [**88b**]; here, Féry (2013:718) acknowledges that the lexical stresses following the ι –phrase head constitute a possible exception to the absence of postnuclear accents required in order for the ι –phrase head to be right-aligned. In the second case, of focus structures featuring postnuclear prominent topics, the presence of an intervening stress is more evident. Evidence as to how such focus structures are realised prosodically in English is provided by Calhoun's (2007) findings discussed in the previous section, which are consistent with the representation for postnuclear prominent topic structures repeated in [**89**]. It can be seen that, whilst no stress separates the head of the initial lower IP phrase associated with the focus from its righthand IP phrase boundary, this is not the case for the upper IP phrase, the focus-associated head of which is 'blocked' from stress alignment with its righthand IP boundary by the head of the second lower IP, which is associated with the postnuclear topic.

*			IP
*			IP
*		*	pP
*	*	*	PWd

89) $[[[[\text{NORMA's}]_{\text{PWd}}]_{\text{pP}}]_{\text{IP}}[[[[\text{coming}]_{\text{PWd}}[\text{TOMORROW}]_{\text{PWd}}]_{\text{pP}}]_{\text{IP}}]_{\text{IP}}$

Inspection of the distributions of prominences in these two problematic cases, which are repeated in [**90**], reveals a feature common to both: whilst, in both cases, prominences intervene between the head of an IP phrase and its right boundary, these prominences are also, in both cases, two phrase levels below that of the IP in question.

```
                x                                          IP
                x                                          ip
                x              x              x            pw
90) a) [[Ein MANN]ip [schneidet die Melone]ip)IP.
        A    man         cuts       the  melon
       'A man is cutting the melon.'

           *                                                              IP
           *                                                              IP
           *                                        *                     pP
           *                      *                 *                     PWd
    b) [[[[NORMA's]PWd]pP]IP[[[[coming]PWd[TOMORROW]PWd]pP]IP]IP
```

This common feature indicates that the relationship between focus structures and prosodic phrasing in these languages is best captured, not with a constraint which aligns the IP head with the right boundary of the IP phrase by deaccenting subsequent prominences, as proposed by Féry (2013), but instead with a new, generalised constraint on the permissible configuration of phrasal heads relative to their boundaries. Furthermore, the same constraint can be shown to apply to each of the French examples in [**86**]. As discussed by Féry (2013), French as an alignment language is contrasted with 'stress' languages in being unable to deaccent postnuclear material. This motivates the extraction of postnuclear given material to the right of the VP to mark it as non-focal, as shown in [**91**].

91) a) $(((\text{Marie})_{\phi}$ $(\text{lui donne un gâteau}_{F})_{\phi})_{\iota}$, $(\text{à son frère})_{\phi})_{\iota}$
        Mary   him give   a cake   to her brother
       'Mary gives a cake to her brother.'
    b) $(((\text{Marie})_{\phi}$ $(\text{donne un gâteau}_{F})_{\phi})_{\iota}$, $(\text{à son frère})_{\phi})_{\iota}$

(Adapted fom Féry 2013:699)

The unavailability of postnuclear deaccentuation in French is consistent with the existence of a constraint in French according to which all ip phrases must be headed. As such, the double IP phrasing of the French subject-focus construction in [**86a**] can be motivated in the same way as the double IP phrasing of the English postnuclear prominent topic construction in [**90b**]; the lower IP head associated with the focussed subject must be aligned with its right boundary, in order to prevent any obligatory ip head associated with the postnuclear material from intervening between the two, as shown in [**92**].

*			IP
*			IP
*		*	ip
*	*	*	AP

92) [[[[C'est l'HOMME]$_{AP}$]$_{ip}$]$_{IP}$ [[[qui pousse]$_{AP}$ [la voiture]$_{AP}$]$_{ip}$]$_{IP}$]$_{IP}$

This obligatory ip head alignment may motivate the use of the resumptive pronoun in examples like [**91a**], which Féry (2013) points out marks the extraposed indirect as an anti-topic or tail in the sense of Vallduví (1992), as opposed to an afterthought, which is its interpretation in [**91b**].

The constraint identified in the French, English and German data above with respect to the configuration of heads at the right edge of prosodic phrases can be seen in other data to apply also at the left edge of prosodic phrases. As discussed by Büring (2009), Japanese ip phrases are left-headed, whereas post-focal deaccenting and dephrasing indicates that IPs in the language are right-headed, as shown in [**93**].

93) (Náoko wá)$_{ip}$ (nichiyóobi)$_{ip}$ (Nágoya dé)$_{ip}$ (Mári ní)$_{ip}$ (átta)$_{ip}$
Naoko top Sunday Nagoya at Mary with met
'Naoko met with Mary in Nagoya on Sunday.'

a) (Náoko wá)$_{ip}$ (nichiyóobi)$_{ip}$ (Nágoya dé)$_{ip}$ (Mári ní)$_{ip}$ (átta$_F$)$_{ip}$
b) (Náoko wá)$_{ip}$ (nichiyóobi)$_{ip}$ (Nágoya dé)$_{ip}$ (Mári$_F$ ní átta)$_{ip}$
c) (Náoko wá)$_{ip}$ (nichiyóobi)$_{ip}$ (Nágoya$_F$ dé Mári ní átta)$_{ip}$
d) (Náoko wá)$_{ip}$ (nichiyóobi$_F$ Nágoya dé Mári ní átta)$_{ip}$
e) (Náoko$_F$ wá$_{ip}$ nichiyóobi Nágoya dé Mári ní átta)$_{ip}$

(Adapted from Büring 2009:187; from Nagahara 1994:49)

In a prominence-structural representation of these Japanese data, as shown for example for [**93c**] in [**94**], it can be seen that no additional ip heads occur between the focus-aligned IP head and its right boundary, as consistent with the right-boundary configuration constraint identified above, whereas no additional material occurs between ip heads and their left boundaries, as consistent with the operation of such a constraint at the left boundary. In addition, the lack of additional ip phrases to the right of the IP head is consistent with the operation in Japanese of the same constraint identified in the French data above, according to which all ip phrases must be headed.

		*			IP
*	*	*	-	-	ip

94) [[Náoko wá]$_{ip}$ [nichiyóobi]$_{ip}$ [Nágoya$_{F}$ dé Mári ní átta]$_{ip}$]$_{IP}$

The operation of the same constraint with respect to the left boundary of PWd phrases in English is indicated by discussion in Dalrymple and Mycock (2011) of analyses such as Lahiri and Plank (2010), according to which phonological phrasing in English and other Germanic is arranged on rhythmic grounds and does not correspond to the boundaries of syntactic words. This contrasts with the phrasing analyses of English and German considered in the previous examples, in which words are realised within individual PWd phrases and ip and IP boundaries aligned to their left or right. An example of this lack of isomorphism between syntax and phonological phrasing is provided in [**95**].

95) ‘Anna was studying at the university.’

(IntP (PhP (PW 'æ.nə.wəz.)) (PhP (PW 'stʌ.di.ɪŋ.ət.də.ju.nə.)) (PhP (PW 'vɜː.sə.ti)))

(Dalrymple and Mycock 2011:180)

Whereas, in the examples considered above, PWd phrase heads do not demonstrate any particular restriction with respect to the PWd phrase boundaries with which they are aligned, in [**95**] they appear to show strict left-headedness, as illustrated in [**96**]. This can be accounted for as the effect of the same prominence-configurational constraint at the left boundary of prosodic words, which prevents the heads of syllables on the next phrasing level down from intervening between the heads of prosodic words and their left boundaries. It can be posited that this constraint is overridden by an additional constraint which, in careful speech, ensures that the boundaries of prosodic and syntactic words correspond; Dalrymple and Mycock (2011) posit the existence of such a constraint in their own proposals, which I will discuss further in chapter 6.

96)

```
(IntP)                                                                        *
(PhP)         *                       *                                       *
(PW)          *                       *                                       *
(syll)        *  *  *                 * * * *  * * *                          *  *  *
(IntP (PhP (PWd 'æ.nə.wəz. ) ) (PhP (PWd 'stʌ.di.ɪŋ.ət.də.ju.nə. ) ) (PhP (PWd 'vɜː.sə.ti )))
```

Another language argued by Féry (2013) to be captured better by her focus-as-alignment approach than by focus-as-prominence approaches is Nłeʔkepmxcin (Thompson River Salish). Koch (2008a,b) finds that, whereas all-new and VP focus sentences are realised with a canonical VSO word order, in which the sentence-final nuclear prominence is aligned with the object, narrowly focused arguments are in a large majority of cases realised in nominal predicate and cleft constructions, in which they are linearised at or close to the left edge of the sentence, whilst the nuclear prominence remains sentence-final; no deaccenting effect is found. Koch proposes that the prosodic realisation of focus in Nłeʔkepmxcin is achieved, not by aligning the focused constituent with the head of an IP phrase, but instead by aligning the phonological phrase (corresponding to an ip phrase) containing the focus with the left boundary of an IP phrase. In [**97**], the nuclear IP head is associated, not with the focused subject, but with the rightmost accentable item in the sentence; this is the verb, which in this context is part of the presupposition. The focus, is aligned in a cleft construction in a separate p-phrase to the left of the p-phrase with which the nuclear prominence is associated (Koch 2008a,b). Whilst [**97**] conforms to the identified constraint on prominence configurations, therefore, it is problematic for my proposed prominence-based account of information-structural features, according to which items associated with the IP head are in focus and discourse-active items are not associated with IP or ip heads. As Féry (2013) argues, the dissociation of focus from nuclear prominence in examples like these supports her proposed FA theory of focus prosody.

(x) (x) i-phrase

(x) (x) (x) p-phrase

97) Téʔə. c̓é [ɬ Róss]$_{FOC}$ e pínt-ə-t-Ø-mus.
no. CLEFT DET Ross DET paint-DRV-TR-3O-SUBJ.EXTR
'No, it was [Ross]$_{FOC}$ that painted it.'

(Koch 2008b:251)

Although examples like [**97**] constitute an exception to the association of focus with nuclear prominence, Koch (2008b) does not conclusively show that the data he discusses are better accounted for by his alignment-based model than by a prominence-based model of the kind that I have proposed in this thesis. As shown in [**97**], although the focused subject is not aligned with the head of an IP phrase, it is nonetheless aligned with a prominence in the form of a p-phrase head. Furthermore, Koch's left-alignment model fails to account for those cases he reports in his data in which narrow focus is not realised with a nominal predicate or a cleft construction, but with a canonical construction; this includes a sizeable minority (20.4%) of narrow object focus constructions realised in this way (Koch 2008b:76). Koch reports that in the case of narrow verb focus, which cannot be realised with a nominal predicate or cleft construction, subject and object were often elided and the verb realised in sentence-final position, as for example in [**98**]. Whereas these data cannot be accounted for under Koch's (2008b) proposed left-alignment account, the prominence account of the kind proposed in this thesis is compatible both with these and with those realisations in which the narrow focus is not sentence-final.

98) a) Ké-s-t-Ø-s ƛ̓əm̓ xéʔe
what.happen-CAUS-TR-3O-3TS PERF DEM
e s-cwú-s, ne s-páq^{w}.
DET NOM-work-3SG.POSS, in.DET NOM-watch
'What did he do with the work (he did) in the book?'

b) wʔéx nke ƛ̓uʔ xeʔ neʔ [k̓^{w}én̓-Ø-Ø-es]$_{FOC}$.
PROG EVID PERs DEM there look.at-TR-3O-3TS
'He was just [looking at]$_{FOC}$ it.'

(Koch 2008b:71)

In addition, the canonical, VSO-order constructions used to realise VP and CP-focus, such as [**99**], are likewise problematic for the left-alignment account, insofar as the entire focus is not contained within the left-aligned phonological phrase. A prominence-based account of focus realisation, under which the object occupies the default position for prominence in canonical word order because it is the default focus of the sentence, can again account for these.

(x) i-ph
(x) (x) (x) p-ph
(x) (x) (x) cl-gp

99) [kən-t-Ø-és xeʔ e skíxzeʔ-kt e <u>sínciʔ</u>-kt]$_{FOC}$
Help-TRANS-3O-3TS DEM DET mother-1PL.POSS DET brother-1PL.PS
'[Our mother helped our <u>brother</u>]$_{FOC}$.'

(Koch 2008b:197)

On this basis, it can be argued that the Nłeʔkepmxcin data demonstrate greater compatibility with the proposed prominence-based account than with Koch's (2008a,b) proposed left-alignment account, and that the nominal predicate and cleft-constructions, in which the focus is aligned with the head of an intermediate phonological phrase rather than with the head of the major intonational phrase, are better accounted for as special syntactic strategies of marking narrow focus[8] in which the normal strategy of alignment with the IP head is overridden. Such constructions may be motivated by the lack of availability of deaccentuation as a strategy in the language, which is also consistent with the elision of arguments in examples like [**98**]. This rigid distribution of prominces can be accounted for as the result of a constraint, according to which all IP phrases in Nłeʔkepmxcin must be headed; in combination with the constraint identified on prominence configuration, this has the result that a similar 'double-IP' strategy to that observed in French, in which I argued that all ip phrases must be headed, is unavailable.

Whilst the cross-linguistic data dicussed in this section support both the proposed prominence-based approach to the expression of information-structural features and an additional constraint identified on permissible configurations of prominences with respect to phrase boundaries, more cross-linguistic data from a wider range of focus structures are required to establish the extent of its applicability.

In this section I have compared the prominence-based approach to the relationship between information structure and sentence form proposed in this chapter with Féry's (2013) alternative focus-as-alignment approach. Showing that the distribution of prosodic phrasing to focus structures in the data discussed is better accounted for under a prominence-based approach in both stress and alignment languages, and that existing prominence-as-alignment approaches likewise face problematic examples in which additional prominences intervene between focus-associated phrase heads and their prosodic boundaries, I showed that data from both types of language can be better accounted for with constraints on the configuration of phrase heads with respect to their boundaries such that any head intervening between a phrase head and its respective

[8] Whilst Koch (2008a) does not find that these constructions mark any additional features such as identificationality, this does not exclude the possibility that their role is to distinguish narrow from broader focus.

boundary must be at least two phrasing levels beneath the head in question. In chapters 4 and 5 I will show that Georgian prosodic phrasing data conforms to these constraints, both in existing studies and in my own, and present articulations of them in the OT and LFG frameworks in chapters 5 and 6, which I apply both to Georgian and to some of the other languages discussed here.

2.2.4 Summary and Conclusions

In this chapter I have introduced the information-structural notions focus, topic, discourse-active and discourse-inactive as defined by Lambrecht (1994), and considered the question of in what aspects of sentence form these are most closely reflected. In *2.2.1* I considered proposals, including those of Lambrecht (1994), Selkirk (1995) and Rochemont (2013), which attribute the marking of such features on discourse items to their membership of larger accented or unaccented syntactic constituents above the word level, which are themselves characterised according to these features. Observing that these and similar proposals invoke a notion of pragmatic accommodation to account for the deaccenting of discourse items in certain cases, I argued that such an account can be extended to permit all deaccented discourse items to be treated as discourse-active, thereby eliminating the need for reference to a mechanism of horizontal focus projection within syntactic phrases. I then argued, on the basis of cross-linguistic variation in phrase-structure and phrase-structural constraints, and discontinuous constituency constructions, that reference to a mechanism of vertical focus projection to syntactic domains above the word level can be replaced with a mechanism of non-syntactic vertical projection to propositional components.

In *2.2.2* I then considered accounts of the relationship between information structure and sentence accents which assume a richer prosodic structure. Here I argued that Calhoun's (2007) differentiation between thematic and rhematic accents in terms of prominence structure can be combined with the proposals from the previous section to yield a prominence-based approach to the relationship between information structure and sentence form, according to which the discourse attributes of discourse items are most closely reflected in their association with the heads of prosodic phrases. According to this approach, discourse items associated maximally with the head of an IP phrase are associated with focus, those associated maximally with the head of an ip phrase are associated with discourse-inactiveness and those associated maximally with the head of a word-level PWd phrase are associated with discourse-activeness. Finally in *2.2.3*, I showed that the proposed prominence-based approach is preferable to alternative approaches based on the alignment of discourse items with the boundaries of prosodic phrases, and showed that data from both 'stress' and 'alignment' languages conform to an alternative constraint on the configuration of prosodic heads. I concluded that more cross-linguistic data on the prosodic realisation of a wider range of discourse structures are required to confirm the further applicability of these proposals.

In chapters 3, 4 and 5 I will show that data on the syntactic and prosodic realisation of information structure in Georgian are compatible with the prominence-based approach proposed here. In chapters 5 and 6 I will present formal models of the proposed approach for Georgian and other languages discussed in this chapter in the Optimality-Theoretic and Lexical-Functional Grammar framework.

3. Georgian: Syntax

In the previous chapter I introduced the proposition-based categories of information structure proposed by Lambrecht (1994) and, in particular, the pragmatic relations topic and focus and the activation states discourse-active and discourse-inactive. Considering the question of what aspects of sentence form express these categories the most closely and consistently, I concluded that, in the absence of further disambiguating features from other levels of structure, it is reference to the heads of prosodic phrases with which discourse items are associated, rather than to their membership of larger prosodic or syntactic phrases, or the prosodic boundaries with which they are aligned, which provides the most direct cue as to their information-structural status. Furthermore, I concluded that cross-linguistic variation in the linearisation of discourse features can be explained largely in terms of constraints on the linearisation of these heads.

In the present chapter I turn to the relationship between syntax and information structure in Georgian. I begin in *3.1* by introducing Georgian's relative configurational freedom and its ability to drop multiple arguments. These features, together with evidence from Wier (2014) that Georgian lacks a verb phrase and has a 'flat' phrase structure, in addition to examples of discontinuous constituency constructions, provide additional support for the arguments made in the previous chapter against the necessity of reference to syntactic focus domains above the word level. I then turn in *3.2* to studies of the influence of information structure on syntax. I first introduce several recent models of this interaction, which are articulated in the Minimalist and Lexical Functional Grammar syntactic frameworks and in the Optimality-Theoretic framework. As I subsequently discuss, these models, which make differing predictions, reflect evidence from the available literature to varying extents, and in some cases are inconsistent with it. I identify three aspects of this relationship in particular with respect to which the proposed models require modification; these are the linearisation of preverbal and postverbal foci, the linearisation of given and topical arguments, and verb-initial constructions, which have received less attention in the recent literature. The data show that, whilst information structure influences word order in a number of respects, syntax is responsible for disambiguating discourse features only to a limited extent.

3.1 Grammatical and Dominant Linearisations

Georgian is widely characterised in the literature as exhibiting a great deal of freedom with respect to word order (see Harris (1981), Hewitt (1995) *inter alia*). With some exceptions, all linearisations of major sentential constituents are considered grammatical; this freedom is illustrated by Ḳvačadze (1988), who lists as grammatical the full range of possible argument and verb linearisations for the ditransitive sentence in [**1**].

1) a) (S-IO-DO-V) vano-m deda-s çeril-i misçera.
Vano-NARR mother-DAT letter-NOM write.AOR.3SG
'Vano wrote a letter to (his) mother.'
b) (S-IO-V-DO) vanom dedas misçera çerili.
c) (S-DO-V-IO) vanom çerili misçera dedas.
d) (S-DO-IO-V) vanom çerili dedas misçera.
e) (S-V-IO-DO) vanom misçera dedas çerili.
f) (S-V-DO-IO) vanom misçera çerili dedas.
g) (IO-S-V-DO) dedas vanom misçera çerili.
h) (IO-S-DO-V) dedas vanom çerili misçera.
i) (IO-DO-V-S) dedas çerili misçera vanom.
j) (IO-DO-S-V) dedas çerili vanom misçera.
k) (IO-V-S-DO) dedas misçera vanom çerili.
l) (IO-V-DO-S) dedas misçera çerili vanom.
m) (DO-V-IO-S) çerili misçera dedas vanom.
n) (DO-V-S-IO) çerili misçera vanom dedas.
o) (DO-S-IO-V) çerili vanom dedas misçera
p) (DO-S-V-IO) çerili vanom misçera dedas.
q) (DO-IO-V-S) çerili dedas misçera vanom.
r) (DO-IO-S-V) çerili dedas vanom misçera.
s) (V-IO-S-DO) misçera dedas vanom çerili.
t) (V-IO-DO-S) misçera dedas çerili vanom.
u) (V-S-IO-DO) misçera çerili dedas vanom.
v) (V-S-DO-IO) misçera vanom çerili dedas.
w) (V-DO-S-IO) misçera çerili vanom dedas.
x) (V-DO-IO-S) misçera çerili dedas vanom.

(Adapted from Ḳvač̣adze 1988:223-224)

This freedom is attributed to the role of case in marking grammatical relations (Ḳvač̣adze 1988, Skopeteas et al. 2009b). A distinction in case between the subject of the verb and its objects is maintained within each of three casemarking patterns in Georgian, as distinguished by Harris (1981) in Table 4. As shown in Table 5, the pattern employed varies between Georgian's four verb classes (see Table 6) and between its three series, each of which consists of a number of screeves[9] into which verb forms are grouped according to their temporal, aspectual and modal (TAM) properties (see Table 7).

[9] From the Georgian *mçḳrivi* (row)

Table 4: Casemarking patterns in Georgian (Adapted from Harris 1981:1)

		Subject	Direct Object	Indirect Object
Pattern	A	NARRATIVE	NOMINATIVE	DATIVE
	B	NOMINATIVE	DATIVE	DATIVE
	C	DATIVE	NOMINATIVE	OBLIQUE

Table 5: Casemarking patterns by verb class and series (Harris 1981:2)

		Series	I	II	III
Class	1		B	A	C
	2		B	B	B
	3		B	A	C
	4		C	C	C

Table 6: Verb classes defined by Harris 1981 (as summarised by Amiridze 2006:33)[10]

	Future/Aorist	$S3_{SG}$ (Future)	$S3_{PL}$ (Future)	$S3_{PL}$(Aorist)
Class 1	preverb	-s	-en	-es
Class 2	preverb/e-	-a	-an	-nen
Class 3	i- -eb	-s	-en	-s
Class 4	e-	-a	-	-

Table 7: Screeves of Georgian, adapted from Amiridze 2006:13)

Series	Sub-series	Screeve
I	Present	Present Indicative
		Imperfect Indicative
		Present Subjunctive
	Future	Future Indicative
		Conditional
		Future Subjunctive
II		Aorist Indicative (or Simple Past)
		Aorist Subjunctive (or Optative)
III		Perfect
		Pluperfect
		IIIrd Subjunctive

[10] Harris (1981) defines verb classes 1, 2, 3 and 4 in strictly morphological terms. An alternative classification is made by Hewitt (1985), who uses different syntactic and morphological criteria, into the classes transitive, intransitive, medial, indirect and stative.

Explanations proposed in the literature for the distribution of casemarking patterns across verb class and series vary. A more traditional view is that Georgian is an ergative or split-ergative language (see for example Hewitt 1987); According to this view, verb forms in the first series reflect a nominative/accusative alignment, in which subjects are distinguished from direct objects, whereas verb forms in the second and third series reflect an ergative alignment, in which transitive subjects are distinguished both from unergative and from unaccusative intransitive subjects and from objects. An alternative view, which has gained more support recently, is that Georgian is instead a split nominative/active language. Amiridze (2006) argues that ergative alignment is not used in any of the 3 series. Instead, casemarking in series 1 follows a nominative alignment, in which (di)transitive objects are distinguished from (di)transitive, unaccusative and unergative subjects, whereas casemarking in series 2 and 3 follows an active alignment (Klimov 1973, 1977, 1979), in which both (di)transitive and unergative subjects are distinguished from (di)transitive objects and from unaccusative subjects; this difference is shown in [**2**], [**3**] and [**4**].

2) a) ḳac-i ḳlavs datv-s. (class 1)
man-NOM kill.PRS.3SG bear-DAT
'The man is killing the bear.'
b) ḳac-i q̣viris. (class 3)
man-NOM shout.PRS.3SG
'The man is shouting.'
c) ḳac-i ḳvdeba. (class 2)
man-NOM die.PRS.3SG
'This man is dying.'

(Adapted from Amiridze 2006:27)

3) a) ḳac-ma moḳla datv-i. (class 1, (di)transitive subject)
man-NARR kill.AOR.3SG bear-NOM
'The man killed the bear.'
b) ḳac-ma iq̣vira. (class 3, unergative subject)
man-NARR shout.AOR.3SG
'The man shouted.'
c) ḳac-i moḳvda. (class 2, unaccusative subject)
man-NOM die.AOR.3SG
'The man died.'

(Adapted from Amiridze 2006:28)

4) a) ḳac-s mouḳlavs datv-i.
man-DAT kill.PRF.3SG bear-NOM
'The man has (apparently) killed the bear.'
b) ḳac-s uq̣viria.
man-DAT shout.PRF.3SG
'The man has (apparently) shouted.'
c) ḳac-i momḳvdara.
man-NOM die.PRF.3SG
'The man has (apparently) died.'

(Amiridze 2006:29)

Amiridze argues that alignment in verbal agreement marking likewise corresponds to a split nominative/active rather than a split-ergative system. In this case, marking shows a nominative alignment in series 1 and 2, in which subjects of all kinds are marked on the verb with set A affixes and transitive objects set B affixes, and an active alignment in series 3, in which transitive and unaccusative subjects are marked on the verb with set B affixes and transitive objects and unaccusative subjects are marked with set A affixes; these patterns are shown in Table 8.

Table 8: Agreement marking patterns (Amiridze 2006:30)

Verb Type	Series I	Series II	Series III
Transitive	S_A DO_B	S_A DO_B	S_B DO_A
Unergative	S_A	S_A	S_B
Unaccusative	S_A	S_A	S_B

The verb's agreement affixes permit its arguments to be identified from sentence form to some extent[11] in cases of prodrop; according to the Law of Unemphatic Pronoun Drop proposed by Harris (1981:33), first, second and third person independent personal pronouns are dropped unless they are either emphatic or non-terms. Some of the prodrop possibilities in Georgian are illustrated in [**5**]. I will return to the issue of prodrop in *3.2.2.2*, where I argue that dropping is optional, but not obligatory, for discourse-active arguments; this is reflected in the Lexical-Functional Grammar model of Georgian presented in chapter 6.

5) a) vano-m deda-s c̣eril-i misc̣era.
Vano-NARR mother-DAT letter-NOM write.AOR.3SG
'Vano wrote a letter to (his) mother.'
b) dedas c̣erili misc̣era.
'(He) wrote a letter to (his) mother.'
c) c̣erili misc̣era.
'(He) wrote a letter (to her).
d) misc̣era.
'(He) wrote (it) to (her).'
e) vanom misc̣era.
'Vano wrote (it) to her.'

As with the Polish examples discussed in the previous chapter, the prodrop constructions shown in [**5**] support the argument that the obligatory presence of unfocused material in responses to constituent questions in English need not reflect, at least in the case of the verb phrase, the status of this cross-linguistically as that syntactic domain by which predicates as propositional categories are expressed. In what follows I will consider evidence discussed in the literature as to the existence of a VP in Georgian, which indicates that the language does not possess such a phrase and instead has a 'flat' phrase structure with respect to the verb and its arguments. This provides additional support for the arguments made against the necessity of reference to the vertical projection of discourse features within syntactic phrases.

[11] As discussed for example by Hewitt (1995), affix combinations permit dropped arguments to be unambiguously identified only in a limited number of cases.

A small number of exceptions to the freedom of argument linearisation in Georgian are identified in the literature, some of which show constraints on clausal organisation consistent with the existence of a verb phrase. The first of these is the linearisation of question constituents, which, as shown in [**6**], must appear left-adjacent to the finite verb that governs them[12].

6) a) sad çavida nino-0?
where go:AOR:3SG Nino-NOM
'Where did Nino go?'
b) nino sad çavida?
c) *sad nino çavida?
d) *çavida nino sad?

(Harris 1984:71)

Any question constituents for terms must appear in the order S-IO-DO; as shown in [**7**] and [**8**], alternative orders are available only in the case of echo-questions.

7) a) vin-0 vi-s eẓebs?
who-NOM who-ACC look.for.PRS.3SG
'Who is looking for who?'
b) *vis vin eẓebs?
c) vis vin eẓebs? (echo-reading)
'About whom you are talking that who is looking for him/her?'

(Adapted from Amiridze 2006:64)

8) a) šen vi-s romel-i çign-i gaugzavne?
you who-DAT which-NOM book-NOM send.AOR.2SG
'Who did you send which book?'
b) *šen romeli çigni vis gaugzavne?
c) šen romeli çigni vis gaugzavne? (echo-reading)

(Adapted from Amiridze 2006:65)

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[12] An exception to the constraint on wh-constituents is *raṭom* 'why', which may also appear grammatically in other preverbal positions:

raṭom vano-m mtel-i barg-i tviton unda miiṭanos?
why Vano-NARR whole-NOM baggage-NOM EMPH modal carry:OPT:3SG
'Why should Vano carry all the baggage himself?'

(Harris 1984:72)

The negative particle ar(a) must immediately precede the finite verb[13], and follows any preverbal question constituents, as shown in [**9**]. A negative pronoun must do the same, unless the negative particle is also present, in which case the negative pronoun may also follow the verb, as shown in [**10**].

9) a) vi-n ar tamašobs?
who-NOM NEG play.PRS.3SG
'Who isn't playing?'
b) *ar vin tamašobs?

10) a) eg aravin ar icis.
that nobody NEG know.PRS.3SG
'Nobody knows that.'
b) eg ar icis aravin.

Skopeteas *et al.* (2009b) state that negative pronouns occurring together must likewise appear in the order S-IO-DO (see [**11**] and [**12**]). They claim the same of parallel constructions such as those involving indefinite quantifiers, their schema for which is shown in [**15**].

11) a) aravi-n aravi-s dač̣ris
nobody-NOM nobody-DAT cut.PRS.3SG
'Nobody will wound anybody.'
b) ??aravis aravin dač̣ris.

12) a) aravi-s araper-s ačukeb.
nobody-DAT nothing-DAT give.PRS.2SG
'You give nothing to nobody.'
b) ??arapers aravis ačukeb.

13) viġaca viġaca-s V
'somebody.NOM somebody-DAT V

(Adapted from Skopeteas *et al.* 2009b:195)

[13] When the negative particle negates a single word or phrase it may precede it:

ara merab-i, aramed irak'li c̣avida ameriḳa=ši
NEG Merab-NOM rather Irakli.NOM go.AOR.3SG America=in
'It was not Merab, but Irakli, who went to America.'

(Adapted from Harris 2002:237)

According to Skopeteas *et al.* (2009b), the linearisation constraints identified on wh-constituents, negative pronouns and indefinite quantifiers, which they describe as being incompatible with topicalisation, reflect the embeddedness of Georgian phrase structure, with the direct object as the most embedded constituent surfacing closest to the verb. The same ordering features in what Harris (1984) characterises as the most natural and frequent linearisation of constituents in relation to one another, shown in [**14**].

14) SUBJ - IND OBJ - Time/Place ADV - DIR OBJ - Manner ADV - VERB

(Harris 1984:67)

Several corpus studies find that subject-initial linearisations are the most frequent and verb-final orders are the most common. Of these, the most extensive is Apridonidze's (1981) study of more than 30,000 sentences from literary and scientific texts (including translations) dating from the second half of the 19th century to her time of writing. Grammatical linearisations of the simple sentence ranked by frequency in Table 9 below provide confirmation for the dominance of both subject-initial and verb-final linearisations, in addition indicating the comparative rareness of verb-initial linearisations.

Table 9: Frequencies of 3-constituent sentences. Adapted from Apridonidze (1986:57)

Linearisation Type	Number in Corpus (Total 2,169)
SOV	1,010
SVO	626
OSV	277
OVS	184
VOS	52
VSO	20

It can further be noted from Table 9 that the same statistical preference for preverbal to postverbal object position applies to the subject in object-initial sentences. This pattern is in agreement with Ḳvač̣adze's (1988:222) description of SOV, SVO and OSV linearisations as ‘normal’ but OVS, VOS and VSO linearisations as rarely occurring. The same patterns are in evidence in the data for ditransitive sentences; Table 10 reveals the same pattern of subject-initial linearisations being the most frequent and verb-initial orders the least frequent[14]. The data in addition indicate the same preference for the preverbal to postverbal ordering of the direct object.

Table 10: Frequencies of ditransitive linearisations. Adapted from Apridonidze (1981:62)

(Total 448)					
SDVI	112	IDVS	17	IVSD	4
SIDV	110	DVSI	10	DISV	3
SIVD	38	DSVI	9	IDSV	3
SVID	35	ISVD	9	DIVS	2
ISDV	34	DSIV	8	VDIS	1
SDIV	22	DVIS	5	VSDI	1
SVDI	20	VSID	4	IVDS	1

The same patterns of dominant subject-initiality, verb-finality and rare verb-initiality in written Georgian are revealed in a smaller corpus study conducted by Pochxua (1962), who is concerned primarily with the questions of subject-initiality and of whether Georgian is a verb-final language. In order to avoid the contextual influence of preceding or following sentences, Pochxua (1962:109) concentrates his investigation on isolated sentences taken from children’s primers, although he also compares these findings with selections from fables and from contemporary scientific texts. Pochxua (1962) again finds subject-initiality in the overwhelming majority of cases, and verb-finality in 65% of the sentences he examines overall, although he finds this to be marginally less frequent in collections of fables. Vogt (1971) undertakes a yet smaller study based on selections from a work of prose and a collection of folk tales. His data again reveal subject-initiality in the overwhelming majority of sentences. With respect to the relative ordering of direct object

[14] Three of the logically possible verb-initial linearisations (VDSI, VISD and VIDS) are absent from the data set.

and verb, on the other hand, the selections from the prose text and from the collection of folk tales revealed different patterns. In the selection from the prose text, SOV order featured in three quarters of sentences and SVO order in only a sixth. In the selection from the collection of folk tales, on the other hand, preverbal and postverbal objects were found to occur with approximately the same frequency (Vogt 1971:223). Verb-initial sentences were again the least frequently attested sentence type.

Further to the findings of the corpus studies discussed that OV order is more frequent than VO order in Georgian, Harris (2000) points out that Georgian shares a number of linearisation patterns with other OV languages, including postpositions and preposed genitives. On the basis of these shared patterns, she argues that Georgian is in a state of transition from basic VO order in Old Georgian to OV order.

Arguing that the evidence of the kind discussed above is insufficient, Wier (2014) applies to Georgian a number of tests often used in the syntactic literature as a means of establishing whether or not languages exhibit subject/object asymmetries indicating the existence of a verb phrase. The first of these is the possibility of moving or displacing a verb phrase constituent. Wier finds that, even in the case of participial constructions like [**15**], all constituents show free mobility with respect to one another, as indicative of the absence of a verb phrase and a ‘flat’ organisation for the Georgian clause.

15) a) ivane-s akvs ċign-i ċaḳitxuli.
Ivane-DAT have.PRS.3SG book-NOM read.PFPT
'Ivane has read the book.'
b) ivanes aqvs ċaḳitxuli ċigni.
c) ċigni ivanes akvs ċaḳitxuli.
d) ivanes ċaḳitxuli akvs ċigni.
e) ivanes ċigni ċaḳitxuli akvs.
f) akvs ċaḳitxuli ivanes ċigni.
g) akvs ċaḳitxuli ċigni ivanes.
h) akvs ivanes ċaḳitxuli ċigni.
i) akvs ċigni ċaḳitxuli ivanes.
j) ? ċaḳitxuli ivanes akvs ċigni.
k) ċaḳitxuli akvs ivanes ċigni.
l) ċigni ivanes ċaḳitxuli akvs.
m) ċigni ċaḳitxuli akvs ivanes.

(Adapted from Wier 2014:42)

This he contrasts with the inability of material to scramble beyond clause boundaries; this is shown in [**16**], which features the modal auxiliary *unda* 'want'[15], which subcategorises for a CP argument.

16) a) ivane-s unda ċign-i iḳitxos.
Ivane-DAT want book-NOM read.AOR.OPT.3SG
'Ivane wants to read the book.'
b) ivanes unda iḳitxos ċigni.
c) ?ivanes ċigni iḳitxos unda.
d) ??/*ivanes iḳitxos unda ċigni.
e) ??/*ċigni ivanes unda iḳitxos.
f) *unda iḳitxos ivanes ċigni.
g) *unda iḳitxos ċigni ivanes.
h) ??/* unda ivanes iḳitxos ċigni.
i) ??/* unda ċigni iḳitxos ivanes.
j) *iḳitxos ivanes unda ċigni.
k) *iḳitxos unda ivanes ċigni.
l) *ċigni ivanes iḳitxos unda.
m) *ċigni iḳitxos unda ivanes.

(Adapted from Wier 2014:42)

The second test is the possibility of substituting a verb phrase constituent with a pro-verb construction equivalent to the English *do so*. Such a construction does not exist in Georgian, which instead uses a combination of an object and a verb, as shown in [**17**]. As

[15] This contrasts with a different modal auxiliary *unda* 'should', which does not select a CP argument and instead behaves as an immediate constituent of the clause (Wier 2014:42).

Wier (2014) points out, the ungrammaticality of [**17b**] and [**17c**] can instead be attributed to the constraint on the focus clitic =ve to appear in preverbal position.

17) a) ivane-m çaiḳitxa çign-i,
Ivane-NARR read.AOR.3SG book

da mariam-ma=c igi=ve gaaḳeta.
and Mariam-NARR=too that.NOM=just do.AOR.3SG
'Ivane read the book, and Mariam did so too.'
b) * ivane-m çaiḳitxa çign-i, da igive mariammac gaaḳeta.
c) * ivane-m çaiḳitxa çign-i, da mariammac gaaḳeta igive.

(Wier 2014:43)

The existence of object-oriented idiomatic interpretations available only in the object-verb linearisation in Georgian are argued by Skopeteas and Fanselow (2010) to be evidence for a VP constituent, as in [**18**].

18) a) p̣iṭer-ma pex-eb-i gač̣ima.
Peter-NARR leg-PL-NOM stretch.AOR.3SG
'Peter stretched his legs.'/'Peter died.'
b) p̣iṭer -ma gač̣ima pexebi.
'Peter stretched his legs.'

(Skopeteas and Fanselow 2010:1376)

Wier however finds that the idiomatic interpretation is not limited to the OV order for all Georgian speakers, but may also be available in the VO linearisation. In addition, he points out that Georgian also features a number of subject-oriented idioms, of which [**19**] is an example.

19) bevr-ma çq̣al-ma chaiara.
much-NARR water-NARR come.down.AOR.3SG
'Much water came down.'/ 'A long time passed by.'

(Wier 2014:44)

Furthermore, Wier finds that cleft and pseudo-cleft constructions, as exemplified in [**20a**] and [**20b**] respectively, are rare and often unacceptable to Georgian speakers, as shown in [**21**].

20) a) See John is what you should do.
b) What you should do is see John.

21) a) ??vin=c unda vnaxo, ivane=a.
who=REL should see.AOR.OPT.1SG Ivane=be.PRS.3SG
'Who I should see is Ivane.'

b) *ivane naxos=a, ra=c
Ivane.NOM see.AOR.OPT.3SG=be.PRS.3SG what.NOM=REL

unda gaaḳetos.
should do.AOR.OPT.3SG
'See Ivane is what he should do.'

(Adapted from Wier 2014:45)

Two further tests for VP constituency discussed by Wier are the existence of binding asymmetries and weak crossover effects, neither of which provides evidence for a Georgian VP. Based on these findings, Wier proposes a flat phrase structure for the Georgian clause, which I discuss further in *3.2.1.5*. Like the prodrop evidence discussed above, therefore, this evidence for the absence of a verb phrase in Georgian is problematic for proposals that discourse features are projected vertically from accents to larger syntactic domains. Syntactic domains corresponding to propositional predicates are however available in Georgian in the form of another set of constructions discussed by Wier based on the masdar or verbal noun, which perform a similar role to Indo-European infinitives (Harris 1981:152-154). Within these, masdars may form complex noun phrases together with their thematic arguments, which are realised as genitive complements of the masdar. These have same distribution as other noun phrases, thereby permitting predicates expressed by these constructions to be linearised in positions not available to predicates expressed by the verb and its arguments, as shown in [**22**]. In this respect, such complex noun phrases in Georgian comprising the masdar and one or more of its thematic arguments are similar to the Russian infinitival VP constructions discussed in chapter 2, which show characteristics of larger syntactic domains bearing information-structural features.

22) a) ç̣eril-is daç̣era-s vap̣ireb.
letter-GEN write.MAS-DAT intend.PRS.1SG
'I intend to write a letter.'
b) *ç̣eril-i davç̣ero vap̣ireb.
letter-NOM write.AOR.OPT.1SG intend .PRS.1SG
'I intend to write a letter.'

(Adapted from Wier 2014:54)

Similarly to English, however, Georgian also features discontinuous constituency constructions, as attested by the examples in [**23**] from various sources. Although constructions of this kind in Georgian await a comprehensive information-structural analysis, they are likely motivated by the rigid internal structure of the noun phrase; as described by Wier[16], this may include up to several kinds of distinct embedded phrases; among them, determiners, possessors, quantifiers, qualifying nominals and postpositional phrases.

23) a) ç̣inadadeba p̣iter-s bevr-i aqvs garčeuli.
sentence.NOM Peter-DAT many-NOM have.PRS.3SG analyse.PFPT
'Peter has analysed many sentences.'

(Skopeteas and Fanselow 2010:1380)

b) gvar-i ar vutxari chem-i.
surname-NOM NEG tell.AOR.3SG my-NOM
'I didn't tell (him) my surname.'

(Meurer 2009:8)

c) ramden=ze ilap̣araḳa p̣iter-ma naxaṭ=ze?
how.many=on speak.AOR.3SG Peter-NARR painting=on
'About how many paintings did Peter speak?'

(Fanselow and Féry 2006:73)

[16] Wier (2014:50) does not mention discontinuous noun phrases in connection with Georgian, and provides only an example from a dialect provided by an anonymous reviewer.

d) vi-s icnob, vin=c mušaobs biblioteḳa=ši?
who-DAT know.PRS.2SG who.NOM=REL work.PRS.3SG library=in
'Who do you know who works in a library?'

(Adapted from Harris 1984:71)

Like the English discontinuous noun phrases discussed in chapter 2, these constructions, which I discuss further in *3.2.2.1*, are problematic for accounts of vertical feature projection based on syntactic phrasing, and suggest that such projection is better modelled as taking place on a propositional level instead. Under such an approach, the availability of such constructions featuring masdars in Georgian to express predicates can, like the Russian VP constructions, be understood as a reflex of this proposition-based projection of information-structural features, rather than as its mechanism.

Whilst the evidence discussed in this section speaks against the notion of vertical focus projection within syntactic domains in favour of a projection on the propositional level, Wier (2014) claims that syntactic structure is relevant to the expression of information-structural relations in Georgian in a different sense, in that, whilst word order in Georgian is largely unconstrained with respect to grammatical relations, it displays a good deal of discourse-configurationality. In the next section I will consider some existing models of this relationship together with available data from the literature. These indicate that, whilst several syntactic constraints on the linearisation of information-structural relations can be identified, the extent to which these are instrumental to the identification of information-structural relations in sentence form is limited.

3.2 Syntax and Information Structure

Several models of the relationship between information structure and syntax have been proposed in recent years within different formal frameworks. In what follows I will briefly introduce each of several models proposed in recent years: the Minimalist model presented by Skopeteas and Fanselow (2010a, 2010b), the Optimality-Theoretic models presented by Skopeteas *et al.* (2009a) and by Féry (2013) and the Lexical-Functional Grammar models presented by Meurer (2007, 2009) and by Wier (2014), before comparing the extent to which they reflect the available findings from the literature with respect to different aspects of this interaction.

3.2.1 Previous Models

3.2.1.1 Skopeteas and Fanselow (2010a, 2010b)

The model of Georgian information structure proposed by Skopeteas and Fanselow (2010a, 2010b) in the Minimalist[17] syntactic framework posits that clausal arguments are generated VP-internally in the 'canonical' order S-IO-DO-V, with the subject occupying VP specifier position. According to the model, single foci may be realised in one of two positions: preverbally, in a position left-adjacent to the verb, or postverbally. In the former case, the verb moves from its base-generated position within the VP to the head of a functional projection FP, and the focused constituent to the specifier position of this projection, as shown in [**24**]; this is posited to be a unique position, which is not associated specifically with focus, but which may also be occupied by interrogative pronouns and negative particles and words, which compete to do so.

24) [$_{FP}$ XP [$_{F'}$ verb ... [$_{vP}$ ~~XP verb~~]]]

(Skopeteas and Fanselow 2010a:1376)

In the latter case, the focused constituent remains in situ in its base-generated position, and the verb scrambles within the VP to a position preceding it. The verb in their model may

[17] I briefly compare the Minimalist and Lexical-Functional Grammar theories in chapter 6.

scramble forward in this way for various pragmatic and stylistic reasons, including a preference for non-verb final orders in longer sentences[18] the verb itself being less discourse-salient, as in [**25**]. The same forward scrambling is invoked to account for the predominance of the SIODOV and SIOVDO linearisations in the sentence focus context.

25) a) mebaḡe-m ṭiṭa morc̣q̣a.
Gardener-NARR tulip.NOM water.AOR.3SG
'The gardener watered the tulip.'
b) mebaḡe-m moglija ṭiṭa.
Gardener-NARR tear.out.AOR.3SG tulip.NOM
'The gardener tore out the tulip'.

(Skopeteas and Fanselow 2010a:1382)

When itself focused, Skopeteas and Fanselow posit that the verb preferentially, but not obligatorily, surfaces in the FP head position. This is distinguished from clause-initial position, which they state that the verb occupies only in special cases, such as in discourse-initial sentences or presentational contexts (Skopeteas and Fanselow 2010a:1382).

Other, non-focal constituents may precede a preverbal focus, in which case they move from within the VP to the specifier position of a tense projection (TP) and precede the FP, as shown in the case of the object in [**26**].

26) $[_{CP}\ldots[_{TP}$ object $[_{FP}$ wh- $[_{F'}$ verb … $[_{VP}$ ~~wh object verb~~$]]]]]$

(Skopeteas and Fanselow 2010a:1380)

Movement to the TP specifier position is not motivated by specific discourse features such as topicality, however, as it may also be occupied by non-referential material such as parts of idioms which cannot bear such features, as shown in [**18**], discussed in 3.1.

The occupant of the TP specifier position is instead characterised as that constituent which surfaces initially within the VP as the optimal candidate with respect to competing

[18] This is based on the preference for non verb-final linearisations in longer sentences, as shown in Apridonidze's (1981) corpus data for ditransitive sentences in **Table 10**.

thematic, givenness, animacy and other hierarchies (Skopeteas and Fanselow 2010a:1380); this constituent, which is generally the subject due to its thematic prominence, is moved to the TP specifier position. A final phrase posited above the TP is the complementiser phrase or CP, the specifier position of which is occupied by a topicalised constituent, but which may also be occupied by, for example, a complementiser, shown in [**27**].

27) [$_{CP}$ çinadadeba [$_{TP}$ piṭer-s [$_{FP}$ *bevr-i* [$_{F'}$ akvs [$_{VP}$ garčeuli.]]]]]
sentence.NOM Peter-NARR many-NOM have.PRS.3PSG analyse.PFPT
'Peter has analysed many sentences.'

(Skopeteas and Fanselow 2010a:1380)

Although they present experimental data indicating that the preverbal FP specifier position is preferred for the realisation of contrastive foci, Skopeteas and Fanselow also provide data indicating that, if prosodically prominent, contrastive foci may be realised in either position, and that contrastive and identificational focus interpretations are available, but not obligatory, in either[19]. Rather than associate contrastiveness specifically with the preverbal FP specifier position, they instead explain this preference as the result of it being more structurally marked than the postverbal position, and therefore more suited for responses which contradict the assumptions of the listener (Skopeteas and Fanselow 2010a:1390). By contrast, they claim, the postverbal focus position requires a marked prosodic structure, realised by a low, flat pitch accent and tenseness in consonant articulation, as reported by Skopeteas *et al.* (2009), whereas preverbal focused consituents were not found to necessarily display any sign of prosodic prominence (Skopeteas and Fanselow 2010a:1383).

[19] For an alternative analysis, see Bush and Tevdoradze (1999) and Bush (2000).

3.2.1.2 Skopeteas *et al.* (2009a)

Skopeteas *et al.* (2009a) base their Optimality-Theoretic model on the results of a judgement experiment designed to test a set of four proposed constraints on Georgian word order, of which two are strong and two weak. The strong constraint $XP_{FOC}V$ states that focused constituents which precede the finite verb must appear left-adjacent to it (Skopeteas *et al.* 2009:104). The second strong constraint, which is referred to as *V-initial*, permits verb-initial order only when it ‘occurs in very restricted contexts, e.g., at the beginning of narratives’ (Skopeteas *et al.* 2009a:103). The weak constraint *A-reordering* states that violations of the argument order S>O2>O1 are less preferred (Skopeteas *et al.* 2009:104). Finally, *V-fronting* is a weak constraint according to which non verb-final linearisations negatively affect acceptability judgments; this excludes verb-initial orders which are policed by the strong constraint *V-initial*. The predicted ranking of different linearisations of subject focus in Georgian according to the interaction of these strong and weak constraints is shown in Table 11.

Table 11: Predicted ranking of tested word orders in subject focus according to proposed constraints (Skopeteas et al. 2009a:117)

S FOCUS	STRONG	WEAK	PREDICTED RANK
$\underline{S}O_2O_1V$	$XP_{FOC}V$ *VIOLATION*		3
$O_2O_1\underline{S}V$		*A-REORDERING*	1
$O_1\underline{S}VO_2$		*A-REORDERING, V-FRONTING*	2
$V\underline{S}O_1O_2$	*V-INITIAL*	*A-REORDERING*	4

3.2.1.3 Féry (2013)

Féry (2013) posits four constraints: two strong and two weak, to account for the syntactic and prosodic realisation of Georgian foci and topics. Of the two strong constraints, the first, *VERBADJACENCY*, states that focused constituents, whether they occur in preverbal or in postverbal position, must appear adjacent to the verb, and the second, *ALIGN-FOC-Φ-L*, that foci in Georgian must be aligned with the left boundary of a prosodic phrase *Φ*. Of the two weaker constraints, the first, *CWO*, expresses a preference for canonical word order[20], and the second, *TOPIC*, that a topic must be initial within its prosodic domain (Féry 2013:714). The tableau in Table 12 shows that the optimal candidates [**a**] and [**b**] violate only CWO and TOP respectively, whereas candidates [**c**] and [**d**] violate VERBADJ and *ALIGN-FOC-Φ-L* respectively.

Table 12: Constraints on Georgian focus and topic linearisation (Féry 2013:715). Reprinted by permission from Springer Nature, *Natural Language and Linguistic Theory*, Focus as Prosodic Alignment, Caroline Féry, 2013. https://doi.org/10.1007/s11049-013-9195-7

[ḳac-i]$_F$ açveba ḳac-s man-NOM is-pushing man-DAT 'The man is pushing the man.'	*VERBADJ*	*ALIGN-FOC-Φ-L*	*CWO*	*TOP*
a. ☞ ((ḳacs)Φ (ḳaci açveba)Φ)ι			*	
b. ☞ ((ḳaci açveba ḳacs)Φ)ι				*
c. ((ḳaci)Φ (ḳacs açveba)Φ)	*!			
d. ((ḳacs ḳaci açveba)Φ)ι		*!	*	

3.2.1.4 Meurer (2007, 2009)

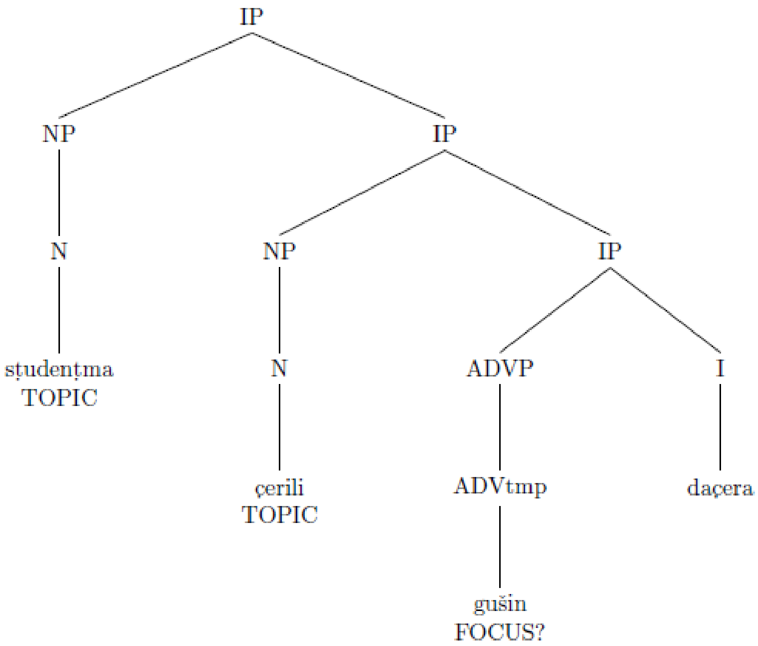
The model of Georgian presented by Meurer (2009:7) in the Lexical-Functional Grammar framework contains the set of phrase structure rules in [**28**]. According to these rules,

[20] *CWO* is apparently violated in Féry's (2013) model by linearisations in which the subject fails to precede the direct object and would presumably also be violated by linearisations in which the verb or other arguments do the same, although this is not made explicit.

Georgian phrase structure consists minimally of an endocentric IP phrase [**28b**]; this minimally contains an intermediate projection I' [**28c**], which in turn minimally contains the IP head I, which contains the finite verb [**28e**]. Any additional XPs appearing within the I' projection are realised within an exocentric phrase S [**28d**], which appears as a sister of I to its right [**28f**]. As for additional items to the left of the finite verb, foci or question phrases are associated with a special IP specifier position which is sister to the intermediate projection I' [**28b**], which may also be occupied by a topicalised constituent if sentence-initial; Meurer (2007, 2009) points out that the discourse properties of a constituent occupying this position may be ambiguous if constituents both precede and follow the verb; topic and focus are not coded exclusively configurationally in his model, as for example heavy focused constituents may follow the verb or be sentence-final, and focused verbs tend to precede the argument. Any additional constituents to the left of the immediately preverbal IP specifier position occupy the specifier positions of additional, recursively adjoined IPs [**28a**]; as shown in Figure 5 Meurer (2007) associates these positions with topicalised constituents.

28) a) IP → XP IP
b) IP → XP I'
c) IP → QP + I'
d) I' → I (S)
e) I → *Vinfl*
f) S → XP+

(Meurer 2009:7)



sṭudenṭ-ma çeril-i gušin daçera
student-NARR letter-NOM yesterday write.AOR.3SG
'The student wrote the letter yesterday.'

Figure 5: Proposed LFG phrase structure for Georgian with annotations (Meurer 2007:sl. 29)

3.2.1.5 Wier (2014)

The LFG phrase structure proposed for Georgian by Wier (2014), illustrated in Figure 6, consists minimally of an exocentric phrase S, which in turn contains minimally the finite verb V, and which may contain additional XPs on either side of the finite verb. The minimal exocentric phrase S may in turn appear within a complementiser phrase CP as sister to a complementiser C which is the head of the phrase. Within S, an XP immediately preceding V is annotated as the position for a negative phrase, whereas an XP preceding this is annotated as the position for a focused item. A final annotated position in the proposed phrase structure is an XP preceding CP within a larger S phrase, which is annotated for topical items.

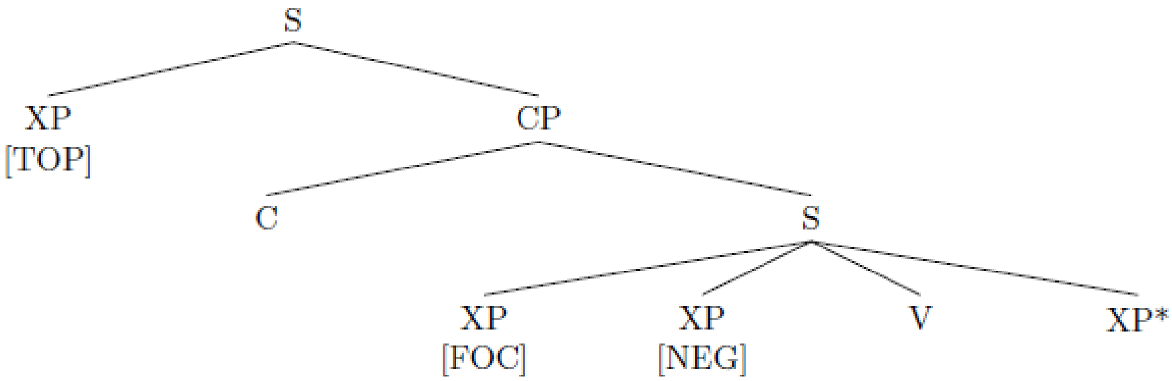


Figure 6: Proposed LFG phrase structure for Georgian with annotations (Wier 2014:49)

3.2.2 Comparisons and Data

The models discussed above, which make varying predictions with respect to the syntax-information structure relationship in Georgian, likewise vary in the extent to which they reflect available data on this relationship, and are in some cases inconsistent with them. Three areas in particular can be identified with respect to which this is the case: the linearisation of preverbal and postverbal foci, the linearisation of non-focal constituents and sentence-initiality, and the verb-initial constructions. I discuss each of these in turn below.

3.2.2.1 Preverbal and Postverbal Foci

With respect to the linearisation of preverbal foci, each of the models discussed constrains a preverbal focused constituent to appear left-adjacent to the finite verb, with only negatives permitted to intervene. Such a constraint is well supported in the literature, both by descriptive observations and by experimental data. These include production experiment data reported Skopeteas and Fanselow (2010a) and Skopeteas and Fanselow

(2010b), in which constituent linearisations violating this constraint were not produced, and the results of a judgement experiment conducted by Skopeteas *et al.* (2009a), in which linearisations violating this constraint received a low score.

Whilst all of the models constrain an individual preverbal focus to appear left-adjacent to the verb, their predictions with respect to the occurrence of multiple preverbal foci appear to vary. Whereas it is unclear whether the constraints $XP_{FOC}V$ and *VERBADJ* as defined by Skopeteas *et al.* (2009a) and by Féry (2013) are compatible with the occurrence of multiple preverbal foci, both Meurer's (2007, 2009) and Wier's (2014) LFG models feature only a single preverbal node annotated for focus. The same is true of Skopeteas and Fanselow's (2010a, 2010b) model, in which they explicitly posit a single FP specifier position as the landing site for a preverbal focus, which interrogative pronouns and negative words also compete to occupy. By contrast, constituents in sentence focus are accommodated in their model within the VP layer in which they are base-generated.

Skopeteas and Fanselow's (2010a, 2010b) different treatment of individual focused constituents and constituents in sentence focus reflects their identification of sentence focus with a 'neutral' context, associated with canonical word order; on the other hand, their posited movement of individual preverbal foci to a separate FP specifier position is based on the claim that the finite verb moves in these cases to the head of the same projection. This claim is supported using several examples in which the position of the verb in canonical word orders is contrasted with its more leftward position in a 'preverbal focus' context. These include [**29**], in which the position of the finite verb *akvs* in constructions containing focused constituents and wh-constituents, shown in [**29b**] and [**29c**] respectively, is contrasted with its position following the non-finite verb form šenišnuli in [**29a**], which is characterised by Harris (2000) as the relative ordering of these constituents in 'unmarked order'.

29) a) es movlena šenišnuli akvs.
this phenomenon.NOM note.PFPT have.PRS.3SG
'(He) has noted this phenomenon.'
b) es movlena akvs šenišnuli.
c) ra akvs šenišnuli?
what.NOM have.PRS.3SG note.PFPT
'What has (he) noted?'
d) *ra šenišnuli akvs?

(Skopeteas and Fanselow 2010:1377)

Another is [**30**], in which preferred position of the clitic form of the third person copula *=a*, which cliticises to a phonological host to its left, preferentially occupies the position in [**30a**] in the context of an all-new question, whereas in a context in which the prepositional constituent is in focus, it must immediately follow it, as in [**30b**]; they conclude from this that the copula cliticises to the left of a focused constituent.

30) a) gor̥-is marjvniv zebra=a
pig-GEN left zebra.NOM=be.PRS.3SG
'To the right of the pig is a/the zebra.'
b) gor̥is marjvniv=a zebra

(Skopeteas and Fanselow 2010:1377)

As Skopeteas and Fanselow (2010a:1378) point out, all of their provided examples can alternatively be accounted for as the result of a focus-to-verb adjacency constraint, without the need to posit movement. Certainly under the assumptions set out in chapter 2, both the non-finite verb form in [**29**] and the subject in [**30**] are compatible with a focus interpretation satisfying such a constraint. As an alternative piece of evidence, they identify the case of the verb itself being focused, the forward positioning of which in [**31**] in comparison to its posited VP-final base-generated position is argued to be evidence for movement rather than simple adjacency.

31) ara, piṭer-ma GATALA vashl-eb-i.
no Peter-NARR count.AOR.3SG apple-PL-NOM
'No, Peter counted the apples.'

(Adapted from Skopeteas and Fanselow 2010:1379)

That a necessary link exists between the forward positioning of the focused verb, which is in any case described as optional, and the positioning of preverbal foci, is however unclear. In accordance with my assumptions in this thesis, according to which, following Lambrecht (1994), arguments in sentence focus contexts are in focus, I therefore propose that the permissibility of multiple preverbal constituents in sentence focus contexts constitutes evidence that Georgian permits multiple preverbal foci which have the same focal status as the individual preverbal foci described in the models introduced above, and that the verbal adjacency constraint is better articulated as one according to which no non-focal constituents may intervene between preverbal foci and the finite verb. Additional evidence for the permissibility of multiple preverbal foci is provided by the constructions discussed in *3.1* featuring multiple preverbal wh-constituents, negative pronouns and indefinite quantifiers. Following Mycock (2006) and Wier (2014), wh-constituents may be characterised as conventionally focused, as in addition may negative pronouns and indefinite quantifiers which, as discussed, are likewise characterised by Skopeteas *et al.* (2009b) as unavailable for topicalisation. Additional evidence that these three categories needn't be treated as fully distinct from other foci, and may be captured with the same modified preverbal focus constraint proposed, is provided in the case of wh-constituents by Amiridze's (2006) observation that the S-IO-DO-V linearisation constraint on these may be violated in the event of an echo-question, repeated in [**32**]. In this case, the context described is consistent with the wh-constituent having non-focal, topical discourse features, due to which they must precede verb-adjacent foci.

32) a) vin-0 vi-s eẓebs?
who-NOM who-ACC look.for.PRS.3SG
'Who is looking for who?'
b) *vis vin eẓebs?
c) vis vin eẓebs? (echo-reading)
'About whom you are talking that who is looking for him/her?'

(Adapted from Amiridze 2006:64)

An additional phenomenon discussed by Skopeteas and Fanselow (2010a) in connection with the preverbal focus constraint is that of discontinuous constituency constructions in Georgian, of which I provided examples from various sources in [**23**]. Under their analysis of the example repeated in [**33**], discontinuity is motivated by the requirement of the quantifier and the noun, which bear differing information-structural features, to occupy the FP specifier and CP specifier positions respectively.

33) [$_{CP}$ çinadadeba [$_{TP}$ piṭer-s [$_{FP}$ *bevr-i* [$_{F'}$ akvs [$_{VP}$ garčeuli.]]]]]
sentence.NOM Peter-NARR many-NOM have.PRS.3PSG analyse.PFPT
'Peter has analysed many sentences.'

(Skopeteas and Fanselow 2010a:1380)

As mentioned, discontinuous constituency constructions in Georgian await a full information-structural analysis, which must be left to future research. Examples like [**33**] suggest that these can be captured in terms of constraints identified in existing models on the verb-adjacent linearisation of preverbal foci and the clause-initial linearisation of discourse-inactive topics (discussed further in *3.2.2.1* below), which cannot be satisfied within the noun phrase due to its rigid internal structure. On the other hand, other examples introduced in [**23**], such as the one repeated in [**34**], suggest that constituents in these constructions are displaced, not only from material which would otherwise cause the violation of these constraints, but also from other material within the noun phrase; in this case, the possessor *chemi*, which appears clause-finally.

34) gvar-i ar vutxari chem-i.
surname-NOM NEG tell.AOR.3SG my-NOM
'I didn't tell (him) my surname.'

(Meurer 2009:8)

In chapter 5 I will propose an articulation of such an analysis for discontinuous constituency constructions in the Optimality-Theoretic framework with the constraints ***PROMSEP*** and ***CONSTINT***, for which I then propose an articulation in the Lexical-Functional Grammar framework in chapter 6.

The final issue to be addressed in this section concerns the linearisation of postverbal foci. Whereas all of the models introduced constrain a preverbal focus constituent to appear adjacent to the finite verb, these vary with respect to their predictions as to how postverbal foci are linearised. The models proposed by Skopeteas and Fanselow (2010a, 2010b), Skopeteas et al. (2009a) and Meurer (2007, 2009) permit foci to appear postverbally without any additional constraints. By contrast, Wier (2014) mentions only the preverbal position with respect to the realisation of focus, whereas Féry's (2013) constraint *VERBADJ* stipulates that postverbal foci must, like preverbal foci, occur adjacent to the finite verb.

Whereas, as discussed, the permissibility of postverbal foci in Georgian is well supported by the available data, as is a strong constraint on the verb-adjacent linearisation of preverbal foci, the basis for a constraint on postverbal adjacency as expressed in *VERBADJ* is unclear. More recent data presented by Vicenik and Jun (2014) from a judgement experiment involving various constituent linearisations within ditransitive sentences, provided in Table 13 below, do not appear to support such a constraint. Instead, they are indicative of a preference for linearising postverbal focused constituents in sentence-final position. Table 14 shows that, in a comparison of averaged scores for postverbal focus linearisations from these data, in verb-adjacent and verb non-adjacent positions, sentence non-final and sentence-final positions, and verb-adjacent sentence non-final and verb-adjacent sentence-final positions, the latter condition has the higher average score in each case.

As such, these data do not support a constraint of verb-adjacency for postverbal foci, as included in the *VERBADJ* constraint, but instead support a constraint proposed in an earlier paper by Féry *et al.* (2010), *ALIGN-FOCUS-R*, according to which foci are preferentially aligned with the right boundary of an IP phrase, i.e. clause or sentence-finally. Féry *et al.* (2010) present the results of a production experiment designed to establish the preferential linearisation of new, reintroduced and given referents relative to localising expressions in Georgian and several other languages. Their results indicate that Georgian, unlike the other languages examined, preferentially employs a cross-linguistically marked order (in which the referent being located appears to the right of the localising expression) not only when the referent is new or reintroduced to the discourse (marked order selected in 90% of responses in each condition), as in [**35**], but also when the referent is given (56% of responses).

35)	datv-is	marjvniv	ẓag̣l-i	dgas
	bear-GEN	left	dog-NOM	stand.PRS.3SG.

‘To the right of the bear stands a dog.’

(Adapted from Féry *et al.* 2010:338)

In addition, they found that the referent in question was placed not only to the right of the localising expression, but also in clause-final position, as in [**36**], in 69% of responses.

36) cxen-is marcxena mxare-s dgas lom-i,
horse-GEN left side-DAT stand.PRS.3SG lion-NOM,

niang-i agar aris.
Crocodile-NOM no.longer be.PRS.3SG
‘To the left of the horse stands a lion, the crocodile is no longer there.’

(Adapted from Féry *et al.* 2010:339)

Table 13: Average scores for focus structures by constituent linearisation (Vicenik and Jun 2014:175)

Q-type / A-type	No Focus	Subject Focus S(?)VDI	Subject Focus S(?)VID	Direct Object Focus D(?)VSI	Indirect Object Focus SI(?)VD	Indirect Object Focus I(?)VSD	Verb Focus
SVID	0.8	0.4	0.9	0.3	0.4	0.5	0.7
SVDI	0.7	0.9	0.5	0.4	0.5	0.7	0.7
SIDV	0.4	0.6	0.2	0.3	0.3	0.4	0.6
IDSV	0.2	0.3	0.2			0.2	
DSVI	0.1	0.1			0.2	0.1	
VSDI	0						
SDVI	0.2	0.4	0.5	0.9	0.3	0.6	0.4
SIVD	0.2	0.6	0.3	0.5	0.8	0.5	0.4
DVSI				0.2			
DISV		0.2		0.1		0.2	
ISVD		0.2	0.3	0.3		0.25	
IVSD		0		0		0.5	

Table 14: Averaged scores from the data of Vicenik and Jun (2014) for postverbal verb-adjacent and verb non-adjacent positions, postverbal sentence non-final and sentence-final positions, and postverbal verb-adjacent sentence non-final and verb-adjacent sentence-final positions

VADJ (SXVF, SVFX)	VNONADJ (SVXF)
0.45	0.5
FNONFIN (SVFX)	FFIN (SXVF, SVXF)
0.43	0.48
VADJNF (SVFX)	VADJF (SXVF)
0.43	0.47

In section 5.1.1 below I present further support for such a constraint from focus linearisation preferences indicated by my own data. In my proposals for a new set of constraints in chapter 5, I therefore include the weak prosodic constraint ***ALIGN-FOCUS-R*** as proposed by Féry *et al.* (2010). Following the presentation in the same chapter of new prosodic data, I replace this with the prosodic constraint ***NOPHRASE***, as employed by Féry (2011). This competes with another weak constraint, ***FMARK***, which captures the preference for linearising foci in preverbal position. This syntactic constraint captures Skopeteas and Fanselow's (2010a, 2010b) characterisation of the preverbal focus position as a structurally marked position preferred for the realisation of contrastive and identificational foci, which contradict the expectations of the listener.

3.2.2.2 Non-Focal Constituents and Sentence-Initiality

With respect to the realisation in Georgian of discourse-inactive topics, each of the models proposed by Skopeteas and Fanselow (2010a, 2010b), Meurer (2007, 2009) and Wier (2014) posit that these are linearised in clause-initial position. By contrast, neither of the models proposed by Skopeteas et al. (2009a) or by Féry (2013)[21] make such a prediction. A preference for the clause-initial linearisation of discourse-inactive topics is indicated by data from a production experiment presented by Skopeteas and Féry (2007). As shown in Table 15, whereas in these data the object follows the subject in all cases when narrowly focused, it appears sentence-initially in half of cases when discourse-given in response to a single focus question and in a greater proportion of cases still in response to a pairing answer, in which it is more likely to be attributed a contrastive topic reading (Skopeteas and Féry (2007:335).

Table 15: Frequencies of subject-object and object-subject linearisations by focus context and single/pairing answer (adapted from Skopeteas and Féry (2007:335))

	Focus	SO	OS
Single answer	All	15	1
	O	14	-
	S	7	7
	SO	12	-
Pairing answer	All	14	1
	O	14	-
	S	6	10
	SO	13	1

Additional evidence for topic-initiality is provided by the discontinuous constituency construction in [**33**] provided by Skopeteas and Fanselow (2010a). This is also consistent with other observations such as those made by Alxazishvili (1959) that 'heavy semantic subjects' prefer sentence-initial position, and by Testelec (1998), according to whom contrasted topics bearing any grammatical relation always appear in leftmost position, unless preceded by a setting adverbial which 'modifies the contrastive situation as a whole', as shown in [**37**]. According to my assumptions, both contrasted topics and setting

[21] This is not articulated by Féry's (2013) weak constraint *TOP*, according to which topics must be aligned with the left boundary of an ip phrase; as **Table 12** shows, this constraint does not require a topic to appear ahead of other constituents.

adverbials have the status of discourse-inactive topics, indicating that multiple topics of this kind may occupy clause-initial position, as permitted in Meurer's (2007, 2009) model.

37) a) saxl-i aašena givi-m,
house-NOM build.AOR.3SG Givi-NARR

vašl-i ḳi dargo sandro-m.
apple.tree-NOM CONTR plant.AOR.3SG Sandro-NARR
'It was Givi who built the house, and it was Sandro who planted the apple-tree.'
b) *aashena saxli givim, dargo k'i vashli sandrom.

(Testelec 1998:241)

38) a) chem bag̣=ši gušin davbare miçạ,
My.DAT garden=in yesterday dig:PST:1SG ground-NOM

dg̣es ḳi vmorglav.
today CONTR weed:PRS:1SG
'In my garden, yesterday I was digging the ground, and today, I am weeding.'
b) ??bag̣ši davbare gučin miçạ, vmorglav dg̣es.

(Testelec 1998:241)

In chapter 5 I present additional syntactic data indicating that discourse-inactive topics are linearised clause-initially, and prosodic data indicating that postnuclear prosodically prominent topics are not permitted in Georgian. In the same chapter I follow the models proposed by Skopeteas and Fanselow (2010a, 2010b), Meurer (2007, 2009) and Wier (2014) in proposing the inviolable constraint ***DITINIT***, according to which discourse-inactive topics must precede other material in the clause. In my LFG model in chapter 6 I follow Meurer (2007, 2009) in positioning discourse-inactive topics initially within the 'flat' S phrase. I reserve CP specifier positions for constituents marked as discourse-inactive topics by preceding complementisers such as *rom*, as in [**39**].

39) merab-i sakartvelo=ši rom iq̣o, me ik ar vq̣opilvar
Merab-NOM Georgia=in THAT be.AOR.3SG, I there NEG be.PRF.1SG
'When Merab was in Georgia, I [contrastive] was not there.'

(Harris 2002:237)

With respect to the realisation of discourse-active constituents, none of the models discussed restrict these from occurring either preverbally or postverbally, with the exception of Meurer's (2007, 2009) model, in which, other than a focused constituent, only topicalised constituents may appear preverbally. Evidence in the literature that discourse-active constituents may appear in both positions includes the data from Skopeteas and Féry (2007) provided in Table 15. Furthermore, Skopeteas and Fanselow (2009) in particular show that given subjects are found to appear initially with greater frequency than focused subjects, and given objects to appear initially with greater frequency than focused objects, a pattern which is likewise visible in the production experiment data discussed by Skopeteas and Fanselow (2010a) and Skopeteas and Fanselow (2010b). In their own data, Skopeteas *et al.* (2009a) found that, although violation of *A-reordering* had a significant effect on sentence acceptability in the neutral (all-new focus) context, a similar effect was absent when these violations occurred in other contexts in conjunction with a congruent prosody[22]. This is consistent with a preference for the fronting of given constituents. Furthermore, it supports the occurrence of multiple discourse-active constituents preverbally; this contradicts the proposals of Skopeteas and Fanselow (2010a, 2010b), who discuss only one TP specifier position in their model that may be occupied by such a constituent.

The evidence from the literature that discourse-active constituents in Georgian may occur both in preverbal and postverbal positions contradicts Harris' (1981) Law of Unemphatic Pronoun Drop discussed in *3.1*, according to which first, second and third person independent personal pronouns are dropped unless they are either emphatic or non-terms. The data indicate that pronoun drop for discourse-active constituents is optional rather than

[22] The significance of this effect appears to be measured in their study together with that of the other weak constraint *V-fronting*, so that it is hard to separate the effects of the two. In contrast to that of the *A-reordering* constraint, an effect of *V-fronting* is not well attested in other studies and I will not consider it further here.

obligatory. In chapter 5 I will present additional data in support of the preferential clause-initiality of constituents of this kind, which I articulate with the violable constraint ***GINIT***. The LFG model presented in chapter 6 includes an articulation of this together with an information-structural analysis of dropped arguments.

Both Féry's (2013) *CWO* and Skopeteas *et al.*'s (2009a) *A-reordering* constraints address an additional preference indicated by the available data for the subject in Georgian, whether focused or given, to precede other arguments. Such a preference is reflected in data from a sentence judgment experiment conducted by Vicenik and Jun (2014), in which, of the word orders which received higher scores (>0.5), only one was subject non-initial (Vicenik and Jun 2014:175) (see Table 13). It is also reflected in the relative frequencies of subject-initial orders produced in a number of sentence production experiments, for example Skopeteas and Fanselow (2009, 2010a, 2010b) and Skopeteas and Féry (2007). Neither Meurer's (2007, 2009) nor Wier's (2014) models address such a preference. Whereas the model proposed by Skopeteas and Fanselow (2009, 2010a, 2010b) predicts that a non-focused subject is, as the winner on thematic and other hierarchies, the most likely of non-focused arguments within the VP to be promoted to the TP specifier position, it is unclear whether it reflects a preference for the initiality of the focused subject when this appears in the FP specifier position, particularly as selection of a non-focused argument to occupy the TP specifier position appears to be obligatory. In chapter 5 I propose the violable constraint ***SJINIT*** to capture this preference, which competes with the constraint ***GINIT***.

In addition to a preference for the clause-initial linearisation of the subject, the literature provides evidence for an additional, stronger constraint, according to which the subject must precede other arguments which share its information-structural features. Such a constaint captures the obligatory subject-initiality discussed in *3.1* amongst multiple wh-constituents, negative pronouns and indefinite quantifiers which, as observed in the case of echo-questions, may only be violated in the event that the information-structural features associated with these constituents differ. Further evidence is provided by Skopeteas *et al.*'s (2009a) observation mentioned above that non subject-initial linearisations produced with a congruent prosody scored significantly lower in acceptability judgements only in the sentence-focus context. The data on wh-constituents, negative pronouns and indefinite quantifiers are indicative of a related strong constraint, according to which the direct object must follow other arguments sharing its information-structural features. Unlike the strong subject-initial constraint, the effect of this constraint appears to be limited to preverbally linearised arguments; the data from Vicenik and Jun (2014) show that sentence focus linearisations ending with either the direct or the indirect object occur. In chapter 5 I will present, and subsequently articulate in the LFG model in chapter 6, the inviolable constraints $\boldsymbol{S_{DF}<IO,DO_{DF}}$ and $\boldsymbol{(IO_{DF}<DO_{F})V}$ to capture these observations.

3.2.2.3 Verb-Initial Constructions

A final aspect of how major sentential constituents in Georgian are linearised concerns verb-initial sentences. Whereas Féry (2013) addresses the observed dispreference for this sentence type only (presumably) with the violable constraint *CWO*, Skopeteas *et al.* (2009a) propose the strong constraint *V-initial*, which permits such orders only 'in very restricted contexts, e.g., at the beginning of narratives'. Skopeteas and Fanselow (2010a, 2010b) similarly propose a separate kind of movement to place the verb in clause-initial position, which they do not further elaborate upon, licensed only in restricted contexts including discourse-initial sentences and presentational contexts. By contrast, Meurer (2007:6) states that focused verbs mostly precede their arguments, although he does not elaborate further on this. Wier (2014) does not discuss these constructions with respect to his model, other than to state that verb-initiality to the topicalised position preceding a complementiser occurs only in poetic genres (Wier 2014:48).

Verb-initiality in presentational contexts can be found in the case of certain presentational predicates such as that in [**40**]. Alxazishvili (1959:35) characterises both the informational and prosodic prominence of such constructions as more evenly spread across its constituents than in others, yet with slightly greater intensity on the initial constituents, including the verb; this is consistent with each constituent being in focus.

40) dadga maẓḡar-i šemodgoma.
set.in.PST:3SG rich-NOM autumn.NOM
'A rich autumn set in.'

(Alkhazishvili 1959:385)

Aside from narrative-initial or presentational constructions, the existing literature indicates that there are other kinds of verb-initial construction in Georgian, which appear to have varying degrees of acceptability depending on context. These include yes-no questions, as exemplified in [**41**], and declarative sentences in which the verb is focused, as exemplified in [**42**].

41) a) çavida šen-i da?
go.AOR.3SG your-NOM sister.NOM
'Did your sister go?'

(Harris 2002:235)

b) damala gamomgonebel-ma borbal-i?
hide.PST-3SG inventor-NARR wheel-NOM
'Did the inventor hide the wheel?'

(Vicenik and Jun 2014:170)

42) a) ra ukna monadire-m irem-s?
what.NOM do.AOR.3SG hunter-NARR deer-DAT
'What did the hunter do to the deer?'

[moḳla]$_F$ monadire-m irem-i.
kill.AOR.3SG hunter-NARR deer-NOM
'The hunter killed the deer.'

(Adapted from Asatiani 2009:5)

b) ra-s aḳetebs monadire?
what-DAT do.PRS.3SG hunter.NOM
'What is the hunter doing?'

[ḳlavs]F monadire [irem-s]F.
kill.PRS.3SG hunter.NOM deer-DAT
'The hunter is killing the deer.'

(Adapted from Asatiani 2009:8)

The constructions in [**40**], [**41**] and [**42**] have in common that the verb is in focus. Skopeteas *et al.* (2009a) demonstrate in their data a strong dispreference for verb-initiality in non-presentational all-new contexts and contexts in which the verb is given and discourse-active, which is consistent with a connection between the attested verb-initial constructions and the verb being focused. Whereas their more frequent occurrence in the literature indicates that verb-initial presentational constructions and yes-no question constructions as in [**40**] and [**41**] are relatively more acceptable, however, constructions involving focus on the verb in non-presentational declaratives like [**42**] have been acknowledged less in the literature and appear to be more marginally acceptable, which indicates that these constructions are subject to differing constraints. My own data for narrow verb focus presented in chapter 5 likewise support a marginally acceptable status for verb-initial focus constructions like those in [**43**]. The posited differences in acceptability between the constructions discussed are captured in chapter 5 with the alternative constraints ***DAPINIT** and ***DNPRSINIT**.

In this section I have introduced several models of the relationship in Georgian between information structure and syntax. Comparing them with the available data, I identified three areas in which their predictions vary: the linearisation of preverbal and postverbal foci, the linearisation of non-focal constituents and sentence-initiality preferences, and the linearisation of the finite verb in sentence-initial position, and identified a new set of constraints on this relationships supported by the available data.

The data considered in this section indicate that, whilst a number of syntactic constraints can be identified from the literature on the linearisation of constituents bearing information-structural features in Georgian, syntax plays the role of disambiguating the information-structural features of a constituent only in a limited number of cases, such as the verb-initial constructions discussed above, and discontinuous constituency constructions. Other constraints play a more indirect role, identifying features only in more specific cases.

In chapters four and five I will introduce data which indicate that, as proposed in the previous chapter, the most direct and consistent role in expressing discourse features is played by alignment with the heads of prosodic phrases. Both types of constraints will be modelled in chapters five and six. Prominence structure can also be attributed an indirect role in the nature of some of the syntactic effects identified. As discussed Skopeteas and Fanselow (2010a, 2010b) characterise the preverbal position in which contrastive foci are preferentially placed as a structurally marked position on the basis of the accentuation rules of the language, according to which foci are preferentially placed in clause-final position as articulated by the constraint *ALIGN-FOCUS-R* proposed by *Féry et al.* (2010). Constructions in which the focused verb appears clause-initially discussed in *3.2.2.3* can similarly be attributed to this indirect influence of prosody. This is consistent with Féry's (2013) characterisation of clause-final position as the unmarked position for nuclear prominence placement, and therefore the unmarked position for focus placement, cross-linguistically.

3.3 Summary and Conclusions

In this chapter I have considered data from the available literature on the relationship in Georgian between information structure and syntax. I began in *3.1* by discussing grammatical and dominant constituent linearisations, together with a brief discussion of Georgian casemarking and agreement systems. Considering in particular the possibility of dropping arguments in Georgian, in combination with data presented by Wier (2014) supporting the absence of a verb phrase in Georgian, and with examples of discontinuous constituency constructions, I argued that these features provide additional support for the arguments made in the previous chapter against the cross-linguistic necessity of reference to syntactic domains above the word level to which focus and other discourse features are projected from individual accents.

In section *3.2* I introduced several models of the information structure-syntax relationship in Georgian proposed in the literature, in the Minimalist, Optimality Theoretic and Lexical-Functional Grammar frameworks. These models vary in their predictions and are in some cases inconsistent with the available evidence. I identified three areas in particular where this is the case: the linearisation of preverbal and postverbal foci, the linearisation of given and topical arguments and the discourse features of verb-initial constructions. In each of these I identified a number of constraints on the syntactic expression of discourse features supported by the available data, to be included in a new model of this relationship. From these data I concluded that, whilst syntax is influenced by information structure in a number of respects, the discourse features of items are disambiguated by syntax only in a limited number of cases; for example, verb-initial constructions. As consistent with the approach proposed in the previous chapter, the data point to an important role for prosodic structure, both in directly disambiguating discourse features of items, and indirectly, in influencing the linearisation of items in terms of the markedness of prosodic structure. I will consider available data on the relationship between information structure and prosody in the next chapter. In chapter 5 I present my own syntactic and prosodic data together with an analysis which also captures the data discussed here.

In this chapter I identified several areas for future research. Whilst some discourse attributes of discontinuous constituency constructions were proposed, these still require a full analysis. A related issue is that of how some of the constraints identified within more complex noun phrases, and above the level of the clause.

4. Georgian: Prosody

In the previous chapter I considered evidence from the literature on the relationship in Georgian between information structure and syntax. I concluded that, whilst information structure influences syntax in a number of ways, discourse features are disambiguated by syntax only in a limited number of cases.

In the present chapter I consider evidence from the literature on the relationship between information structure and prosody. Whilst empirical studies of this relationship indicate that prosody disambiguates information-structural relations to a greater extent than syntax, as with the syntactic models discussed in the last chapter, these studies have resulted in differing proposals as to how discourse relations are realised, which reflect and are consistent with the available data to varying degrees. I begin in *4.1* by discussing analyses which attribute the main role in the prosodic marking of focus to particular pitch accents or other tonal types. In *4.2* I discuss analyses which attribute this role to the boundaries of prosodic phrases with which foci are aligned. These observations form the basis for a set of hypotheses for a new prosodic production experiment, data from which I present in chapter 5.

4.1 'Pitch Accent' Analyses

4.1.1 Vicenik and Jun (2014)

In a recently published study[23], Vicenik and Jun (2014) report the results of an empirical study on the prosodic realisation in Georgian of 'declaratives', focus sentences, yes/no-questions and wh-questions. The primary consultants for their study were two females in

[23] For an earlier version of this study see Jun *et al.* (2007).

their 50s originally from Tbilisi[24], with additional data provided by another four female and one male speakers[25]. Data were gathered by prompting participants to produce spontaneous natural Georgian translations of various utterances. Focus sentences were elicited by means of wh-questions and corrective contexts. Although Vicenik and Jun (2014) make reference to broad as well as to narrow focus contexts, however, it is unclear in what context or contexts the declaratives were elicited.

In their study, Vicenik and Jun (2014) identify three prosodic units for Georgian: the Accentual Phrase (AP), the Intermediate Phrase (ip) and the Intonational Phrase (IP), each of which is associated with its own phrase-final boundary tone. The AP is the smallest of these units and characterises the tonal pattern observed generally over the span of a content word[26]; this typically ended in a high AP boundary tone Ha, but could also end in a low tone La, or in a complex boundary tone L+Ha stretching across the penultimate and final syllables of the AP. Two additional tonal events are identified within this phrase. The first syllable of the AP is host to a postlexically assigned pitch accent; increased amplitude and duration were identified on this syllable as consistent with stress[27]. The pitch accent can be of four kinds: low (L*), high (H*), a rise on the syllable (LH*) or a rise across the first and second syllables (L+H*)[28]. Finally, a high tone was sometimes observed on the antepenultimate syllable of the AP which then falls to a low tone on its penultimate syllable. Contrary to Robin and Waterson (1952) and to Aaronson (1990), who identify lexical stress on the antepenult of Georgian words (see section 3.1.1), this pattern was not

[24] It is mentioned that both consultants had been living in the United States for 15-30 years at the time of the study.
[25] No further information on these participants is provided.
[26] As Vicenik and Jun (2014) point out, this unit is proposed in analyses of a number of languages, e.g. Japanese (Beckman & Pierrehumbert 1986), Korean (Jun 1993, 1998) and French (Jun & Fougeron 1995, 2000, 2002) (see chapter 1).
[27] To establish the presence of increased intensity and duration on word-initial syllables, Vicenik and Jun (2014) asked participants to read aloud words of between 2 and 5 syllables in length within the sentence *siṭq̣va XXX davçere*, "I wrote the word XXX."
[28] Vicenik and Jun (2014) observe a complex tonal pattern L*+H L+Ha on longer words, but report that participants were unable to distinguish these from simple L* Ha patterns in terms of meaning when tested.

found to be accompanied by additional amplitude or duration, and was also observed to cross word boundaries within the phrase. It is therefore analysed as an AP phrase accent H+L.

A simple declarative sentence (see Figure 7) was found typically to consist of a sequence of APs, each beginning with a L* pitch accent and ending in a Ha boundary tone, whereby the pitch range declined such that each subsequent Ha peak was lower than the one that preceded it. The final AP was an exception; this began with a L* pitch accent but ended at a lower level with a low Intonational Phrase boundary tone L% which replaces the lower-level AP boundary tone and is accompanied by lengthening of the IP-final syllable. Other IP boundary tones identified are H% and HL%. Vicenik and Jun (2014) propose the systematic replacement of lower-level boundary tones by higher-level boundary tones in Georgian as a pattern contrasting with that observed in English, in which boundary tones of different levels appear together in a string (see chapter 2).

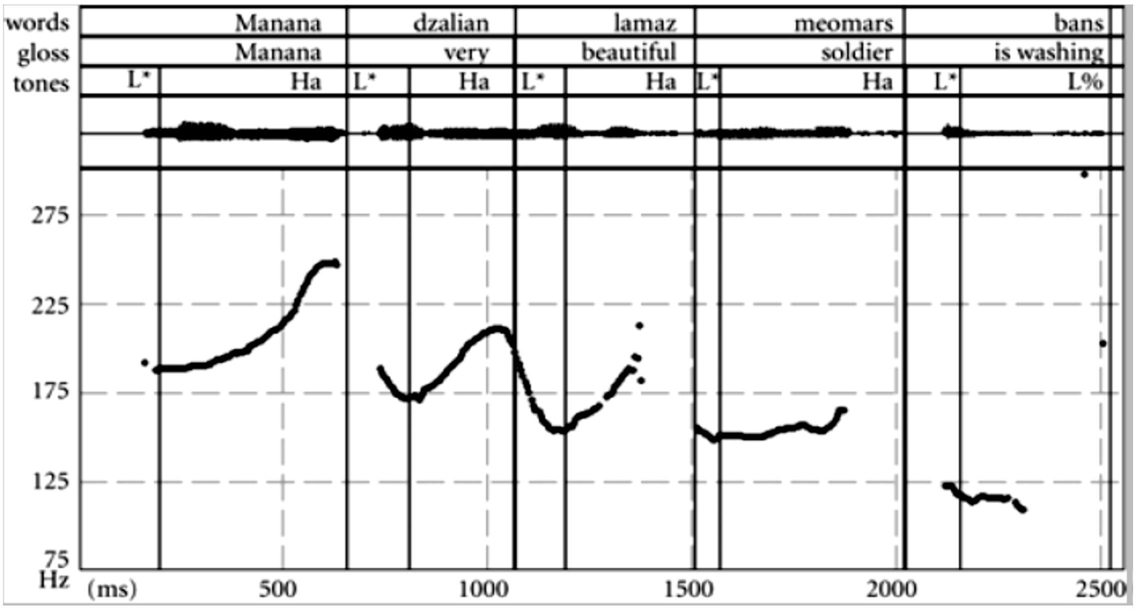


Figure 7: A typical declarative sentence (‘Manana is washing the very beautiful soldier.’) (Vicenik and Jun 2014:158)

The ip, which contains one or more APs, is marked by one of three ip boundary tones: a high (H-) or a low (L-) boundary tone on the final syllable of the phrase, or a complex rising (L+H-) boundary tone which stretches across the penultimate and final syllables of the phrase. Each of these again replaces a lower AP boundary tone and is accompanied by slight lengthening of the ip-final syllable. The H- ip boundary tone is about twice as high as the Ha AP boundary tone relative to a preceding L* pitch accent and interrupts the downward declination pattern in a sequence of APs. In their declarative sentence data, Vicenik and Jun (2014) observe that complex noun phrases are often contained within an ip (see Figure 8).

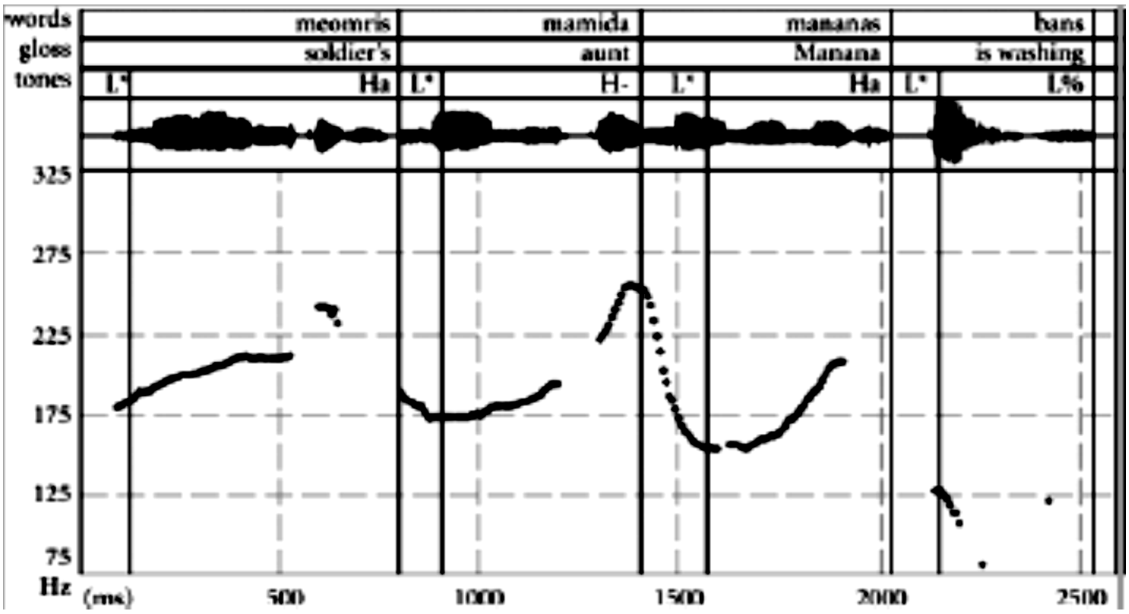


Figure 8: A declarative sentence featuring an ip phrase (‘The soldier’s aunt is washing Manana.’) (Vicenik and Jun 2014:161)

Vicenik and Jun (2014) observe that APs within an ip often exhibit a falling (H* La) pitch contour. An additional feature attributed to the ip is pitch reset; subsequent APs appear within a reduced pitch range (see Figure 9). According to Vicenik and Jun (2014) this reduced range is ignored by subsequent ip boundary tones, although in the examples that they provide these appear downstepped relative to preceding ip boundary tones.

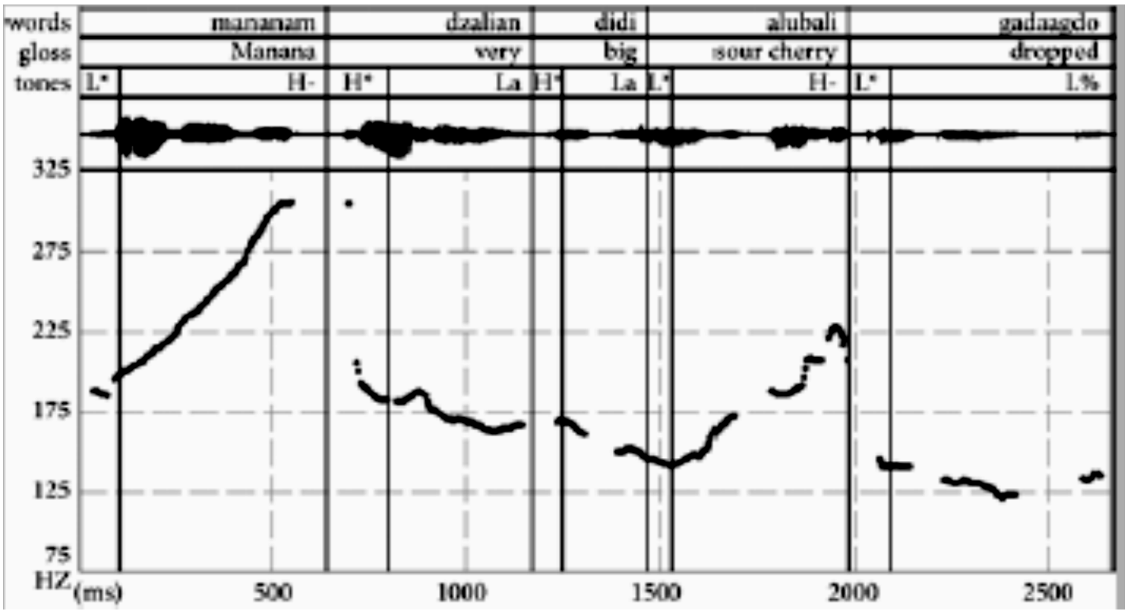


Figure 9: The common falling AP contour identified on non-final constituents in a heavy NP ('Manana dropped a very big sourcherry.') (Vicenik and Jun 2014:162)

Narrow focus was elicited in sentences using both wh-questions and corrective contexts. No difference was found between the prosodic focus realisations produced by these two methods; in both cases, Vicenik and Jun (2014) identify the most common intonational marker of focus in Georgian as an H+L phrase accent on the focused constituent, appearing together with a rising (LH*) or less often a high (H*) pitch accent and often ending in an La boundary tone (see Figure 10). This contour-type is contrasted with the 'declarative' L* Ha pattern, which was found on constituents preceding the focus; post-focal contours were sometimes dephrased and deaccented, or produced with the same contour as the focused constituent but in reduced pitch range.

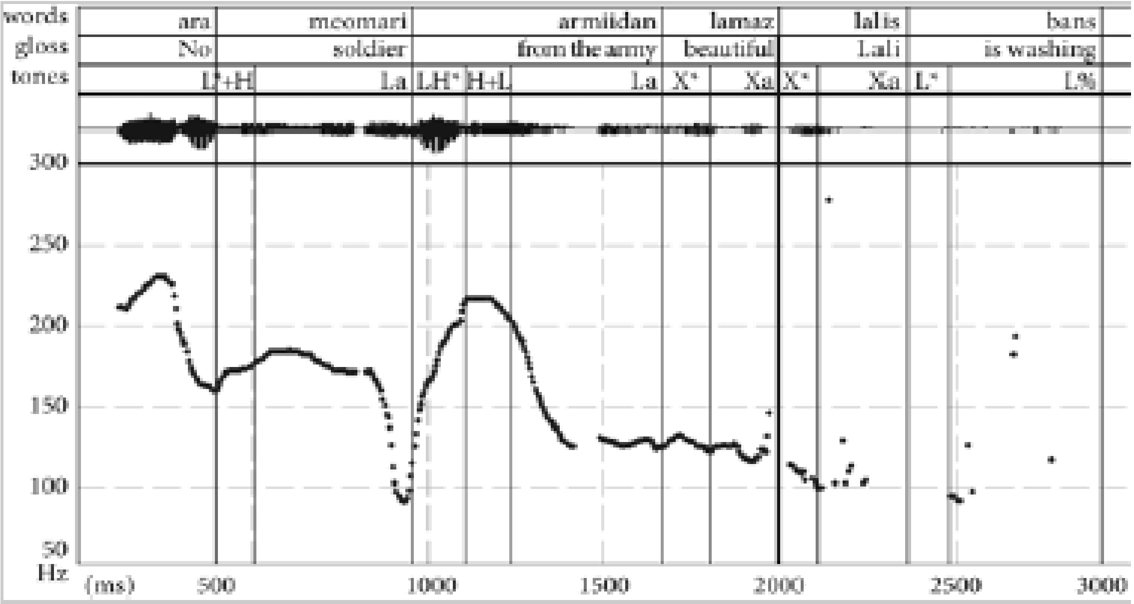


Figure 10: A typical narrow focus pattern, here on ‘armiidan’ (‘from the army’) (‘No. The soldier from the army is washing beautiful Lali.’) (Vicenik and Jun 2014:178)

Although they identify the H+L phrase accent strongly with focus, Vicenik and Jun (2014) find that it doesn’t always occur on the focused constituent; if the verb following the focus is three or more syllables long, this sometimes bears the phrase accent instead, either within the same AP as the focused constituent (see Figure 11) or phrased separately in its own AP. In this case, the focused constituent could exhibit the rising L* Ha pattern associated with declarative sentences and pre-focal constituents (see Figure 12).

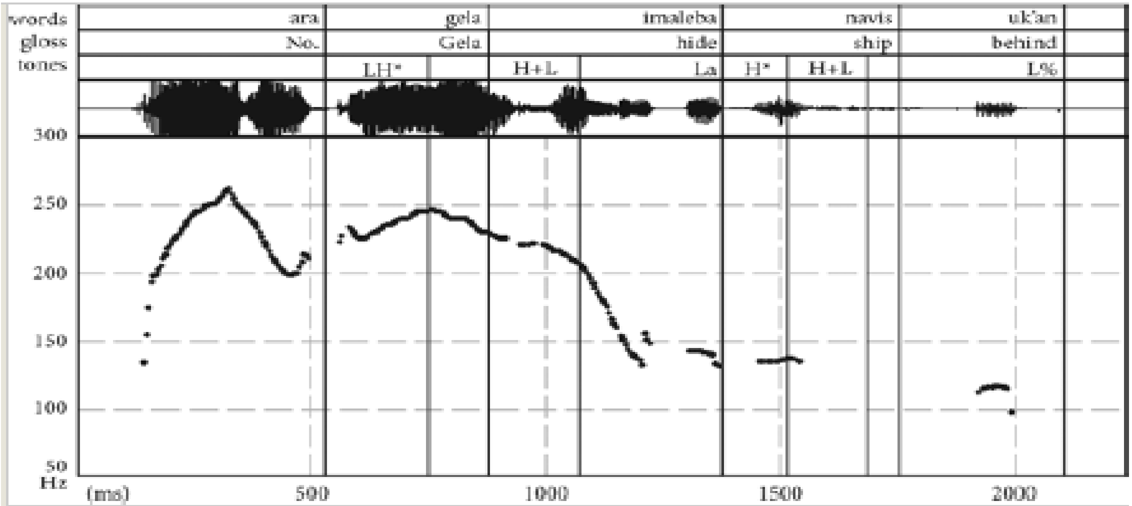


Figure 11: An example of a postfocal verb bearing the H+L phrase accent within a single AP with the focused constituent ‘Gela’ (‘No. Gela is hiding behind the ship.’) (Vicenik and Jun 2014:180)

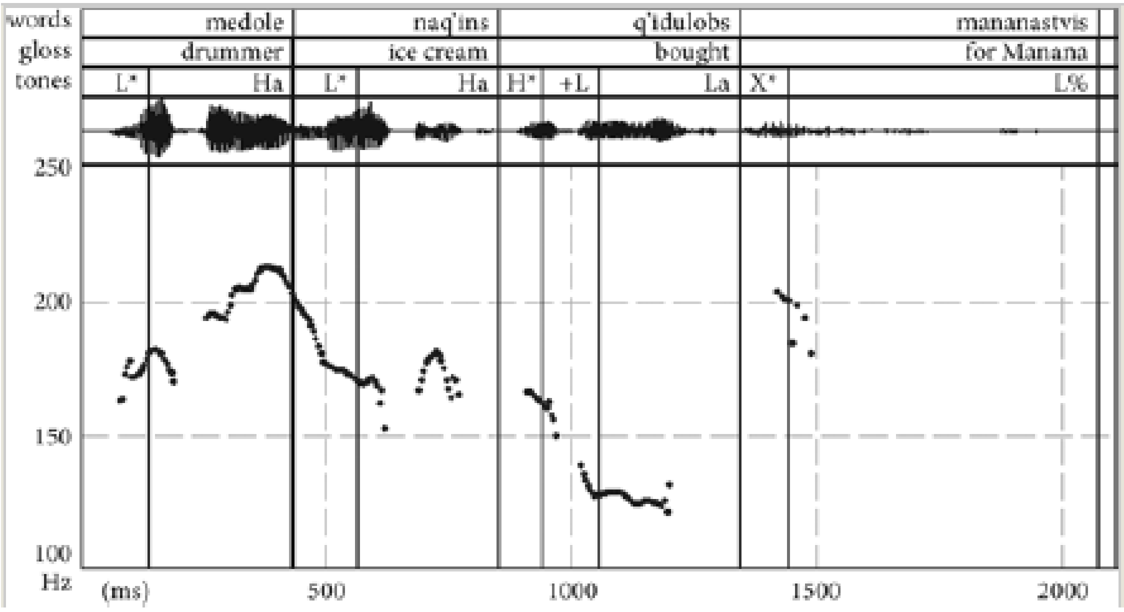


Figure 12: An example of the focused constituent ‘naqins’ (‘ice cream’) bearing a rising contour and the postfocal verb, separately phrased, bearing a H+L phrase accent (‘The drummer buys the ice cream for Manana.’) (Vicenik and Jun 2014:181)

In some cases the H+L phrase accent was absent entirely. In these cases, the focused constituent could be marked simply with a LH* or an H* pitch accent, followed by dephrasing of subsequent material[29] (see Figure 13).

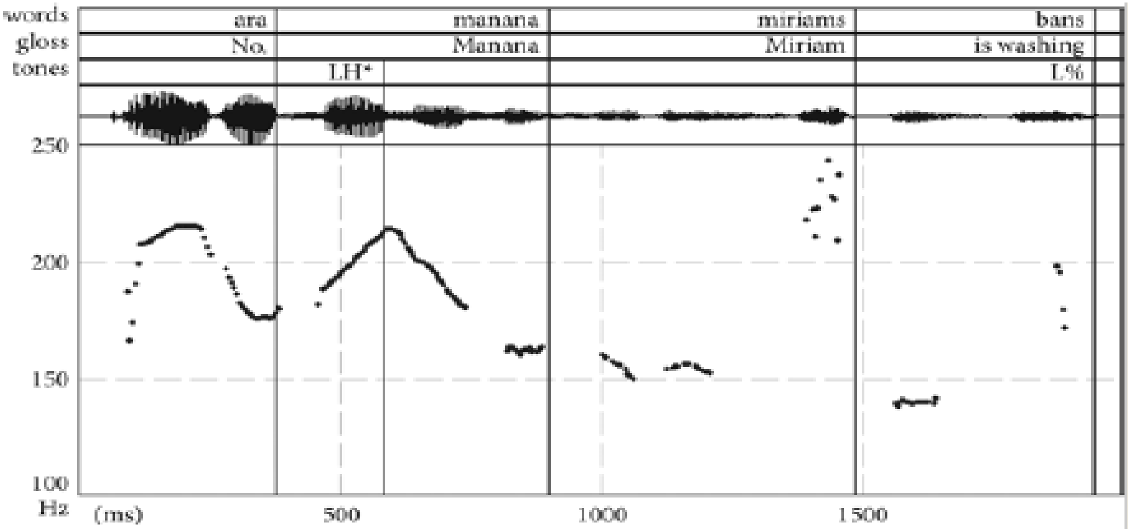


Figure 13: Absence of H+L phrase accent. Instead, the focused constituent 'Manana' is marked with an LH* pitch accent and subsequent dephrasing ('No. Manana is washing Miriam.') (Vicenik and Jun 2014:179)

Another intonational feature frequently observed with focus was alignment of the focused constituent to the right of a high ip boundary tone H-, which was realised on the final syllable of the preceding constituent. The focused constituent could then bear the phrase accent as normal (see Figure 14) or, alternatively, the phrase accent H+L or both the phrase accent and the LH*/H* pitch accent could be absent, making phrasing the only marker of focus (see Figure 15).

[29] Vicenik and Jun (2014) report that they observed post-focal dephrasing only in the absence of a phrase accent on the focus.

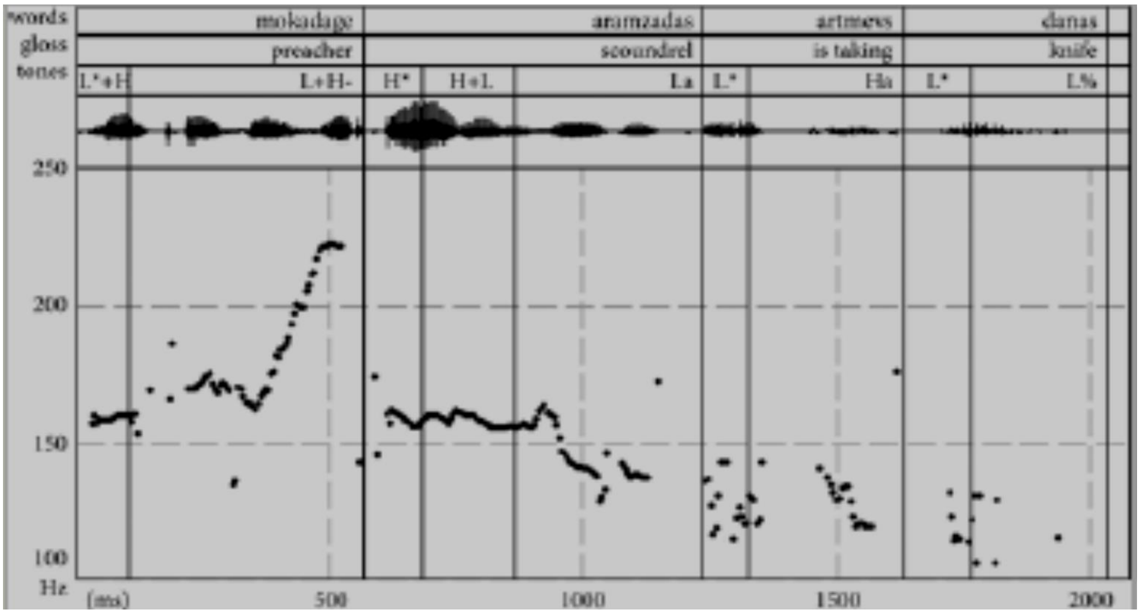


Figure 14: Example of a focused constituent ‘aramzadas’ (‘the rascal’) aligned to the right of an ip boundary (‘The preacher is taking the knife from the scoundrel.’) (Vicenik and Jun 2014:183)

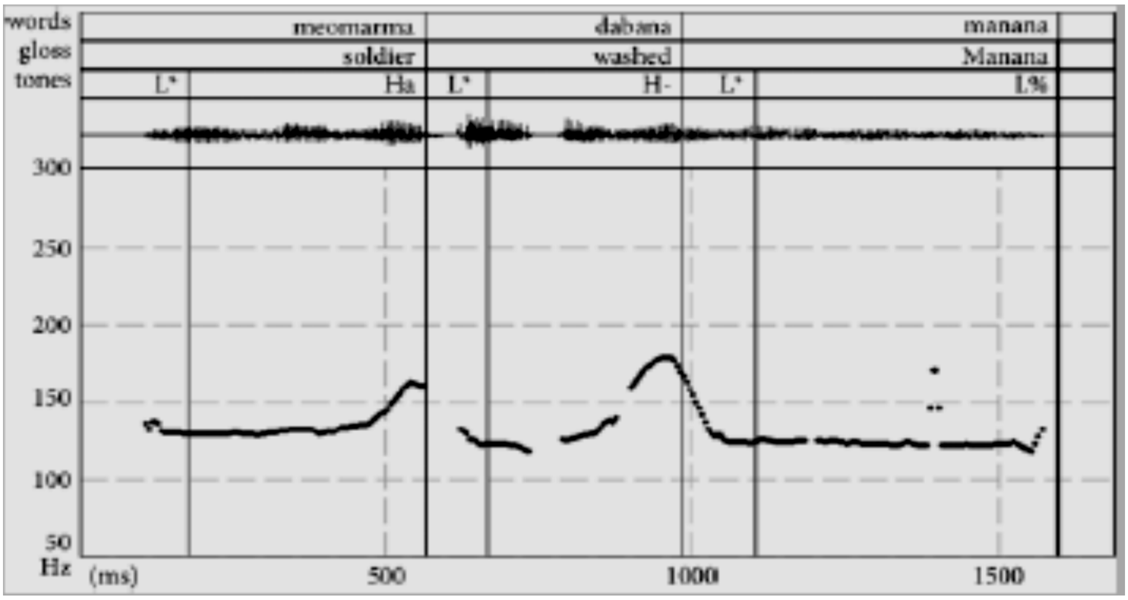


Figure 15: Example of a focused constituent ‘Manana’ marked only by alignment to the right of an ip boundary (‘The soldier washed Manana.’) (Vicenik and Jun 2014:182)

Vicenik and Jun (2014) find further support for their association of the H+L phrase accent with focus in their analysis of yes-no questions, in which the phrase accent is found to mark focus on the verb. The distinctive wave-like intonational contour associated particularly with yes-no questions in Georgian (see for example Hewitt (1995)) is analysed by Bush (1999) as a complex L+H- ip boundary, which appears on the focused verb and other constituents focused in the question. Sentence-finally, this ip boundary tone appears adjacent to a low (L%) or a high (H%) IP boundary tone, the former associated with politeness and the latter neutral. By contrast, as their analysis does not permit boundary tones of different phrase levels to be realised together on the same syllable (as discussed, a higher boundary tone instead replaces a lower one), Vicenik and Jun (2014) instead analyse the pattern as a phrase accent H+L appearing in combination either with a simple H% or complex HL% boundary tone sentence-finally, or with a simple H- boundary tone non-finally. The H+L phrase accent simultaneously accounts for a sustained level of pitch height that they observe following a preceding high pitch accent H*. In some cases, Vicenik and Jun (2014) found that the preceding argument joined the verb in a single AP and ip with the pitch and phrase accents and boundary tone spread across the two, as observed in Figure 11 above in 'focus sentences' (see Figure 16). In other cases, the verb appeared in its own AP and accommodated the three tonal events by partial replacement: the H* pitch accent replaced the first high tone H of the phrase accent and was followed by its low tone +L, which preceded the high boundary tone H- (see Figure 17):

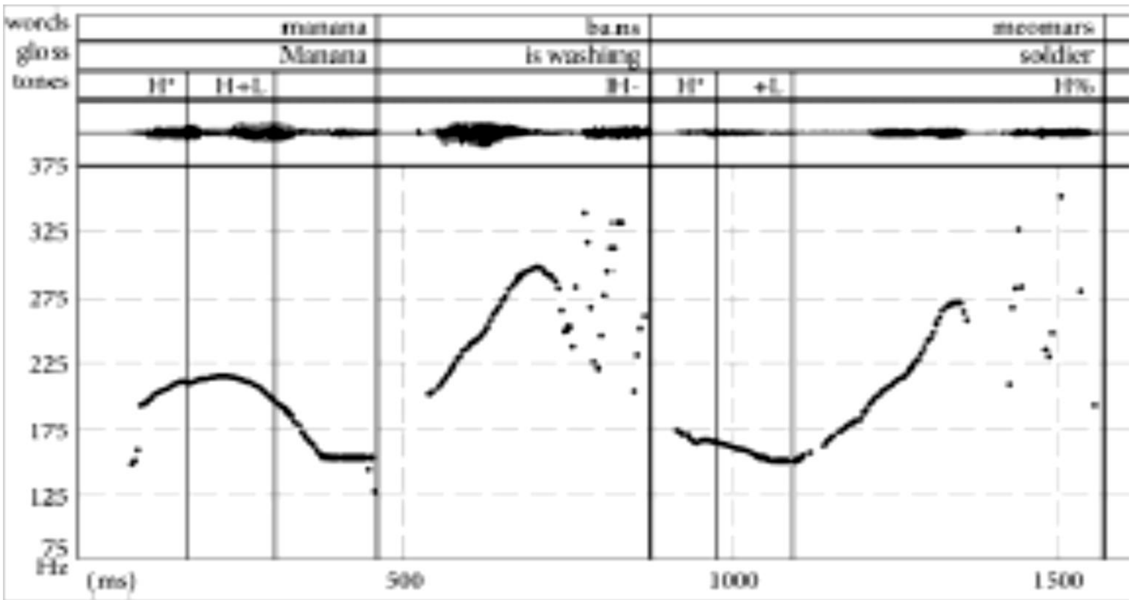


Figure 16: Yes-no question with verb and preceding subject forming a single AP ('Manana is washing the soldier?') (Vicenik and Jun 2014:171)

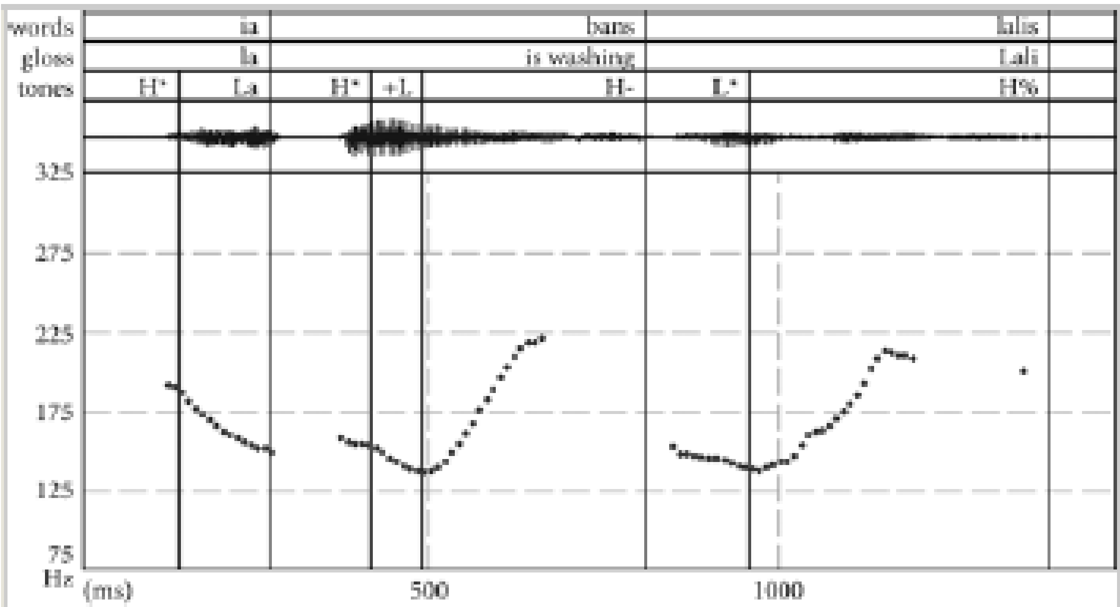


Figure 17: Yes-no question with verb and preceding subject forming separate APs ('Ia is washing Lali?') (Vicenik and Jun 2014:170)

Although in their data yes-no questions ended most often with a high H% or with a falling HL% IP boundary tone, Vicenik and Jun (2014) observed that they also sometimes ended in a low IP boundary tone L% of the type found in their declaratives and focus sentences (see Figure 18).

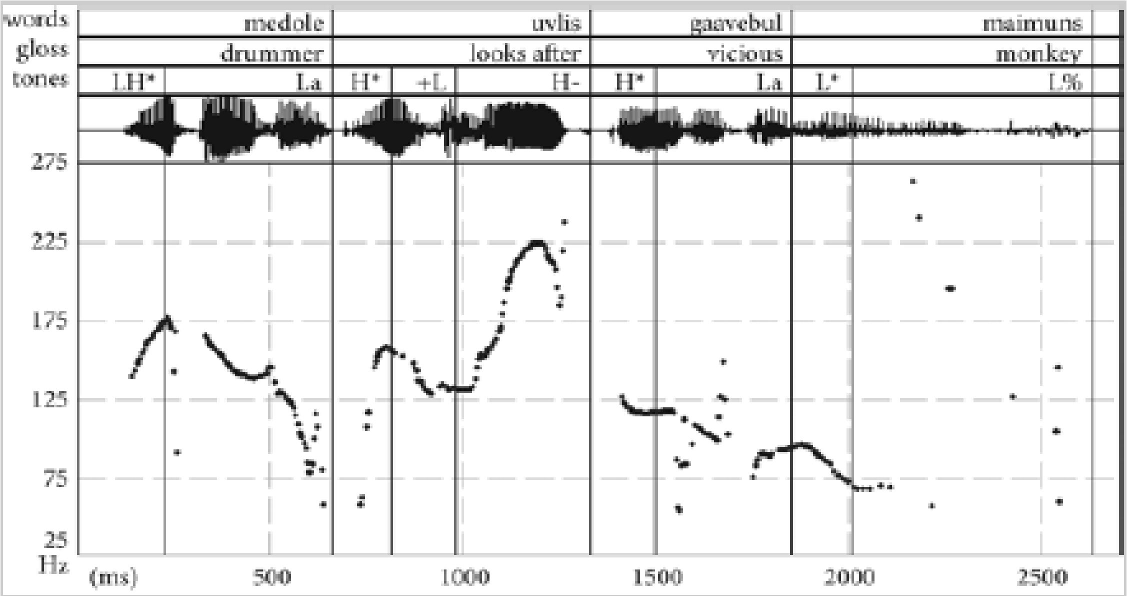


Figure 18: Yes-no question ending in a low boundary tone L% (‘The drummer is looking after the vicious monkey?’) (Vicenik and Jun 2014:173)

The H+L phrase accent is likewise identified by Vicenik and Jun (2014) as the main feature marking focus in wh-questions. In their analysis, the wh-constituent and following verb are again commonly realised within a single AP and ip, with the phrase accent spread over the verb (see Figure 19). If they are phrased individually in separate APs, the phrase accent remains on the verb and wh-constituent and verb still form one ip together (see Figure 20). Unlike the ip boundary tone found on the verb in yes-no questions, though, the boundary tone here was not always a high H- tone but could also be low tone L-. As with yes-no questions, wh-questions were found to end most commonly in an H% boundary tone, although HL% and L% boundary tones were also observed.

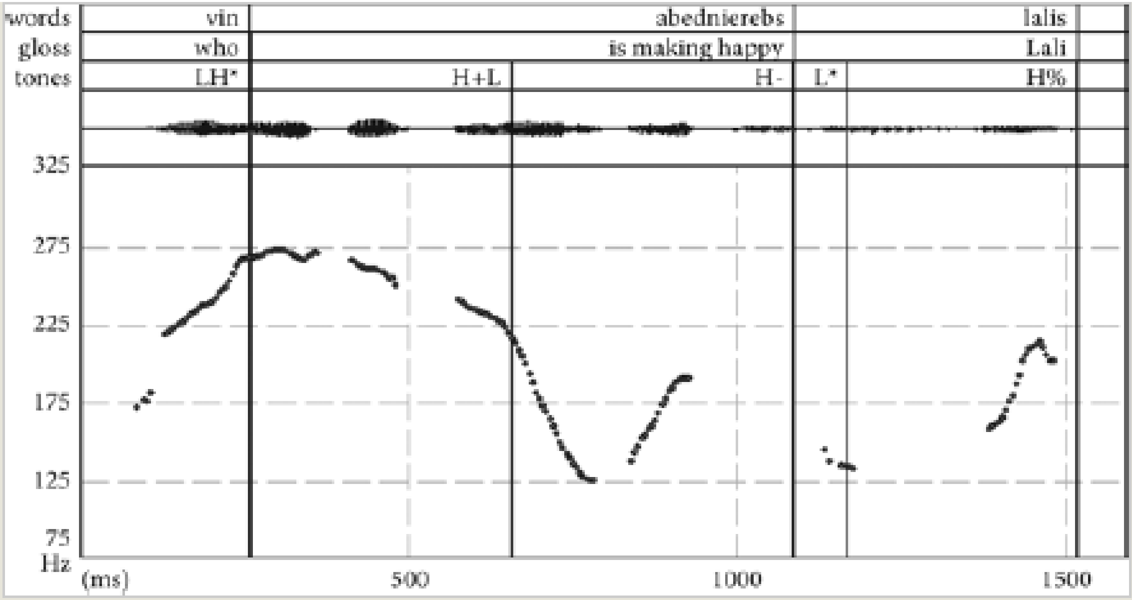


Figure 19: Wh-question showing grouping of wh-constituent and verb into a single AP (‘Who is making Lali happy?’) (Vicenik and Jun 2014:165)

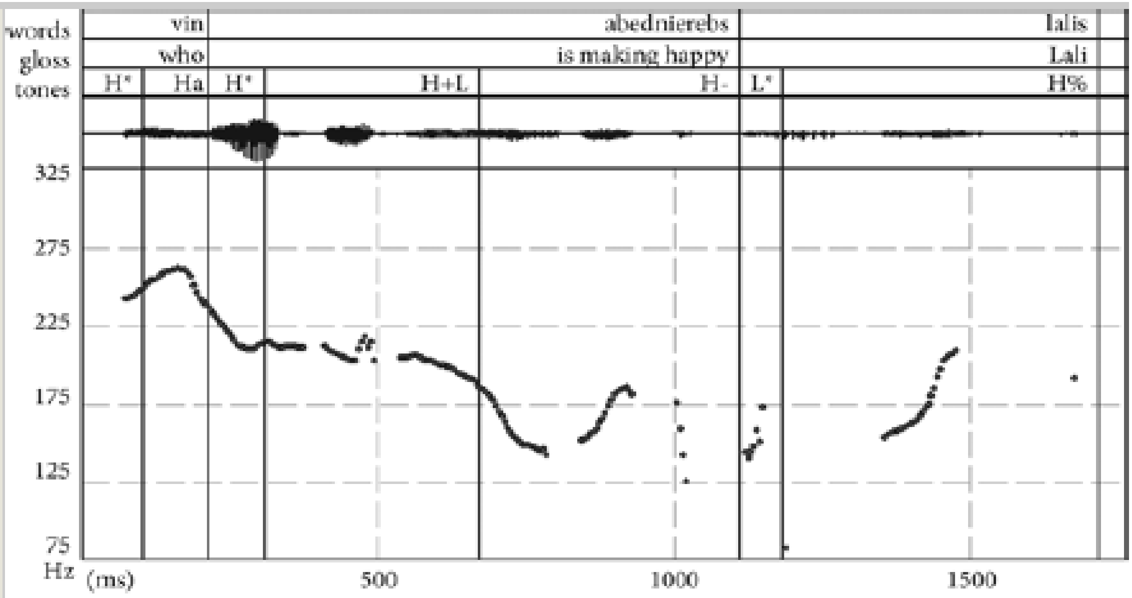


Figure 20: Wh-question showing wh-constituent and verb realised in separate APs (‘Who is making Lali happy?’) (Vicenik and Jun 2014:166)

In summary, Vicenik and Jun (2014) associate focus in statements and questions predominantly with a phrase accent H+L, which often appears with a rising (LH*) or a high (H*) pitch accent. This is contrasted with a rising L* Ha contour associated with ‘declaratives’. As they point out, however, this H+L phrase accent can be located on a different, non-focused constituent or, at least in statements, may be absent altogether and focus signalled by other means. The pitch accent H*/LH* can similarly be absent in some cases of focus and according to their analysis can also appear on non-focused constituents within complex NPs. The same is true of left alignment of the focused constituent with an ip phrase boundary, which is identified as a focus-signalling feature only in statements.

This variability in the expression of focus raises the possibility that an alternative prosodic property or properties may exist which are common to focused constituents and which serve to distinguish them from non-focal or non-prominent constituents[30]. The possibility of an alternative distinction between prominence and non-prominence is further suggested by the ‘declaratives’ with which the focus sentences are contrasted in the study. As discussed, the status of the declaratives and the rising L* Ha declarative contour with respect to focus and prominence is not made fully clear; whilst they are contrasted with focus sentences and the focus contour, Vicenik and Jun (2014:155) also appear to refer to them as examples of ‘broad focus’. Although the contexts in which they were elicited are not fully elaborated either, however, it appears likely that participants were simply presented with English sentences for which they were asked to settle on a natural Georgian translation. As discussed in chapter 2, I follow Lambrecht (1994) and others in assuming that ‘out of the blue’ sentences of the kind discussed are realised with a sentence focus structure, with prominence not only on the final argument in the sentence (generally an object) but also on at least any other arguments present in the sentence[31]. If this was the case with Vicenik and Jun’s (2014) declaratives, it is likely that the rising L* Ha contours observed non-finally in them are themselves markers of prosodic prominence. If it is the case that prominence can be realised both by rising and by falling contours, the

[30] Vicenik and Jun (2014) point out that their study is only a preliminary, qualitative one.
[31] As discussed in chapter 2, predicating expressions are found often to be unaccented, even if not previously mentioned.

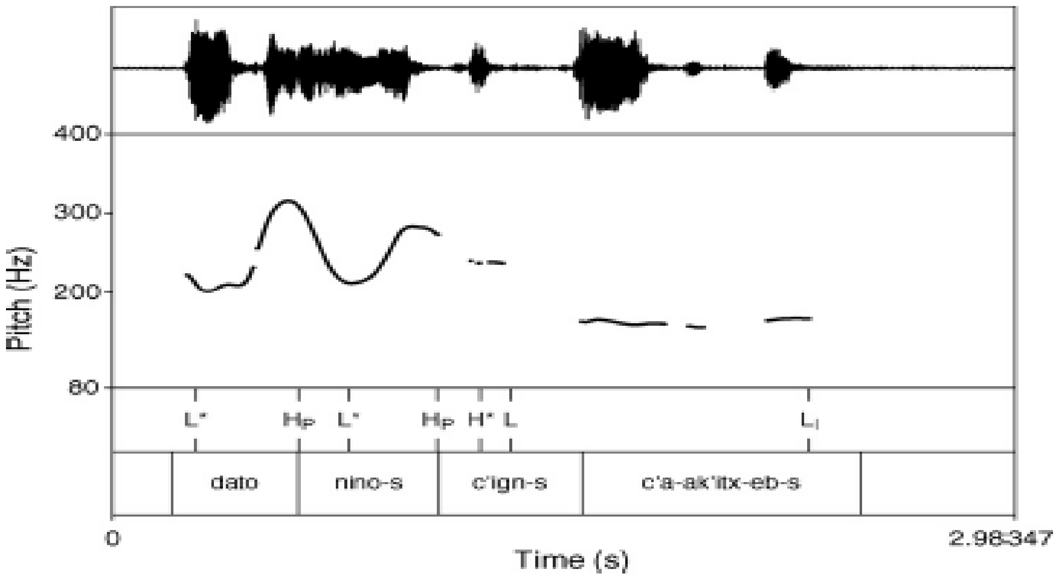
distinguishing property between prominence and non-prominence remains to be established. Below I will discuss several analyses, including more quantitative studies, which indicate that this is the case.

With reference in particular to the models of focus alignment discussed in chapter 2, which posit a single direction of alignment upon a single phrasal level within a given language (see for example Féry 2013), marking of focus in Georgian by alignment to the left of an ip boundary in some cases as proposed by Vicenik and Jun (2014) sits uncomfortably with two other cases of alignment from their data. The first, as also proposed by Bush (1997) and Müller (2007), is the consistent alignment of the focused verb in yes-no questions with the right edge of an ip boundary, which is manifested in their analysis by a H- high tone. As mentioned, this high tone forms an integral part of the distinctive yes-no question intonation; Vicenik and Jun (2014) note that this is consistently a high boundary, unlike in wh-questions in which the verb is found to align to the left both of high H- and of low L- boundary tones. The second is the observation that complex noun phrases tend to end with an ip boundary tone. Vicenik and Jun (2014) do not address the possibility that the 'declarative' sentences in their study are likely to have been produced with a sentence-focus intonation in which the subject, especially if complex, is prosodically prominent. This raises the possibility that the ip boundary to the left of which these complex NPs are aligned may serve to mark this prominence. These instances of apparent right-boundary alignment conflict with the partial left-boundary alignment analysis posited by Vicenik and Jun (2014). Bearing in mind the posited difficulty of fully controlling for the degree of prosodic prominence with which non-focal constituents are realised in production experiments of this kind, together with the fact that Georgian is a pro-drop language, the left- boundary alignment cases observed by Vicenik and Jun (2014) (see Figure 14 and Figure 15) could, under an alternative right-boundary analysis, be accounted for as marking prominence on the preceding constituent. In chapter 5 I will present data from a new production experiment, which support an analysis in which alignment with the right boundary of an ip phrase is the key consistent feature separating focus from non-focus.

4.1.2 Skopeteas *et al.* (2009a)

As part of a larger study into interaction of word order and prosody (see chapter 3), Skopeteas *et al.* (2009a) analyse the prosody of a set of ditransitive declarative sentences, which were recorded in Tbilisi by a female native speaker of Georgian in her twenties with a knowledge of linguistics. The sentences were uttered in response to written questions eliciting various focus contexts, which in this case are made fully explicit: in addition to the wh-constituent questions used to elicit narrow and multiple focus, ‘all-new’ or ‘wide’ focus was elicited with the question ‘what is happening?’. Sentences were also checked for context-naturalness by other native speakers.

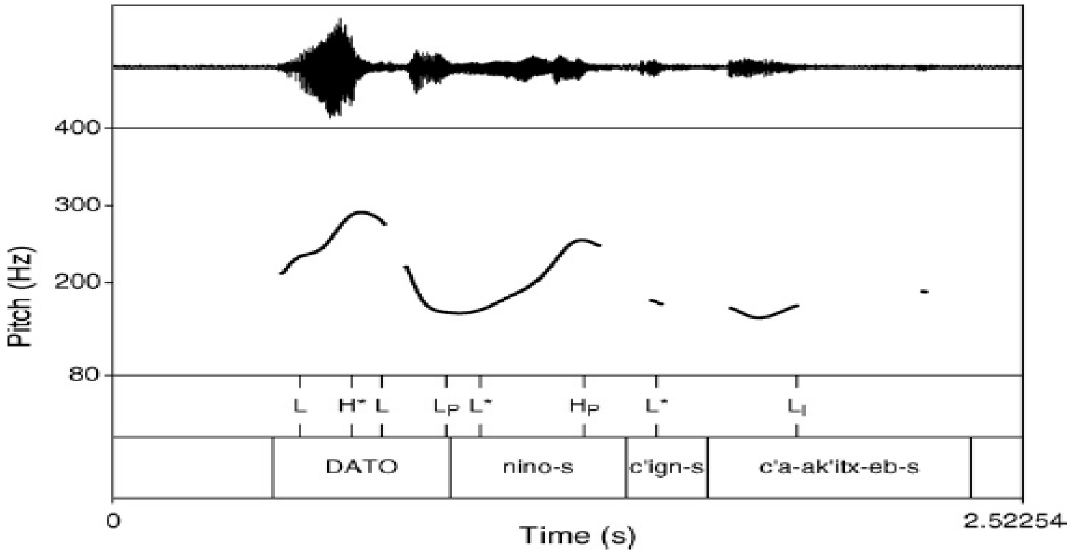
Unlike Vicenik and Jun (2014), Skopeteas *et al.* (2009a) identify only two prosodic units in Georgian: the Intonation Phrase (IP) and, below this, the p-phrase (PP). The PP is similar to the AP posited by Vicenik and Jun (2014), in that each constituent is found to form one. The verb is an exception; this is found generally to form a p-phrase, most commonly with the preceding constituent, or with the following constituent in cases in which the verb appears sentence-initially. Similarly to Jun et al. (2007), Skopeteas *et al.* (2009a) describe the p-phrase as featuring an initial pitch accent (H*, L*, LH* or H*L), again post-lexically assigned, followed by a p-phrase boundary tone (H_P or L_P). Despite the difference in prosodic units proposed, Skopeteas *et al.* (2009a) observe a similar contrast to Vicenik and Jun (2014) between the realisation of all-new sentences, in which every constituent is assumed to be in focus, and that of narrow focus sentences. The all-new sentence in Figure 21 displays a similar pattern to the ‘declarative’, in that the non-final subject and indirect object are realised with a rising contour. In contrast with the ‘declarative’ pattern, however, the direct object is realised with the verb in a single phrase with a falling contour. P-phrase peaks are again downstepped relative to the preceding peak.



dato nino-s ċign-s ċaaḳitxebs.
Dato.NOM Nino-DAT book-DAT help.read.PRS.3SG
‘Dato is helping Nino read a book.’

Figure 21: Example of an all-new focus contour (Skopeteas et al. 2009a:112)

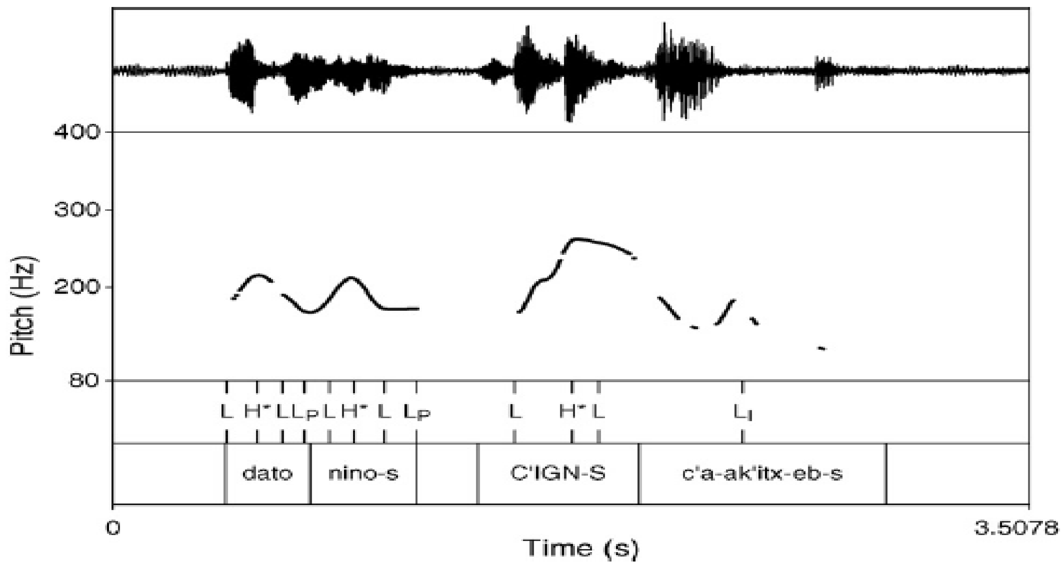
By contrast, sentence-initial focused constituents were often, but not obligatorily, realised with a rising-falling contour LH*L L_P, with the fall found to begin early following the peak reached in the first syllable (see Figure 22). This is similar to the contrast described in Vicenik and Jun (2014) between a rising L* Ha declarative contour and a focus contour composed of LH* or H* pitch accent and ending in an La boundary tone. The additional L tone ending this pitch accent has a parallel in the final +L component of the H+L phrase accent. Focused constituents were reportedly also realised with intensity in their consonants, and with increased duration compared with their all-new sentence counterparts. Unlike Vicenik and Jun (2014), Skopeteas *et al.* (2009a) observe little deaccenting of post-focal material in comparison with other languages; full intonation, although within a compressed range, is observed at least after initial subjects and indirect objects, with a greater degree of compression following an initial direct object.



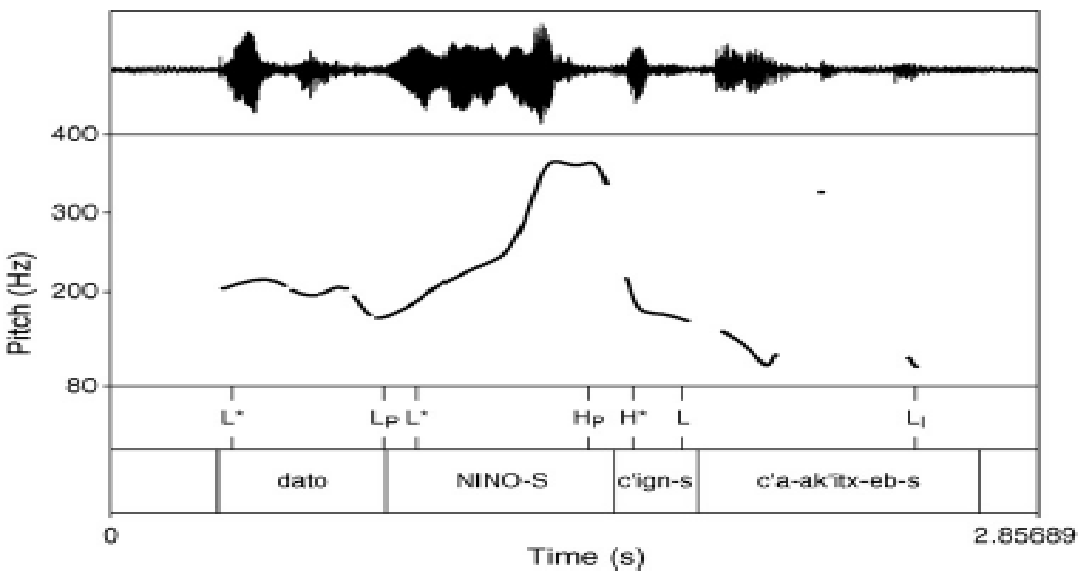
dato nino-s çign-s çaakitxebs.
Dato.NOM Nino-DAT book-DAT help.read.PRS.3SG
'Dato is helping Nino read a book.'

Figure 22: Example of initial subject focus contour (Skopeteas et al. 2009a:112)

Significantly, Skopeteas *et al.* (2009a) did not find that the rising-falling LH*L L_P contour was biuniquely associated with focus, as it was observed not only on focused constituents but also on non-focused constituents, including prefocal constituents, as shown in Figure 23. The prefocal contour was found to be fully intonated and otherwise realised with the rising contours associated with the all-new sentence contour. In addition, it is observed that sentence-medial foci were often realised with the LH*L L_P contour when phrased individually, but could also be realised with just a rising contour when phrased together with the following verb. More rarely, an individually phrased medial focus was found to be realised with a rise, as in Figure 24.



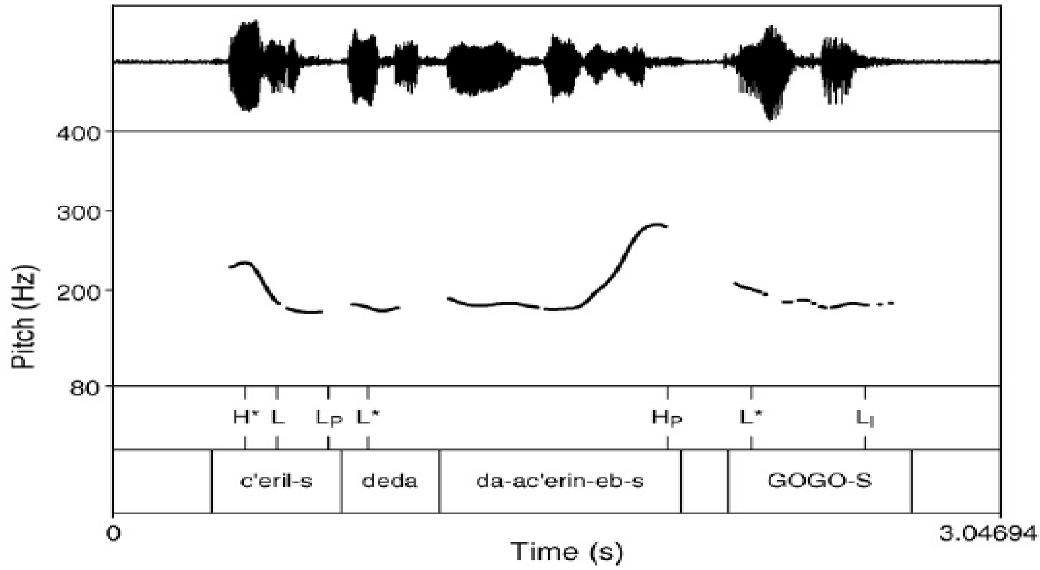
dato nino-s çign-s çaaķitxebs.
Dato.NOM Nino-DAT book-DAT help.read.PRS.3SG
'Dato is helping Nino read a book.'
Figure 23: medial focus, with same falling contour on preceding constituents (Skopeteas et al. 2009a:113)



dato nino-s çign-s çaaķitxebs.
Dato.NOM Nino-DAT book-DAT help.read.PRS.3SG
'Dato is helping Nino read a book.'

Figure 24: Example of focus realised just with a rising contour (Skopeteas et al. 2009a:113)

Similarly to Vicenik and Jun (2014), final focused constituents were found to be realised with a low, flat contour L* L_I, and within a separate phrase preceded by a short break, as shown in Figure 25. Sentence-final foci were also found to be realised with additional duration compared with other narrowly focused constituents.



ç̣eril-s deda daaç̣erinebs gogo-s
letter-DAT mother.NOM help.write:PRS:3SG girl-DAT
'Mother is helping the girl to write a letter.'

Figure 25: Low, flat realisation of final focus (Skopeteas et al. 2009a:114)

Similarly to Vicenik and Jun (2014), then, Skopeteas *et al.* (2009a) associate focus prosody with a particular contour type, which again is a rising-falling contour which they contrast with a rising contour associated with 'all-new' focus. As with Vicenik and Jun (2014), however, they also observe that foci vary from this contour type in their realisation, both between and within particular sentence positions as shown by final and by medial focus. Again, therefore, this variation suggests the possibility of an alternative prosodic feature which unites these focus realisations.

Furthermore, Skopeteas *et al.* (2009a) find that the LH*L L_P contour is not bi-uniquely associated with focus, but can also appear on non-focal constituents, including on constituents preceding the focus, which they analyse as discourse-prominent topics. By contrast, the rising L* H_P contour is explicitly referred to as the 'default' pattern used to mark 'non-prominent' phrases (Skopeteas *et al.* (2009a:115), suggesting that the distinction between these contours marks one between informationally prominent constituents, including both foci and discourse-inactive topics, and informationally non-prominent constituents, rather than one specifically between focal and non-focal constituents. On the other hand, the context in which the all-new sentences were elicited is clearly stated here as the question 'What is happening?'. As with the apparent context in which Vicenik and Jun's (2014) declaratives were elicited, such a context is likely to elicit informational prominence on all sentential arguments. The alternative analysis I suggested above, in which the distinction between the rising-falling and the rising contour marks not a distinction between informational prominence and non-prominence, but instead one between a more emphatic subtype of informational prominence and a more general kind of informational prominence, has additional support in this study from the fact that the native speaker who produced the sentences was instructed to do so with emphasis on the information under question, and is therefore likely to have made a conscious effort to make the constituents produced with the rising-falling contour additionally 'emphatic' rather than simply responding to the elicitation questions in a natural way[32]. As discussed, whereas Vicenik and Jun (2014) characterise penultimate direct objects in declarative sentences as bearing a rising contour, Skopeteas *et al.* (2009a) characterise them as bearing a falling contour; this difference in realisation is compatible with one between a standard and a more emphatic realisation of what would be a prominent constituent in both cases under the interpretation I suggest.

[32] Skopeteas *et al.* (2009:107) in fact refer to this rising-falling contour in one place as a 'contrastive accent'.

That prominence may also be expressed by a rising contour in Georgian is supported by two studies of information-structural prosody with a more cross-linguistic scope. In the first of these, Skopeteas and Féry (2007) investigate differences between the realisations of narrow and multiple focus in 'single' and in 'pairing' answers in Georgian and several other languages, with the prediction that pairing answers force a contrastive topic reading on the subject which overrides any focus reading it may have in a single answer. As Figure 26 and Figure 27 show, whereas the initial narrowly focused subject was realised with a falling contour similar to those identified by Vicenik and Jun (2014) and by Skopeteas *et al.* (2009a)[33], when part of multiple focus or part of a pairing answer it is realised with a rising contour similar to the kind which the same studies associate with 'declarative' or 'all-new' constituents and which was also identified on the subject in the narrow object focus contexts.

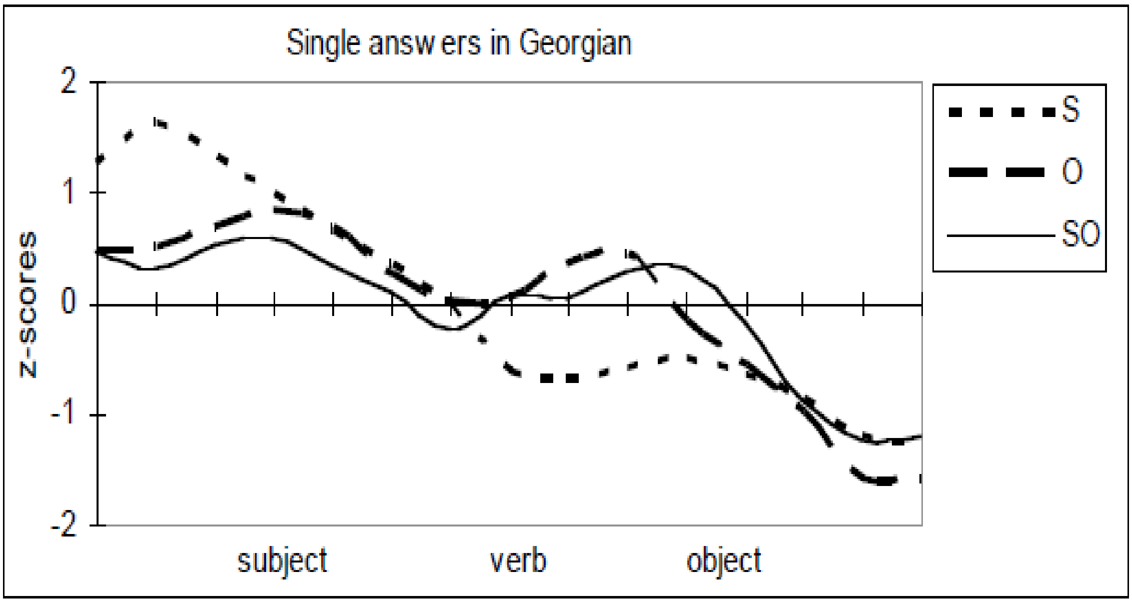


Figure 26: Time and F_0 normalised contours for single answers in Georgian, showing subject focus (S), object focus (O) and multiple focus (SO) (Skopeteas and Féry 2007:340

33 Skopeteas and Féry (2007) also comment that the object and verb here have similar realisation to the other conditions, which is consistent with the lack of post-focal deaccenting observed by Skopeteas *et al.* (2009a).

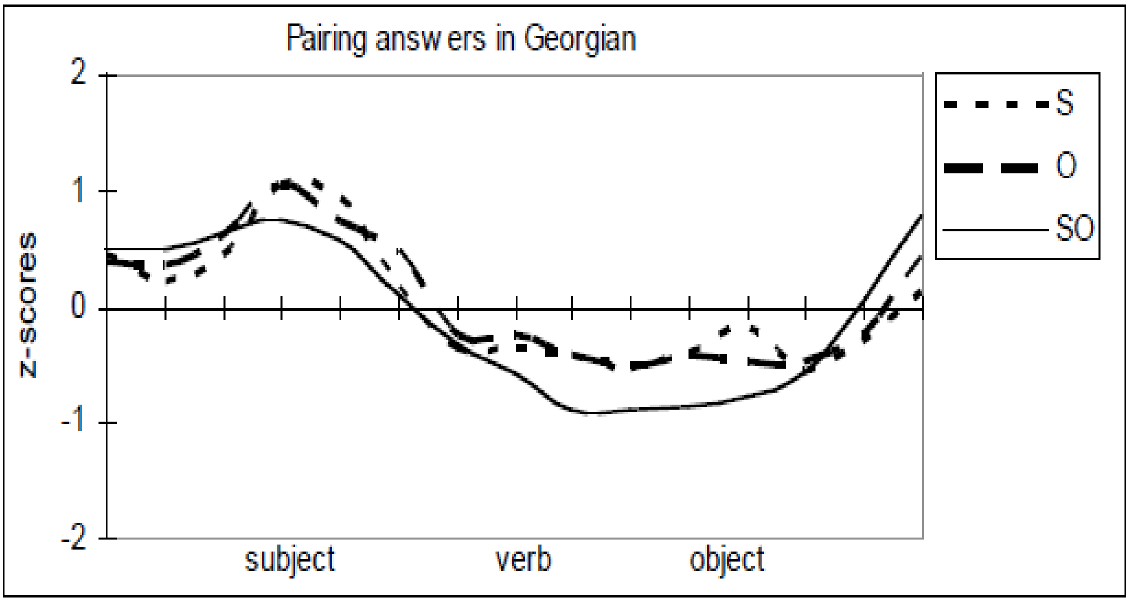


Figure 27: Time and F_0 normalised contours for pairing answers in Georgian, showing subject focus (S), object focus (O) and multiple focus (SO) (Skopeteas and Féry 2007:341)

Some data of a more quantitative nature which speak against this analysis are provided by Féry et al. (2010). Investigating the syntax (see chapter 3) and prosody of referents newly introduced in varying spatial relationships to given items in Georgian and other languages, they find that, whereas sentence-final focused locatives are realised predominantly (92% of cases) with the 'super-low' flat tone observed on final foci by Vicenik and Jun (2014) and by Skopeteas *et al.* (2009a)[34], or with a falling tone (8% of cases), the majority of non-final narrowly focused referents were realised with a rising contour, produced in 69% of cases rather than with a falling contour, produced in only 31% of cases. These quantitative data clearly contradict the observations of the studies discussed above that initial narrowly focused subjects were realised predominantly with a rising-falling contour. In addition, that an initial narrowly focused subject can be realised with a rising contour provides further support for the alternative role of a rising-falling vs rising distinction suggested above as one between a more emphatic and a standard informational prominence; it is

[34] It can be noted that none of the studies mentioned so far which discuss the super-low pattern state whether they observed it in non-final focus contexts.

incompatible with alternatives under which the contours distinguish either discourse-prominent topics from focused constituents or prenuclear from nuclear prosodic prominences. Further evidence that focus in Georgian may be realised with a rising contour is provided by Asatiani (2009), who as a native speaker of Georgian contrasts the realisation of focus with a rising contour with that of topics, which she describes as having a wave-like contour.

In this section I have discussed studies which associate the realisation of focus, or of prominence, with a particular contour type, contrasting it with a rising contour, whilst acknowledging some variation in focus marking. With the support of some findings from smaller-scale studies of Georgian, I have shown how the data are compatible with an alternative interpretation. This interpretation is compatible with the assumption that sententences produced in speech production experiments of the type discussed may feature prosodic prominences upon more constituents than those upon which focus is elicited and thus leaves the question of the prosodic distinction between focus/prominence and non-focus/non-prominence. In the next section I will discuss additional analyses which, with the support of further quantitative data, reject the pitch accent analysis in favour of a phrasing analysis of Georgian prosody.

4.2 'Prosodic Phrasing' Analyses

4.2.1 Skopeteas and Féry (2010), Féry (2013)

On the basis of a more quantitative study on the realisation in Georgian of initial, medial and final narrow foci ([S]fVO, S[O]fV and SV[O]f) and of broad focus ([SVO]f and

[SOV]f)[35], Skopeteas and Féry (2010) reject an analysis of focus realisation dependent on pitch accents in favour of one based fully on prosodic phrasing. Contrary to the qualitative analyses of Vicenik and Jun (2014) and Skopeteas *et al.* (2009a) discussed in the previous section, according to which focus, in combination with other tonal features, is realised most commonly with a high H* or rising LH* pitch accent on the focused constituent, Skopeteas and Féry (2010) report a similar finding to Féry *et al.* (2010): in the SVO order the focused subject featured a high tone on its initial rather than its final syllable in only 15.6% of utterances, and in the sentence focus context in only 25% of utterances[36].

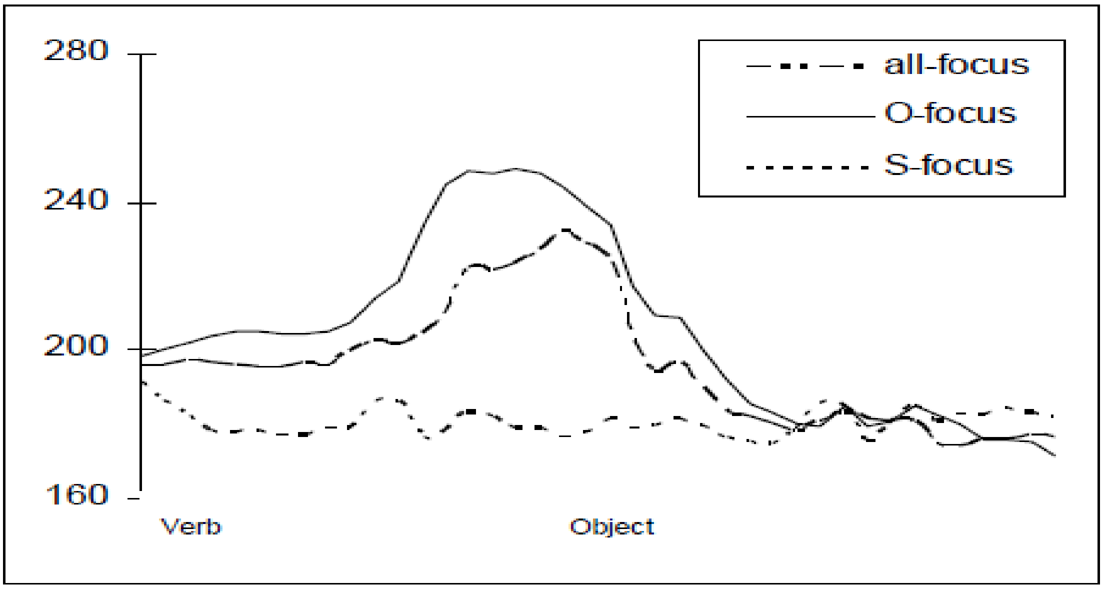


Figure 28: Average F0 measurements for broad, object and subject focus (Skopeteas and Féry 2010:4)

At the same time, their findings for final object focus and sentence focus reflect those of Vicenik and Jun (2014) and Skopeteas *et al.* (2009), among others: the final object in both cases is realised with a low, flat contour which is preceded by a final high tone on the medial verb. This pattern contrasts with the subject focus context, in which the post-focal

[35] The experiment was completed in Berlin by 8 female participants who had left Georgia only 0.6 to 3 years before taking part. Focus was elicited by means of context questions. Other word orders and focused contexts were reportedly included in the task, but data on these are not discussed.
[36] From this it appears that Skopeteas and Féry (2010) assume in this study that the sentence focus subject is ‘in focus’ in the same way as narrow foci.

contour on the verb and object was found to remain flat and low (see Figure 28). In the SOV linearisation, object focus was realised with a high tone on the preceding subject in a narrow majority of cases (56%). On the basis of these observations, Skopeteas and Féry (2010) propose that focus in Georgian is realised, not by a specific pitch accent, but rather by alignment of the focused constituent with the boundary of a p-phrase[37] manifested in the form of a high boundary tone (H). This is argued to support the analysis presented by Skopeteas & Fanselow (2010) that canonical word order in Georgian is SOV and that SVO is the result of syntactic fronting; in SOV, object and verb are realised within a single p-phrase, with the left boundary of which the object is aligned, whereas in SVO order the two are phrased separately, with the object again aligned to the left boundary. The initial focused subject, by contrast, is aligned with the right boundary of a p-phrase. The phrasings posited in their analysis are summarised in Table 16. They also note that the duration of narrowly focused constituents is greater than that of their broad focus counterparts.

Table 16: Summary of focus phrasings by word order according to Skopeteas and Féry (2010)

Focus Type	SVO	SOV
Broad	$[SV]_P$ $[O]_P$	[SOV], [S][OV]
Subject	[S] [VO]	-
Object	[SV][O]	[SOV], [S] [OV]

In addition to its more quantitative basis, the prosodic phrasing analysis proposed by Skopeteas and Féry (2010) characterises Georgian focus prosody in a more uniform way; whereas the pitch accent analyses of Vicenik and Jun (2014) and Skopeteas *et al.* (2009a) note the exception of final foci, which are realised not with a high H* but with a low L*

[37] As discussed, the p-phrase is also employed in the analysis proposed by Skopeteas *et al.* (2009a).

pitch accent, this variation is not an issue from the point of view of prosodic phrasing. As a phrasing analysis based on syntax, on the other hand, it is at odds with those discussed in chapter 2, which posit a uniform direction of prosodic alignment for discourse relations within a given level of prosodic phrasing in a given language. It can also be noted that the phrasings posited reflect only partially the syntactic phrasings posited by Skopeteas and Fanselow (2010), which were discussed in chapter 3; particularly as more than one prosodic phrasing is proposed for broad and object focus.

As part of her paper discussed in chapter 2, in which all languages discussed are posited to exhibit a uniform direction of alignment per prosodic phrase level, Féry (2013) includes an analysis of Georgian in which focus is uniformly realised by alignment with the left boundary of a p-phrase. This is again realised by a high p-phrase boundary tone H_P on the final syllable of the preceding constituent, and is therefore absent in the case of sentence-initial focus. Her posited phrasings are shown in [**1**] (in which the p-phrase is annotated *Φ* and the larger intonation phrase *ι*). Féry (2013) also mentions that a final high tone was found on the object in 90% of cases in the OSfV linearisation.

1) a) Agent correction (S_FVO)
{In the scene in front of the well: Is a woman pushing a man?}
ara, ((ḳats-i$_F$ aç̣veba ḳac-s)Φ)ι
no, man-NOM push.PRS.3SG man-DAT
'No, a man is pushing the man.'

b) Agent correction (OS_FV)
{In the scene with the blue sky: Is a man hitting the man?}
ara, ((ḳac-s)Φ (kal-i$_F$ urṭq̣ams)Φ)ι
no, man-DAT woman-NOM hit.PRS.3SG
'No, a woman is hitting the man.'

c) Patient new (SVO_F)
{In the scene in front of the fence, what is the girl hitting?}
((gogo urṭq̣ams)Φ (mankana-s$_F$)Φ)ι
girl.NOM hit.PRS.3SG car-DAT
'The girl is hitting a car.'

(Féry 2013:712)

In addition to the phrasing shown in 1c), Féry (2013) reports that a sentence-final focus was often found to be realised with an extremely low, flat contour starting with a low tone on the first syllable. This pattern is again termed ‘superlow’ and its attributed phrasing shown in [**2**].

2) New patient (SVO$_F$)
{About whom does Nino care?}
(((nino eloliaveba)Φ)ι (mama-s$_F$)Φ)ι
Nino.NOM care.about.PRS.3SG father-DAT
‘Nino cares about the father.’

(Féry 2013:714)

Finally, a sentence in broad focus is realised within a single p-phrase, as shown in [**3**].

3) All-new sentence (SOV)F
{What happens?}
((nona bebo-s emudareba)Φ)ι
Nona.NOM grandmother-DAT beg.for.PRS.3SG
‘Nona begs for the grandmother.’

(Féry 2013:713)

This analysis however contradicts the data discussed in Skopeteas and Féry (2010) on which it is reportedly based; specifically, that initial subject focus was realised with a falling rather than a rising contour in only 15.6% of utterances, and the subject in the sentence focus context in only 25% of utterances; the prevalence of a subject-final high tone in these contexts is incompatible with the absence of a p-phrase boundary under Féry’s (2013) analysis. On the other hand, Skopeteas and Féry (2010) themselves fail to accommodate in their analysis the occurrence of low final tones where high final tones are predicted. In the SOV order, they report that instances of non-rising subject contours are in fact higher in the object focus context (44%) than they are in the sentence focus context (34%), which in both cases seem like high proportions of final low tones, associated with the absence of a p-phrase boundary, in positions in which p-phrase boundaries are posited. Their analysis of initial subject focus as being realised with a high boundary tone is similarly inconsistent, not only with Féry (2013), but also with the analyses of Vicenik and Jun (2014) and of Skopeteas *et al.* (2009a) discussed in the preceding section; although comparable statistics are not available from these more qualitative studies, such observations of falling focus contours in combination with Skopeteas and Féry's (2010) findings suggest that focused constituents in Georgian may bear both rising and falling contours, and may be preceded by constituents bearing both rising and falling contours. As such, the evidence is challenging for an alignment analysis in which prosodic boundaries are manifested by a high tone alone, whether alignment is to the left or to the right of this boundary. Instead, the evidence suggests an analysis under which such a boundary is distinguished from its absence not by a high tone alone, but instead by some prosodic feature which may be manifested either by a high or by a low final tone. Under the system of prosodic phrasing proposed by Skopeteas *et al.* (2009a) and assumed by Skopeteas and Féry (2010) and Féry (2013), which alongside the Intonation Phrase includes only the p-phrase, it is less clear how a boundary of this kind would be realised.

A second inconsistency of Skopeteas and Féry's (2010) analysis is, inversely, the occurrence in their data of final high tones which are not treated as prosodic boundaries. The analysis presented by Skopeteas and Féry (2010) leads us to expect an absence of high tones on constituents not immediately preceding a focus. Evidence for the absence of a final high tone on the medial verb following initial subject focus is contrasted with evidence for its presence on the verb when preceding a final focused object and in broad focus (see Figure 28), which supports the left-alignment argument. In their discussion of the realisation of sentence focus in canonical SOV order, on the other hand, they point out that all non-final constituents bear a rising contour, and then go on to point out that a medial object when narrowly focused likewise ends in a rising contour, which they then state that they analyse as a high boundary tone (Skopeteas and Féry 2010:2). It is unclear why, despite this statement, the high tone on the object in SOV order is not treated in their subsequent analysis as a prosodic boundary, either in the case of sentence focus or of medial object focus (as discussed, both are attributed the phrasings [S][OV] or [SOV]). Certainly in the case of object focus, the presence of this high tone on the object appears problematic both for a left-alignment analysis and for the syntactic analysis proposed, according to which object and verb are phrased together in canonical SOV order.

It is also unclear whether it is in some way magnitude that distinguishes between high tones which do and don't represent boundary tones; Skopeteas and Féry (2010) point out that the pitch excursion between subject and object in SOV order is greater in the case of object focus than it is in broad focus, but no similar data are provided for the excursions between object and verb in this order, and in any case this noted difference between sentence and object focus is not used to posit a difference in phrasing between the two focus structures. Data are similarly lacking for subject contours in SVO order in the final object focus context as a complement to Figure 28 above, which leaves it unclear whether the subject also exhibits an unaccounted-for final high tone in this context. As such, it can be seen that the data presented in support the left-alignment analysis both indicate the presence of unaccounted-for high tones to the right of focused constituents and are not complete enough to demonstrate that high tones are not present in other environments which do not directly precede foci.

On the one hand, these additional final high tones suggest that perhaps not all final high tones should be analysed as manifestations of prosodic boundaries marking prominence. On the other hand, in the light of the rising contours observed on all-new and topical constituents in the previous subsection, these additional boundary tones are compatible with the opposite analysis to that proposed by Féry (2013), in which not only sentence-initial foci, but all prosodically prominent constituents in all sentential positions, are marked uniformly by alignment with the right boundary of a prosodic phrase. Under such an analysis, these ‘extra’ boundary tones can be accounted for with the likelihood that prominent topics[38] and other constituents which also require this marking are present in these sentences. It can be noted that Skopeteas and Féry (2010:3,4) report the proportion of rising to non-rising contours to be higher upon focal subjects (15.6% non-rising in SVO) than upon subjects immediately preceding focused objects (44% non-rising in SO_FV), a difference which is more readily explained under an analysis in which both the focused subject and prominent topical subjects align to the right boundary of a p-phrase. The questions used to elicit focus contexts in the experiment are not provided in full, and it is not clear that the distinction between informationally prominent and non-prominent given items was controlled for, making it seem likely that the data may feature prominent given material which could account for this pattern of additional rises. Furthermore, Harris (1981) states that in Georgian, which has a verbal morphology permitting multiple arguments to be dropped, arguments are only present in the sentence if ‘emphatic’. In addition, prominent topics in Georgian bear a rising contour according to the findings of Skopeteas and Féry (2007), and such an analysis is consistent with the pre-focal rising contours observed by Vicenik and Jun (2014) and by Skopeteas *et al.* (2009)[39].

A right-alignment analysis likewise provides an alternative account for the prosodic patterns observed in the case of sentence-final foci, as in Figure 28: rather than marking the prominence of a final focused constituent, the final high tone observed on the preceding verb can instead be analysed as a boundary marking given prominence on the verb itself. As discussed in chapter 2, Lambrecht (1994) and others observe that the verb is

[38] In the OT analysis presented by Féry (2013) for Georgian, topics are likewise constrained to align to the left of a p-phrase; however this is modelled as a weak constraint, suggesting this alignment is not considered crucial to their realisation.
[39] As discussed, Vicenik and Jun (2014) also find that heavy noun phrases align to the right of an ip boundary.

generally given a non-prominent realisation, even in sentence focus contexts. In production experiments of the kind discussed in this chapter, however, in which native speaker participants are asked to utter generally simple sentences, particularly by reading aloud the same sentence in different focus contexts, and particularly if instructions involving emphasis are involved, it is quite possible that sentences will be produced with prominence on additional constituents to those intended, including on the verb. In this regard, the lack of a final rise on the verb in the subject focus context in Figure 28 has an explanation in the reduced likelihood of additional prominences being produced in postnuclear position. In chapter 5 I propose a set of hypotheses concerning Georgian focus prosody which are intended to take into account the possibility of participants realising target sentences with additional prominences to those predicted by the focus structures. The data then presented in the same chapter provide further support for a uniform right-alignment analysis, indicating in addition both that not all final high tones should be analysed as manifesting prosodic boundaries marking prominence, and that some should be analysed as markers of prosodic prominence on non-focused constituents.

4.2.2 Bush (1999)

Further support for a right-alignment model of Georgian focus prosody is provided by Bush's (1999) analysis of yes-no question intonation[40]. As discussed in the previous chapter, Bush (1999) proposes an analysis of Georgian yes-no questions according to which the finite verb, which is posited to be in verum focus, aligns to the right of and therefore bears a complex ip boundary tone L+H-[41], as do any other focused constituents in the question. At the end of the sentence, this complex boundary tone is followed either by

[40] Skopeteas and Féry (2010) report that exactly the same analysis is proposed by Müller (2007).
[41] This analysis is posited due to the low tone not needing to associate with a stressed syllable and therefore not being analysed as a pitch accent.

an intonation phrase boundary tone L% (see Figure 29), or by a tone H%, which is associated with politeness.

čai ḳovz-i ginda?
tea.NOM spoon-NOM want.PRS.2SG
‘Do you want a teaspoon?’

Figure 29: Analysis of yes/no question intonation contour (Bush 1999:7)

Importantly, this complex L+H ip boundary tone may accompany the verb when non-final, and may also accompany other constituents in the sentence, leading Bush (1999) to analyse such other constituents (and the verb) as being in focus in these questions. This complex tone can also cause monosyllabic lengthening on constituents bearing it. [**4**] shows monosyllabic lengthening on *gakvs* (you-have) and *eg* (that) when these elements, each in focus, bear the complex boundary tone.

4) gaakvs [eeg]F ?
have.PRS.2SG that
‘Do you have *that*?’

(Bush 1999:9)

Further comments on the phenomenon of monosyllabic lengthening in Georgian are provided by Harris (2002). Significantly, she points out that, unnoted by Bush (1999), final yes-no question monosyllables do not always require lengthening, as shown in [**5**].

5) ḉavidä šeni da?
go your sister
‘Did your sister go?’

(Harris 2002:235)

As discussed, Vicenik and Jun (2014) likewise identify a high ip boundary tone H- to the right of the verb as a consistent component of yes-no question contours in Georgian, but due to the incompatibility of co-occurring ip and IP boundary tones with their tone replacement analysis, attribute focus marking on the verb instead to the same H+L phrase accent proposed to be the main focus marker in declaratives. In addition, similarly to Harris' (2002) observation, Vicenik and Jun (2014) note that yes-no questions sometimes ended in a way similar to declaratives, in a low IP boundary tone L%. In chapter 5 I will argue that this provides motivation for a complex L+H- ip boundary tone which the data show is specific to yes-no questions, cannot be easily reanalysed as an H+L phrase accent and instead supports a general right-alignment analysis of focus in Georgian.

The various studies of the relationship between information structure and prosody in Georgian discussed in this chapter, whilst diverse in their proposals as to by what prosodic means information-structural features are expressed, indicate that it is prosody, rather than syntax, which is chiefly responsible for disambiguating the information-structural features of sentential constituents. Whereas, as discussed, syntax serves to identify these features only in particular linearisations, the studies indicate that prosody serves such a function regardless of the position of the focused constituent in the sentence.

As discussed, the more quantitative data on which the studies discussed in this section are based indicate that is by association with the boundary of an intermediate-level prosodic phrase, rather than by pitch accent type, that focus in Georgian is prosodically expressed; indeed, the 'pitch accent' analyses discussed likewise associate focus-marking with phrase boundaries of this kind in a number of cases. In addition to the apparent inconsistencies pointed out with respect to the 'prosodic phrasing' analyses discussed, on the basis of which I suggested an alternative possible interpretation of the data, potential problems of a different kind can be noted with respect to accounts in which focus is realised solely by alignment of the focused constituent with phrase boundaries as identified in these proposals.

In the analysis proposed by Skopeteas and Féry (2010), narrow focus on a sentence-initial subject is realised by its alignment with the right boundary of a prosodic phrase, whereas narrow focus on a sentence-final object is realised by its alignment with the left boundary of such a phrase, and narrow focus on a sentence-medial object is likewise realised by alignment with the left boundary of such a phrase. It is unclear how, in an 'alignment-only' account based on these proposals, focus on a sentence-initial constituent is distinguished from focus on a sentence-medial constituent; for example, the verb, which may be focused in the same linearisation as the sentence-initial subject. Similarly, in Féry's (2013) proposed left-alignment analysis, initial subject focus and sentence focus are posited to be realised with the same prosodic phrasing. The same is the case with final object focus with a discourse-active initial subject topic and final object focus with a discourse-inactive initial subject topic; following Féry's (2013) constraint TOP discussed in chapter 3, according to which prominent topical constituents align with the left boundary of a Φ-phrase, these would likewise have the same phrasal realisation. In order to disambiguate these distinct focus structures, it appears that a prosodic feature additional to alignment is required, such as increased duration, which Skopeteas and Féry identify as an additional property of focused constituents. This suggests that Georgian is better accounted for by focus-as-prominence theories, of the kind proposed in chapter 2, than in terms of focus-as-alignment theories of the kind discussed in the same chapter. In chapter 5 I will formulate a set of hypotheses based on this observation, before presenting data from a new production experiment designed to test them.

4.3 Summary and Conclusions

In this chapter I have discussed several studies of the relationship in Georgian between information structure and prosody. Whilst these indicate that prosody, rather than syntax, plays the key role in disambiguating information-structural relations, they vary with respect to the prosodic mechanism they propose to be responsible; whereas some attribute this role to pitch accent type, other more quantitative studies find that alignment with the boundaries of prosodic phrases is more important. Reviewing these proposals, I pointed out some differences between the assumptions underlying them and my own, as well as some apparent inconsistencies in their analyses, and on the basis of these observations suggested some possible alternative interpretations of their data. These will form the basis for a new set of hypotheses which I present in chapter 5, together with new data from a prosodic production experiment designed to test them.

5. A New Model

In the present chapter I present a new model of Georgian information structure. In section *5.1*, following a summary of my review of the syntactic literature in chapter 3 and after presenting some of my own data from a production experiment conducted in Tbilisi in 2011, I propose a new set of Optimality-Theoretic constraints for Georgian word order. Included are constraints to account for the fronting of discourse-active and discourse-inactive constituents, for the linearisation of foci with respect to the finite verb and for a wider range of verb-initial constructions than considered in existing models. In section *5.2* I then turn to prosody, presenting a set of alternative hypotheses based on the conclusions drawn in chapter 4, as well as chapter 2. I then present the results of a production experiment conducted in Stuttgart in October 2014. These new data support hypothesis *1*; that focused constituents in Georgian are aligned with the right rather than with the left boundary of an ip phrase, and hypothesis *2*; that the same is true of prenuclear discourse-inactive topics and additional prenuclear foci, and that prosodic structures which may be identical for distinct focus structures are disambiguated in these cases by an additional prosodic feature, in the form of intensity. The data with respect to hypothesis *3*, which concerns the permissibility of postnuclear prominences in Georgian, are more problematic, but on balance do not support their permissibility; this is consistent with the relative configurational freedom attested in the syntactic data, which permits Georgian to linearise discourse-inactive topics in prenuclear positions. Finally in 5.2.3 I present a new set of Optimality-Theoretic constraints which capture my analysis of the interaction between prosody and information structure in Georgian. These constraints likewise capture my proposals from chapter 2 that information-structural relations cross-linguistically are reflected most closely in sentence form in the association of discourse items with the heads of prosodic phrases, rather than in their alignment with the boundaries of prosodic phrases, as proposed recently by Féry (2013), and that the alignment of prosodic phrase boundaries with their heads is best captured with a constraint on the level of additional phrase heads which may intervene between the two. I go on to show that these constraints successfully capture the facts for other languages discussed in chapter 2. The Optimality-Theoretical constraints for Georgian syntax and prosody proposed in this chapter form a component of the fuller Lexical-Functional Grammar model of Georgian presented in the next chapter.

5.1 Word Order

In chapter 3 I reviewed proposals in the existing literature as to how discourse relations are expressed syntactically in Georgian. As I pointed out, these models vary in scope and do not fully capture the available data, and in some cases make predictions which are inconsistent with the available data as well as with those of other models. I identified three issues in particular with respect to which this is the case: the linearisation of constituents in sentence-initial position, the linearisation of foci in relation to the finite verb and the linearisation of the finite verb in sentence-initial position. I concluded that the varying extent to which each of the models of Georgian word order and information structure discussed captures the patterns attested in the literature shows that a new, more comprehensive model of these interactions is needed. I present such a model, in the form of a new set of Optimality-Theoretic constraints, in *5.1.2* below, following the presentation in *5.1.1* of some new data from a production experiment conducted in Tbilisi in 2011.

5.1.1 Some New Data

5.1.1.1 Method

A free speech production experiment was conducted in Tbilisi over the period August-October 2011. In the experiment, material was presented to participants in the form of a Microsoft *PowerPoint*^{TM} slideshow featuring pre-recorded questions, through which participants navigated by clicking a mouse. Participant responses were recorded at 16000Hz using a *Creative*^{TM} microphone and *Praat* (Boersma 2001). Participants were native speakers of Georgian, age ranges from 18 to approximately 65. Participants completed the experiment individually.

The experiment took the form of a question-elicited sentence production task consisting of 54 pairs of slides. The first slide of each pair featured a simple depiction of an agent performing a transitive action on a patient, and the second a sound file of a question pre-recorded by a native speaker pertaining to the action depicted. The experimental material consisted of six different question-elicited focus contexts (see Table 17), including questions eliciting narrow focus on the verb and discourse-inactive topic interpretations of the subject and of the object. Each context was presented in three tokens (see Table 18), resulting in a total of 18 items. The focus elicitation contexts took the form of a slide depicting a transitive action performed by an agent on a patient, followed by a focus elicitation question concerning the action depicted.

Table 17: Focus elicitation questions with examples

Elicited Focus Context	Label	Example/question formula
Narrow subject focus	SJFOC	vin ḳocnis gogo-s? who.NOM kiss.PRS:3SG girl-DAT 'Who is kissing the girl?'
Narrow object focus	OFOC	ra-s loḳavs lom-i? what-DAT lick.PRS:3SG lion-NOM 'What is the lion licking?'
Subject topic	SJTOP	ra-s iṭq̇vit ḳac-is šesaxeb? what-DAT say.FT:2PL man-GEN about 'What will you say about the man?'
Object topic	OTOP	ra-s iṭq̇vit gogo-s šesaxeb? what-DAT say.FT:2PL girl-GEN about 'What will you say about the girl?'
Sentence focus	STFOC	ra xdeba? what.NOM happen.PRS:3SG 'What is happening?'
Narrow verb focus	VFOC	ra-s ušvreba ḳac-i what-DAT 3PSIO-do.PRS-3SG man-NOM p̣ingvin-s? penguin-DAT 'What is the man doing to the penguin?'

Table 18: Items with SVO target sentence examples

Item	Target Sentence (SVO examples)
1	bič̣-i ḳocnis gogo-s. boy-NOM kiss:PRS:3SG girl-DAT 'A/the boy is kissing a/the girl.'
2	lom-i loḳavs boḳver-s. lion-NOM lick:PRS:3SG cub-DAT 'A/the lion is licking a/the cub.'
3	ḳac-i amšralebs p̣ingvin-s. man-NOM dry:PRS:3SG penguin-DAT 'A/the man is drying a/the penguin.'

The remaining two thirds of the slide pairs comprised 36 fillers. These consisted of a range of depictions of characters travelling to or situated in different locations and various points in time and using various modes of transportation, followed by several alternative focus elicitation question types pertaining to these details.

Participants were presented with the 54 slide-pairs in a pseudo-randomised order. They were instructed to navigate through the slides by clicking the mouse, in each case first pausing to observe the image before moving on to the related question, then responding to the question with a simple full-sentence answer. The participants were informed that they could correct responses if dissatisfied with them and that they could use the same answer as many times as they wished. A series of four example slide pairs, with recorded example answers, were presented to participants before the beginning of the task. The free production experiment was completed by 42 participants. The time required to complete the task was approximately 15 minutes.

5.1.1.2 Results

The distribution of constituent linearisations by focus context shown in Table 19 shows consistency with syntactic tendencies identified in chapter 3.

With respect to the linearisation of preverbal focused constituents, the distribution of linearisations selected in response to questions eliciting a focus on either the subject or the object (the STFOC, SJFOC, OFOC, SJTOP and OTOP contexts) is consistent with the prediction of a strong constraint identified in the literature that no non-foci may intervene between preverbal foci and the finite verb; only in the OTOP context were a small number of linearisations (SOV) produced in which a non-focused constituent intervened between a preverbal focused constituent and the finite verb.

Patterns in the relative ordering of subject and object indicated by the data are likewise consistent with the preferences identified in the literature both for fronting subjects and for fronting discourse-given constituents. In the vast majority of linearisations produced in the STFOC context, in which both subject and object were in focus, the subject preceded the object; only in two responses was an object-initial linearisation selected. In the VFOC context, in which both subject and object were discourse-given, the object likewise preceded the subject in only two responses. The distribution in the OFOC context, in which the subject was given, was similar, with only 6% object-initial responses produced. By contrast, in the SJFOC context, in which the object was given, the subject preceded the object in just under 50% of responses. With respect to the additional preference for fronting discourse-inactive topics suggested by the data presented by Skopeteas and Féry (2007), the linearisations produced in the SJTOP and OTOP contexts were likewise indicative of such a preference; compared with its OFOC counterpart, all responses produced in the SJTOP context were subject-initial, whereas a somewhat larger proportion of sentences produced in the OTOP context were object-initial (78%) compared with those produced in the SJFOC context (51%).

In support of observations made in some studies that the verb may appear sentence-initially when narrowly focused, the VFOC context was the only context in which verb-initial responses were produced. Only three such responses were produced, however, which is consistent with the apparent marginality of this construction. Otherwise, the majority of responses for this context featured the verb in sentence-final position, which was the preferred position overall for all focused constituents. This tendency is consistent with evidence discussed in the previous section for a weak constraint ***ALIGN-FOCUS-R*** responsible for positioning foci sentence-finally, as proposed by Féry *et al.* (2010).

Table 19: Approximate percentage linearisation selections by focus context

	Responses	SVO	SOV	OVS	OSV	VSO	VOS
SJTOP	94	94%	6%				
OFOC	115	91%	2%	6%			
SJFOC	115	49%		50%	1%		
OTOP	69	19%	3%	75%	3%		
VFOC	105	23%	72%		2%	3%	
STFOC	95	93%	5%	2%			

5.1.2 A New System of Constraints

The various discourse-linearisation preferences in Georgian indicated by data from the available literature, with which the data presented in the previous section were shown to be largely consistent, can be captured with a new set of Optimality-Theoretic constraints, which I propose in the present section.

The first constraints to be proposed relate to preferences for some constituents to occupy clause-initial position. As discussed, the constraints ***CWO*** and ***A-reordering***, proposed by Féry (2013) and by Skopeteas *et al.* (2009) respectively, both capture a preference attested in the literature for the subject to precede other arguments, whatever its discourse status. To articulate the preference for the clause-initiality of the subject in more explicit and theory-neutral terms, I propose the constraint ***SJINIT***, defined in [**1**].

1) ***SJINIT***
   Subjects precede other constituents.

The evidence from linearisation distributions indicates that this constraint ranks equally with the second constraint, ***GINIT***, defined in [**2**], which captures the attested preference for fronting given arguments.

2) ***GINIT***
A given constituent precedes non-given constituents.

The tableau in Table 20 demonstrates how ***SJINIT*** and ***GINIT*** account for the equal preference attested in the data for sentences like candidates [**a**] and [**b**], each of which violates one of the two constraints. By contrast, candidate [**a**] in the tableau in Table 21, which violates neither constraint, is clearly preferable to candidate [**b**], which violates both.

Table 20: SJINIT and GINIT constraints with focused subject

[lom-i]$_F$ lok'avs bok'ver-s. lion-NOM lick.PRS:3PSG cub-DAT 'The lion is licking the cub.'	***SJINIT***	***GINIT***
a. ☞ lomi lok'avs bok'vers.		*
b. ☞ bok'vers lok'avs lomi.	*	

Table 21: SJINIT and GINIT constraints with focused object

lom-i lok'avs [bok'ver-s.]$_F$ lion-NOM lick.PRS:3PSG cub-DAT 'The lion is licking the cub.'	***SJINIT***	***GINIT***
a. ☞ lomi lok'avs bok'vers.		
b. bok'vers lok'avs lomi.	*	*

An inviolable constraint, according to which discourse-inactive topics must precede other constituents in the clause, is captured with ***DITINIT***, defined in [**3**]; this outranks ***SJINIT*** and ***GINIT***.

3) ***DITINIT***
Discourse-inactive topics precede other constituents.

The tableau in Table 22 illustrates the effect of this constraint. Whereas candidates [**a**] and [**b**] in Table 20 are equally ranked with respect to ***SJINIT*** and ***GINIT***, here candidate [**b**], in which the subject precedes the object, fails in violating ***DITINIT***. Additional support for the strength of this constraint is provided by the non-permissibility of postnuclear prominent topics in Georgian, as indicated by new prosodic data presented in *5.2.2*.

Table 22: Constraints SJINIT, GINIT and DITINIT with discourse-inactive topic object

[bok'ver-s]$_T$ lok'avs [lom-i]$_F$ cub-DAT lick.PRS:3PSG lion-NOM 'The lion is licking the cub.'	***DITINIT***	***SJINIT***	***GINIT***
a. ☞ bok'vers lok'avs lomi.		*	
b. lomi lok'avs bok'vers.	!*		*

The next constraints to be defined capture tendencies in the data relating to verb-initial constructions. As discussed, the definition of the ***V-initial*** constraint proposed by Skopeteas *et al.* (2009) refers to a restricted set of contexts in which verb-initial constructions are permitted, but does not go into further detail about the nature of this set beyond the fact that it includes sentences 'at the beginning of narratives'. Other verb-initial constructions attested in the literature include yes-no questions and declarative narrow verb focus constructions. A feature common to all three constructions is the focal status of the verb, whereas the experimental data presented by Skopeteas *et al.* (2009) indicate a strong dispreference for verb-initiality in constructions in which the verb is not in focus but instead given and discourse-active. The constraint ***V-initial*** can therefore be replaced for greater explicitness with a constraint of equivalent strength, ****DAPINIT***, defined in [**4**]. Like ***V-initial***, this inviolable constraint accounts for the strong dispreference evident in the data presented by Skopeteas *et al.* (2009) for verb-initial sentences in which the verb is given and discourse-active. These include the all-new sentences in their data, the predicate in which can be treated as given and discourse-active by pragmatic accommodation, as per my proposed extension to Rochemont's (2013) treatment of thetic predicates in chapter 2.

4) ****DAPINIT***
Discourse-active predicates may not appear in sentence-initial position.

Table 23 illustrates the function of ***DAPINIT*** in accounting for the strong dispreference (as indicated by the **!* notation) for examples like candidate [**c**]. This effect is additional to the effect of violating ***SJINIT***, which the optimal candidate [**b**] also does. The other optimal candidate [**a**] violates only ***GINIT***.

Table 23: *DAPINIT, SJINIT and GINIT with discourse-active verb

[lom-i]F lok'avs bok'ver-s. lion-NOM lick.PRS:3PSG cub-DAT 'The lion is licking the cub.'	***DAPINIT**	**SJINIT**	**GINIT**
a. ☞ lomi lok'avs bok'vers			*
b. ☞ bok'vers lok'avs lomi		*	
c. lok'avs bok'vers lomi	*!	*	

As discussed, an additional constraint is required to account for the apparent difference in acceptability between the three varieties of verb-initial construction which do appear permissible in Georgian. Whereas verb-initiality in presentational constructions and yes-no questions appears to be quite commonplace and widely attested in the literature, verb-initiality in declarative narrow verb focus constructions is less discussed and appears to be more marginal, although in my data a small number of verb-initial responses were produced in the VFOC context. The constraint ***DNPRSINIT**, defined in [**5**], ranks equally with the first two constraints introduced, ***SJINIT*** and ***GINIT***.

5) ***DNPRSINIT**
A declarative non-presentational predicate may not appear in sentence-initial position.

Table 24 illustrates how this constraint accounts for the limited acceptability of sentences like candidate [**c**], which, unlike candidates [**a**] and [**b**], violates ***DNPRSINIT** in addition to ***SJINIT*** and ***GINIT***. As shown in Table 25, verb-initial yes-no questions like candidate [**c**] likewise violate ***SJINIT*** and ***GINIT***, but do not violate ***DNPRSINIT**, which accounts for their more widespread attestation in the literature. Verb-initial presentational constructions like candidate [**c**] in Table 26, in which all constituents are in focus, violate only ***SJINIT***.

Table 24: *DNPRSINIT with narrowly focused verb

lomi [lok'avs]F bok'vers lion.NOM lick.PRS:3PSG cub-DAT 'The lion is licking the cub.'	***DAPINIT**	***DNPRSINIT**	***SJINIT***	***GINIT***
a. ☞ lomi lok'avs bok'vers				
b. bok'vers lok'avs lomi			*	
c. lok'avs lomi bok'vers		*	*	*

Table 25: *DNPRSINIT with yes-no question

Lomi [lok'avs]F bok'vers? lion.NOM lick.PRS:3PSG cub-DAT Is the lion licking the cub?	***DAPINIT**	***DNPRSINIT**	***SJINIT***	***GINIT***
a. ☞ lomi lok'avs bok'vers?				
b. bok'vers lok'avs lomi?			*	
c. lok'avs lomi bok'vers?			*	*

Table 26: *DNPRSINIT with presentational construction

[Shemodgoma dadga]$_F$ Autumn.NOM set.in.PST:3PS 'Autumn set in.'	***DAPINIT**	***DNPRSINIT**	***SJINIT***	***GINIT***
a. ☞ shemodgoma dadga				
b. dadga shemodgoma			*	

Turning finally to constraints on the positioning of focused constituents more generally, the strong constraint $\boldsymbol{XP_{FOC}V}$ as proposed by Skopeteas *et al.* (2009), which is reproduced in [**6**], appropriately captures the strong dispreference well supported by the available data for sentences in which a preverbal focus is not positioned left-adjacent to the verb. This constraint ranks equally with the inviolable constraints ***DITINIT*** and ***DAPINIT**.

6) ***XP_{FOC}V***
No non-focal constituent may intervene between a preverbal focused constituent and the verb.

As discussed, the weaker preference indicated by data presented by Vicenik and Jun (2014) for focused constituents to appear sentence-finally is captured by ***ALIGN-FOCUS-R***, a constraint proposed by *Féry et al.* (2010). For the purposes of the present section the same constraint can be included here with a ranking equal to that of ***SINIT***, ***GINIT***, and ****DNPRSINIT***.

7) ***ALIGN-FOCUS-R***
Align focus with the right boundary of an IP phrase.

(Skopeteas *et al.* (2009))

In section *5.2.4* below I will replace ***ALIGN-FOCUS-R*** with the constraint ***NOPHRASE***, proposed by Féry (2011) in her analysis of German, which articulates the same tendency within the prominence-configuration constraints discussed there as a means of capturing the interaction in Georgian between information structure and prosody.

FMARK, as defined in [**8**], is an additional further weak constraint to account for the preference observed by Skopeteas and Fanselow (2010a, 2010b), Bush and Tevdoradze (1999) and Bush (2000) for identificational foci to be aligned in a preverbal position; as discussed, Skopeteas and Fanselow (2010a) attribute this association, which is not biunique, to the greater syntactic markedness of this position as compared with postverbal position. This constraint ranks equally with ***ALIGN-FOCUS-R*** and the majority of the other constraints proposed.

8) ***FMARK***
Increase the prominence of foci by linearising them in a marked position (preverbally).

The interaction of these constraints is demonstrated in the tableau in Table 27 with an example sentence featuring narrow identificational focus upon the direct object. The optimal realisations of such a focus structure are candidates [**a**] and [**b**], each of which violates only one of ***FMARK*** and ***ALIGN-FOCUS-R***.

Table 27: Interaction of the constraints $XP_{FOC}V$, FMARK and ALIGN-FOCUS-R with narrow identificational object focus

vano [puls]$_{IDF}$ adzlevs datos. vano.NOM money-DAT give.PRS:3PSG dato.DAT 'Vano is giving money to dato.'	***XP$_{FOC}$V***	***FMARK***	***ALIGN-FOCUS-R***
a. ☞ vano puls adzlevs datos			*
b. ☞ vano adzlevs datos puls		*	
c. vano adzlevs puls datos		*	*
d. puls vano adzlevs datos	*!		*

The next constraint to be introduced, ***S$_{DF}$<IO,DO$_{DF}$***, defined in [**9**], is an inviolable constraint which stipulates that a subject must precede any other arguments with the same discourse function. This reflects evidence for subject-initiality amongst constituents in sentence focus, wh- and other constituents.

9) ***S$_{DF}$<IO,DO$_{DF}$***
A subject precedes other arguments with the same discourse function

In the tableau in Table 28, the optimal candidate [**a**] violates only the distinct weak constraint SJINIT. Candidate [**b**] satisfies *S$_{DF}$<IO,DO$_{DF}$* but violates ***XP$_{FOC}$V***. Conversely, whereas [**c**] satisfies ***XP$_{FOC}$V***, it violates *S$_{DF}$<IO,DO$_{DF}$*, whereas candidate [**d**] violates all three constraints.

Table 28: Interaction of the constraints S_{DF}<IO,DO_{DF}, $XP_{FOC}V$ and SJINIT

p'avle-s [ivane]$_F$ [pul-s]$_F$ adzlevs Pavle-DAT ivane.NOM money.DAT give.PRS.3SG 'Ivane is giving money to Pavle.'	***S$_{DF}$<IO,DO$_{DF}$***	***XP$_{FOC}$V***	***SJINIT***
a. ☞ p'avles ivane puls adzlevs			*
b. ivane p'avles puls adzlevs		!*	
c. p'avles puls ivane adzlevs	!*		
d. puls p'avles ivane adzlevs	!*	*	*

This is complemented by an additional inviolable constraint, ***$(IO_{DF}<DO_{DF})V$***, defined in [**10**], which reflects the obligatory IO-DO order noted amongst preverbal wh- and other constituents.

10) ***$(IO_{DF}<DO_{DF})V$***
An indirect object precedes a direct object with the same discourse function preverbally.

The effect of this constraint is shown in the tableau in Table 29, in which the optimal candidate [**a**] satisfies both ***$S_{DF}<IO,DO_{DF}$*** and ***$(IO_{DF}<DO_{DF})V$***, whereas candidate [**b**] satisfies ***$S_{DF}<IO,DO_{DF}$*** but violates ***$(IO_{DF}<DO_{DF})V$***.

Table 29: Interaction of the constraints $S_{DF}<IO,DO_{DF}$ and $(IO_{DF}<DO_{DF})V$

vin vi-s ra-s adzlevs? who.NOM who-DAT what-DAT give.PRS.3SG ‘Who gives what to whom?’	***$S_{DF}<IO,DO_{DF}$***	***$(IO_{DF}<DO_{DF})V$***
a. ☞ vin vis ras adzlevs?		
b. vin ras vis adzlevs?		!*

The final constraints to be proposed here are the violable constraints ***PROMSEP*** and ***CONSTINIT***, defined in [**11**] and [**12**], which rank equally with the other violable constraints proposed; these articulate the observations made in chapter 2 with respect to discontinuous constructions.

11) ***PROMSEP***
Realise a prominent constituent in separation from other material.

12) ***CONSTINT***
Constituents may not be discontinuous.

The effect of these constraints is shown in the tableau in Table 30. Here, the contiguous object in candidate [**a**] satisfies ***CONSTINT*** but violates ***PROMSEP***, whereas the discontinuous object in candidate [**b**] conversely satisifies ***PROMSEP*** but violates

CONSTINT. In candidate [**c**] the object is discontinuous but the prominent noun is not realised in separation from its possessor; this results in both constituents being violated.

Table 30: Interaction of the constraints PROMSEP and CONSTINT

čem-i [gvar-i]$_F$ ar vutxari. my-NOM surname-NOM NEG tell.AOR.3SG 'I didn't tell (him) my surname.'	***PROMSEP***	***CONSTINT***
a. ☞ čemi gvari ar vutxari	*	
b. ☞ gvari ar vutxari čemi		*
c. čemi gvari ar vutxari	*	*

In this section I have presented a new set of twelve constraints to model the interaction in Georgian between information structure and syntax. These are summarised in Table 31 in blocks representing their relative ranking, with the strongest at the top and the weakest at the bottom.

Table 31: Summary of the proposed set of constraints with ranking

Inviolable	***XP$_{FOC}$V*** (Skopeteas *et al.* (2009a) ***DITINIT*** ****DAPINIT*** ***S$_{DF}$<IO,DO$_{DF}$*** ***(IO$_{DF}$<DO$_{DF}$)V***
Violable	***SJINIT*** ***GINIT*** ****DNPRSINIT*** ***FMARK*** ***ALIGN-FOCUS-R*** (Féry *et al.* (2010)) ***PROMSEP*** ***CONSTINT***

The proposed set of constraints is intended to address some of the shortcomings in the Optimality-Theoretic models of these interactions in Georgian presented by Skopeteas *et al.* (2009a) and by Féry (2013), as well as in the Minimalist syntactic model presented by Skopeteas and Fanselow (2010a) and in the Lexical-Functional Grammar models presented by Meurer (2007, 2009) and by Wier (2014). As discussed, these models vary in scope and consistency with respect to the available data. As discussed in chapter 3, the available data in the literature upon which the set of constraints proposed here is based range from more robust experimental findings, which support the constraints ***SJINIT***, ***GINIT***, ***DITINIT***, ***XP$_{FOC}$V*** and ***FMARK*** in particular, to tendencies commented on or otherwise identifiable in the literature which would benefit from further investigation in future research. This applies in particular to the data upon which the constraints ****DAPINIT***, ****DNPRSINIT*** and ***ALIGN-FOCUS-R*** are based. Some additional support for the preferences reflected in the set of constraints proposed here is provided by my own data, which I presented in *5.1.1*.

The constraint ***ALIGN-FOCUS-R*** is modified in *5.2.3* below, in which I show that the interaction in Georgian between information structure and prosody can be captured with prominence-based constraints reflecting the approach to information structure and prosody that I proposed in chapter 2.

5.2 Prosody

In chapter 4 I reviewed the literature on the interaction in Georgian between information structure and prosody. As discussed, empirical studies of this interaction have ended in differing conclusions as to how discourse relations are prosodically manifested. I begin in *5.2.1* by presenting a set of hypotheses designed to test alternative interpretations I proposed for some of the data discussed in chapter 4. In section *5.2.3* I then present the results of a production experiment designed to test these hypotheses. Finally in section *5.2.4* I show how the prosodic realisation of discourse functions in Georgian based on these new data can be captured in the Optimality-Theoretic framework with a new set of constraints, which I show can also be applied to other languages discussed in chapter 2.

5.2.1 Hypotheses

5.2.1.1 Narrow Focus Realisation

In reviewing the literature on the prosodic realisation of narrow focus in Georgian, I suggested two alternative explanations for the data on which some of the more recent proposals are based. The first is that the properties attributed to narrow focus on the basis of comparison with sentences produced in 'all-new' contexts are not properties which distinguish focus from non-focus, or prosodic prominence from non-prominence, but are instead properties distinguishing focus realised with additional emphasis from standard focus or prosodic prominence, which is arguably likewise realised on the 'all-new' constituents with which narrow foci have been compared. The second, similarly, is that the left-alignment analysis of sentence-medial and final narrow foci proposed by Skopeteas and Féry (2010) and by Féry (2013) is influenced by the occurrence in their data of prosodic prominences realised on constituents preceding the narrow foci, which interfered with the interpretation of the data by causing an additional prosodic boundary marking these preceding prominences to be attributed to the focused constituent. Taking these alternative interpretations into account, I argued that the data instead point to an analysis in which foci and prominent topics in Georgian are realised prosodically by alignment with the right boundary of a prosodic phrase, as Bush (1999) and Müller (2007) propose is the case in Georgian yes-no questions and Skopeteas and Féry (2010) propose is the case with clause-initial focused subjects in Georgian, rather than by alignment with the left boundary of a prosodic phrase, as proposed to be uniformly the case by Féry (2013) and to be the case with clause-medial and final focused objects by Skopeteas and Féry (2010). As discussed in chapter 4, both Skopeteas and Féry (2007) and Vicenik and Jun (2014) associate the realisation of prosodically prominent topics in Georgian with a rising pitch contour on the constituent, which in the case of Vicenik and Jun's (2014) analysis is analysed as ending in a high ip boundary tone H-.

The two alternative explanations identified for the existing data indicate that the most appropriate method to establish the prosodic realisation of narrow focus is to compare the prosodic realisation of a sentence-medial constituent in a context in which it is narrowly focused with its realisation in a context in which it is unfocused but follows a sentence-initial narrow focus. Such a comparison is preferable to comparing a narrowly focused constituent with its counterpart realised in an 'all-new' context in which, as I have pointed out, it may likewise be realised with prosodic prominence. It is also preferable to comparing the prosodic realisation of a sentence-final constituent in a context in which it is narrowly focused with its realisation in a context in which it is unfocused and follows a sentence-initial narrow focus. As I have pointed out, a constituent preceding the final focus may be realised with a prenuclear prominence, whereas the occurrence of a postnuclear prominence following the initial focus appears comparatively less likely; this may result in the prosodic marking of the prenuclear prominence being confused with that of the final focus. In the comparison proposed, a prominence realised on the constituent following the sentence-medial constituent which could confuse the analysis would in either context be postnuclear and therefore more equally likely to occur in either, reducing the likelihood of confusion. It can be noted that such a quantitative comparison of initial and medial narrow focus conditions is lacking in existing studies of Georgian.

An issue separate to the location of the prosodic boundary relative to the focused constituent is that of by what prosodic feature the boundary is expressed. In the previous section I argued that phrasing analyses of Georgian had made the same error as pitch accent analyses in asserting that boundaries are realised only by a high tone, which ignores the evidence that focused constituents, as well as the constituents preceding them, may end either in a high or in a low tone. Whichever direction alignment is supposed to occur in, therefore, the boundary should be one that can be realised either with a high or with a low tone.

The first subset of hypotheses on narrow focus in Georgian is provided in [**13**].

13) Hypothesis Set 1: Realisation of single focus in Georgian

a. Right alignment of medial focus
   i. The prosodic realisation of an SVO medial verb focus sentence in Georgian is distinct from the realisation of an SVO initial subject focus sentence.
   ii. This distinction is consistent with the presence of a prosodic phrase boundary to the right of the verb in the verb focus context and the absence of such a boundary to the right of the verb in the subject focus context.
   iii. The prosodic manifestation of this prosodic boundary cannot be defined simply as the presence of a final high target on the verb; rather, it is one which permits either a rising or a falling contour on the verb to manifest a prosodic boundary to its right.

Having first compared the realisation of the verb in initial and medial focus contexts, I propose next to compare its realisation in medial and in final focus contexts, with the prediction that such a prosodic boundary will be manifested more consistently in the medial focus condition than in the final focus condition, in which, as I discuss, it may in some cases occur to mark prenuclear prominence realised on the verb (see [**14**]). This comparison will serve to complement the previous comparison in [**a**], and to provide evidence that prosodic alignment in Georgian is unidirectional and not multidirectional, as proposed by Skopeteas and Féry (2010).

14) b. Right alignment of final focus

i. The prosodic realisation of final object focus in an SVO sentence in Georgian is distinct from the realisation of medial verb focus.
ii. This distinction is consistent with the presence of a prosodic phrase boundary to the right of the verb in the verb focus context and its absence to the right of the verb in the object focus context.
iii. This difference is marked in the same way as the difference observed in [**a**].

The final narrow focus realisation to be established is that of initial focus. Due to the predicted likelihood of non-focal subjects receiving prominent topic realisations, establishing whether initial focused subjects are aligned to the right of prosodic boundaries by comparing them with their non-focused counterparts is problematic. As an alternative, I propose to compare initial focused subjects with the postfocal medial verbs that follow them in the sentence, which as discussed are less likely to show signs of additional prominence (see [**15**]). This indirect comparison will need to take into account possible effects of the positional difference between subject and verb which are additional to any prosodic boundaries involved, such as downstep. As such, the conclusions that can be drawn from this comparison will be weaker, and more data on differences in the realisation of prosodic boundaries will be required.

15) c. Right alignment of initial focus

i. The prosodic realisation of an initial focused subject in an SVO sentence in Georgian is distinct from the realisation of a post-focal verb in the same initial subject focus condition.
ii. This difference is consistent with the presence of a prosodic phrase boundary to the right of the subject and its absence to the right of the verb, as consistent with the findings from [**a**] and [**b**].

5.2.1.2 Prominent Topics and Additional Foci

As discussed above, Skopeteas and Féry (2007) present evidence that prominent topics in Georgian have a similar realisation to that associated by Vicenik and Jun (2014) and by Skopeteas *et al.* (2009) with that of non-final constituents in all-new contexts, and also of pre-focal constituents, in the form of a rising contour. This realisation was in turn similar to the one observed on initial narrow foci from Féry *et al.* (2010), suggesting that the prosodic features presented as evidence for a left-boundary analysis of Georgian focus by Skopeteas and Féry (2010) and by Féry (2013) could instead be markers of prominence on pre-focal constituents under a right-alignment analysis. To establish whether prominent topics and secondary foci are, as predicted in the previous subsection for initial narrow foci, aligned with the right boundary of a prosodic phrase, I propose to compare them, in the same way, with the postfocal verb from the initial subject focus context. My prediction is that the distinction between them will be consistent with the presence of such a prosodic phrase boundary following prominent subjects and secondary foci of sentence foci and with its absence following the postfocal verb in the initial subject focus condition (see [**16**]), in a way consistent with the predictions of the first set of hypotheses.

16) Hypothesis Set 2: Realisation of prominent topics and prenuclear foci in Georgian

a. Realisation of prominent topics and additional foci
   i. The prosodic realisation of prominent subject topics in subject topic contexts, and of focused subjects in sentence focus contexts, is distinct from the realisation of verbs in initial subject focus contexts.
   ii. This difference is consistent with the presence of a prosodic phrase boundary following the subjects in the former cases and its absence following the verb in the latter case, as consistent with [**c**] of the first hypothesis set.

If, as per my hypotheses, it is the case that not only initial narrow foci, but also initial prominent topics subjects and additional focused subjects, are marked by alignment with the right boundary of a prosodic phrase, and that this direction of alignment is consistent for informationally prominent constituents in Georgian, this means that an initial narrow focused subject will be identical in phrasing to, for example, a final focused object with a prominent topic subject (taking ips an example alignment phrase type: $[S]_{ip}[VO]_{ip}$ in both cases). This raises the question of whether these two different focus structures are distinct prosodically, as appears to be the case in the majority of analyses of other languages which treat them. As discussed above, Skopeteas and Féry (2010) find that narrowly focused constituents are realised with increased duration in comparison with their broadly focused counterparts, but do not compare narrowly focused with non-focused constituents in this respect. I propose that prominent constituents, in addition to alignment, are realised with some additional prosodic property which distinguishes focus structures with identical phrasings (see [**17**]).

17) b. Marking of prominences beyond phrasing

i. The prosodic realisation of initial subject focus is distinct from that of final object focus with a prominent subject topic.
ii. This distinction is consistent with the presence of a prosodic feature on the object in the latter case and its absence on the object in the former case other than pitch.

5.2.1.3 Postnuclear Prominences

The final set of hypotheses proposed here concerns the permissibility in Georgian of postnuclear prominences. As discussed in chapter 2, Calhoun (2007) presents evidence for the permissibility of postnuclear prominent topics in English. Establishing whether the same is the case in Georgian would be useful both in its own right and as a complement to the questions addressed in the previous hypotheses, which are based on the assumption that the occurrence of postnuclear prominences in Georgian, particularly if not explicitly elicited, is unlikely. Should postnuclear prominences be permissible in Georgian, I predict that they are distinguished from non-prominences by the additional non-pitch characteristic predicted to mark prominences in [**17**], but are distinguished as postnuclear prominences by bearing it to a lesser extent than nuclear or prenuclear prominences (see [**18**]).

18) Hypothesis Set 3: Postnuclear prominences

i. The prosodic realisation of a final object in an SVO sentence in Georgian produced in a context eliciting a prominent topic interpretation on that object is distinct from the realisation, both of a final narrowly focused object and of a final unfocused object in an initial subject focus context.
ii. These distinctions are consistent with the presence of a prosodic feature on the object in the first case and its absence in the second case, but its presence to a greater degree in the third case, as consistent with the findings for [**17**].

5.2.2 Some New Prosodic Data
5.2.2.1 Method
5.2.2.1.1 Experimental Design

In order to test the hypotheses presented in the previous section, a speech production experiment consisting of two focus elicitation tasks (henceforth **T1** and **T2**) was conducted in Stuttgart in October 2014. In each task, native speakers of Georgian were presented individually with a pseudo-randomised[42] sequence of paired slides on a computer screen, the first of which featured a simple sentence in Georgian and the second a recording of a question in Georgian relating to that sentence and eliciting a particular focus structure. Participants were asked to memorise the sentence on the first slide before proceeding to

[42] In each task, the question eliciting sentence focus was the first elicitation context from each lexical set presented to participants; this was done in order to minimise the likelihood of a prominent topic rather than the intended focus interpretation of the sentence-initial subject.

the second slide by clicking a mouse and using the memorised sentence to answer the recorded question. Practice examples were presented to participants before they began each task, and they were allowed to repeat each answer as many times as they wished until they were satisfied with their response. Participants first completed **T1** and then completed **T2** after a 5 minute break. Each task took approximately 5 minutes to complete.

The sentences memorised by participants were all of the form SVO, which is both a statistically prevalent linearisation in Georgian and compatible with each of the focus contexts in the hypotheses under investigation. This sentence type was realised in three different lexical sets, henceforth **L1**, **L2** and **L3** (see Table 32), the segmental content of each of which was selected in order to minimise the likelihood of pitch perturbation which could interfere with *f0* analysis.

Table 32: Lexical sets, items used in T1 and T2

Lexical Set	Sentence
L1	lom-i elodeb-a irem-s. lion-NOM await-3PSG deer-DAT 'A/the lion is waiting for a/the deer.'
L2	mela-0 emaleb-a mamal-s. fox-NOM hide.from-3PSG cockerel-DAT 'A/the fox is hiding from a/the cockerel.'
L3	vazh-i uvli-s lama-s. boy-NOM look.after-3PSG llama-DAT 'A/the boy is looking after a/the llama.'

The experimental design detailed above addresses the three sets of hypotheses formulated on the basis of the literature discussion in chapter 3. The questions accompanying the simple sentences in **T1** were designed to elicit six focus structures. Three of these were the narrow subject (SJF), verb (VF) and object (OF) focus structures, included to investigate hypothesis set *1*. The remaining three were the sentence focus (STF) structure and two focus structures not included in the hypotheses: the contrastive subject (CSJF) and object

(COF) focus structures (see Table 33). The sentence focus context (STF) was the first context presented to participants for each lexical set, in order to reduce the likelihood of a prominent topic interpretation of the subject rather than the intended focal interpretation. Contrastive focus contexts were included to provide further quantitative data on a possible relationship between contrastive focus and contour type, further to Vicenik and Jun's (2014) observation that both contrastive and non-contrastive foci are realised with a falling or rising-falling contour, and to Skopeteas and Féry's (2007) observation that contrastive topics in Georgian are realised with a rising contour. In addition, participants were also presented in **T1** with slides featuring each item as a yes-no question with the subject and, separately, with the object underlined to elicit additional focus on these constituents, and asked on the subsequent slide to utter these questions as memorised (see Table 34). Yes-no questions were included to further test the analyses of Vicenik and Jun (2014) and of Bush (1999), who attribute differing analyses of yes-no question intonation to the marking of focus. In total, therefore, each participant was asked in **T1** to produce 3X8=24 responses.

Table 33: Focus contexts and elicitation questions (T1)

Focus Structure	Label	Example Elicitation Question
Sentence focus	STF	What is happening?
Subject focus	SJF	What is hiding from the cockerel?
Object focus	OF	What is the boy looking after?
Verb focus	VF	What is the lion doing to the deer?
Contrastive subject focus	CSJF	Is a/the girl looking after the lama?
Contrastive object focus	COF	Is a/the lion waiting for the pig?

Table 34: Yes-no Question Contexts and Elicitation Sentences (T1)

Focus Structure	Label	Elicitation Sentence
Subject focus question	SJFQ	lomi elodeba irems? lion-NOM await-3PSG deer-DAT Is the lion waiting for the deer?
Object focus question	OFQ	lomi elodeba irems? lion-NOM await-3PSG deer-DAT Is the lion waiting for the deer?

Seven questions accompanied the simple sentences in **T2**. Five of these were designed to elicit the sentence (STF), subject (SJF) and object (OF) focus structures, and the prominent subject (SJT) and object (OT) topic structures, as required for the investigation of hypothesis sets *2* and *3*. In addition, T2 contained two further questions designed to elicit contrastive subject (CSJT) and object (COT) topic structures, to complement the questions eliciting contrastive focus structures included in **T1**. In total, therefore, each participant was asked in **T2** to produce 3X7=21 elicited responses (see Table 35).

Table 35: Focus contexts and elicitation questions (T2)

Focus Structure	Label	Example Elicitation Question
Sentence focus	STF	What is happening?
Subject focus	SJF	What is hiding from the cockerel?
Object focus	OF	What is the boy looking after?
Subject topic	SJT	What will you tell me about the boy? What is the boy looking after?
Object topic	OT	What will you tell me about the cockerel? What is hiding from the cockerel?
Contrastive subject topic	CSJT	I'm not interested in the girl but in the boy. What is the boy looking after?
Contrastive object topic	COT	I'm not interested in the pig but in the deer. What is waiting for the deer?

The two tasks were completed by 11 native speakers of standard Georgian (8 female, 3 male) who had been living abroad for between 0.5 and 4 years[43]. Participants were

[43] The tasks were completed by an additional five speakers of standard Georgian who had been living abroad for between 7 and 10 years and by two speakers of non-standard varieties of Georgian (Gurian and

recorded throughout each task with their consent using a *Creative*^{TM} microphone and *Praat* (Boersma and Weenink 2015) with a sampling rate of 16000Hz. The questions were recorded by a native speaker of Georgian who had been living abroad for 10 years.

5.2.2.1.2 Analysis of the Data

Statistical testing of the hypotheses was performed using *R* (R Core Team 2015) and within it the *lme4* package (Bates *et al.* 2015) in particular. A comparison of the automatically generated data points for raw and for time-normalised *f0* and intensity with those measured directly from the spectrograms in *Praat*^{TM} in several cases revealed inconsistencies between the two. Owing to the small size of the data sets involved, tests were therefore instead conducted using the raw *f0* and intensity data points as measured directly from the spectrograms.

The *f0* contour types produced by a given participant varied across focus contexts, lexical sets and tasks. As a result, the data sets available for testing *f0*-related hypotheses were unbalanced; participants who, within a given lexical set, produced the same pitch target type on the same constituent in each of the two focus contexts to be compared in order to test a given hypothesis[44] did not in the majority of cases do so within all three lexical sets or, where applicable, for the same lexical set in both tasks. In addition, some participants did not reply to some questions in a small number of cases. Consequently, linear statistical models which assume fully balanced data sets, such as the standard anova, could not be

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Kakhetian) who had been living abroad for 7 and for 2.5 years respectively; data from these speakers have not been included in the analysis.

[44] Due to the likelihood of variation in *f0* range between participants, the data sets employed for hypothesis testing prioritised the representation of response pairs representing both relevant focus contexts where produced by a given participant within a given lexical set in a given task.

[5] Data sets were also unbalanced in some cases due to participant omissions or external noise interference.

applied[45]. Tests for statistical significance were therefore instead conducted with linear mixed models using the *lme4* package (Bates *et al.* 2015). These are suitable for unbalanced data sets and in addition permit the inclusion of fixed and random variables, as well as of random slopes for the random variables, which accommodate a differing effect of focus context between items and between participants (Winter 2014).

For models in which pitch was the response variable, both focus context and gender were incorporated as fixed variables, and lexical set, participant and task (where applicable) as random variables. Where possible, these were given random slopes for the effect of the response variable. The *R* command for such a model is shown in [**19**]. With the exclusion of gender, the same configuration of variables was used in models in which the response variable was intensity. Significance for these linear mixed models was calculated in the form of an anova comparing the hypothesised model with its null counterpart (Winter 2014); the *R* command for the null counterpart of [**19**] is shown in [**20**] and the command for the anova in [**21**].

19) (hypothesised model) = lmer(Hz ~ context + gender + (1+context | lexset) + (1 + context | participant) + (1+context|task), data = (dataset), REML=FALSE)
20) (null model) = lmer(Hz ~ gender + (1+context | lexset) + (1 + context | participant) + (1+context|task), data = (dataset), REML=FALSE)

21) anova(null model, hypothesised model)

For each hypothesis, the distribution of residuals in both the hypothesised and the null models was checked prior to anova for assumptions of normality and heteroscedasticity (homogeneity of variance) using the Shapiro-Wilk normality test and Levene's test for homogeneity of variance, both of which should return a p-value greater than 0.05. In several cases, a transformation such as the natural log transformation was applied to the response variable in both the hypothesised and null models to better satisfy these assumptions (Winter 2014). Following significance testing, outliers which could not be dropped were removed and significance tests repeated; both results are included in the report below (Winter 2014). In some cases, initial linear mixed models created to test hypotheses failed to converge; this was in most cases the result of a lack of variance in one of the variables. In these cases, non-convergent models were substituted with a simplified model.

5.2.2.2 Results

5.2.2.2.1 Narrow Focus Realisation

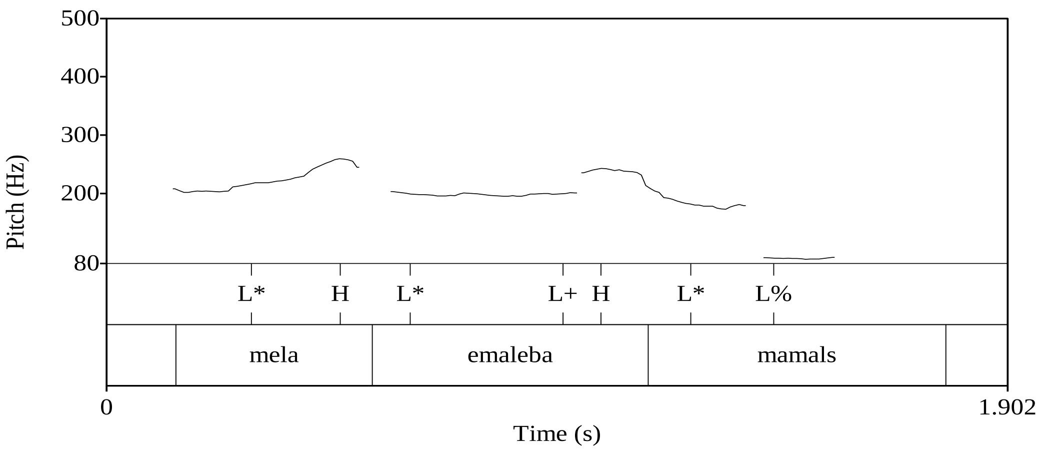
5.2.2.2.1.1 Right Alignment of Medial Focus

The first part of hypothesis set 1 is repeated in [**22**].

22) Hypothesis Set 1: Realisation of single focus in Georgian
    a. Right alignment of medial focus
        i. The prosodic realisation of an SVO medial verb focus sentence in Georgian is distinct from the realisation of an SVO initial subject focus sentence.
        ii. This distinction is consistent with the presence of a prosodic phrase boundary to the right of the verb in the verb focus context and the absence of such a boundary to the right of the verb in the subject focus context.
        iii. The prosodic manifestation of this prosodic boundary cannot be defined simply as the presence of a final high target on the verb; rather, it is one which permits either a rising or a falling contour on the verb to manifest a prosodic boundary to its right.

The data from ***T1*** show that approximately 66% (21/32) of responses produced in the verb focus (VF) context were realised with an *f0* contour type in which both non-final constituents, subject and verb, were realised with rising contours, and the final object with a falling or flat contour (see Figure 30). In this contour type (henceforth *RRF*), the initial rise began from a low target on the first syllable of the subject, which is consistent with the

L* pitch accent posited in the previous analyses, and reached a final high target on its second syllable[46]. The rise on the verb was similar in nature, generally beginning at or below the level of the initial target on the subject and generally reaching a final high target below the height of the final high target on the subject. Evidence of an H+L phrase accent was absent in this contour type, even in the data from ***L1*** and ***L2***, in which the verb was four syllables long rather than two, as in ***L3***. Instead, the rising subject and verb contours either rose gradually from the initial low target to the final high target, or remained at the height of the initial low target until the final syllable, upon which they rose abruptly to the final target; as this pattern also occurred in ***L1*** and ***L2***, in which the verb is four syllables in length, it is better analysed as a low tone L forming part of a complex boundary tone L+H. The object contour again generally began at or below the level of the previous rises and then fell to a lower final target on the second syllable, although sometimes it remained flat; this is consistent with the final L% boundary tone identified in previous analyses.

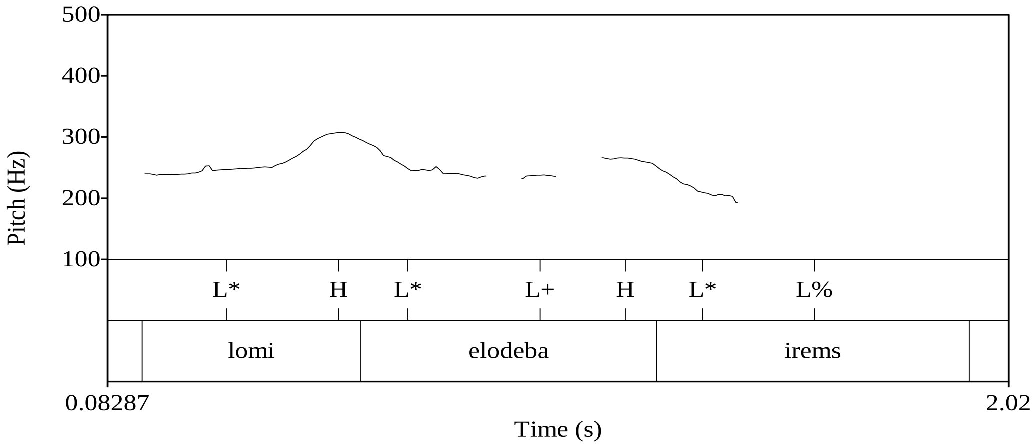


mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'A/the fox is hiding from a/the cockerel.'

Figure 30: Example VF contour, type RRF, L2, participant 5 (F), T1, annotated for tonal targets and with partial identification of tonal types

[46] *f0* targets were identified as a clearly audible change in *f0* of at least 10 Hz aligned with a peak in intensity within the syllable in question.

The most frequently produced contour type in the subject focus (SJF) context in each task was again *RRF*, with a final high target on both the subject and the verb (see Figure 31). This was produced in approximately 39% of responses (13/33) in ***T1*** and in approximately 52% (17/33) of responses in ***T2***. The majority of contours produced in the SJF context in both tasks featured a final high target on the verb: this was the case in approximately 55% of contours (18/33) in ***T1*** and in approximately 73% of contours (24/33) in ***T2.***



lom-i elodeb-a irem-s.
lion-NOM await-3PSG deer-DAT
'A/the lion is waiting for a/the deer.'

Figure 31: Example SJF contour, type RRF, L1, participant 1 (F), T1, annotated for tonal targets and with partial annotation of tonal types

The prevalence of this *RRF* contour type in the responses produced in both the VF and the SJF contexts consistent with the prediction made in hypothesis *1aiii* that a boundary tone distinguishing the SJF and VF focus structures cannot be identifiable simply as a high tone in opposition to the absence of a high tone. A comparison of average verb-final high *f0* target heights from the VF and SJF contexts by lexical set from the response pairs[47] produced in ***T1*** (see Table 36) indicates that a distinction between the two focus structures

[47] These reflect those cases in which a participant produced a high verb-final *f0* target in both the VF and the SJF contexts in a given lexical set.

instead lies in the relative heights of these targets: *f0* is consistently higher in the VF context. In a case-by-case comparison of the response pairs produced in these data, the target was higher in the VF context in 76% of cases (13/17 response pairs).

Table 36: Average verb-final high f0 target heights (Hz) by lexical set, VF and SJF

	L1	L2	L3	Overall Ave.
SJF	227.5	223.4	233.83	235.17
VF	259.83	243.2	241.5	255.74
Difference	32.33	19.8	7.67	19.93

To test for a statistically significant difference in *f0* between verb-final high targets in the VF and SJF contexts, a linear mixed model was initially applied to the ***T1*** data which incorporated focus context and gender as fixed effects and lexical set and participant as random effects, of which both were given random slopes for the effect of focus context[48]. As the null version of this model[49] failed to converge, most likely due to zero variance within the lexical set variable, a simplified model was instead applied both to the full model and to its null counterpart in which the lexical set variable was given a fixed instead of a random slope[50]. The resulting full and null models both passed the Shapiro-Wilk normality test and Levene's test for homogeneity of variance (Levene's test: full: p=0.88, null: p=0.99, Shapiro-Wilk: full: p=0.89, null: p=0.95). Anova of the full model and the null model revealed a significant effect of focus context on the pitch of the verb-final target ($\chi 2$= 8.5751, p= 0.003408). *f0* was raised in the VF context by about 19.87 Hz (standard error 5.42 Hz). A significant result was maintained following removal of an

[48] lmer(Hz ~ context + gender + (1 + context | lexset) + (1 + context | participant), data=(dataset), REML=FALSE)
[49] lmer(Hz ~ gender + (1 + context | lexset) + (1 + context | participant), data=(dataset), REML=FALSE)
[50] lmer(Hz~ (context +) gender + (1 | lexset) + (1 + context |participant), data=(dataset), REML=FALSE)

outlying data point (χ2= 7.2548, p= 0.007071). Anova of the original non-convergent models also produced a significant result (χ2= 5.6974, p= 0.01699).

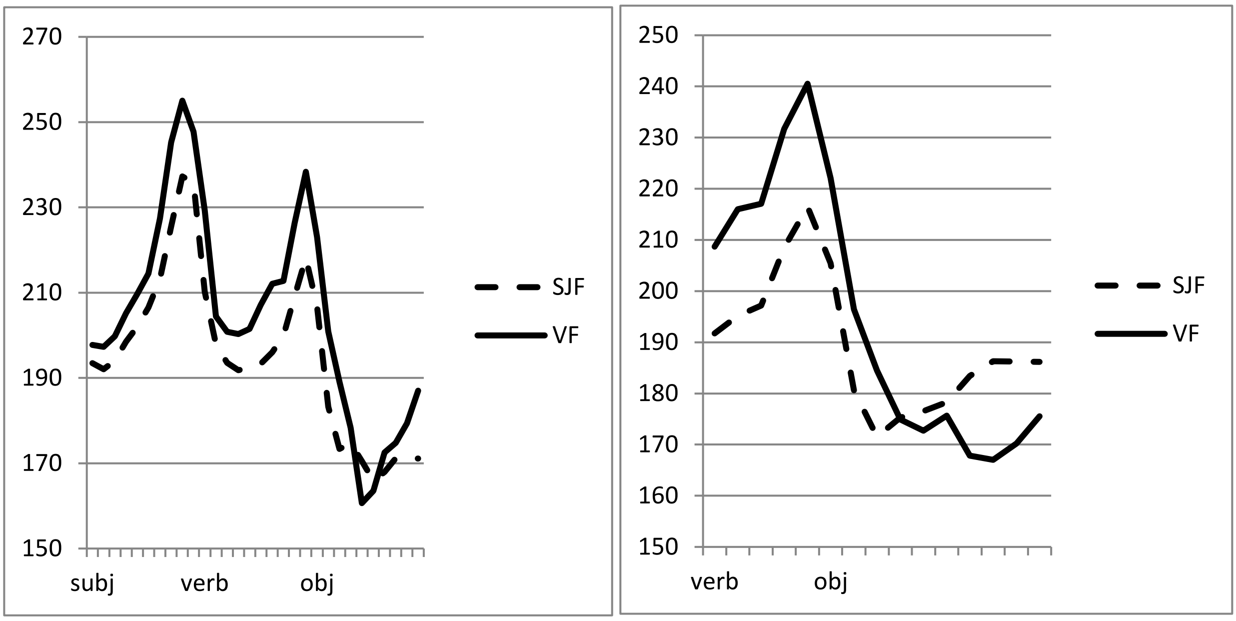


Figure 32: Averaged time-normalised RRF (left) and RF (right) contours produced in the VF and SJF contexts

Comparison of average time-normalised RRF and RF contours produced in the VF and SJF contexts[51] (see *Error! Reference source not found.*) shows that, in both cases, the verb-final high *f0* target in the VF context is higher than the verb-final high *f0* target in the SJF context. This indicates that the significant difference measured between verb-final high *f0* target heights in the two contexts is consistent with the predictions of hypothesis *1a* that the SJF and VF contexts are distinguished by the presence of an ip boundary tone to the right of the verb in the VF context and its absence in the SJF context, and that this boundary is not identifiable simply as a high tone but is instead a high ip boundary tone H-, which is greater in height than a high AP boundary tone Ha with which the verb is aligned in the SJF context. Further support for this distinction is provided by a comparison

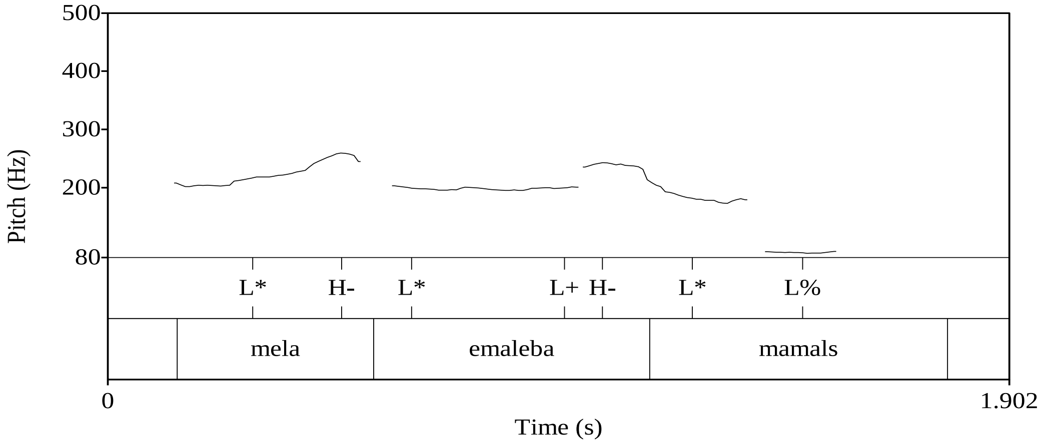
[51] Each again reflects those cases in which a participant produced the relevant contour in both contexts in a given lexical set.

of average *f0* excursions between the verb-initial pitch accent and verb-final high target in the two contexts (see Table 37).

Table 37: Average f0 excursions (Hz) between verb-initial and verb-final targets, VF and SJF

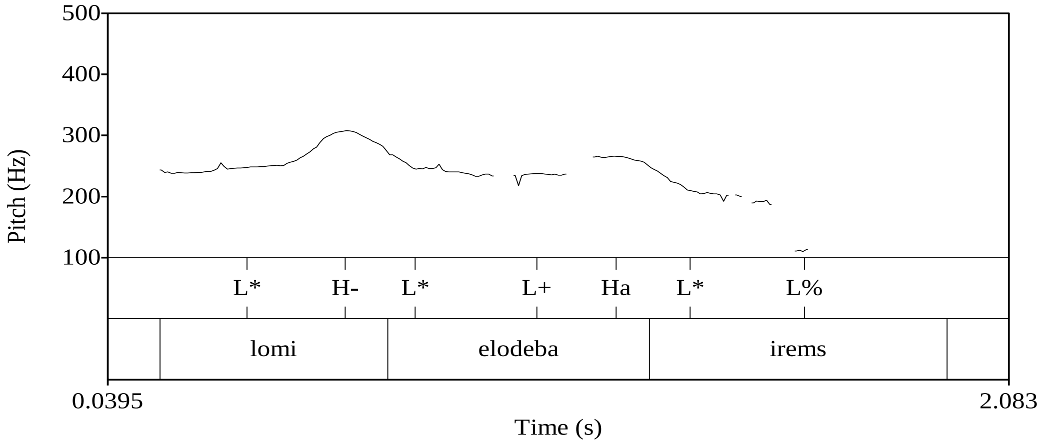
	L1	L2	L3	Overall Ave.
SJF	29.83	40.8	38.3	36.49
VF	55.83	52.4	40.67	49.63
Difference	26	11.6	1.83	13.14

Figure 32 ***[left]*** indicates that this H- boundary tone occurred on average at roughly the same height as the subject-final high target in the SJF context. The height of these subject-final high tones relative to the height of the verb-final ip boundary tone H- in the VF condition indicates that both must at least likewise be high ip boundary tones; below I will present evidence that both initial focused constituents and initial prominent topics are aligned with the right boundary of an ip phrase, which accounts for this pattern. Updated tonal analyses for the example contours from each context annotating the boundary tones are provided in Figure 33 and Figure 34.



mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'A/the fox is hiding from a/the cockerel.'

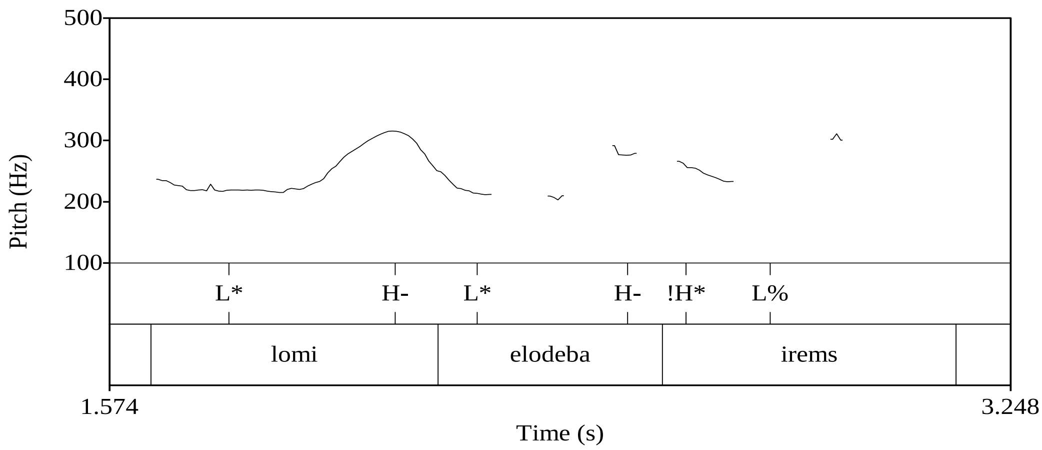
Figure 33: Example VF contour, type RRF, L2, participant 5 (F), T1



lom-i elodeb-a irem-s.
lion-NOM await-3PSG deer-DAT
'A/the lion is waiting for a/the deer.'

Figure 34: Example SJF contour, type RRF, L1, participant 1 (F), T1

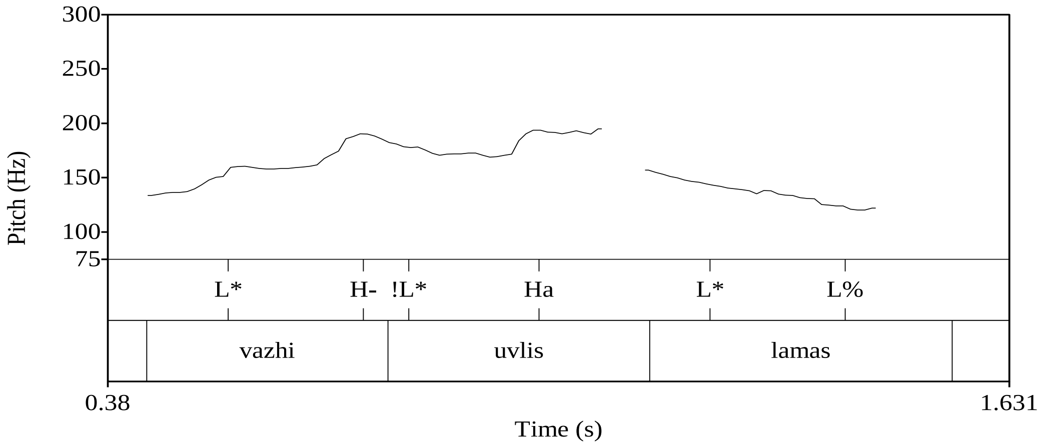
Further support for the presence of ip phrase boundaries in the proposed positions is provided by a small number of RRF contours in which the initial pitch accent of a constituent following a posited ip boundary was upstepped to or close to the level of the posited boundary tone[52]. In one RRF contour produced in the VF context, the initial pitch accent of the object was upstepped to the level of the preceding ip boundary tone on the verb (see Figure 35), whereas in two RRF contours produced in the SJF context, the initial pitch accent of the verb was upstepped to close to the level of the preceding ip boundary tone on the subject, with the following high AP boundary tone upstepped accordingly (see Figure 36). The upstepping observed in these cases has a motivation under the proposed analysis as the resetting of *f0* following an ip phrase break.



lom-i elodeb-a irem-s.
lion-NOM await-3PSG deer-DAT
'A/the lion is waiting for a/the deer.'

Figure 35: VF contour type RRF with post-verbal upstep, L1, participant 11 (F), T1

[52] Upstepped targets or those following an upstepped target were excluded from comparisons involving non-upstepped targets or those which did not follow an upstepped target.

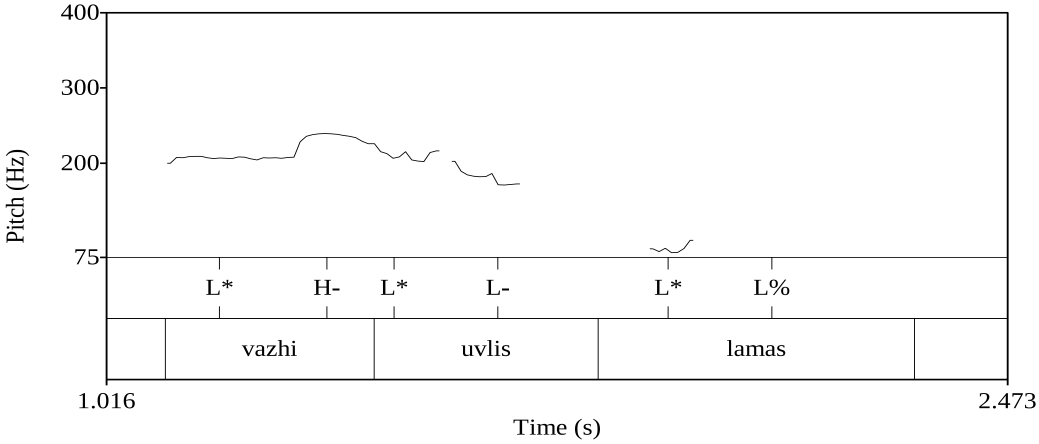


vazh-i   uvli-s   lama-s.
boy-NOM look.after-3PSG llama-DAT
'A/the boy is looking after a/the llama.'

Figure 36: SJF contour type RRF with post-subject upstep, L1, participant 9 (M), T1

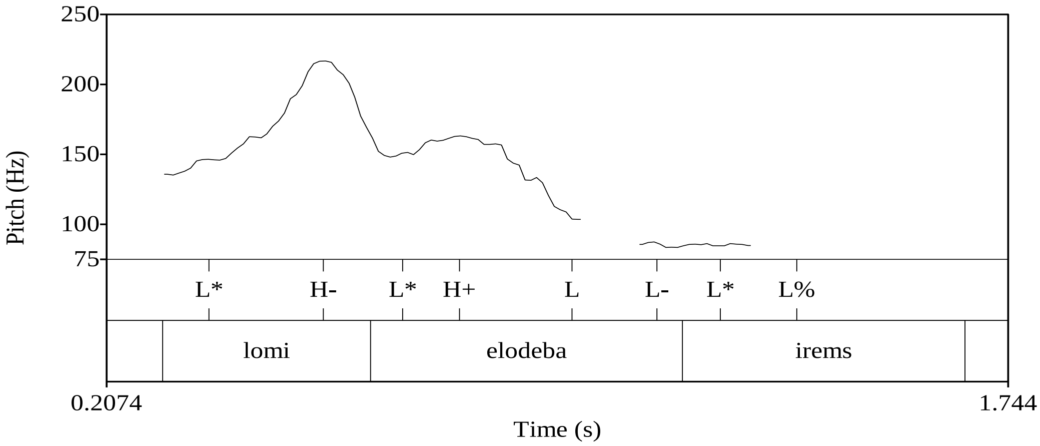
Hypothesis *1aiii* predicts not only that an ip boundary in Georgian cannot be identified simply as a high tone, but also that an ip boundary can likewise be realised by a low tone. Support for this prediction is provided by an additional six minority contour types with which responses in the VF and SJF contexts were produced: *RFF*, *FRF*, *Rd*, *Fd*, *FlRF* and *RFlF*, which I discuss below. The distribution of these is in the majority of cases consistent with a right-alignment model.

After *RRF*, the next most frequently produced sentence contour type in the VF context, *RFF*, occurred in approximately 19% of responses (6/32). This contour type featured a rise on the initial subject, which in ***L3*** was followed by a fall from an initial target on the verb to a low final target on the verb at or near the bottom of the speaker's range, with *f0* then falling further or remaining low for the remainder of the contour (see Figure 37). In ***L1*** and ***L2*** the final low target reached on the verb was preceded by a pattern consistent with an H+L phrase accent (see Figure 38): a slight rise in pitch on the second syllable of the verb was followed by a steep fall on the penultimate syllable, with the final syllable of the verb occurring very close to the bottom of the speaker's range. In both cases, the final low target reached on the verb is compatible with an analysis in which a low ip boundary tone L- is aligned to the right of the focused verb. By comparison, the RFF contour was found in the SJF contour data only in approximately 9% (3/33) of responses in both ***T1*** and ***T2***.



vazh-i uvli-s lama-s.
boy-NOM look.after-3PSG llama-DAT
'A/the boy is looking after a/the llama.'

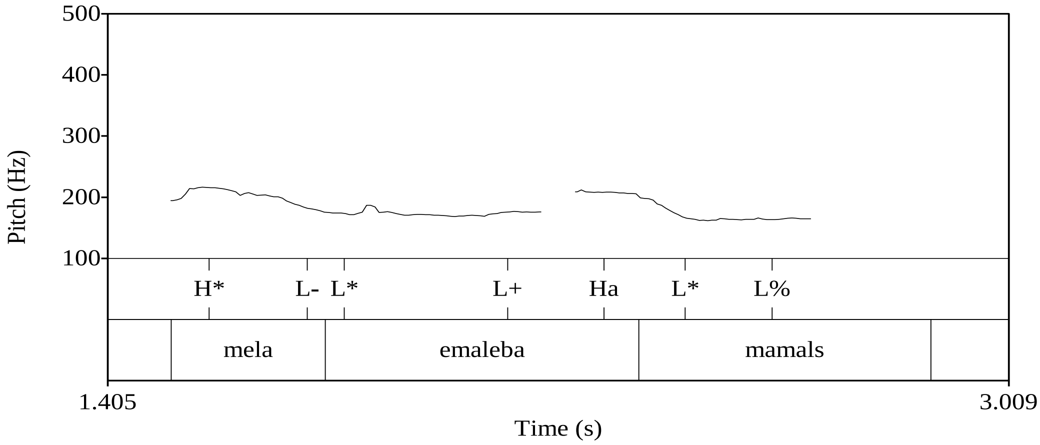
Figure 37: Example VF contour, type RFF, L3, participant 4 (F), T1



lom-i elodeb-a irem-s.
lion-NOM await-3PSG deer-DAT
'A/the lion is waiting for a/the deer.'

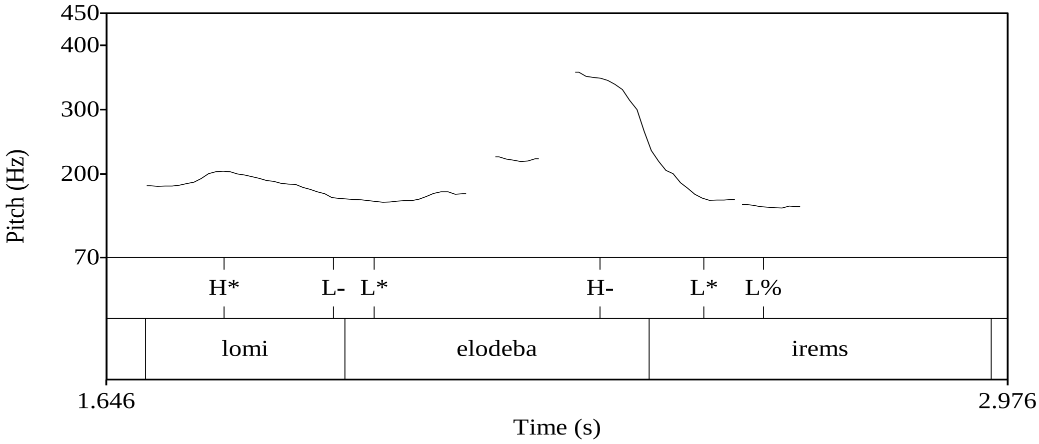
Figure 38: Example VF contour, type RFF, L1, participant 2 (M), T1

A further contour type featuring a non-final fall was *FRF*, in which a fall in *f0* on the subject occurred from an initial high target, consistent with a high pitch accent H*, to a final low target, again consistent with a low ip boundary tone L-, at or near the level of the following low pitch accent on the verb (see Figure 39 and Figure 40**)**. This contour was relatively rare, occurring in the SJF context in 12% (4/33) of contours in **T1** and in 15% of contours (5/33) in **T2**, and in 9% (3/32) of contours in the VF context. The occurrence of this contour type in both focus contexts is compatible with the proposed analysis, according to which the subject is focused in the SJF context and a prominent topic in the VF context.



mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'A/the fox is hiding from a/the cockerel.'

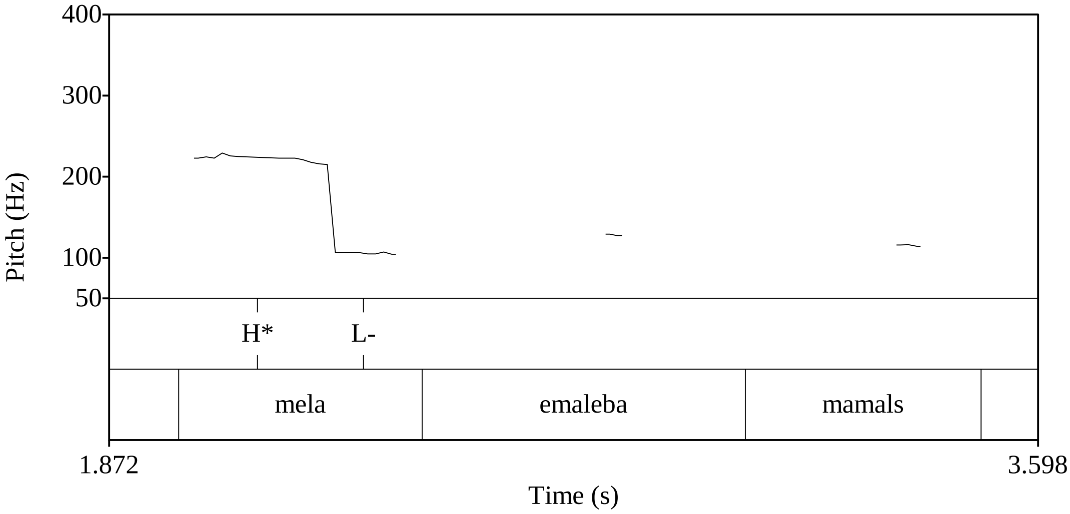
Figure 39: SJF contour, type FRF, L2, participant 4 (F), T2



lom-i elodeb-a irem-s.
lion-NOM await-3PSG deer-DAT
'A/the lion is waiting for a/the deer.'

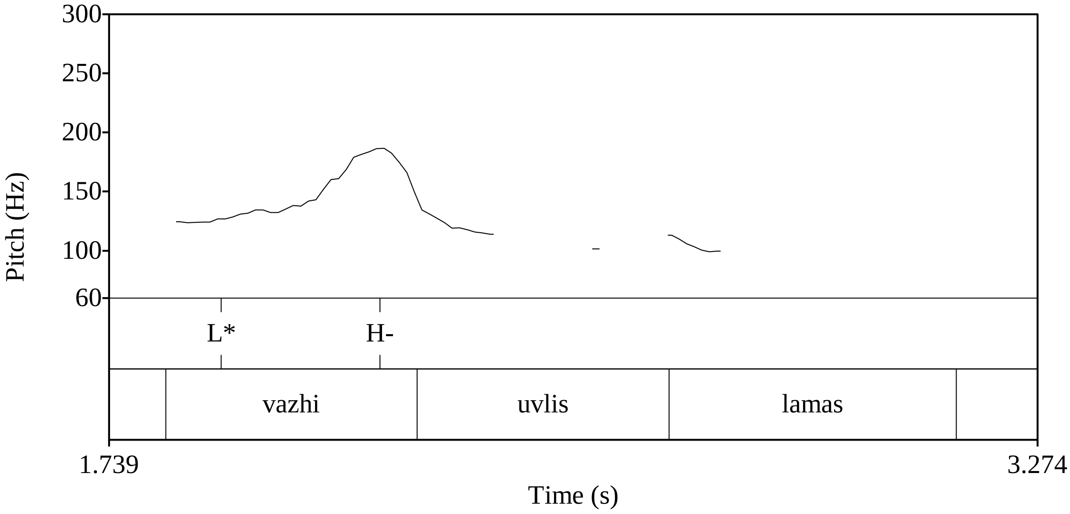
Figure 40: VF contour, type FRF, L1, participant 7 (F), T1

The falling *f0* pattern on the verb in the RFF contour type can be contrasted with postfocal dephrasing and/or deaccenting in the *Fd* and *Rd* contour types. In these, following respectively an initial falling (see Figure 41) or rising (see Figure 42) contour on the subject, the remainder of the sentence is produced with *f0* at the bottom of speaker range. These contour types occurred in small numbers in the SJF context (*Rd* 1/33 in ***T1***, *Fd* 4/33 in ***T1*** (12%), 5/33 in ***T2*** (15%)), but were absent in the VF context; this distribution is consistent with the proposed analysis, according to which focused constituents are aligned with the right rather than with the left boundary of an ip phrase.



mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'A/the fox is hiding from a/the cockerel.'

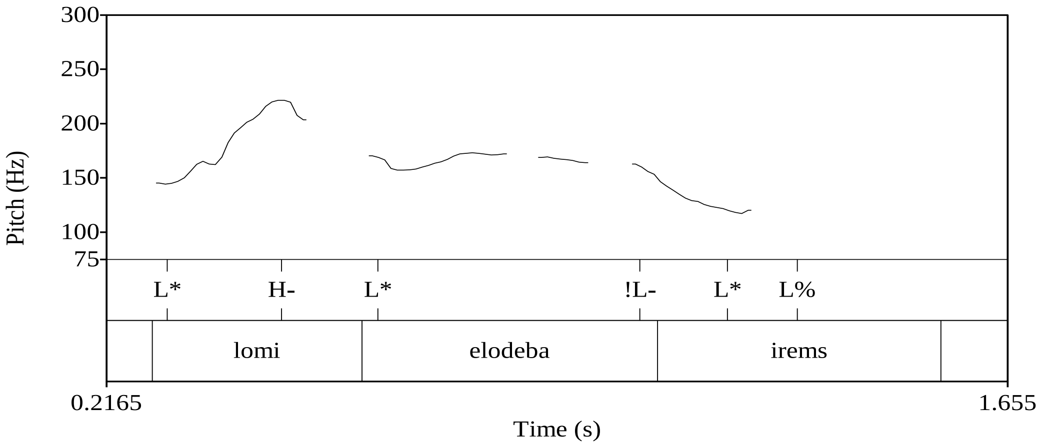
Figure 41: SJF contour, type Fd, L2, participant 11 (F), T1



vazh-i uvli-s lama-s.
boy-NOM look.after-3PSG llama-DAT
'A/the boy is looking after a/the llama.'

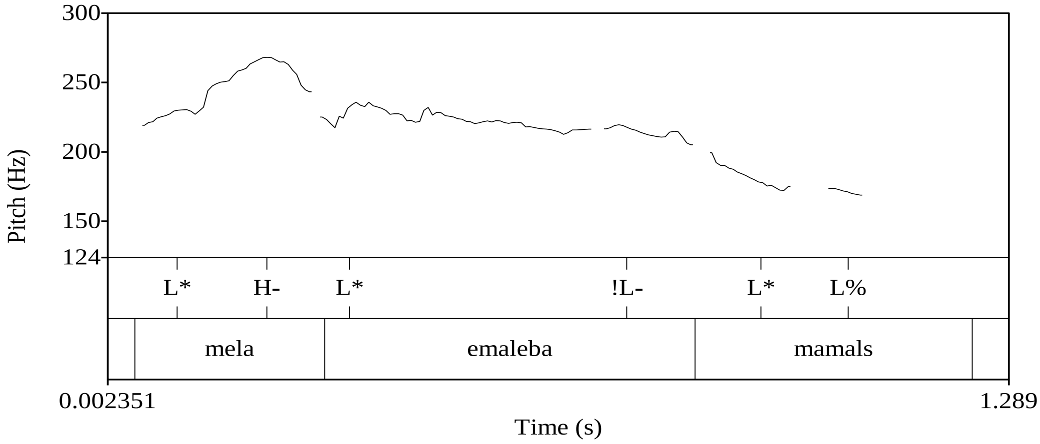
Figure 42: SJF contour, type Rd, L3, participant 2 (M), T1

A final pair of contour types identified were each produced only in very small numbers. The first, *RFlF*, featured an initial rising contour on the subject, following which *f0* on the verb started at a low level and remained quite flat until a verb-final target at a similar height. *f0* on the following object then started at a distinctly lower level. This type accounted for (6%) of contours (2/32) in the VF context and 9% of contours in each task (3/33, 2/33) in the SJF context. The second, *FlRF*, featured a flat contour on the subject rather than the verb. This contour type was not observed in the VF context but occurred in the SJF context in 1/33 contours in ***T1*** and in 2/33 contours (6%) in ***T2***. These contour types were produced in very small numbers and could reasonably be attributed to speaker error in the realisation of the other, more numerous contour types. As in each contour type the pitch accent immediately following the flat contour in question was at a distinctly lower level, however, I suggest that an analysis is available in which the flat contour on the verb (see Figure 43 and Figure 44**)** or on the subject (see Figure 45) respectively ends in an upstepped low ip boundary tone !L-.



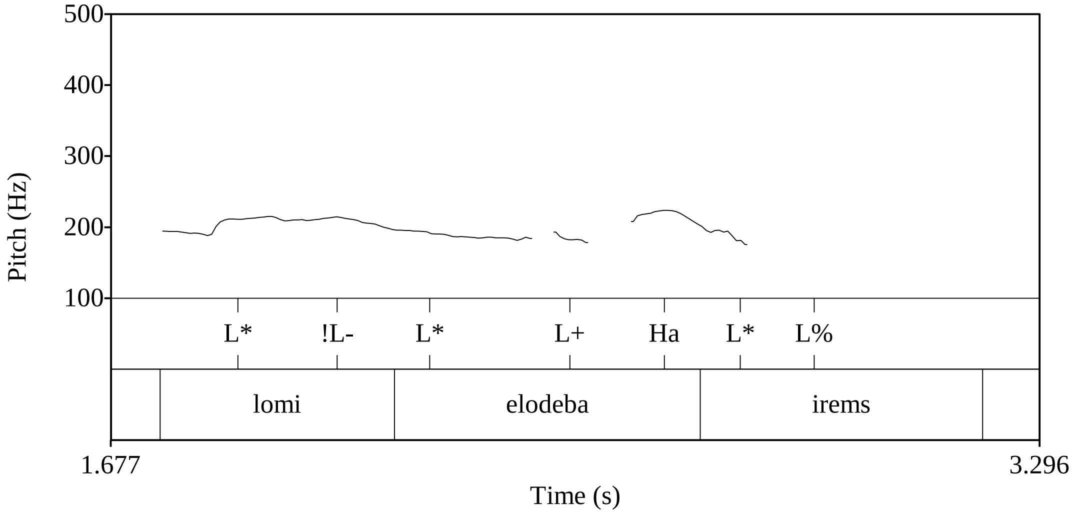
lom-i elodeb-a irem-s.
lion-NOM await-3PSG deer-DAT
'A/the lion is waiting for a/the deer.'

Figure 43: VF contour, type RFlF, L1, participant 9 (M), T1



mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'A/the fox is hiding from a/the cockerel.'

Figure 44: SJF contour, type RFlF, L2, participant 3 (F), T1



lom-i elodeb-a irem-s.
lion-NOM await-3PSG deer-DAT
'A/the lion is waiting for a/the deer.'

Figure 45: SJF contour, type FlRF, L1, participant 5 (F), T2

The distribution of the seven contour types identified in the data is summarised in Table 38.

Table 38: Distribution of identified contour types, VF and SJF contexts

	RRF	RFF	FRF	Rd	Fd	(FlRF)	(RFlF)
VF (***T1***) (/32)	21	6	3				2
SJF (***T1***) (/33)	17	3	4	1	4	1	3
SJF (***T2***) (/33)	16	3	5		5	2	2

In summary, the data presented in this section support hypothesis *1a*: the prosodic realisations of medial verb focus and initial subject focus were shown to be distinctive, and this distinction shown to be consistent with the presence of an ip boundary tone to the right of the medial verb when this was focused and its absence to the right of the medial verb when this was not in focus. This ip boundary tone was as predicted not identifiable simply as a high tone, but was instead shown to be a tone greater in height than the high boundary tone of a smaller AP phrase, as consistent with the distinction between AP and ip boundary tones proposed by Vicenik and Jun (2014)[53]. That the majority of responses in both the verb and subject focus contexts were produced with the same RRF contour type, attributed by Vicenik and Jun (2014), Skopeteas et al (2009), *inter alia* to the marking of 'declarative' or 'all-new' sentences, or of final object focus, is inconsistent, both with Vicenik and Jun's (2014) proposal that the principal prosodic means of marking focus in Georgian is an H+L phrase accent on the focused constituent, and with Skopeteas *et al.*'s (2009) proposal that focus is marked principally with a rising-falling LH*L L_P contour. Furthermore, it is inconsistent with the proposals of Skopeteas and Féry (2010) and of Féry (2013) that focus is realised by alignment with the edge of a high boundary tone H_P as opposed to the absence of a high tone. As discussed in section chapter 4, both analyses posit only this level of phrasing for Georgian in addition to the IP phrase.

[53] As discussed in chapter 4, Vicenik and Jun (2014) observe the consistent alignment of constituents to the right of an ip boundary in the case of heavy noun phrases and of the verb in yes-no questions, but in neither case associate this alignment with informational prominence, instead finding that this is marked in some cases by left ip alignment.

In addition, an analysis was presented of an additional six minority contour types produced in the two focus contexts and their distribution shown to be compatible with the prediction in hypothesis *1aiii* that an ip boundary in Georgian cannot be identified simply as a high tone, but also that an ip boundary can likewise be realised by a low tone. This prediction was made to account for the association made by Vicenik and Jun (2014) and Skopeteas *et al.* (2009) between focus and a rising-falling *f0* contour. The data indicate that, as hypothesised, a low ip boundary tone L- or upstepped low boundary tone !L- may likewise be aligned to the right of focused constituents. Contours incompatible with the proposed analysis occurred only in comparatively small numbers and can be reasonably attributed to participant error. The minimal phrasings posited for the two focus contexts are summarised in Table 39.

Table 39: Posited phrasings for VF and SJF focus structures

Focus Context	Phrasings
VF	$[[[S]_{AP}\ [V_F]_{AP}]_{ip}\ [[O]_{AP}]_{ip}\ ]_{IP}$
SJF	$[[[S_F]_{AP}]_{ip}\ [[V]_{AP}[O]_{AP}]_{ip}\ ]_{IP}$

5.2.2.2.1.2 Right Alignment of Final Focus

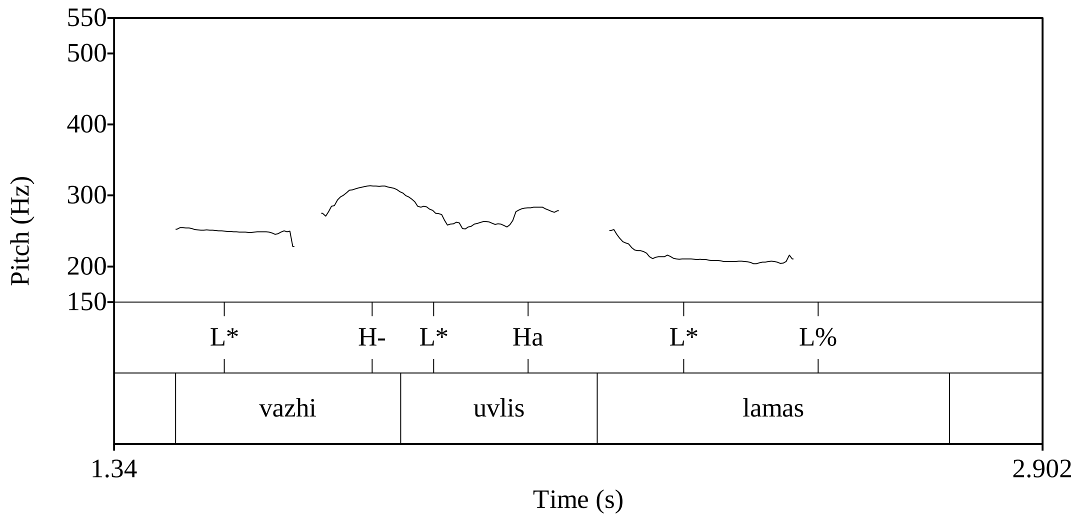
The second part of hypothesis set *1* is repeated in [**23**].

23) Hypothesis Set *1b*: Right alignment of final focus

i. The prosodic realisation of final object focus in an SVO sentence in Georgian is distinct from the realisation of medial verb focus.
ii. This distinction is consistent with the presence of a prosodic phrase boundary to the right of the verb in the verb focus context and its absence to the right of the verb in the object focus context.
iii. This difference is marked in an identical way to the difference observed in [**a**].

As argued in section *5.2.2.1*, a comparison of initial subject and medial verb focus structures is preferable as a means of determining the direction of prosodic alignment to a comparison of initial subject and final object focus contexts. This is due to the difficulty in focus elicitation experiments of controlling for the realisation of prosodic prominence on additional constituents to those in focus; participants asked to read aloud simple sentences may do so in a way which places an individual emphasis on each word. As prenuclear prominences appear cross-linguistically to be produced more readily than postnuclear prominences (see chapter 2), it is preferable to compare two contexts in which additional prominences which could confuse an alignment analysis have a more equal likelihood of occurring, i.e. subject and verb focus, than two contexts in which such an additional prominence is more likely in one than the other, ie subject focus and object focus. In the first pair, the realisation of a postnuclear prominence on the object is equally unlikely in both cases, whereas in the second, the possibility of a prenuclear prominence on the verb is more likely in the object focus case than is the possibility of a postnuclear prominence on the object in the subject focus case. In this way, the observed difference in verb-final target height between the subject and verb focus contexts is less likely to be explained as the result of postnuclear object prominence in the verb focus case, which would support an opposite analysis of focus alignment to the left boundary of an ip phrase.

Despite the prediction, made in *5.2.2.1*, that the likelihood of the verb being realised with prenuclear prominence in the final object focus context (OF) would reduce the extent to which the phrasing of this focus structure can be distinguished from that of the medial verb focus structure (VF), the data do indicate a difference between the two focus structures as predicted by hypothesis *1b*. As was the case in the VF and SJF contexts, the prevalent contour type produced in the OF context was *RRF* (see Figure 46): this was produced in 70% (23/33) of responses in ***T1*** and in 73% (24/33) of responses in ***T2***.



vazh-i uvli-s lama-s.
boy-NOM look.after-3PSG llama-DAT
'A/the boy is looking after a/the llama.'

Figure 46: OF contour, type RRF, L3, participant 1 (F), T2

A comparison of verb-final high *f0* target heights in the OF and VF contexts in ***T1*** indicates that, as predicted by hypothesis *1b*, the *f0* of the verb-final high target in the VF context is higher than that of the verb-final *f0* target in the OF context in all three lexical sets (see Table 40). In a case-by-case comparison of verb-final high targets from these contours, the target was higher in the VF context in 86% of cases (18/21 response pairs). Similarly, in a comparison of *f0* excursions between initial and final verbal targets in the two contexts, again in ***T1***, the excursion is greater in the VF context in **L1** and **L2**, although not in **L3** (see Table 41), in which the OF excursion is greater than the VF excursion. A case-by-case comparison of these excursions revealed that the VF excursion was higher in 76% of cases (17/21 response pairs).

Table 40: Average verb-final high f0 target heights (Hz), OF and VF

	L1	L2	L3	Overall Ave.
VF	272.63	247.43	235.67	251.91
OF	241.88	228.86	228.5	233.08
Difference	30.75	18.57	7.17	18.83

Table 41: Average f0 excursions (Hz) between verb-initial and verb-final targets, OF and VF

	L1	L2	L3	Overall Ave.
VF	72.13	55.14	35.67	54.31
OF	37.63	34.14	36	35.92
Difference	34.6	21	-0.33	18.39

As with the statistical comparison of VF and SJF verb-final *f0* target heights in the previous section, the model applied to the verb-final *f0* target height data incorporated focus context and gender as fixed effects and lexical set and participant as random effects, of which both were given random slopes for the effect of focus context. The natural log transformation was applied to the response variable to satisfy assumptions of heteroscedasticity and normality, following which both the full and the reduced transformed models passed the Shapiro-Wilk test for normality (full: p=0.2756, reduced: p=0.2016) and Levene's Test for homogeneity of variance (full: p= 0.1776, reduced: p= 0.1372). Anova of the full and null models revealed a marginal effect of focus context on *f0* ($\chi 2 = 3.126$, $p = 0.07705$). Back transformation revealed that *f0* was raised in the VF context by 21.05 Hz (upper 30.69 Hz, lower 11.74 Hz). Removal of outliers resulted in non-convergent models. This marginally significant result provides limited support for hypothesis *1b*; it is consistent with the verb being aligned with the right boundary of an ip phrase in the VF context and only with the right boundary of an AP phrase in the OF context (see also Figure 47, ***left***). As discussed, however, a lack of support in the data for such a distinction between the prosodic phrasings of the two focus contexts would not be problematic for the proposed model, in which ip boundary-alignment of the verb in the OF context can be accounted for as the result of the verb being realised with prenuclear prosodic prominence.

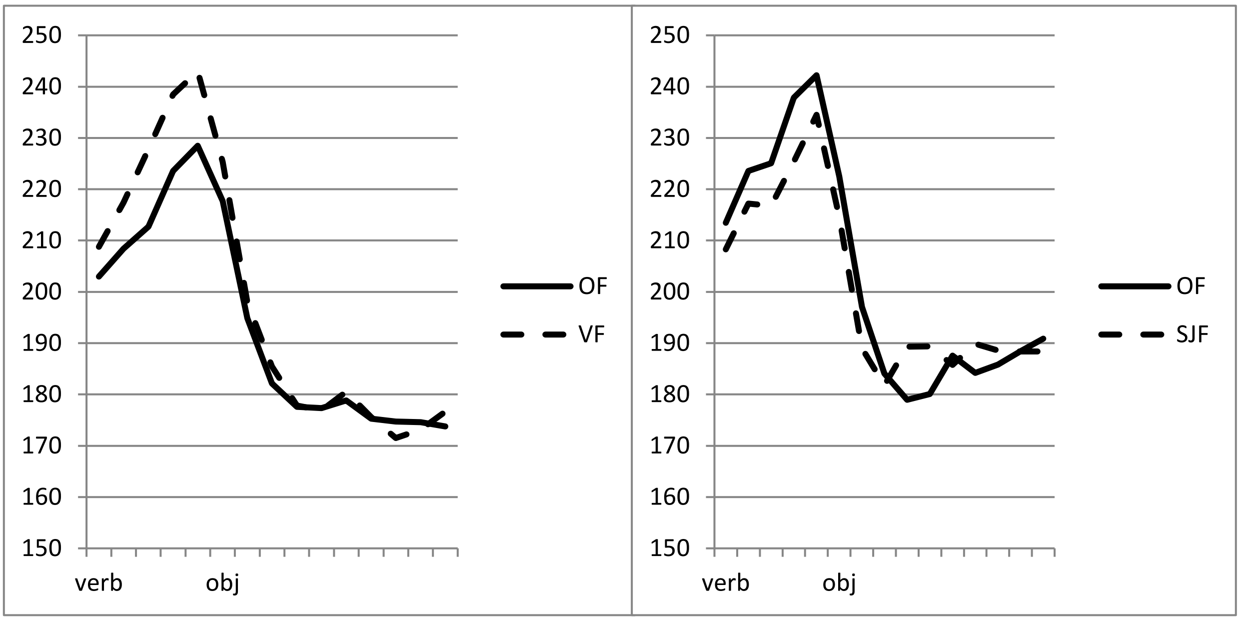


Figure 47: Averaged time-normalised RF contours in the OF and VF contexts, T1 (left) and in the OF and SJF contexts, T1 and T2 (right)

Of further relevance to hypothesis *1b* are the results of a comparison of verb-final high *f0* target heights in the OF and SJF focus contexts in ***T1*** and ***T2***. An opposite, left-alignment model of Georgian focus would predict the two contexts to be prosodically distinct, reflecting the presence of an ip boundary to the left of the focused object in the OF context and its absence to the left of the object in the SJF context. Such a prediction is not well supported by the data. A comparison of the average verb-final high *f0* target heights from these contours by lexical set and task (see Table 42) shows that, although *f0* is higher in the OF context overall, this is not the case in **L3** in **T1** or in **L3** in **T2**. In a case-by-case comparison of verb-final high targets from these contours, the target was higher in the OF context only in 53% of cases (21/40 response pairs) (see also Figure 47, ***right***).

Table 42: Average verb-final high f0 target heights (Hz), OF and SJF

	SJF	OF	Difference
T1			
L1	227.5	237.67	10.17
L2	215.43	215.86	0.43
L3	232.83	220.33	-12.5
Overall Ave. (T1)	225.25	224.61	-0.63
T2			
L1	225.13	259.25	34.13
L2	222.88	227.38	4.5
L3	264	251.2	-12.8
Overall Ave. (T2)	237.33	245.94	8.61
Overall Ave. (T1&T2)	231.29	235.28	3.99

A comparison of *f0* excursions between initial and final verbal targets in the two contexts similarly fails to support a clear difference between the two focus contexts in this respect (see Table 43).

Table 43: Average f0 excursions (Hz) between verb-initial and verb-final targets, OF and SJF

	SJF	OF	Difference
T1			
L1	30	32.83	2.83
L2	34.43	30.29	-4.14
L3	44.17	37.5	-6.67
Overall Ave. (T1)	36.2	33.54	-2.66
T2			
L1	33.38	57.88	24.5
L2	34.5	37.88	3.38
L3	55.6	52.6	-3
Overall Ave. (T2)	41.16	49.45	8.29
Overall Ave. (T1&T2)	38.68	41.49	2.82

A statistical model applied to the verb-final high *f0* target height data in this case again incorporated focus context and gender as fixed effects and lexical set, participant and task as random effects, all three of which were given random slopes for the effect of focus context. The data in this case satisfied the assumptions of heteroscedasticity and normality and were left untransformed; both the full and the reduced transformed models passed the Shapiro-Wilk test for normality (full: p= 0.9157, reduced: p= 0.927) and Levene's Test for homogeneity of variance (full:p= 0.6468, reduced: p= 0.6468). Anova of the full and null models did not reveal a significant effect of focus context on *f0* ($\chi 2$ = 0.2699, p= 0.6034). This result fails to support the predictions of a left-alignment model of Georgian focus; instead, it is consistent with the proposed right-alignment model, which predicts that the verb both in the SJF context and minimally in the OF context is aligned only with the right boundary of an AP phrase (see Table 44).

Table 44: Posited minimal phrasings for average RRF contours for VF, SJF and OF contexts

Focus context	Proposed phrasing
VF	$[[[S]_{AP}\ [V_F]_{AP}]_{ip}\ [[O]_{AP}]_{ip}\ ]_{IP}$
SJF	$[[[S_F]_{AP}]_{ip}\ [[V]_{AP}[O]_{AP}]_{ip}\ ]_{IP}$
OF	$[[[S]_{AP}\ [V]_{AP}[O_F]_{AP}]_{ip}\ ]_{IP}$

Of additional relevance to the proposed model is a comparison of average object-initial pitch accent heights (see Table 45) and of average *f0* excursions (see Table 46**)** between the verb-final high *f0* target and the object-initial pitch accent in the OF and SJF contexts. Comparison of these *f0* measurements are not consistent with final object focus being distinguished by a 'superlow' pattern, marked by a dramatic fall in f0 from a preceding high f0 target on the verb; instead, they indicate that the SJF and OF contexts are similar with respect to object-initial pitch accent height.

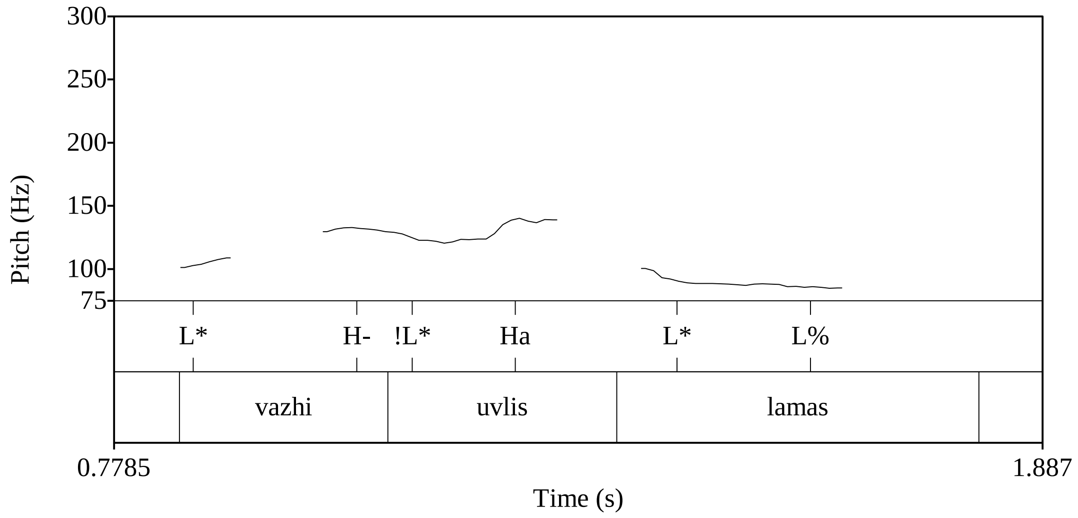
Table 45: Average object initial low f0 target heights (Hz), OF and SJF

	SJF	OF	Difference
T1			
L1	227.5	237.67	10.17
L2	215.43	215.86	0.43
L3	232.83	220.33	-12.5
Overall Ave. (T1)	225.25	224.62	-0.63
T2			
L1	225.13	259.25	34.13
L2	222.88	227.38	4.5
L3	264	251.2	-12.8
Overall Ave. (T2)	237.33	245.94	8.61
Overall Ave. (T1&T2)	231.29	235.28	3.99

Table 46: Average f0 excursions (Hz) between verb-final high and object-initial low f0 targets, OF and SJF

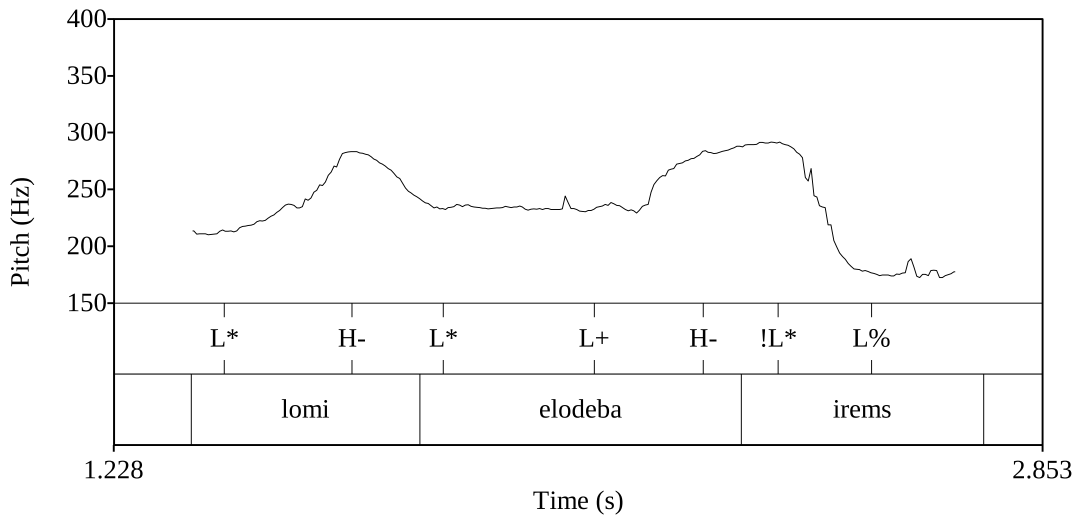
	SJF	OF	Difference
T1			
L1	57.2	49.8	-7.4
L2	50.86	48.14	-2.71
L3	65.67	57.5	-8.17
Overall Ave. (T1)	57.91	51.81	-6.09
T2			
L1	50.29	75	24.71
L2	54.17	58	3.83
L3	84	62	-22.2
Overall Ave. (T2)	62.95	65.07	2.12
Overall Ave. (T1&T2)	60.43	58.44	-1.99

Of the RRF contours produced in the OF context, 3 featured upstepping of the verb-initial pitch accent (see Figure 48) and 3 upstepping of the object-initial pitch accent (see Figure 49). Within the proposed model, these incidences can be accounted for as upstep following a high ip boundary tone H- marking a prominent topic interpretation of the subject in the former case and as upstep following the same tone marking a prominent given interpretation of the verb in the latter case, as predicted in *5.2.2.1*.



vazh-i uvli-s lama-s.
boy-NOM look.after-3PSG llama-DAT
'A/the boy is looking after a/the llama.'

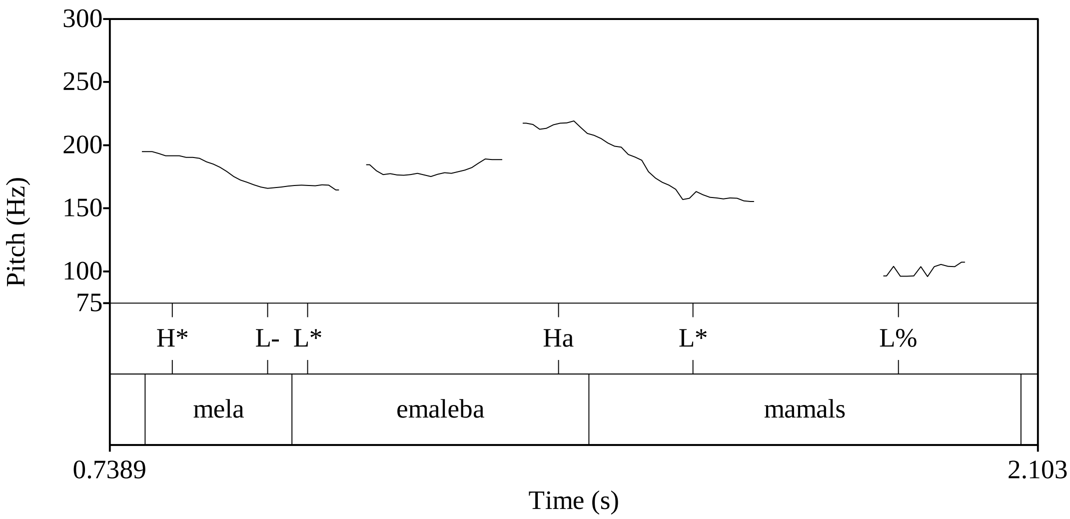
Figure 48: OF contour type RRF with post-subject upstep, L3, participant 10 (M), T2



lom-i elodeb-a irem-s.
lion-NOM await-3PSG deer-DAT
'A/the lion is waiting for a/the deer.'

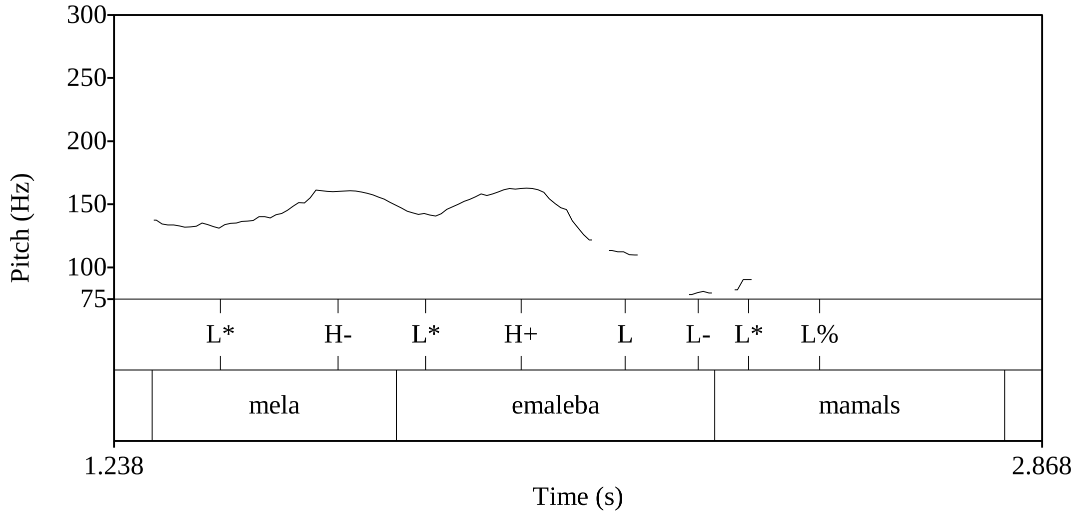
Figure 49: OF contour type RRF with post-verbal upstep, L1, participant 3 (F), T1

The less frequently produced contour types in the OF context are likewise compatible with the predictions of the model. These included FRF (see Figure 50), which was produced in 6% of OF responses (2/33) in T1 and 12% of responses (4/33) in T2, RFF (see Figure 51), again produced in 6% of responses (2/33) in T1 and 9% of responses (3/33) in T2, FlRF (see Figure 52), produced in 9% of responses (3/33) in T1 and in a single response in T2, and RFlF (see Figure 53), which had the same distribution as FlRF. As with the VF context, no responses featured the Rd or Fd contours featuring deaccenting following a rising or falling contour on the subject, observed in the SJF context data.



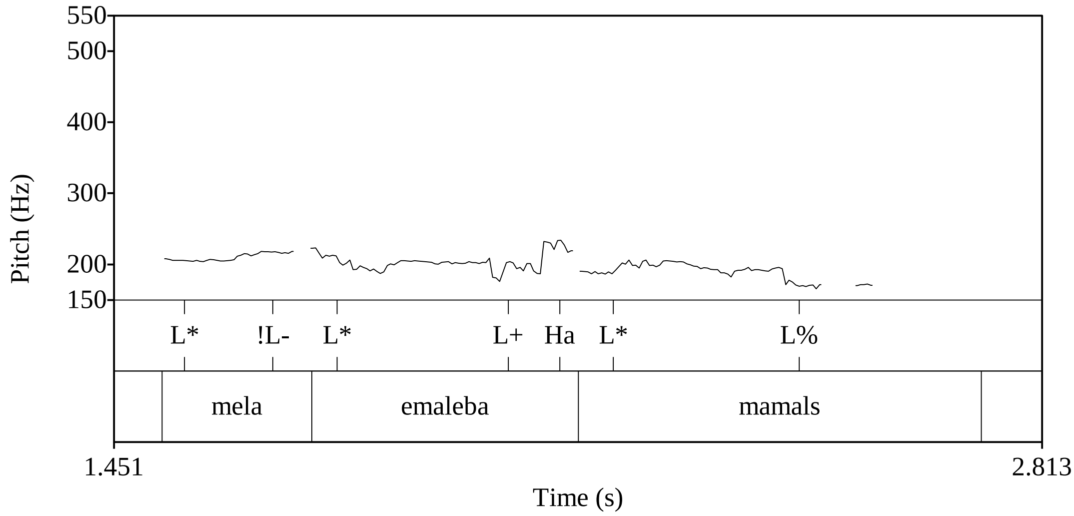
mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'A/the fox is hiding from a/the cockerel.'

Figure 50: OF contour, type FRF, L2, participant 7 (F), T1



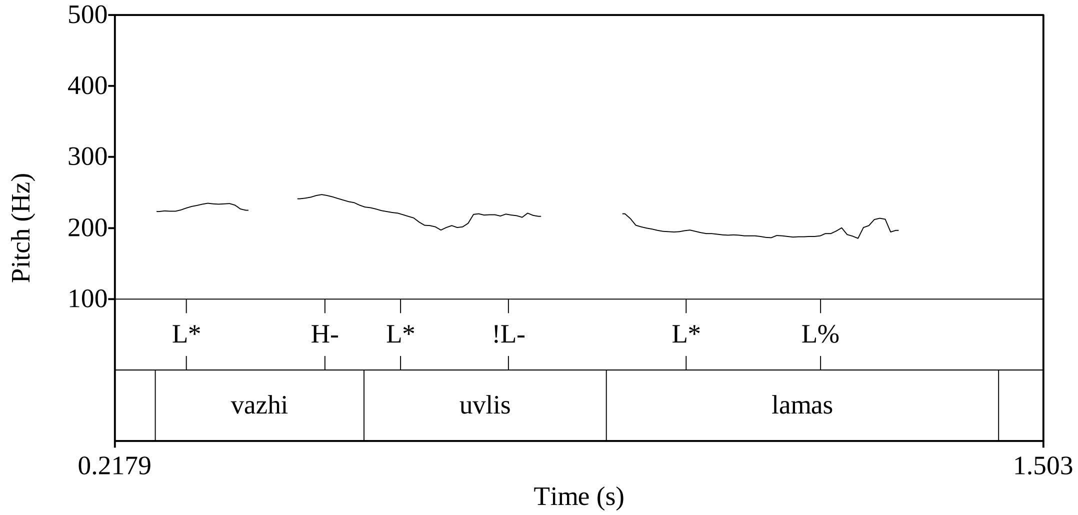
mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'A/the fox is hiding from a/the cockerel.'

Figure 51: OF contour, type RFF, L2, participant 2 (M), T1



mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'A/the fox is hiding from a/the cockerel.'

Figure 52: OF contour, type FlRF, L2, participant 4 (F), T1



vazh-i uvli-s lama-s.
boy-NOM look.after-3PSG llama-DAT
'A/the boy is looking after a/the llama.'

Figure 53: OF contour, type RFlF, L3, participant 5 (F), T1

The distribution of contour types realised in the OF context is summarised in Table 47.

Table 47: Distribution of observed contour types, VF, SJF and OF contexts

	RRF	FRF	RFF	FlRF	RFlF	Rd	Fd
VF (***T1***) (/32)	21	3	6		2		
SJF (***T1***) (/33)	17	4	3	1	3	1	4
SJF (***T2***) (/33)	16	5	3	2	2		5
OF (***T1***) (/33)	23	2	2	3	3		
OF (***T2***) (/33)	24	4	3	1	1		

To summarise, the data presented in this section support, albeit in a more limited way, hypothesis *1b*, that the same prosodic boundary aligned to the right of the medial focused verb is absent to the left of the final focused object. The more limited nature of this support is consistent with the prediction made in *5.2.2.1* that the verb preceding the final focused object may itself be prominent and have such a boundary aligned to its right. On the other hand, a comparison of the OF and SJF contexts with respect to this feature supported neither a significant nor a marginally significant difference between the two, contra the predictions of a left-alignment model of the kind proposed by Féry (2013), according to which the two focus structures differ with respect to this feature. As discussed, Skopeteas and Féry (2010), Féry *et al.* (2010) and Féry (2013) identify a frequently occurring pattern of 'superlow' *f0* on final focused objects in Georgian, which drops dramatically from a preceding high verbal *f0* target; this is attributed to the alignment of the focused object with the left boundary of a prosodic phrase. As pointed out, these studies do not discuss whether or how frequently the superlow pattern occurred in other focus contexts; my data do not indicate a difference between OF and SJF object-initial pitch accent heights consistent with such a pattern. The distribution of contour types realised in the OF context is likewise consistent with the predictions of hypothesis *1b*.

5.2.2.2.1.3 Right Alignment of Initial Focus

The final part of hypothesis set 1 is repeated in [**24**].

24) Hypothesis Set *1c*: Right alignment of initial focus

i. The prosodic realisation of an initial focused subject in an SVO sentence in Georgian is distinct from the realisation of a post-focal verb in the same initial subject focus context.
ii. This difference is consistent with the presence of a prosodic phrase boundary to the right of the subject and its absence to the right of the verb, as consistent with the findings from [**a**] and [**b**].

In hypothesis *1c* it was predicted that the realisation of the initial focused subject in the SJF context would be distinct from the realisation of the post-focal verb in the same context, and that this distinction would be consistent with the presence of an ip boundary to the right of the focused subject and its absence to the right of the postfocal verb. As discussed, the initial focus hypothesis was formulated in this way due to the predicted likelihood of initial non-focused subjects in other focus contexts being interpreted and produced as prominent topics, and thus also being aligned with ip phrase boundaries, rendering problematic a comparison of the focused subject with these subjects as a means of establishing the realisation of initial subject focus. The predicted contrast with the postfocal verb, aligned in the proposed analysis to the left of an AP phrase boundary Ha, represents a minimal condition for an ip-right alignment analysis for the focused subject; it is to be expected that a high boundary tone H- should at least be higher than a subsequent high boundary tone Ha[54].

As already discussed in subsection *5.2.3.2.1.1* above, the *RRF* contour was the most frequently produced contour type in the *SJF* context; this contour type was produced in approximately 39% (13/33) of responses in ***T1*** and in approximately 52% (17/33) of responses in ***T2***. Evidence for the contrast predicted in *1c* was moreover provided by the averaged RRF contours for the SJF and VF contexts shown in Figure 32, which indicate, not only that the focused subject in the SJF context is realised with a final high *f0* target which is greater in height than the final high *f0* target of the postfocal verb in the same context, but that this subject-final high *f0* target is approximately the same height as the verb-final high *f0* target in the VF context, which is itself analysed as a high ip boundary tone H-. In addition, it was noted that the contour types *Rd* and *Fd*, which featured a rising or falling *f0* contour on the subject followed by deaccenting or dephrasing of the remaining contour, were produced only in the SJF context and were absent in the VF and OF contexts, which is consistent with the requirement within the posited model that focused constituents be aligned with the right boundary of an ip phrase rather than with the left boundary of one.

[54] As discussed in chapter 3, in the data presented by Vicenik and Jun (2014), a high ip boundary H- is higher than a preceding or following high AP boundary Ha.

Further evidence for the contrast predicted in hypothesis *1c* is provided by comparison of average subject-final high *f0* target heights in the SJF context with verb-final high *f0* target heights from the same context in ***T1*** and ***T2*** (see Table 48). In a case-by-case comparison of response pairs, the subject-final target was higher than the verb-final target in the SJF context in 93% of cases (28/30 response pairs).

Table 48: Average subject and verb-final high f0 target heights (Hz), SJF

	SJF subj-final *f0*	SJF verb-final *f0*	Difference
T1			
L1	253.17	224.33	28.83
L2	225.25	212	13.25
L3	246.6	234.4	12.2
Overall Ave. (T1)	241.67	223.58	18.09
T2			
L1	252.6	229	23.6
L2	246.33	223.67	22.67
L3	240.25	231.25	9
Overall Ave. (T2)	246.39	227.97	18.42
Overall Ave. (T1&T2)	244.03	225.78	18.26

The linear mixed model applied to these data incorporated focus context and gender as fixed effects and lexical set, participant and task as random effects, all three of which were given random slopes for the effect of focus context. The natural log transformation was again applied to the response variable Hz in both the hypothesised and the null models to optimise homogeneity of variance. Both the hypothesised and the null transformed models passed the Shapiro-Wilk test for normality (hypothesised: p=0.352, null: p=0.3737) and Levene's Test for homogeneity of variance (hypothesised: p= 0.2052, null: p= 0.2396). Anova of the hypothesised and null models revealed a significant effect of focus condition on *f0* ($\chi 2$=10.926, p=0.0009484). *f0* was lowered in the postfocal verb-final target data by approximately 22 Hz (upper 25.9497, lower 17.8111). A significant result was maintained following removal of an outlying data point ($\chi2$=10.888, p= 0.0009677). These data therefore support the predictions of hypothesis *1c*; initial focused subjects and medial postfocal verbs had a distinct prosodic realisation, as consistent with the presence of an ip boundary to the right of the focused subject and its absence to the right of the postfocal verb (see also Figure 54, ***left***). It can also be noted that the effect size in this comparison was similar in size to that calculated in the comparison of verb-final high targets in the VF and SJF contexts.

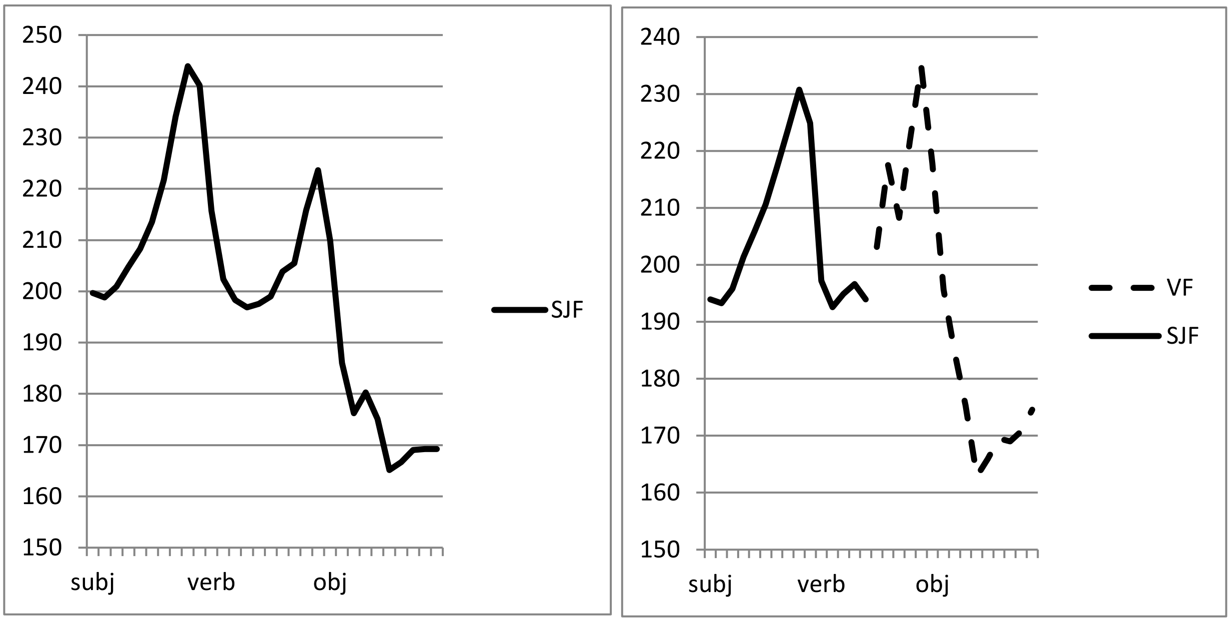


Figure 54: Averaged time-normalised RRF contour in the SJF context, T1 and T2 (left) and initial R (SJF) and final RF (VF) contours, T1 (right)

Whilst increased subject-final *f0* target height relative to the final *f0* target height of the postfocal verb is consistent with the presence of an ip boundary following the subject insofar as this is a necessary condition for its presence, it is not a sufficient condition. This is because the same pattern may obtain as the result of the downstepping of boundary tone heights between initial and subsequent AP phrases. As discussed in chapter 4, this is noted by Vicenik and Jun (2014), who find that subsequent APs are realised in a reduced range relative to preceding APs, whereas a high ip boundary H- ignores the reduced range triggered by a preceding AP boundary and in their examples always exceeds it in height.

A further prediction to be made on the basis of these observations is that the subject-final high *f0* target in the SJF context should not be lower than the verb-final high *f0* target in the VF context, which data presented above indicate is consistent with a high ip boundary H-. Support for this further prediction was provided by the averaged RRF contours for the SJF and VF contexts in Figure 54., ***right*** above, which indicate that the two *f0* targets in question were realised at approximately the same height. A comparison of subject-final high *f0* target heights from the SJF context with verb-final high *f0* target heights from the VF context from ***T1*** (see Table 49), on the other hand, indicates that the *f0* of the subject-final target is slightly higher; subject target height was greater in 75% of response pairs (12/16).

Table 49: Average subject-final (SJF) and verb-final (VF) high f0 target heights (Hz)

	L1	L2	L3	Overall Ave.
SJF subj-final *f0*	258	244.5	240.86	247.79
VF verb-final *f0*	252.8	230.83	233	238.88
Difference	5.2	13.67	7.86	8.91

The linear mixed model applied to these data again incorporated focus context and gender as fixed effects and lexical set and participant as random effects, of which both were given random slopes for the effect of focus context. Both hypothesised and null models exhibited normality and homogeneity of variance and so the data were not transformed. Both the hypothesised and the null models passed the Shapiro-Wilk test for normality (hyp: p=0.4794, null: p=0.1654) and Levene's Test for homogeneity of variance (hyp: p=0.544, null: p=0.4406). Anova of the full and null models revealed a marginally significant effect of focus context on *f0* ($\chi 2$=3.7084, p=0.05414), although the effect was small: VF2 lowered *f0* by approximately 8.9 Hz (error approximately 4 Hz). A marginally significant result was maintained following the removal of an outlier ($\chi 2= 3.1829$, $p= 0.07441$). This marginally significant result, in combination with the significant result reported above and the distribution of contour types in the SJF, VF and OF contexts reported in the preceding two subsections, supports hypothesis *1c*; the prosodic realisation of the initial focused subject is consistent with it being aligned to the right of an ip boundary, which in the majority of cases is realised as a high ip boundary tone H- but which can also be realised as a low ip boundary tone L- or an upstepped low ip boundary tone !L-.

In this section I have presented data on the prosodic realisation of information-structural relations in Georgian which provide support for my first set of proposed hypotheses, concerned with the realisation of narrowly focused constituents. The prevalence of the RRF contour type in the SJF, VF and OF focus contexts examined indicates that, as predicted, the prosodic realisation of narrow focus in Georgian cannot be defined as a special rising-falling contour type as proposed by Vicenik and Jun (2014) or by Skopeteas *et al.* (2009). As also predicted, it indicates that focus prosody can neither be defined as alignment of the narrowly focused constituent simply with a high boundary tone as opposed to the absence of one, as in the two phrase level model proposed by Skopeteas and Féry (2010) and by Féry (2013). Instead, the data are consistent with the existence of three levels of phrasing in Georgian, as proposed by Vicenik and Jun (2014): the AP, the ip and the IP, and indicate that narrow foci in Georgian are aligned with the boundary of an ip phrase realised in the majority of cases with a high ip boundary tone H-, which is distinctive in height from a high AP boundary tone Ha realising an AP boundary with which non-prominent constituents are aligned. Again in agreement with the predictions of hypothesis set 1, the data indicate that narrowly focused constituents are aligned with the right boundary of an ip phrase, rather than with the left boundary of one as proposed by

Féry (2013) and in part by Skopeteas and Féry (2010). In addition, I showed that a comparison of the SJF and OF context data fails to support the predictions of the alternative left-alignment analysis. The distribution of less frequently produced contour types within the three focus contexts examined is, with some exceptions, compatible with the further prediction made that the ip boundary to the left of which narrow foci in Georgian are aligned is not realised only as a high ip boundary tone H-; instead, it may alternatively be realised as a low ip boundary tone L- or as an upstepped low ip boundary tone !L-.

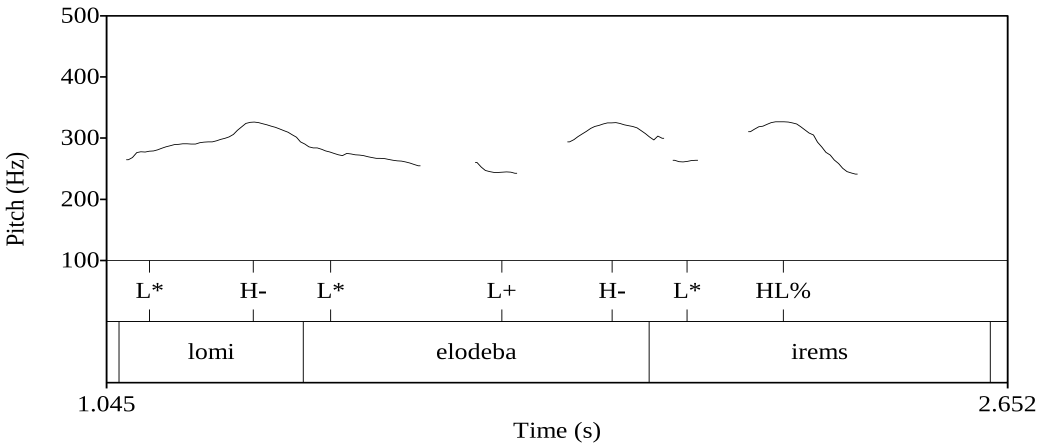
5.2.2.2.1.4 Additional Data from Yes-No Questions

Additional support for the proposed right-alignment analysis is provided by data from two additional focus structures included in **T1**. These were the yes-no questions OFQ and SJFQ, designed, in addition to the verb, to elicit focus on the object and on the subject respectively. As discussed in the previous chapter, Bush (1999) analyses the distinctive contour associated with these questions as a complex boundary tone L+H- marking the right boundary of an ip phrase, with which the focused verb and other focused constituents in these questions are aligned. Sentence-finally, this ip boundary tone appears adjacent to a low (L%) or a high (H%) IP boundary tone, the former associated with politeness and the latter neutral. By contrast, as their analysis does not permit boundary tones of different phrase levels to be realised together on the same syllable[55], Vicenik and Jun (2014) instead analyse the pattern as a focus-marking phrase accent H+L appearing in combination either with a simple H% or complex HL% boundary tone sentence-finally or with a simple H- boundary tone non-finally, which they do not connect with focus marking. Although in

[55] As discussed, a higher boundary tone is instead found to replace a lower one.

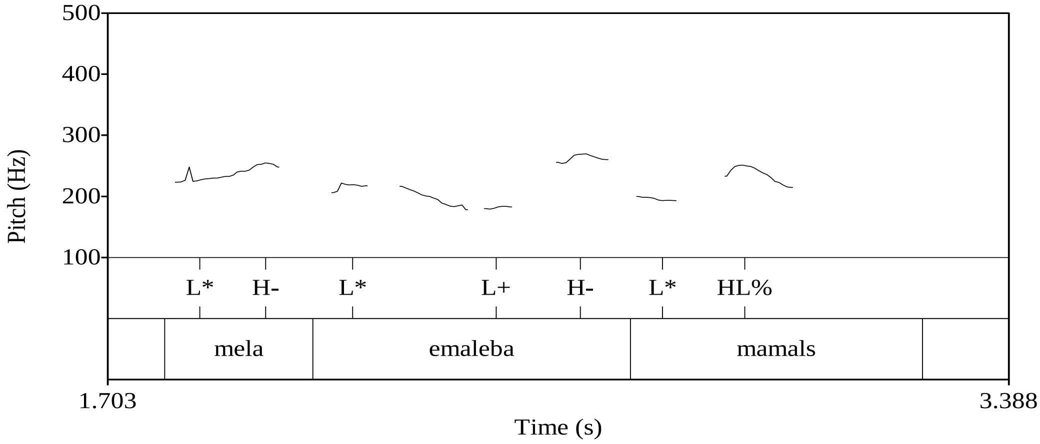
their data, yes-no questions ended most often with a high H% or with a falling HL% IP boundary tone, Vicenik and Jun (2014) observed that they also sometimes ended in a low IP boundary tone L% of the type found in their declaratives and focus sentences.

Evidence of the H+L phrase accent observed by Vicenik and Jun (2014) was absent from the contour type produced most frequently in these contexts in my data. The prevalent contour type produced in both contexts instead consisted of a rise on all three constituents (see Figure 55 and Figure 56); this comprised 63% of responses (20/32) in the SJFQ context and 61% of responses (20/33) in the OFQ context.



lom-i elodeb-a irem-s?
lion-NOM await-3PSG deer-DAT
'Is a/the lion is waiting for a/the deer?'

Figure 55: Example SJFQ contour, type RRR, L1, participant 1 (F), T1



mela-0 emaleb-a mamal-s?
fox-NOM hide.from-3PSG cockerel-DAT
'Is a/the fox is hiding from a/the cockerel?'

Figure 56: Example OFQ contour, type RRR, L2, participant 6 (F), T1

In the responses with this contour type in the **L1** and **L2** data, a pattern was observed on the medial verb which differed from that found in the VF contours reported in section *5.2.2.2.1.1*. Rather than rising steadily from a low L* pitch accent on the initial syllable to the final high H- ip boundary tone on the final syllable of the verb, or remaining at the level of this pitch accent until the penultimate syllable before rising abruptly to the high boundary tone, the contour fell to a target on the penultimate syllable lower than that of the initial low pitch accent, prior to rising as before (see Figure 57, ***left***). This observation is supported by a comparison of average *f0* target heights on the penultimate syllable of the verb in the medial verb focus (VF) and object focus yes-no question (QOF) contexts preceding a verb-final high target (see Table 50).

Table 50: Average f0 target heights of verb-penultimate syllables (Hz) preceding verb-final high targets, VF and OFQ

	L1	L2	L3	Overall Ave.
VF	210.14	202	194.75	202.3
OFQ	186	178.38	192.38	185.58
Difference	24.14286	23.625	2.375	16.71429

This ‘dipping’ verbal *f0* pattern observed in the prevalent RRR contour type, which occurred in the absence of a preceding high tone on the verb as observed in the RFF contour type, is more consistent with a complex ip boundary tone L+H- (see Figure 58), as identified by Bush (1999), than with a phrase accent H+L appearing in combination with a high ip boundary tone H-, as identified by Vicenik and Jun (2014). As my data indicate, this complex boundary tone is distinct from the combination identified in the declarative data of a low tone on the penultimate syllable of the verb at the level of the preceding pitch accent followed by a high ip boundary tone H-. I propose that this latter combination of tones be analysed as the first component of a complex AP boundary tone L+Ha appearing in combination with a simple high ip boundary tone H-. In keeping with the pattern of boundary tone replacement reported by Vicenik and Jun (2014) and observed in my own data, this simple ip boundary tone replaces the second component of the complex L+Ha boundary tone on the final syllable of the verb, resulting in a combination boundary tone (La)+H- (see Figure 59). That this distinction in boundary tones is not evident in the **L3** data (see also Figure 57, ***right***) can be explained as the result of the verb in this case consisting only of two syllables, the first of which bears the initial low pitch accent L*; this pitch accent is realised in place of the first component of a boundary tone.

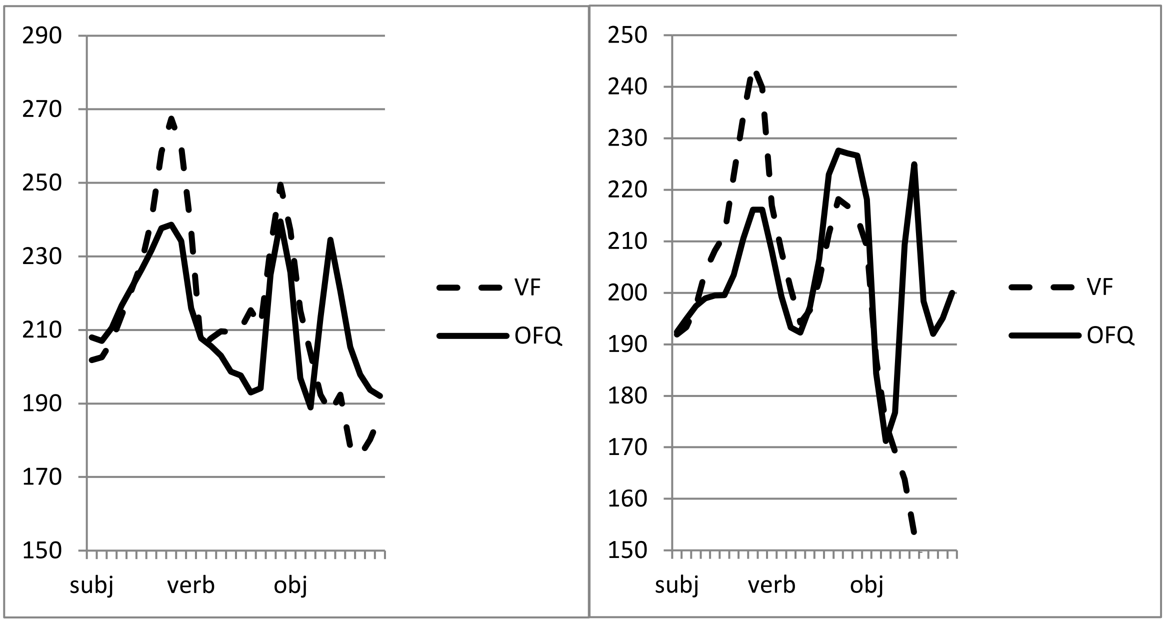
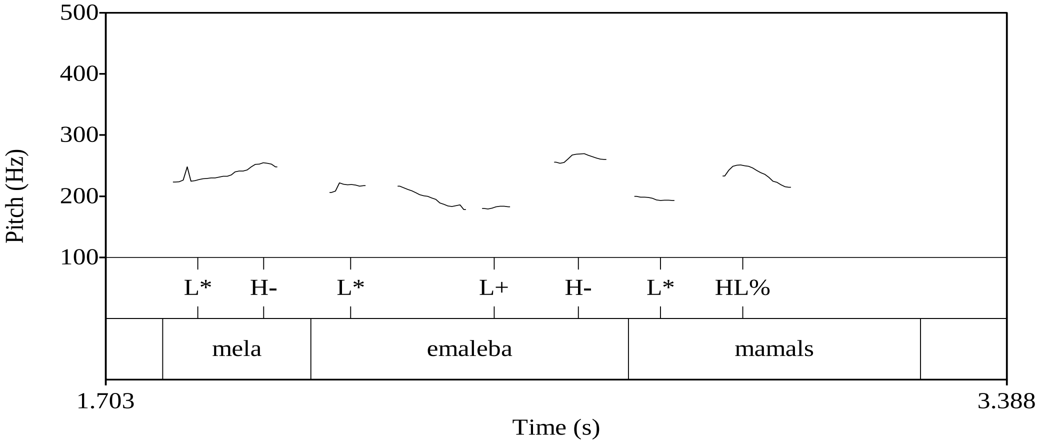
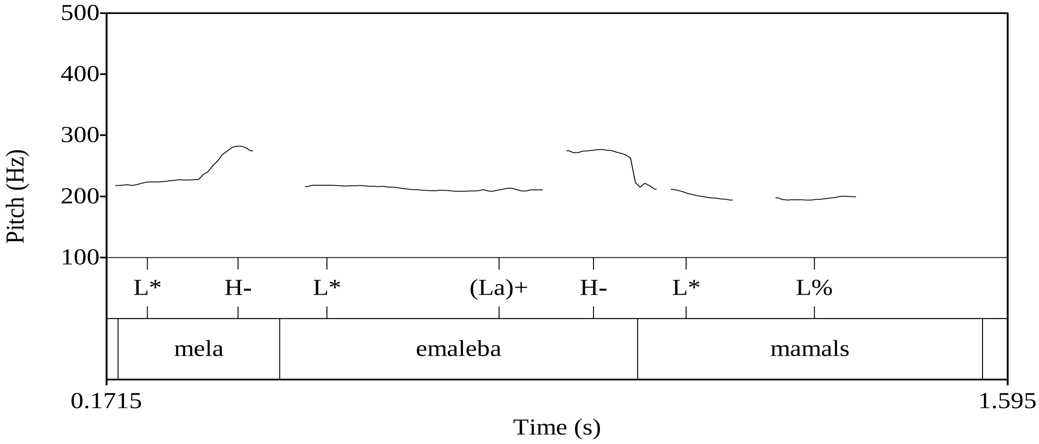


Figure 57: Averaged time-normalised RRF f0 contours in the OFQ and VF contexts in L1 and L2 (left) and in L3 (right), T1



mela-0 emaleb-a mamal-s?
fox-NOM hide.from-3PSG cockerel-DAT
'Is a/the fox is hiding from a/the cockerel?'

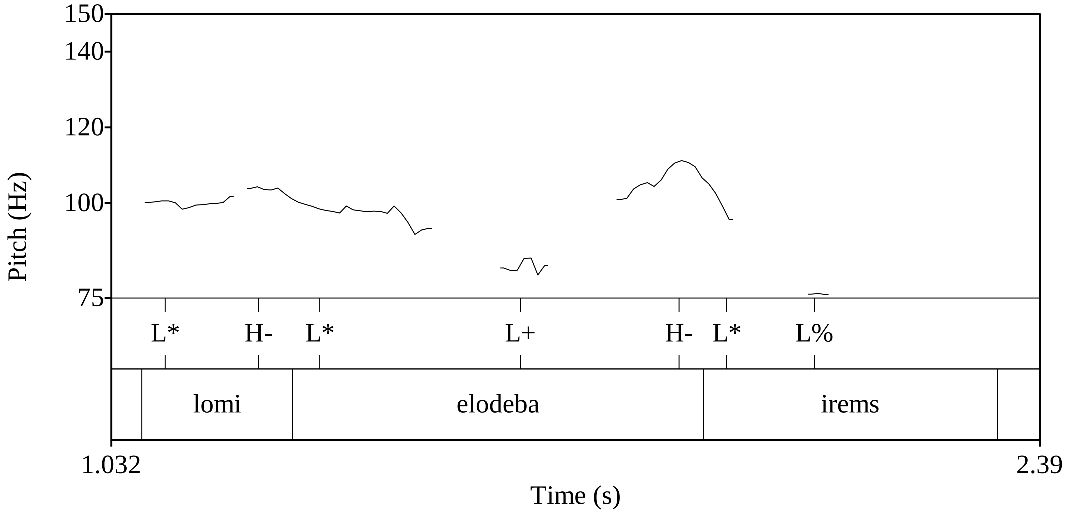
Figure 58: Example OFQ contour type RRR with complex L+H- boundary tone, type RRR, L2, participant 6 (F), T1



mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'A/the fox is hiding from a/the cockerel.'

Figure 59: Example VF contour type RRF with revised complex (La)+H- boundary tone, type RRR, L2, participant 6 (F), T1

As observed by Vicenik and Jun (2014) in some of the yes-no question responses in their data, a small number of contours in both contexts, like the majority of their declarative counterparts, consisted of a rise on the subject and verb, followed by a fall on the final object (see Figure 60). This contour type occurred in 13% (4/32) of responses in the SJFQ context and in 15% (5/33) of responses in the OFQ context. The occurrence of this contour type in the data suggests a motivation for the distinctive complex L+H ip boundary tone observed in the *RRR* data; it is this distinctive boundary tone, rather than a final IP boundary H% or HL%, which has the role of distinguishing yes-no questions, which minimally focus the verb, from their declarative counterparts. To capture the combination of three tones (LHL) present sentence-finally in these RRR contours in a way which doesn't violate Vicenik and Jun's (2014) principle of higher level boundary tones overriding and replacing lower level ones, which I have observed to apply in my own declarative sentence data, it is necessary to posit a complex IP boundary HL%, which similarly to the AP/ip combination La+H- replaces the H- tone of the complex ip boundary and appears in combination with the first tone of the ip boundary, L-+HL%.



lom-i elodeb-a irem-s?
lion-NOM await-3PSG deer-DAT
'Is a/the lion is waiting for a/the deer?'

Figure 60: Example SJFQ contour, type RRF, L1, participant 4 (F), T1

The remaining contour types produced in both contexts featured flat or falling contours on the initial subject, followed in all cases by a rising contour on the verb and then a rising or falling contour on the object (see Table 51).

Table 51: Distribution of contour types, SJFQ and OFQ

	RRR	RRF	FRF/R	FlRF/R
SJFQ (***T1***) (/32)	20	4	4	4
OFQ (***T1***) (/33)	20	5	2	6

Although more data are required to support the complex ip boundary tone analysis proposed in this subsection, the absence of an H+L phrase accent as identified by Vicenik and Jun (2014) in the prevalent contour type produced in the yes-no question contexts, in combination with evidence for a distinctive combination ip boundary tone L+H- marking the right boundary of an ip phrase with which the verb and other focused constituents in these questions are aligned, and which has the role of distinguishing questions from declaratives, provides further support for the proposed right-alignment analysis in hypothesis set *1*.

In the next section I turn to the second set of hypotheses proposed, which are concerned with the prosodic realisation in Georgian of secondary foci and prominent topics; these are likewise supported by the data and account for the apparent alignment of subject with right ip boundary observed in the VF and OF contexts.

5.2.2.2.2 Realisation of Prenuclear and Nuclear Prominences

The second set of hypotheses proposed above, which are repeated in [**25**] below, are concerned with the prosodic realisation in Georgian of secondary foci and prominent topics.

25) Hypothesis Set *2*: Realisation of prominent topics and prenuclear foci in Georgian

a. Realisation of prominent topics and additional foci

i. The prosodic realisation of prominent subject topics in subject topic contexts, and of focused subjects in sentence focus contexts, is distinct from the realisation of verbs in initial subject focus contexts.

ii. This difference is consistent with the presence of a prosodic phrase boundary following the subjects in the former cases and its absence following the verb in the latter case, as consistent with [**c**] of the first hypothesis set.

b. Marking of prominences beyond phrasing

i. The prosodic realisation of initial subject focus is distinct from that of final object focus with a prominent subject topic.

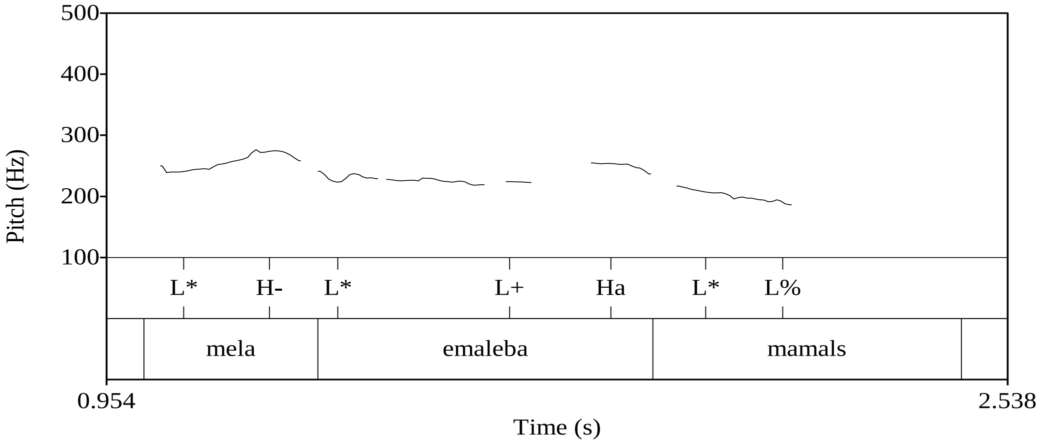
ii. This distinction is consistent with the presence of a prosodic feature on the object in the latter case and its absence on the object in the former case other than pitch.

These hypotheses are supported by the data that I present in the present section, which indicate that prominent topical subjects and secondary focused subjects are likewise aligned with the right of an ip boundary, and that narrowly focused constituents are realised with increased intensity in addition to ip boundary alignment.

5.2.2.2.2.1 Realisation of prenuclear prominent topics and additional foci

As discussed above, the prediction made in hypothesis *2a*, that the means of prosodic realisation of narrowly focused sentence-initial subjects in Georgian is shared by sentence-initial subjects which are prominent topics and by those which are additional foci preceding the nuclear focus, is consistent with the observation in subsections *5.2.2.2.1.1* and *5.2.2.2.1.2* that the average height of subject-final high *f0* targets in the VF and OF contexts is comparable to that of the focused subject in the SJF context; this can be explained as the result of a prominent topic interpretation for the subject in these contexts.

The data for responses produced in the prominent subject topic (SJT) context show that, as in the VF, SJF and OF contexts, the majority contour type produced was again *RRF* (see Figure 61): this was produced in approximately 70% of responses (23/33).



mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'The fox is hiding from a/the cockerel.'

Figure 61: Example SJT contour, type RRF, L2, participant 8 (F), T2

A comparison of average subject-final high *f0* targets from the SJT context with average verb-final high *f0* targets from the SJF context by lexical set (see Table 52) indicates that the relationship between the two peaks is similar to that observed between subject-final and verb-final *f0* targets from the SJF context in the previous subsection: the subject-final *f0* target in the SJT context is again approximately twice the height of the verb-final *f0* target in the SJF context, as consistent with the former being aligned to the right of a high ip boundary tone, H-. The subject-final target in the SJT context was higher in 94% of response pairs (17/18).

Table 52: Average subject-final (SJT) and verb-final (SJF) high f0 target heights (Hz), T2

	L1	L2	L3	Overall Ave.
SJT subj-final *f0*	259.71	264.33	242	255.35
SJF verb-final *f0*	227	230	235.6	230.87
Difference	32.71	34.33	6.4	24.48

As with previous models, the linear mixed model applied to these data incorporated focus context and gender as fixed effects and lexical set and participant as random effects, of which both were given random slopes for the effect of focus context. Both hypothesised and null models exhibited normality and homogeneity of variance; both the full and the null models passed the Shapiro-Wilk test for normality (full: p= 0.6874, null: p=0.7717) and Levene's Test for homogeneity of variance (full: p=0.4271, null: p=0.5615), and so the data were not transformed. Anova of the full and null models revealed a significant effect of focus context on f0 ($\chi 2$=4.4121, p= 0.03569). The f0 of the subject-final high target in the SJT context was raised by 26.23 Hz (standard error 9.13 Hz). As such, the data support hypothesis *2a* with respect to the realisation of initial prominent topics, indicating that these, like initial narrow foci, are aligned to the right of a high ip phrase boundary tone H- (see also Figure 62, ***left***).

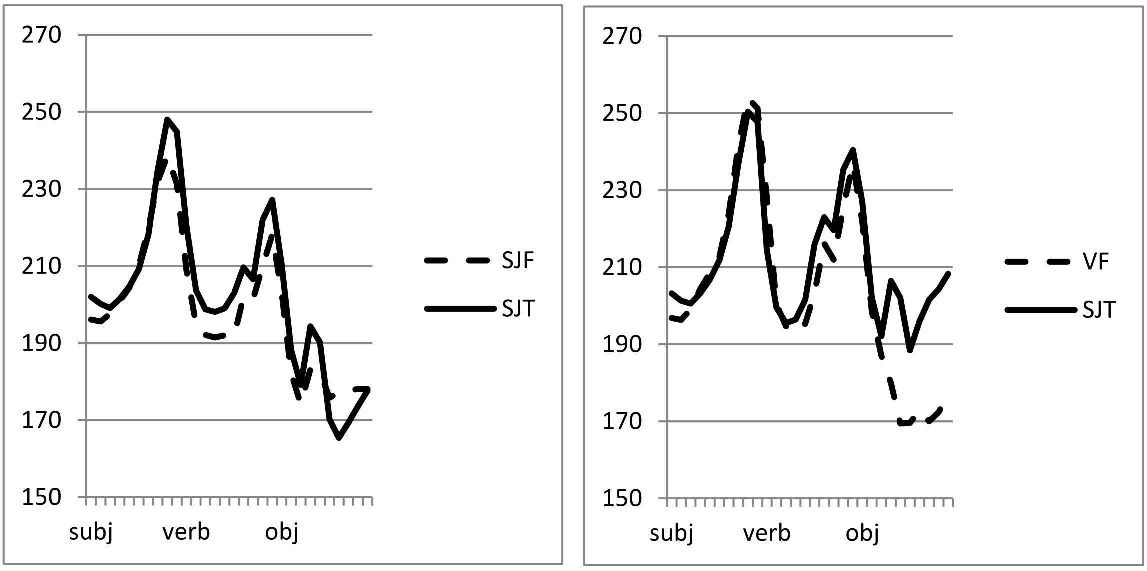


Figure 62: Averaged time-normalised initial R (SJT) and final RF (SJF) contours, T2 (left) and initial R (SJT, T2) and final RF (VF, T1) contours (right)

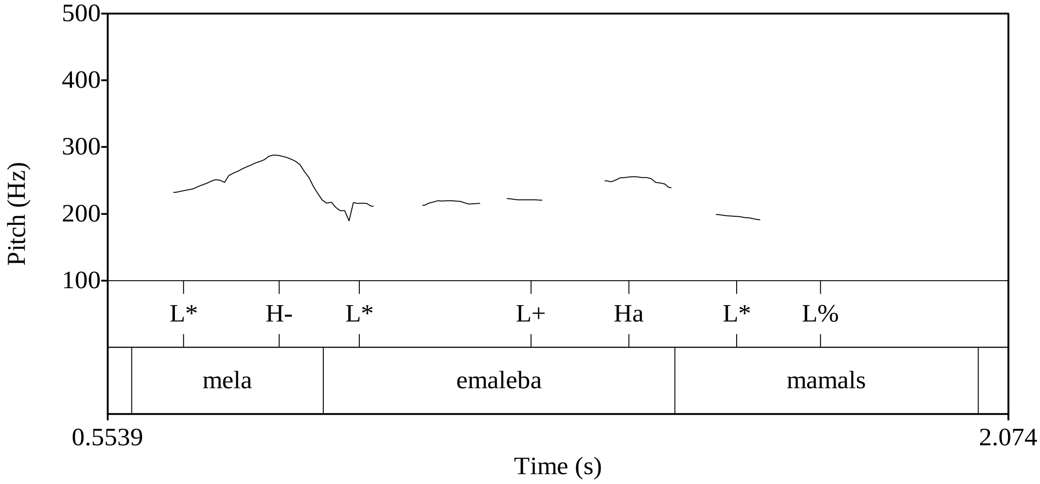
As with subject-final high *f0* targets in the SJF context in section *5.2.2.2.1.3*, those from the SJT context in ***T2*** were also compared with verb-final high *f0* targets from the VF context in ***T1***. As shown in Table 53, the subject-final high *f0* targets are again on average higher. This was the case in 72% of response pairs (13/18). These data therefore provide further support for the subject in this context being aligned with the right boundary of an ip phrase under the proposed analysis. The linear mixed model applied to these data incorporated focus context and gender as fixed effects and lexical set, participant and task as random effects, of which all three were given random slopes for the effect of focus context. Both hypothesised and null models satisfied assumptions of normality and homogeneity of variance (both the full and the null models passed the Shapiro-Wilk test for normality (full: p= 0.7872, null: p=0.7272) and Levene's Test for homogeneity of variance (full: p=0.4196, null: p=0.2679) and were left untransformed. Anova of the full and null models revealed a marginally significant effect of focus context on *f0* ($\chi 2$=3.2374, p=0.07198)[56]. *f0* was reduced in the VF context by approximately 12.69 Hz (standard error approx. 5.36 Hz) (see also Figure 62, ***right***).

Table 53: Average subject-final (SJT, T2) and verb-final (VF, T1) high f0 target heights (Hz)

	L1	L2	L3	Overall Ave.
SJT subj-final *f0*	272.43	247.83	243.29	254.42
VF verb-final *f0*	262	230.83	233	241.9
Difference	10.29	17	10.29	12.52

The data from the sentence focus context (STF) likewise support hypothesis *2a*, indicating that additional prenuclear foci are, like prominent topics, aligned with the right boundary of an ip phrase. The most frequently produced contour type in the STF context was again RRF: this occurred in 78% of responses in **T1** (25/32) and in 73% of responses in **T2** (24/33) (see Figure 63).

[56] The null model was reported by *R* to be nearly unidentifiable due to a large eigenvalue ratio.



mela-0 emaleb-a mamal-s.
fox-NOM hide.from.PRS.3SG cockerel-DAT
'A fox is hiding from a cockerel.'

Figure 63: Example STF contour, type RRF, L2, participant 8 (F), T1

A comparison of average subject-final high *f0* targets in the STF context with verb-final high *f0* targets in the SJF context (see Table 54**)** reveals that the former are higher; this was the case in 82% of response pairs (32/39). The initial linear mixed model applied to these data again incorporated focus context and gender as fixed effects and lexical set, participant and task as random effects, of which all three were given random slopes for the effect of focus context. As this model failed to converge, it was simplified by giving the lexical set variable a fixed instead of a random slope. Both hypothesised and null simplified models satisfied assumptions of normality and homogeneity of variance (both the full and the null models passed the Shapiro-Wilk test for normality (full: p= 0.8365, null: p=0.8534) and Levene's Test for homogeneity of variance (full: p=0.3649, null: p=0.3846)) and so the data were left untransformed. Anova of the full and null models revealed a significant effect of focus context on *f0* ($\chi2$=5.2486, p=0.02196). *f0* was reduced in the SJF context by approximately 27.39 Hz (standard error 6.97 Hz).

Table 54: Average subject-final (STF) and verb-final (SJF) high f0 target heights (Hz), T1 and T2

	STF subj-final *f0*	SJF verb-final *f0*	Difference
T1			
L1	264.14	221.71	47.17
L2	260.33	229.67	47
L3	261.83	240.33	28.75
Overall Ave. (T1)	262.1	230.57	31.53
T2			
L1	255.43	227.14	31.5
L2	246.25	222.13	24.33
L3	238.8	235.4	3.4
Overall Ave. (T2)	246.83	228.22	18.60
Overall Ave. (T1&T2)	254.46	229.4	25.07

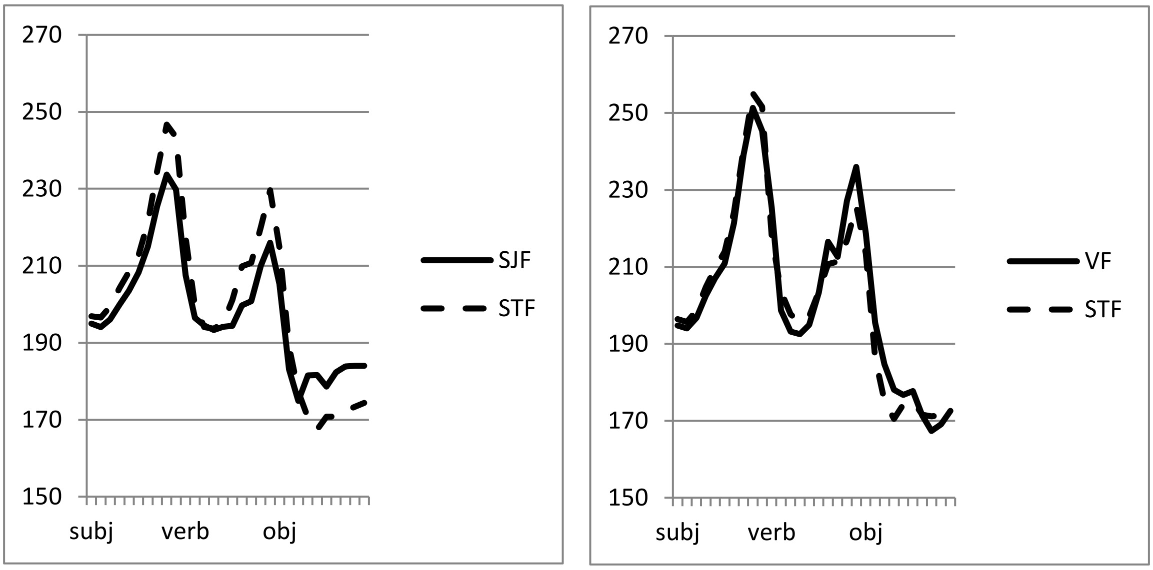


Figure 64: Averaged time-normalised initial R (STF) and final RF (SJF) contours, T1 and T2 (left) and initial R (STF) and final RF (VF) contours, T1 (right)

The proposed analysis is likewise supported by a comparison of average subject-final high *f0* targets in the STF context with verb-final high *f0* targets in the VF context. Table 55 shows that the former are higher than the latter across lexical sets; this was the case in approximately 86% of response pairs (18/21). A linear mixed model was applied to the STF and VF data from **T1** which incorporated focus context and gender as fixed effects and lexical set and participant as random effects, both of which were given random slopes for the effect of focus context. Both full and null simplified models satisfied assumptions of normality and homogeneity of variance (both the full and the null models passed the Shapiro-Wilk test for normality (full: p= 0.1049, null: p=0.0667) and Levene's Test for homogeneity of variance (full: p=0.2614, null: p=0.3578), and so the data were left untransformed. Anova of the hypothesised and null models in this case revealed a significant effect of focus context on *f0* ($\chi 2$=7.9061, p= 0.004927). *f0* was lowered in the VF context by approximately 19.60 Hz (standard error approx. 4.94 Hz) . A significant result was maintained following the removal of an outlier ($\chi 2$=6.8093, p= 0.009069).

Table 55: Average subject-final (STF) and verb-final (VF) high f0 target heights (Hz), T1

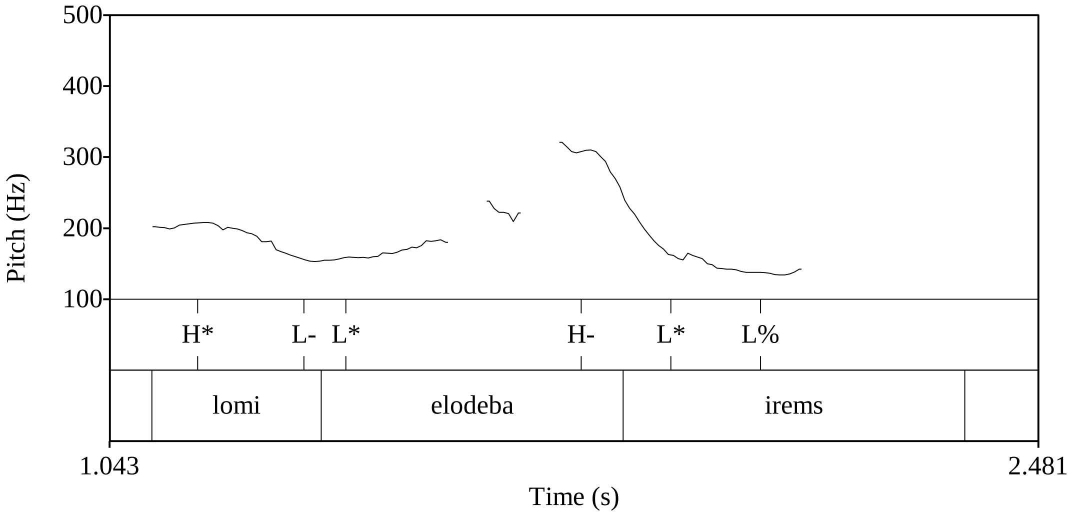
	L1	L2	L3	Overall Av.
STF subj-final *f0*	280.14	251	253	261.35
VF verb-final *f0*	261.86	237.5	229.5	242.95
Difference	18.29	13.5	23.5	18.43

The data for the prevalent RRF contour types in the SJT and STF contexts therefore provide support for hypothesis *2a*, indicating that both prominent prenuclear topics and additional prenuclear foci are, like narrow foci in Georgian in the majority *RRF* contour type, aligned with the right boundary of an ip phrase. The distribution of less frequently produced *FRF*, *RFF*, *FlRF* and *RFlF* contour types in the two contexts (see Table 56) is also consistent with the proposed model.

Table 56: Distribution of observed contour types, SJT and STF contexts

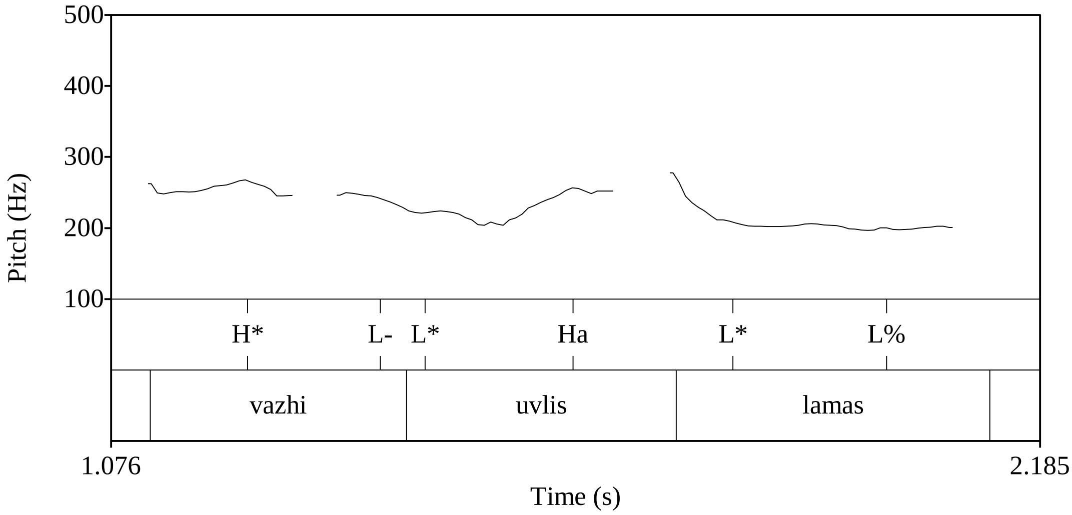
	RRF	FRF	RFF	FlRF	RFlF	Rd	Fd
VF (***T1***) (/32)	21	3	6		2		
SJF (***T1***) (/33)	17	4	3	1	3	1	4
SJF (***T2***) (/33)	16	5	3	2	2		5
OF (***T1***) (/33)	23	2	2	3	3		
OF (***T2***) (/33)	24	4	3	1	1		
SJT (***T2***) (/33)	23	3	3	1	3		
STF (***T1***) (/32)	25	4	2		1		
STF (***T2***) (/33)	24	3	1		5		

Both the SJT and the STF contexts featured small numbers of responses with the *FRF* contour observed in small numbers of responses in the SJF, VF and OF contexts, in which *f0* on the initial subject fell from an initial high target on the first syllable to a final low target on the second syllable (see Figure 65 and Figure 66); as discussed, this pattern is consistent with the alignment of informationally prominent subjects in both cases to the right of a low ip boundary tone L-.



lom-i elodeb-a irem-s.
lion-NOM await-3PSG deer-DAT
'The lion is waiting for a/the deer.'

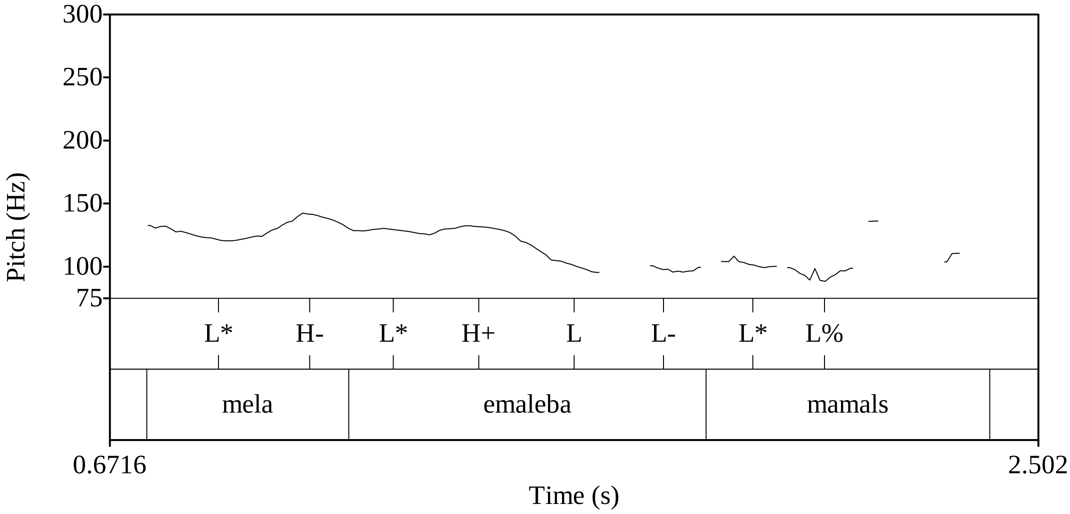
Figure 65: Example SJT contour, type FRF, L1, participant 7 (F), T2



vazh-i uvli-s lama-s.
boy-NOM look.after-3PSG llama-DAT
'A boy is looking after a llama.'

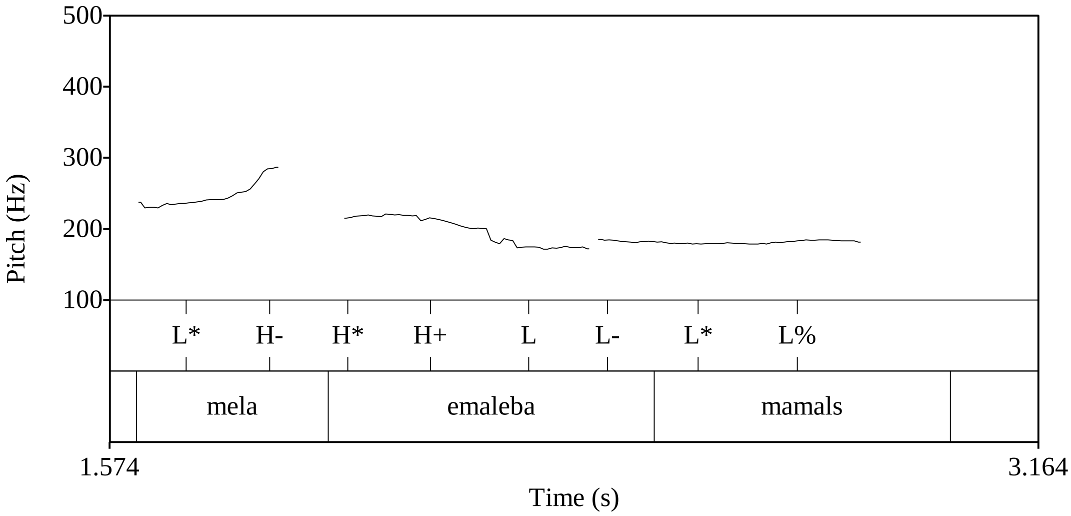
Figure 66: Example STF contour, type FRF, L3, participant 8 (F), T1

The occurrence of a small number of RFF contours in both contexts, with a falling contour on the verb (see Figure 67 and Figure 68), is likewise compatible with the proposed model as a marker of prominence on the verb.



mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'The fox is hiding from a/the cockerel.'

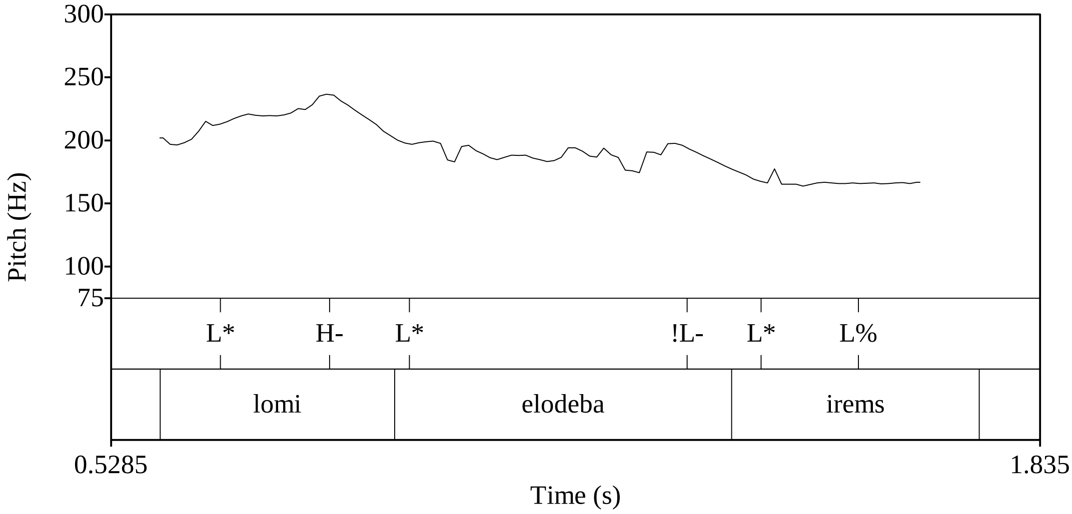
Figure 67: Example SJT contour, type RFF, L2, participant 2 (M), T2



mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'A fox is hiding from a cockerel.'

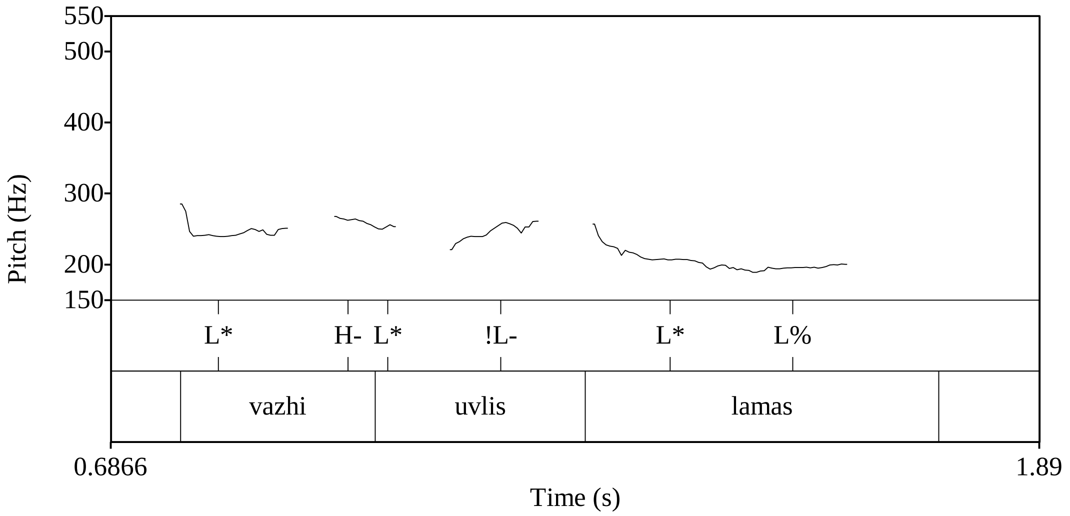
Figure 68: Example STF contour, type RFF, L2, participant 6 (F), T1

The RFlF contour, with a medial flat on the verb, likewise occurred in both contours (see Figure 69 and Figure 70) – as in the SJF, VF and OF, contexts this pattern was followed by a clear drop in f0 to the initial object target, suggesting the presence of an ip boundary tone which can again be analysed as an upstepped low boundary tone !L-.



lom-i elodeb-a irem-s.
lion-NOM await-3PSG deer-DAT
'The lion is waiting for a/the deer.'

Figure 69: Example SJT contour, type RFlF, L1, participant 4 (F), T2



vazh-i uvli-s lama-s.
boy-NOM look.after-3PSG llama-DAT
'A boy is looking after a llama.'

Figure 70: Example STF contour, type RFlF, L3, participant 8 (F), T2

The minimal phrasings proposed for the SJT and STF contexts are illustrated in Table 57, together with the minimal phrasings proposed for the other focus contexts.

Table 57: Proposed minimal prosodic phrasings, SJF and STF focus structures

Focus context	Proposed phrasing
VF	$[[[S]_{AP}\ [V_{F}]_{AP}]_{ip}\ [[O]_{AP}]_{ip}\ ]_{IP}$
SJF	$[[[S_{F}]_{AP}]_{ip}\ [[V]_{AP}[O]_{AP}]_{ip}\ ]_{IP}$
OF	$[[[S]_{AP}\ [V]_{AP}[O_{F}]_{AP}]_{ip}\ ]_{IP}$
STF, SJT	$[[[S_{T/F}]_{AP}]_{ip}\ [[V]_{AP}[O_{F}]_{AP}]_{ip}\ ]_{IP}$

5.2.2.2.2.2 Prominence Marking Beyond Phrasing

As shown in Table 57, the predicted alignment both of nuclear foci and of prenuclear foci and prominent topics with the right boundary of an ip phrase has the consequence that the subject focus structure SJF has the same prosodic phrasing as two focus structures from which it is distinct informationally: SJT, in which the subject is realised as a prominent topic, and STF, in which it is realised as a secondary focus. In hypothesis *2b* I predicted that, in order for two distinct focus structures to be distinguishable which under the proposed model have the same prosodic phrasing, the sentence-final constituent, which is aligned with the right boundary of an ip phrase by default, must be marked when informationally prominent by a prosodic feature additional to phrasing. As discussed in the previous chapter, such a role may be fulfilled by increased duration, which Skopeteas and Féry (2010) identify as an additional prosodic feature on narrowly focused constituents, albeit in comparison with their counterparts in all-new sentences, which I predicted are likewise informationally prominent in this context and therefore likewise likely to be produced with prosodic prominence.

Comparison of focused constituents with their non-focused counterparts in my data did not reveal a pattern suggesting a feature of increased duration in the focused constituents. Instead, comparison of the intensities of the initial syllables[57] of focused and non-focused constituents yielded some evidence that focused constituents are realised with a feature of increased intensity. A comparison of final object intensities in the SJF and OF contexts (see Table 58) revealed a pattern of increased intensity in the latter. This was the case in 68% of response pairs (44/65).

Table 58: Average object-initial syllable intensities (dB), SJF and OF, T1 and T2

	SJF	OF	Difference
T1			
L1	37.27	42.09	4.82
L2	40.18	42	1.82
L3	43	45.82	2.82
Overall Ave. (T1)	40.15	43.30	3.15
T2			
L1	41.82	41.91	0.09
L2	40.09	42.18	2.09
L3	42.64	46.3	3.66
Overall Ave. (T2)	41.52	43.46	1.95
Overall Ave. (T1&T2)	40.83	43.38	2.55

A linear mixed model applied to the SJF and OF data from **T1** and **T2** incorporated focus context as a fixed effect and lexical set, participant and task as random effects; all three of these were given random slopes for the effect of focus context. Both hypothesised and null models satisfied assumptions of normality and heteroscedasticity (both the full and the null models passed the Shapiro-Wilk test for normality (full: p=0.131, null: p=0.3542) and Levene's Test for homogeneity of variance (full: p=0.1286, null: p=0.16)). Anova of the hypothesised and null models revealed a marginally significant effect of focus context on

[57] As discussed, Skopeteas *et al.* (2009) and Vicenik and Jun (2014) locate pitch accent on the word-initial syllable in Georgian, and Vicenik and Jun (2014) find that AP-initial syllables are realised with increased intensity and duration.

intensity ($\chi 2$=3.6506, p=0.05605). Intensity was increased in the OF context by approximately 2.42 dB (standard error approx. 0.96 dB).

As consistent with the predictions of hypothesis *2b*, the same pattern was revealed in a comparison of object-initial syllable intensities in the SJF and SJT contexts (see Table 59). Intensity on the object was greater in the SJT context, in which the object is in focus, in 73% of response pairs (23/33). The linear mixed model applied to the SJF and SJT data from **T1** incorporated focus context as a fixed effect and lexical set and participant as random effects; both of these were given random slopes for the effect of focus context. Both models were transformed with squaring of the response variable to satisfy assumptions of normality and heteroscedasticity (both the full and the null models then passed the Shapiro-Wilk test for normality (full: p= 0.3773, null: p= 0.662) and Levene's Test for homogeneity of variance (full: p= 0.842, null: p= 0.6856)). Anova of the full and the null models revealed a significant effect of focus context on object intensity ($\chi 2$ = 6.2048, p= 0.01274). Object intensity was increased in the SJT context by 2.48 dB (upper 3.29 dB, lower 1.65 dB).

Table 59: Average object-initial syllable intensities (dB), SJF and SJT, T2

	L1	L2	L3	Overall Ave.
SJF	41.82	40.09	42.64	41.52
SJT	44.73	42.55	45.18	44.15
Difference	2.18	2.27	2.73	2.39

The same comparison in the SJF and STF contexts (see Table 60) was indicative of the same pattern, with the exception of **L1** in **T2**. Object intensity was greater in STF, in which it is in focus, in 66% of response pairs (43/65). The linear mixed model applied to the SJF and STF data from **T1** and **T2** again incorporated focus context as a fixed effect and lexical set, participant and task as random effects, all three of which were given random slopes for the effect of focus context. Both models were again transformed with squaring of the response variable to satisfy assumptions of normality and heteroscedasticity (both the full and the null models then passed the Shapiro-Wilk test for normality (full: p= 0.3773, null: p= 0.662) and Levene's Test for homogeneity of variance (full: p= 0.842, null: p= 0.6856)). Anova of the hypothesised and the null models did not however reveal a significant effect of focus context on object intensity in this case ($\chi2$=1.9926, p=0.1581). Inspection of the data in **T1** and **T2** individually revealed a striking difference between the two in this respect: whereas in **T2**, object intensity was greater in STF than in SJF in only 44% (14/33) of response pairs, in **T1** this was the case in 91% (29/32) of pairs.

Table 60: Average object-initial syllable intensities (dB), SJF and STF, T2 and T2

	SJF	STF	Difference
T1			
L1	37.27	43.18	5.91
L2	40.18	43.6	3.42
L3	43	48.18	5.18
Overall Ave. (T1)	40.15	44.99	4.84
T2			
L1	41.82	41	-0.82
L2	40.09	42.27	2.18
L3	42.64	44.64	2
Overall Ave. (T2)	41.52	42.64	1.12
Overall Ave. (T1&T2)	40.83	43.81	2.98

In two of three comparisons made, therefore, the data support the existence of a prosodic feature additional to prosodic phrasing in the form of intensity, which marks prominence on the sentence-final constituent, which is aligned with the right boundary of an ip phrase by default; this feature permits distinct focus structures with identical prosodic phrasings to be distinguished formally from one another (see Table 61). In the next section intensity data will be used again to investigate whether Georgian permits postnuclear prominences.

Table 61: Proposed phrasings and disambiguating intensity features (bold) for SJF and OF, SJT and STF

Focus context	Proposed phrasing
SJF OF, SJT, STF	$[[[\mathbf{S}_{F}]_{AP}]_{ip}\ [[V]_{AP}[O]_{AP}]_{ip}\ ]_{IP}$ $[[[\mathbf{S}_{T/F}]_{AP}]_{ip}\ [[V]_{AP}[\mathbf{O}]_{AP}]_{ip}\ ]_{IP}$

5.2.2.2.3 Postnuclear Prominences

The final set of hypotheses, repeated in [**26**] below, is concerned with the permissibility of postnuclear prominences in Georgian. Whilst more problematic, the data indicate on balance that postnuclear prominences are not permitted in the language.

26) Hypothesis set *3*: Postnuclear prominences

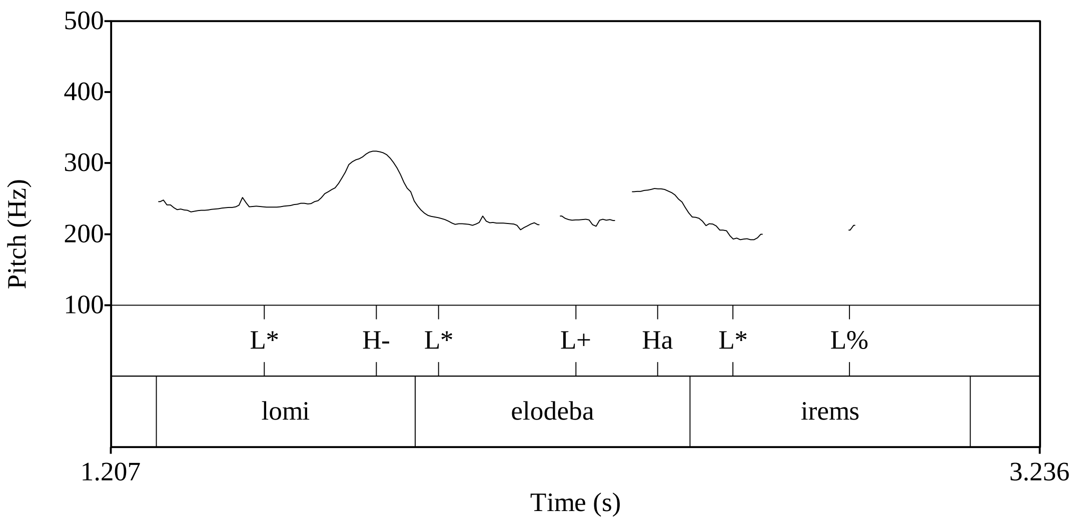
i. The prosodic realisation of a final object in an SVO sentence in Georgian produced in a context eliciting a prominent topic interpretation on that object is distinct from the realisation, both of a final narrowly focused object and of a final unfocused object in an initial subject focus context.

ii. These distinctions are consistent with the presence of a prosodic feature on the object in the first case and its absence in the second case, but its presence to a greater degree in the third case, as consistent with the findings for hypothesis set *2b*.

As discussed in the previous section, a comparison of the SJF context with the OF, SJT and STF contexts with respect to final object realisations indicated that, in the latter contexts, final objects were realised with an increased degree of intensity. Within the proposed model, intensity fulfils the role of a prosodic feature additional to *f0* required to differentiate distinct focus structures which have identical prosodic phrasings. These identical prosodic phrasings result from prominent given material and additional foci being aligned with the right boundary of an ip phrase in the same way as nuclear foci.

Within the proposed right-alignment model, the postnuclear prominent object topic (OT) focus structure is predicted to have the same prosodic phrasing as the contexts mentioned above, and to be differentiated from them by a degree of intensity on the final object which is distinct, both from the low level of intensity identified on the object in the SJF focus structure and from the high level of intensity identified on the object in the OF focus structure. Such a distinctive level of intensity is required within the proposed model to mark the object as a secondary prominence which follows the nuclear prominence associated with the focused subject, rather than as the nuclear prominence which in the OF context is associated with the focused object.

As with all the other declarative focus structures discussed above, the prevalent *f0* contour type produced in the OT context was RRF (see Figure 71): this was produced in 64% of responses (21/33).



[lom-i]$_F$ elodeb-a [irem-s]$_T$.
lion-NOM await-3PSG deer-DAT
'A/the lion is waiting for the deer.'

Figure 71: Example OT contour, type RRF, L1, participant 1 (F), T2

According to the proposed right-alignment model, the medial verb in the OT context should, as in the SJF context, be aligned maximally with the right boundary of an AP phrase; in both cases, the verb follows a nuclear focus on the subject and should have a non-prominent realisation. The height of the verb-final *f0* target in the OT context should therefore be lower than the same in the VF context, in which the focused verb is posited to be aligned with the right boundary of an ip phrase. A comparison of verb-final f0 target heights in the VF and OT contexts (see Table 62) provides limited support for an increase in *f0* in the VF context: whereas *f0* is higher in the OT context in **L2**, it is higher in the VF context in in **L1** and **L3**. In a case-by-case comparison, *f0* was higher in the VF context in 76% of cases (13/17 response pairs), a pattern likewise consistent with my predictions (see also Figure 72, ***left***).

Table 62: Average verb-final high f0 target heights (Hz), OT (T2) and VF (T1)

	L1	L2	L3	Overall Ave.
VF	257.67	242.67	242.6	247.64
OT	249.5	247.5	232.8	243.27
Difference	8.17	-4.83	9.8	4.38

An initial linear mixed model applied to these data incorporated focus context and gender as fixed effects and lexical set, participant and task as random effects, all of which were given random slopes for the effect of focus context. This model however failed to satisfy assumptions of normality and homogeneity of variance, and various transformations of the response variable likewise failed to satisfy them. Removal of an outlying data point resulted in a non-convergent model; a simplified model was therefore applied in which the lexical set variable, which displayed zero variance, was given a fixed instead of a random slope. Application of the log transformation to the response variable then satisfied assumptions of normality and homogeneity of variance (Shapiro-Wilk Test: full: p=0.1094, null = 0.4116, Levene's Test: full: p=0.6565, null: p=0.7427). Anova of the full and null models did not reveal a significant effect of focus context on *f0* (χ2=1.9019, p=0.1679). Removal of a further outlying data point did however yield a significant result (χ2=1.9019, p=0.03792). The data do not therefore provide strong support for a difference in phrasing between the OT and VF focus structures, which is problematic for the proposed model. One possible explanation for this lack of support consistent with the predicted model is however that the verb too is realised with postnuclear prominence and therefore aligned with the right boundary of an ip phrase; this is analogous to the possibility, discussed in section *5.2.2.2.1.2*, that a verb produced with prenuclear prominence may account for the presence of an ip boundary to its right; i.e., to the left of the focused object in the OF context.

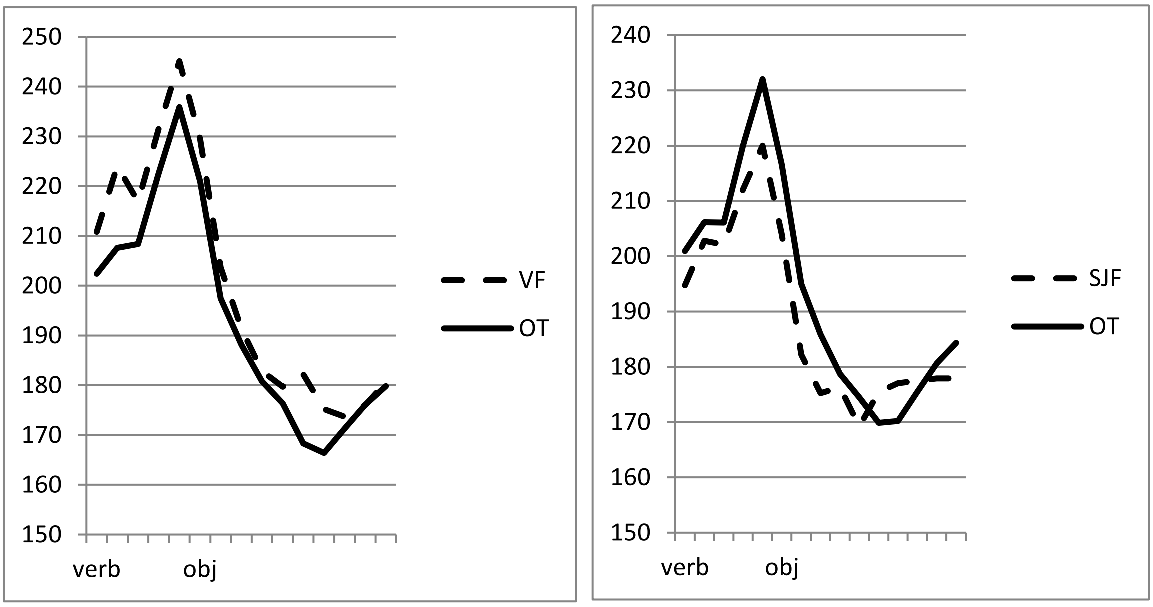


Figure 72: Averaged time-normalised final RF f0 contours, VF (T1) and OT (T2) (left) and SJF and OT (T2) (right)

Whereas the proposed right-alignment model predicts that the OT and SJF focus structures are realised with the same prosodic phrasing, under the predictions of a left alignment model these would be distinctive: the object would be aligned with the left boundary of an

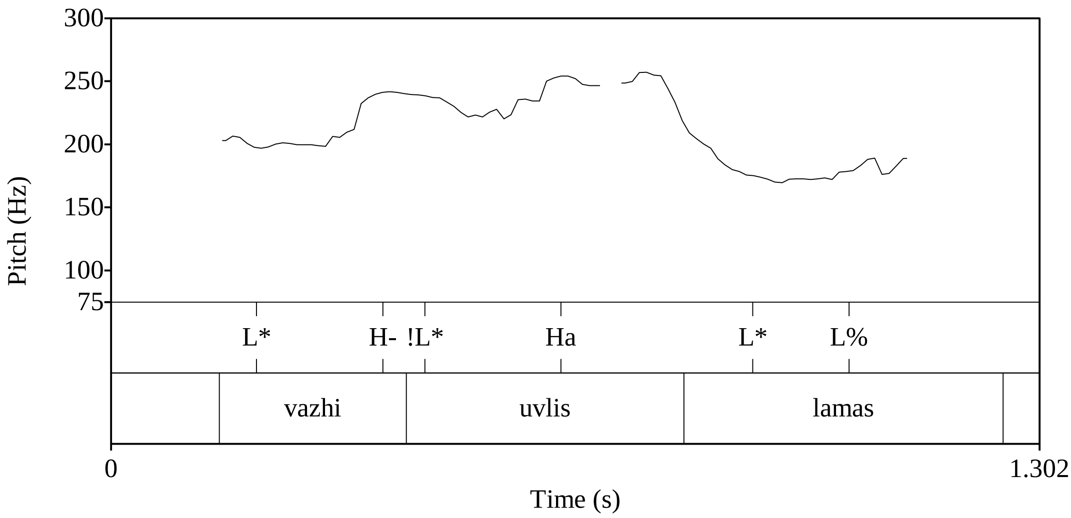
AP phrase in the SJF structure and with the left boundary of an ip phrase in the OT structure. Comparison of average verb-final high *f0* targets in the OT and SJF contexts (see Table 63) provides some support for increased *f0* in the OT context; this is the case in **L1** and **L2** (see also Figure 72, ***right***) although not in **L3**. In a case-by-case comparison, however, *f0* was higher in OT than in SJF only in 56% of cases (9/16 response pairs).

Table 63: Average verb-final high f0 target heights (Hz), OT and SJF (T2)

	L1	L2	L3	Overall Ave.
SJF	228.33	234.5	227	229.94
OT	249.5	249.5	225	241.44
Difference	21.17	15.33	-2	11.5

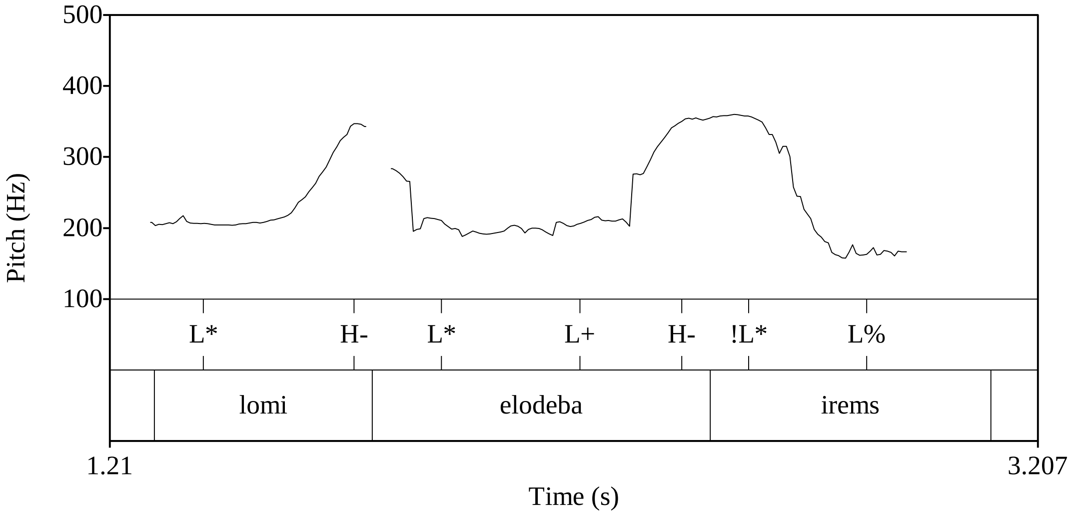
The initial linear mixed model applied to the data incorporated focus context and gender as fixed effects and lexical set and participant as random effects, both of which were given random slopes for the effect of focus context. Again however, none of the transformations of the response variable applied resulted in satisfaction of the assumptions of normality and heteroscedasticity. The model was therefore applied once again following the removal of a large outlier. In this case, assumptions of normality and heteroscedasticity were satisfied (Shapiro-Wilk Test: full: $p=0.4941$, null: $p=0.5581$, Levene's Test: full: $p=0.1728$, null: $p=0.1382$) following application of the log transformation to the response variable. Anova of the full and null models did not reveal a significant effect of focus context on *f0* ($\chi2=0.9426$, $p=0.3316$). Anova of full and null models using the original data set likewise revealed a non-significant result ($\chi2=2.6593$, $p=0.1029$). These data therefore fail to support the predictions of an opposite left-alignment model with respect to prosodic phrasing, and are instead consistent with the predictions of the proposed right alignment model that the verb is aligned maximally with the right boundary of an AP phrase in both the SJF and the OT contexts.

Of the RRF contours produced in the OT context, 3 featured upstep of the verb-initial pitch accent (see Figure 73) and 1 upstep of the object-initial pitch accent (see Figure 74). Whilst upstepping of the verb-initial pitch accent can be accounted for as upstep following an ip boundary marking focus on the initial subject, upstepping of the object-initial pitch accent cannot be accounted for, save for as the consequence of a preceding ip boundary marking postnuclear prominence on the preceding verb.



vazh-i uvli-s lama-s.
boy-NOM look.after-3PSG llama-DAT
'A/the boy is looking after the llama.'

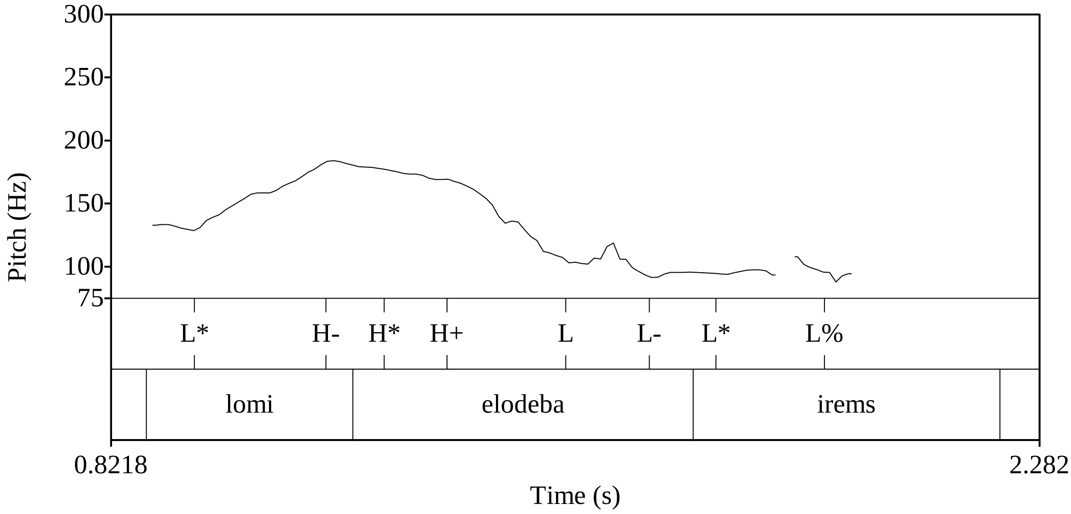
Figure 73: Example OT contour, type RRF with post-subject upstep, L3, participant 4 (F), T2



lom-i elodeb-a irem-s.
lion-NOM await-3PSG deer-DAT
'A/the lion is waiting for the deer.'

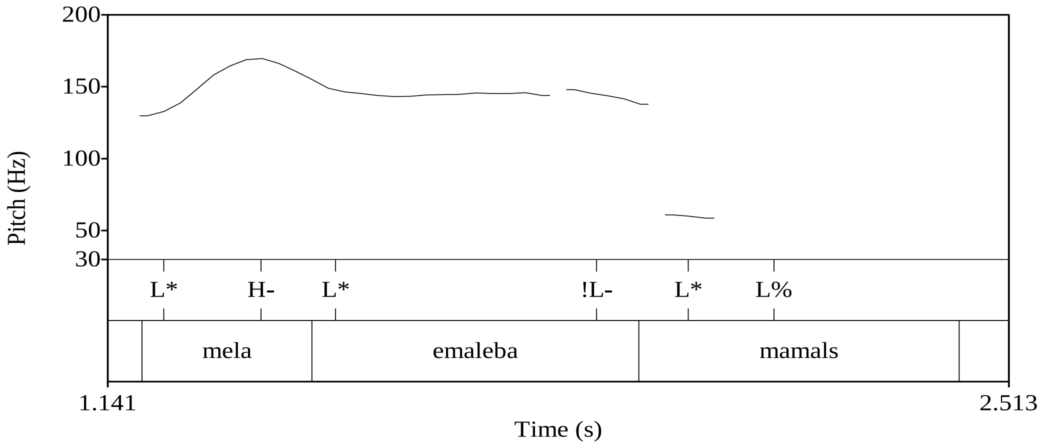
Figure 74: Example OT contour, type RRF with post-verbal upstep, L1, participant 3 (F), T2

Likewise problematic for the proposed analysis are occurrences amongst the less frequently produced contour types in the OT context of a number of RFF contours (see Figure 75) and of a single RFlF contour (see Figure 76); these again can only be explained within the existing model as the result of the medial verb likewise being realised with postnuclear prominence.



lom-i elodeb-a irem-s.
lion-NOM await-3PSG deer-DAT
'A/the lion is waiting for the deer.'

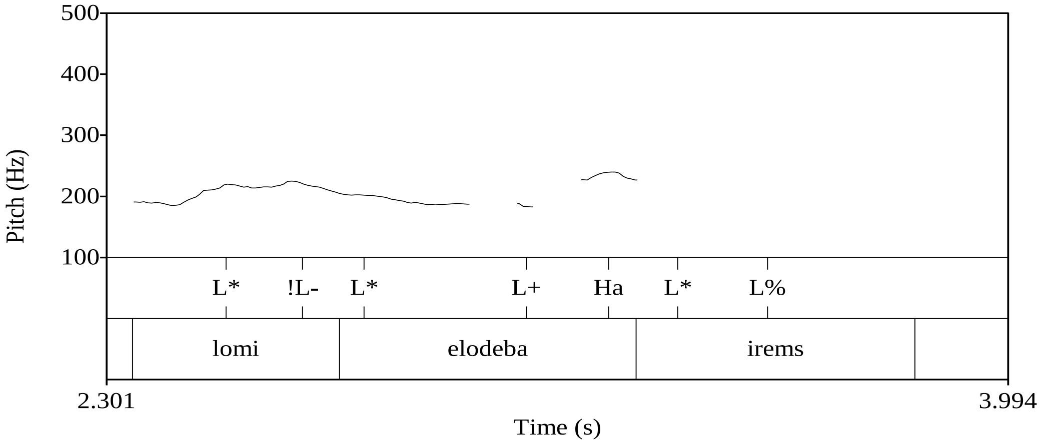
Figure 75: Example OT contour, type RFF, L1, participant 2 (M), T2



mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'A/the fox is hiding from the cockerel.'

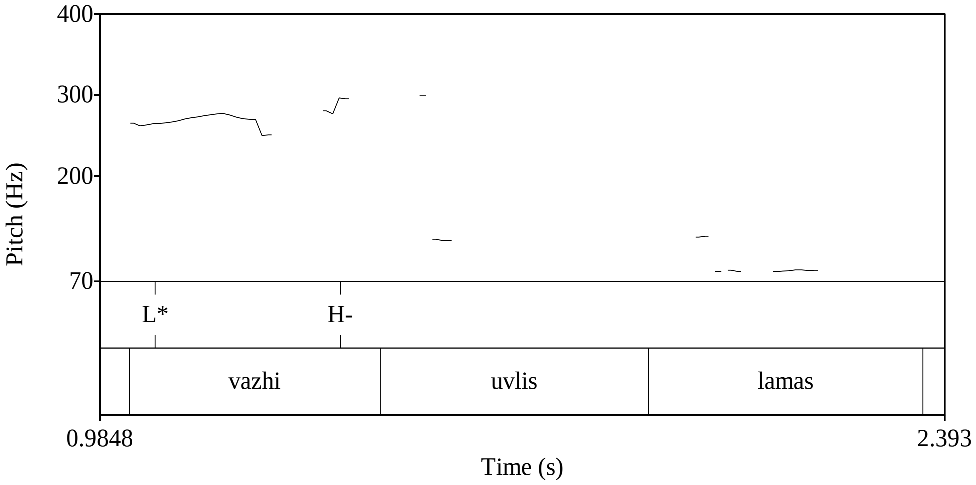
Figure 76: Example OT contour, type RFlF, L2, participant 9 (M), T2

Consistent with the model are two occurrences of the FlRF contour (see Figure 77) and three of the dephrasing contours: two occurrences of the Fd contour type and one occurrence of the Rd contour type (see Figure 78).



lom-i elodeb-a irem-s.
lion-NOM await-3PSG deer-DAT
'A/the lion is waiting for the deer.'

Figure 77: Example OT contour, type FlRF, L1, participant 5 (F), T2



vazh-i uvli-s lama-s.
boy-NOM look.after-3PSG llama-DAT
'A/the boy is looking after the llama.'

Figure 78: Example OT contour, type Rd, L3, participant 11 (F), T2

The distribution of contour types amongst the declarative focus structures discussed so far is summarised in Table 64.

Table 64: Distribution of contour types in the OT and other contexts

	RRF	FRF	RFF	FlRF	RFlF	Rd	Fd
VF (***T1***) (/32)	21	3	6		2		
SJF (***T1***) (/33)	17	4	3	1	3	1	4
SJF (***T2***) (/33)	16	5	3	2	2		5
OF (***T1***) (/33)	23	2	2	3	3		
OF (***T2***) (/33)	24	4	3	1	1		
SJT (***T2***) (/33)	23	3	3	1	3		
STF (***T1***) (/32)	25	4	2		1		
STF (***T2***) (/33)	24	3	1		5		
OT (***T2***) (/33)	21		6	2	1	1	2

The data for final object-initial intensities in the OT, SJF and OF data do not fully support hypothesis *3*, indicating instead that postnuclear prominences are not permissible in Georgian. A comparison of the average intensities of object-initial syllables in the OT and OF contexts (see Table 65) shows that, as predicted, these are consistently greater in the OF context. In a case-by-case comparison, intensity was greater in the OF context in 75% of cases (24/32 response pairs). The linear mixed model applied to the OT and OF data from **T2** incorporated focus context as a fixed effect and lexical set and participant as random effects, both of which were given random slopes for the effect of focus context. The square transformation was applied to the response variable to satisfy assumptions of normality and heteroscedasticity (Shapiro-Wilk Test: full: p=0.9112, null: p=0.9775, Levene's Test: full: p=0.8584, null: p=0.698). Anova of the hypothesised and null models revealed a significant effect of focus context on intensity ($\chi2$=5.6751, p=0.01721). Intensity was reduced in the OT context by approximately 2.9 dB (upper 3.87 dB, lower 1.93 dB). A significant result was maintained following the removal of two outlying data points ($\chi2$=4.7436, p=0.02941). The prediction that these two focus structures would differ with respect to the feature of intensity on the object is thus supported by the data.

Table 65: Average object-initial syllable intensities (dB), OF and OT, T2

	L1	L2	L3	Overall Ave.
OF	41.91	42.18	46.3	43.46
OT	39.09	38.91	42.36	40.12
Difference	2.82	3.27	3.94	3.34

By contrast, a comparison of the average intensities of object-initial syllables in the OT and SJF contexts (see Table 66) does not support the prediction of hypothesis 3 of a greater degree of object intensity in the OT context; on the contrary, this shows that intensity was consistently greater in the SJF context. Similarly, a case-by-case comparison shows that intensity was greater in the SJF context in approximately 76% of cases (22/33 response pairs). As before, the linear mixed model applied to the SJF and OT data from **T2** incorporated focus context as a fixed effect and lexical set and participant as random effects, both of which were given random slopes for the effect of focus context. The square transformation was again applied to the response variable to satisfy assumptions of normality and heteroscedasticity (Shapiro-Wilk Test: full: $p=0.8527$, null: $p=0.9733$, Levene's Test: full: $p=0.6972$, null: $p=0.8178$). Anova of the full and null models did not however reveal a significant effect of focus context on intensity ($\chi2=1.8473$, $p=0.1741$).

Table 66: Average object-initial syllable intensities (dB), SJF and OT, T2

	L1	L2	L3	Overall Ave.
SJF	41.82	40.09	42.64	41.52
OT	39.09	38.91	42.36	40.12
Difference	2.73	1.18	0.28	1.4

In supporting the prediction of a lesser object intensity in the OT context compared with the OF context, but failing to support the prediction of a greater object intensity in the OT context compared with the SJF context, these data fail to support hypothesis *3*, according to which the OT object should be marked as a secondary prominence with a degree of intensity between that of a nuclear prominence and a lack of prominence. Instead, they indicate that postnuclear prominences are not permissible in Georgian, and that responses produced in the OT context were in the majority of cases produced with the SJF focus structure and lacked an additional feature of intensity on the final object to mark it as informationally prominent.

As discussed, the apparent non-permissibility of postnuclear prominences in Georgian has an explanation in the relative configurational freedom of the language as attested in the data in section *5.1*. As this permits non-subject arguments to be linearised in prenuclear positions, the necessity for structures involving postnuclear prominences of the type identified by Calhoun (2007) in English, which is more configurationally constrained, is avoided.

In the light of the intensity data, the prosodic phrasing data remain problematic. On one hand, the lack of a significant difference between verb-final high *f0* targets in the OT and SJF contexts receives an alternative explanation within the proposed right-alignment model as the result of both contexts being realised in the majority of cases with the same SJF focus structure. On the other hand, the lack of a significant difference between the OT and VF contexts is without a straightforward explanation. One alternative explanation is that, when asked to realise a focus structure involving a prominent object topic with an incompatible word order (SVO), in which the object was not linearised in a prenuclear position, one or more participants reacted by instead producing this word order with an OF focus structure, placing nuclear prominence on the final object and prenuclear prominence on the verb, which could account for an increased verb-final high *f0* target in the OT context. The fact that removal of two outlying data points from the data set did yield a significant result may be compatible with such an explanation.

The lack of support for the permissibility of postnuclear prominences in Georgian in turn provides further support for the right-alignment analysis, in being incompatible with an alternative explanation for the presence of ip boundaries in the data presented as markers of postnuclear prominence on constituents aligned with the left boundary of an ip phrase, rather than of markers of nuclear prominence on constituents aligned with the right boundary of an ip phrase.

5.2.2.2.4 Contrast

As discussed in the previous chapter, previous studies by Skopeteas *et al.* (2009) and Vicenik and Jun (2014) attribute the prosodic marking of focus in Georgian to a non-rising *f0* contour on the focused constituent, whereas a rising contour is attributed to the marking of constituents as informationally 'neutral' or 'non-prominent'. Pointing out that, in the 'all-new' contexts in which they were elicited, constituents realised with a rising contour might plausibly likewise have an informationally prominent interpretation, I suggested that focus in Georgian is instead marked prosodically by some means that can combine either with a rising or with a falling contour, and that the falling or rising-falling contour types attributed to focus marking in these studies instead have the function of marking an additional information-structural feature, such as contrast. The experimental data presented in the preceding subsections support the first part of this suggestion, showing that non-final focused and prominent topic constituents were realised predominantly with a rising contour and only in fewer cases with a falling one. Furthermore, the data showed that both realisations are compatible with an analysis in which the informationally prominent constituent is aligned with the right boundary of an ip-phrase, which is realised as a high (H-), a low (L-) or an upstepped low (!L-) ip boundary tone.

In order to gather some data with respect to the second component of this possibility, that a falling contour is associated with a special feature additional to focus, such as contrast, four more focus contexts were included in the experiment. These elicited contrastive focus and topic interpretations on the initial subject (CSJF, CSJT) and on the final object (COF, COT). The distribution of contour types produced in these contexts does not however indicate that a non-rising contour in Georgian has a special role of marking informational contrast. As with all of the preceding contexts discussed, the predominant contour type produced in the CSJF context was again RRF (see Figure 79): this was produced in 39% of responses (13/33). FRF, FlRF, Rd and Fd (deaccenting/dephrasing) contour types, which feature a non-rising contour on the subject, occurred in this context in similar numbers to those found in the non-contrastive subject focus (SJF) context (see Table 67 below). On the other hand, the RFF contour, which features a falling contour on the medial verb, occurred in 21% (7/33) of responses, which is a greater proportion of responses than observed in the SJF data.

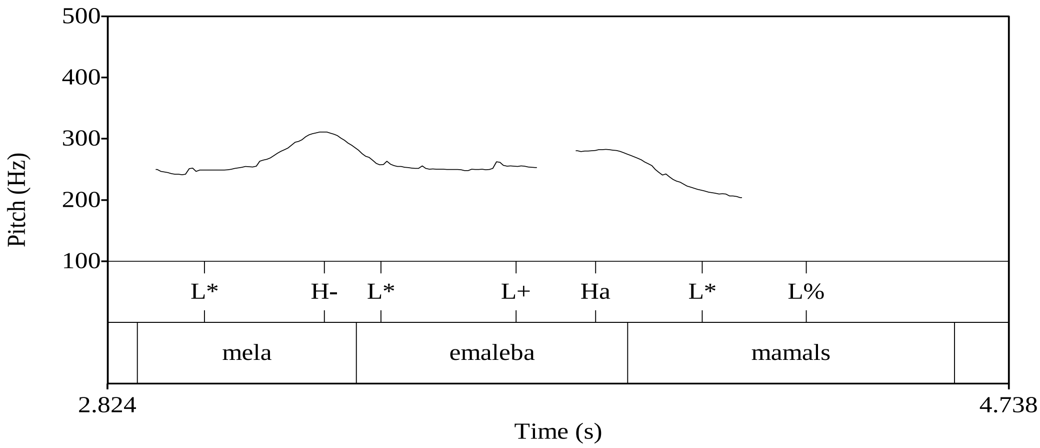
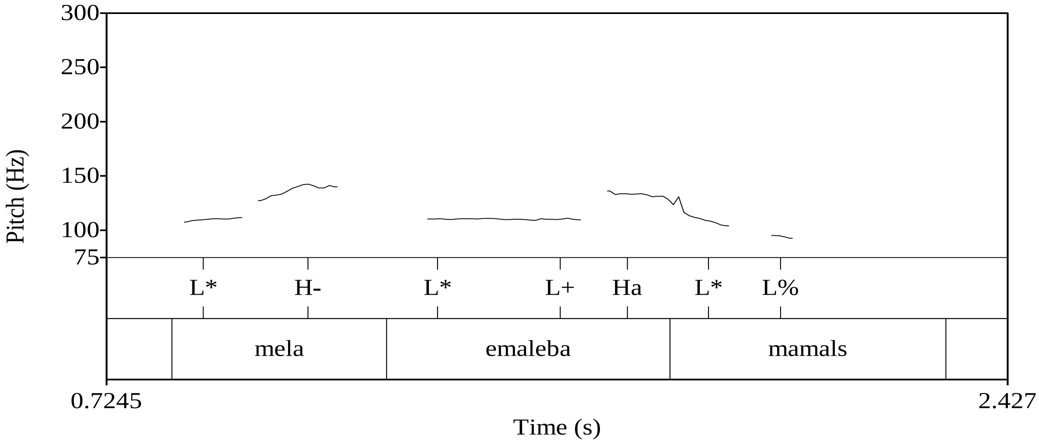


Figure 79: Example CSJF contour, type RRF, L2, participant 1 (F), T1

mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'A/the fox is hiding from a/the cockerel.'

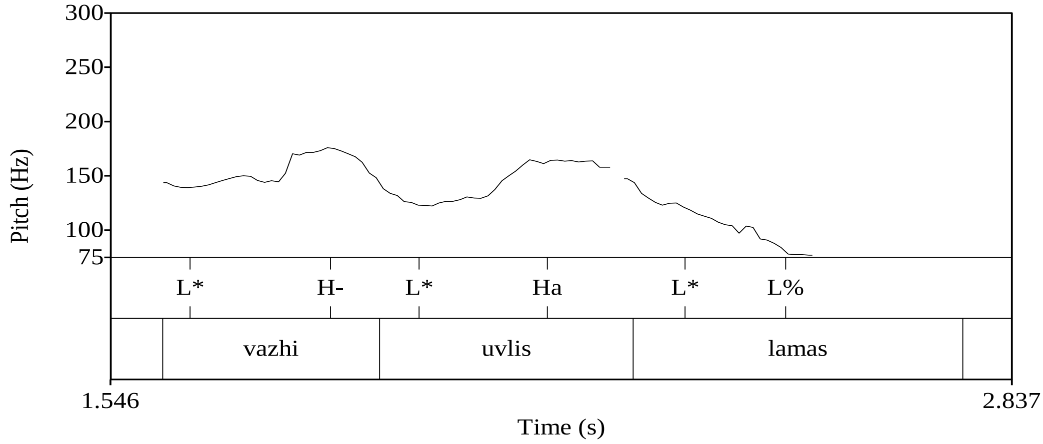


mela-0 emaleb-a mamal-s.
fox-NOM hide.from-3PSG cockerel-DAT
'A/the fox is hiding from a/the cockerel.'

Figure 80: Example COF contour, type RRF, L2, participant 10 (M), T1

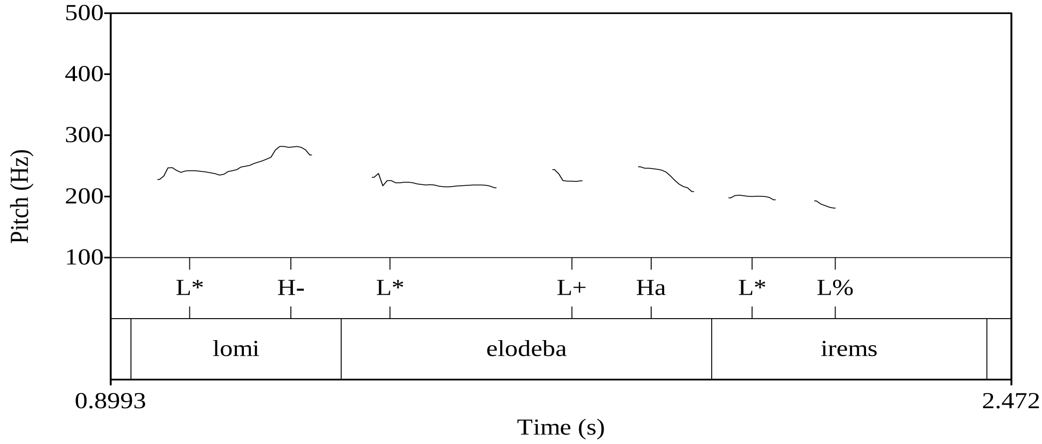
The COF context likewise featured a similar distribution of contour types to that observed in its non-contrastive object focus (OF) counterpart. 79% of responses (26/33) featured the RRF contour, with a flat or falling f0 pattern on the final object (see Figure 80). FRF, FlRF and RFlF contours likewise occurred in a similarly minor number of responses (see Table 67).

Neither does a non-rising contour appear to have a special role in marking contrastive topics. Responses in the CSJT context were likewise produced predominantly with the RRF contour (see Figure 81), which featured in 82% of responses (27/33). Only very small numbers of FRF, RFF and FlRF contours were otherwise produced in this context (see Table 67). As discussed in the previous chapter, Skopeteas and Féry (2007) likewise find in their data that a contrastive topic subject is realised with a rising *f0* contour. Finally, the RRF contour was once again the prevalent contour type produced in the COT context (see Figure 82); this was produced in 55% of responses (17/31). The remaining contour types produced in this context were small numbers of RFF, FlRF, RFlF and Fd contours, which is a similar distribution to that observed in the non-contrastive OT context (see Table 67).



vazh-i   uvli-s   lama-s.
boy-NOM look.after-3PSG llama-DAT
'A/the boy is looking after a/the llama.'

Figure 81: Example CSJT contour, type RRF, L3, participant 2 (M), T2



lom-i   elodeb-a   irem-s.
lion-NOM await-3PSG deer-DAT
'A/the lion is waiting for a/the deer.'

Figure 82: Example COT contour, type RRF, L1, participant 8 (F), T2

A feature of informational contrast does not therefore appear to be the factor controlling the choice between rising and non-rising *f0* contours on constituents. An alternative possibility is that this choice is instead influenced by a feature of identificationality; as discussed, Bush and Tevdoradze (1999) associate identificational focus in Georgian with a non-rising contour. Such a possibility must be left to future research.

Table 67: Distribution of contour types in contrastive and non-contrastive contexts

	RRF	FRF	RFF	FlRF	RFlF	Rd	Fd
VF (***T1***) (/32)	21	3	6	-	2	-	-
SJF (***T1***) (/33)	17	4	3	1	3	1	4
SJF (***T2***) (/33)	16	5	3	2	2	-	5
OF (***T1***) (/33)	23	2	2	3	3	-	-
OF (***T2***) (/33)	24	4	3	1	1	-	-
SJT (***T2***) (/33)	23	3	3	1	3	-	-
STF (***T1***) (/32)	25	4	2	-	1	-	-
STF (***T2***) (/33)	24	3	1	-	5	-	-
OT (***T2***) (/33)	21	-	6	2	1	1	2
CSJF (***T1***) (/33)	13	3	7	3	-	1	6
COF (***T1***) (/33)	26	3	-	3	1	-	-
CSJT (***T2***) (/33)	27	2	2	2	-	-	-
COT (***T2***) (/31)	17	3	3	4	1	-	3

5.2.2.3 Discussion

The data presented in section 5.2.2.2 support the majority of the hypotheses formulated in the previous chapter, pointing to an alternative, expanded model of how prosody and information structure in Georgian interact.

The first set of hypotheses was concerned with the realisation of narrow focus in Georgian. Hypothesis *1a* predicted that initial subject and medial verb focus structures would have differing prosodic realisations, that the differences between them would be consistent with the presence of an ip phrase boundary on the right of the verb in the medial focus context and its absence on the right of the verb in the initial focus context, and that this phrase boundary would not be identifiable simply as a high tone but would also be expressible as a low tone. The initial subject and medial verb focus structures were chosen for comparison following my observation in the previous chapter that this is preferable from a methodological point of view to a comparison of initial subject focus and sentence focus or final object focus, as found in previous studies. A comparison with sentence focus as employed by Skopeteas and Fery is problematic because as the subject is likewise likewise to be prosodically prominent in this context, a comparison is unlikely to reveal what prosodic features distinguish focus from non-focus. A comparison with object focus is problematic due to the likelihood of constituents preceding the focused object being realised by participants with prenuclear prominence; this could result in prosodic features marking prenuclear prominence on these constituents, which would have to be postnuclear prominences and therefore less likely to feature in the initial subject focus context, being erroneously attributed to the marking of nuclear prominence on the object. By contrast, in comparison of initial and medial focus, only postnuclear prominences have an equal likelihood of occurring in either context to confuse the analysis.

The predominance of the *RRF* contour type in responses in both the subject and the verb focus data is at odds with the analyses of Vicenik and Jun (2014) and Skopeteas *et al.* (2009), according to which focus in Georgian is realised with a rising-falling contour in opposition to a rising contour associated with non-focus. It is likewise at odds with the phrasing analyses proposed by Skopeteas and Féry (2010) and by Féry (2013), according to which focused constituents are aligned with a prosodic boundary realised as a high tone, in opposition to a non-high tone. A significant difference in height was instead identified between verb-final high *f0* targets in the two contexts. As predicted, this difference was consistent with the presence of a high ip boundary tone H- aligned with the right edge of the focused verb and with the presence of a lower high AP boundary tone Ha aligned with the right edge of the non-focused verb. The same ip and AP phrasing levels and the same height differentiation between them are identified in Georgian by Vicenik and Jun (2014), although they do not attribute alignment with the right edge of an ip phrase to the marking of focus, instead positing that left-alignment marks focus in some cases. A small number of contours were consistent with an analysis of upstepping of the initial pitch accent following these boundaries, further supporting the proposed right-alignment analysis. The distribution of less frequently produced contour types within the two contexts was shown to be consistent with the prediction of hypothesis *1a* that, in addition to being realised with a high ip boundary tone H-, an ip boundary may also be realised with a low boundary tone L-, accounting for the association of focus in previous studies with a non-rising *f0* contour. The RFF contour type occurred twice as frequently in the VF context as it did in the SJF context, whilst the occurrence of the FRF contour type in the VF context can be accounted for as the result of a prominent topic reading of the subject. In small numbers of responses in both contexts the subject or verb was aligned with an upstepped low ip boundary tone !L-, followed by a clear reduction in pich level. The final contour types, Rd and Fd, which featured deaccenting following a clear pitch movement on the subject, featured in the SJF context but were absent in the VF context, further supporting a right-alignment analysis.

Hypothesis *1b* predicted that medial verb and final object focus structures would be distinctive in the same way as medial verb and initial subject focus structures. The RRF contour type was likewise prevalent in the object focus data. Comparison of verb-final high *f0* targets in the two focus contexts revealed a marginally significant difference between the two in the form of increased *f0* height in the verb focus structure, which provides limited support for this prediction. As discussed, the lack of a significant result from this comparison can be accounted for within the proposed model as reflecting a preference to realise the verb in the object focus case with a prenuclear prominence and therefore to align it with the right boundary of an ip phrase, rather than needing to attribute the presence of such a boundary to the marking of focus on the following object. A further comparison of the initial subject and final object focus contexts did not reveal a significant difference in height between the verb-final *f0* targets of responses produced in the two contexts. This result does not support the model proposed by Féry (2013) and by Skopeteas and Féry (2010), according to which a final focused constituent in Georgian is aligned with the left boundary of a p-phrase. Instead, it is consistent with the predictions of my right-alignment model that the final object is not aligned with the left edge of an ip boundary in either context. An additional comparison of the heights of object-initial *f0* targets in the same two contexts likewise revealed a non-significant result; this is inconsistent with the predictions of left-alignment models that a final focused object is realised with a 'superlow' contour as a consequence of its alignment with the left edge of a prosodic phrase, whereas a non-focused final object is not.

The final part of the first set of hypotheses, *1c*, predicted that the prosodic realisation of the initial subject in the subject focus context would be different from that of the medial verb in the same context, in a way consistent with the presence of an ip phrase boundary to the right of the initial focused subject and its absence to the right of the medial non-focused verb. The hypothesis was formulated in this way due to the predicted likelihood of the initial subject being realised as a prominent topic and therefore likewise being aligned to the right boundary of an ip phrase according to the predictions of my right-alignment model, which renders a comparison of subject-final *f0* target heights in these and the initial subject focus context problematic. The comparison employed revealed a significant result, which supports hypothesis *1c*. As discussed, however, the predicted difference is a necessary but not a sufficient condition for the identification of an ip boundary tone to the right of the focused subject, as this difference is likewise consistent with downstepping in *f0* between an initial and a subsequent AP boundary tone. To exclude such a possibility, *f0* of the subject-final target in this context should also be shown to be higher or of equal height to a subsequent ip boundary tone, rather than lower than one; an equal or greater height would be consistent with Vicenik and Jun (2014). An additional comparison was therefore made between the heights of subject-final *f0* targets in the subject focus data and of verb-final *f0* targets in the verb focus context, which preceding data indicate are aligned to the right of an ip boundary. This comparison revealed a marginally significant result of a small increase of *f0* in the subject focus case, which provides limited support for this prediction and is inconsistent with the focused subject being aligned with the right boundary only of an AP phrase. Further research/more data is required to establish whether or not subsequent ip boundaries reach the height of preceding ones, and what could affect this.

The data therefore support the first set of hypotheses and are consistent with a right-alignment model of narrow focus in Georgian. Further evidence in support of this model is provided by my data for yes-no questions. These indicate that the high ip boundary tone H- with which the focused verb is aligned in these follows a low tone on the preceding syllable which is lower than a similar low tone often observed in the same environment in declarative verb-focus sentences. I proposed that the low tone in declaratives be analysed as the first part of a complex AP boundary tone L+Ha, whereas the lower tone observed in the questions be analysed as the first part of a complex ip boundary tone L+H- as posited by Bush (1999), which I propose serves to prosodically distinguish yes-no questions from statements; in statements, the second part of the complex AP boundary tone is replaced in verb focus with the single high ip boundary tone H-, as consistent with the replacement in Georgian of lower-level boundary tones with higher-level ones identified by Skopeteas et al (2009) and Vicenik and Jun (2014) and observed elsewhere in my data. Differentiation of this L tone between statements and yes-no questions cannot be accounted for with the analysis of focus marking presented by Vicenik and Jun (2014), who posit a phrase accent

H+L as responsible for marking focus in both cases; as such, it provides further support for my analysis according to which focus is marked in both cases by alignment with the right boundary of an ip phrase.

The second set of hypotheses tested was concerned with the prosodic realisation in Georgian of prenuclear prominent topics and additional prenuclear foci. Hypothesis *2a* predicted that, as with the realisation of the initial focused subject in hypothesis *1c*, the subjects in the subject topic and sentence focus contexts would have a distinct prosodic realisation from the postfocal verb in the subject focus context, as consistent with the presence of an ip boundary following the subject in these focus contexts and its absence following the verb in the subject focus context. Comparison of subject-final high *f0* targets, which were again prevalent in both contexts, with verb-final high *f0* targets in the subject focus context in both cases yielded a significant result of increased height of the subject-final target. As with the testing of hypothesis *1c*, the subject-final high *f0* targets in both the subject topic and sentence focus contexts were then additionally compared with verb-final high targets in the verb focus context. This comparison yielded a marginally significant result in the subject topic context and a significant result in the sentence focus context, further supporting the proposed analysis in which the subject in both cases is aligned with the right boundary of an ip phrase. The distribution of less frequently produced contour types within the two contexts was again consistent with the proposed model, with no instances of post-subject deaccenting as observed in the subject focus context. Alignment of prominent given constituents with the right edge of an ip phrase likewise accounts for the average heights of subject-final high *f0* targets in the other non-subject focus contexts in the two tasks.

That prenuclear prominent topics and additional prenuclear foci in Georgian are likewise aligned with the right boundary of an ip phrase has the consequence that the subject topic and sentence focus structures have minimally the same prosodic phrasing as the subject focus structure. As predicted in hypothesis *1b*, this necessitates the presence of a prosodic feature additional to phrasing to differentiate the former focus structures from the latter. A comparison of the intensity of the first syllable of the final object in the subject focus and object focus contexts revealed a marginally significant positive difference in intensity in the latter case. In a comparison of the subject topic and subject focus contexts, intensity was revealed to be significantly greater in the former case, in which the object is in focus. A comparison of the sentence focus and subject focus contexts, on the other hand, did not yield a significant effect of intensity, although a significant result was yielded in a comparison just of the data from *T1*. On balance, therefore, the data support a role for intensity in marking a difference between these identically phrased focus structures. This indicates that Georgian, like German, English and Dutch, is a 'stress' language which does not mark informational structure by phrasal alignment alone.

The third and final set of hypotheses was concerned with the permissibility of postnuclear prominent topics in Georgian. Hypothesis *3a* predicted that responses produced in a context eliciting a prominent topic reading on the final object would be distinct in the prosodic realisation of the object, both from the final object focus context and from the initial subject focus context. Although a comparison of the object intensities of the object topic and object focus data revealed a significant increase in intensity in the latter case, the same comparison between the object topic and subject focus context did not yield a significant difference; in fact, average object intensity was lower in the object topic case than in the subject focus case. The intensity data are not as such consistent with postnuclear prominent topics being permissible in Georgian, suggesting that responses produced by participants in the object topic context instead predominantly had a subject focus structure, with no topic prominence. The syntactic data discussed in section *5.1* indicate that Georgian is more similar to German than to English in its degree of configurational freedom, and is therefore able to linearise prominent topics in prenuclear position.

More problematic, on the other hand, were the *f0* data with respect to the OT context. A comparison of verb-final *f0* high targets, which were again the prevalent type in responses for the object topic context, with those of the subject focus responses did not reveal a significant difference between the two, which is consistent with the intensity data. A comparison of the object topic data with that of verb focus, however, likewise yielded a non-significant result; this suggests that the verb in the object topic context is aligned in at least some cases with the right boundary of an ip phrase, which is incompatible with the predictions of the model, according to which the postnuclear verb should be aligned at most with the right boundary of an AP phrase. Similarly, the less frequently produced contour types in the object topic context included both the *Fd* type with deaccenting following the subject, which was otherwise observed only in the subject focus data, but also the same number of *RFF* contours observed in the verb focus context, which is again incompatible with the predictions of the proposed model that this focus context should not involve a prominent realisation of the medial verb. Although these data are problematic, when combined with the object intensity data, the evidence on balance does not support the possibility of postnuclear prominences in Georgian. In indicating a lack of support for postnuclear prominences, the data simultaneously support the right-alignment model in indicating that the boundary tone with which the focused verb is aligned does not mark prominent topic status of the final object rather than the focal status of the medial verb.

A final question which I attempted to answer with data from this experiment concerned the prosodic expression in Georgian of contrastive topics and foci. The support in the data for the proposed model, in which informational prominence in Georgian is prosodically marked by right-alignment either with a high (H-) or with a low (L-) or upstepped (!L-) ip boundary tone, gives rise to the question of what determines this choice. In my discussion of the existing literature on Georgian focus prosody in the previous chapter, I suggested that the association made by Vicenik and Jun (2014), Skopeteas et al. (2009) and others between a falling or rising-falling *f0* contour and focus in the language may in fact, given evidence that focus may also be realised with a rising contour, reflect an association between these non-rising *f0* contour types and an informational category of contrastiveness. The distribution of contour types in the data for the contrastive subject focus and contrastive subject topic contexts in my data do not support this prediction, however. As with their non-contrastive counterparts, the predominant contour types produced in both contexts were RRF, with a similar distribution of less frequently produced contour types to that observed in the equivalent non-contrastive contexts. The question of what influences tone choice for the ip boundary with which informationally prominent constituents are aligned must therefore be left to future research.

Proposed minimal phrasings by focus context are summarised in Table 68. As discussed, although non-focal subjects in the VF and OF contexts were found to preferentially have a realisation in the data consistent with their interpretation as prominent topics, i.e. aligned to the left of an ip phrase boundary, this is considered to be a preference, which contrasts with their minimal required alignment to the left of an AP phrase boundary. The tonal inventory proposed for Georgian is summarised in Table 69.

Table 68: Proposed phrasings by focus context

Focus context	Proposed phrasing and intensity feature (bold)
VF	$[[[S]_{AP}\ [\mathbf{V}_{F}]_{AP}]_{ip}\ [[O]_{AP}]_{ip}\ ]_{IP}$
SJF	$[[[\mathbf{S}_{F}]_{AP}]_{ip}\ [[V]_{AP}[O]_{AP}]_{ip}\ ]_{IP}$
OF	$[[[S]_{AP}\ [V]_{AP}\ [\mathbf{O}]_{AP}]_{ip}\ ]_{IP}$
SJT	$[[[\mathbf{S}_{\mathbf{T}}]_{AP}]_{ip}\ [[V]_{AP}[\mathbf{O}_{F}]_{AP}]_{ip}\ ]_{IP}$
STF	$[[[\mathbf{S}_{F}]_{AP}]_{ip}\ [[V]_{AP}[\mathbf{O}_{F}]_{AP}]_{ip}\ ]_{IP}$
SJFQ, OFQ	$[[[S]_{AP}]_{ip}\ [[\mathbf{V}_{\mathbf{F}}]_{AP}]_{ip}\ [[O]_{AP}]_{ip}\ ]_{IP}$

Table 69: Proposed tonal inventory

Tone type	Tones
Pitch accent	L*, H*
Phrase accent	H+L
AP boundary tone	Ha, L+Ha
ip boundary tone	H-, L-, !L-, L+H-
IP boundary tone	L%, HL%
Combination boundary tones	La+H-, L-+HL%

In the next section I will present a formalisation of the proposed model in the Optimality Theoretic framework. Here I will show that a similar set of constraints identified for German in chapter 2 can be used to capture the Georgian data.

5.2.3 A New Set of Constraints

In chapter 2 I discussed the relationship between information structure and sentence form cross-linguistically as modelled in the literature. In *2.2.1* and *2.2.2* I argued that an extension of the notion of pragmatic accommodation as employed by Rochemont (2013), Lambrecht (1994) and others reveals prominence structure to be the component of sentence structure most closely reflecting the discourse status of referents. Under this approach, referents aligned maximally with the heads of prosodic words are given and discourse-active, those aligned maximally with the heads of ip phrases are, generally speaking, discourse-inactive, and those aligned with the heads of IP phrases are, generally speaking, in focus.

In *2.2.3* I then discussed Féry's (2013) recent proposals replacing theories of focus-as-prominence (FP) of the kind proposed by Truckenbrodt (1995), Büring (2009) and others with a theory of focus-as-alignment (FA). These FA proposals, articulated within the Optimality-Theoretic framework, dispense with reference to prominence, whether concrete, in the sense of increased duration or intensity, or abstract, and claim that focus prosody in the majority of languages discussed can instead be modelled using a set of constraints which align the edges of a prosodic boundaries, not with the heads of their respective prosodic phrases as stipulated by constraints of FP theories, but directly with focus. Comparing FA with FP constraints in the context of a broader set of focus structures than those considered by Féry (2013), including postnuclear prominent topic structures in English as proposed by Calhoun (2007) on the basis of new prosodic data, I argued that the distributions of prosodic phrasings to focus structures proposed both in 'stress' languages like English and German and in 'alignment' languages like French are problematic, both for FA constraints, in that they are better accounted for with reference to the heads of prosodic phrases rather than to focus directly, and for FP constraints in existing proposals, in that, rather than a straightforward ban on the occurrence of other phrase heads between the head of a phrase and its boundary, there instead appears to be a restriction on the level of intervening phrase heads relative to the head in question which holds across phrasing levels.

From these observations I concluded that the distributions of prosodic phrases to focus structures considered in these languages could be better captured with a new set of Optimality-Theoretic constraints. In what follows I present a new set of constraints designed to capture both the posited generalisations concerning the relationship between prosodic heads and the discourse status of referents with which they are aligned, and the alternative relationship between these heads and alignment with the boundaries of prosodic phrases suggested from my review of FA and FP. I first show that these constraints capture the posited facts of Georgian in a way preferable to the alternatives. I then show that these constraints likewise better capture facts both for other stress languages like English and German and for alignment languages like French which are problematic for previous analyses discussed in chapter 2, and that these are likewise compatible with other language types discussed.

5.2.3.1 Georgian

As in the majority of the analyses of Georgian prosody discussed in chapter 4, the distribution of prosodic structures to focus contexts in my proposed analysis of Georgian are problematic for Féry's (2013) focus-as-alignment theory, according to which foci try to align with IP phrase boundaries, instead indicating that it is by association with prominences, rather than by alignment with phrase boundaries, that discourse functions in Georgian are prosodically expressed. According both to previous analyses and to mine, Georgian has prosodic properties attributed by Féry (2013) to 'stress alignment' languages like German and English which, unlike 'alignment languages' like French and Italian, are argued to achieve focus alignment only indirectly, by the deletion of stresses separating stress-aligned focus from an IP phrase boundary. Word-initial syllables in Georgian are host to a pitch accent, and exhibit additional prominence-related properties including increased intensity and duration. Whether foci are found to be aligned with the left or with the right boundary of a prosodic phrase, this is minimally an ip phrase rather than an IP phrase boundary. In my analysis, clause-final foci, which are aligned with the right boundary of an IP phrase by default, are distinct in realisation from non-foci in the same position in having the property of increased intensity.

Data from previous analyses and my own further indicate that, as I pointed out in the case of the German data discussed by Féry (2013), deletion of stress appears to be the only means by which prosodic structures associated with distinct focus structures are distinguishable which are otherwise identical in terms of phrase boundary alignment. The basic configurations of prosodic heads and phrasings to focus structures in the proposed analysis of Georgian for the subject focus, verb focus, object focus, subject topic and sentence focus structures, which are similar to those discussed by Féry (2013) for German, are provided in [**27**]. The discourse-given subjects in [**27b**] and [**27c**] are represented in their non-prominent realisation in the proposed analysis although as discussed, in accordance with my predictions they frequently had a realisation in the data consistent with that of prosodically prominent topics. As discussed, the data also suggested the availability of an alternative 'emphatic' realisation of such topics by alignment with the right boundary of an IP phrase. The same possible alternative realisations apply to the discourse given verb in [**27c**], [**27d**] and [**27e**], which, as discussed, in accordance with my predictions likewise in some cases had a realisation consistent with prosodic prominence. These distributions reflect the cross-linguistic generalisations concerning the relationship between prosodic phrase head association and discourse status proposed in chapter 2: discourse referents aligned maximally with the head of a prosodic word or AP phrase are discourse-active, those aligned minimally with the head of an intermediate phrase or ip are discourse-inactive, and those aligned minimally with the head of an Intonation Phrase are in focus.

27)

a. Initial narrow focus: SJFOC ($S_F VO$):

*			IP
*			ip
*	*	*	AP

$[[[\text{lomi}]_{AP}]_{ip}[[\text{elodeba}]_{AP}\ \ [\text{irems}]_{AP}]_{ip}]_{IP}$

lion-NOM await:PRS:3PSG deer-DAT

‘The lion is waiting for the deer.’

b. Medial narrow focus: VFOC ($SV_F O$):

	*		IP
	*		ip
*	*	*	AP

$[[[\text{lomi}]_{AP}[\text{elodeba}]_{AP}]_{ip}[[\text{irems}]_{AP}]_{ip}]_{IP}$

c. Final narrow focus: OFOC (SVO_F):

		*	IP
		*	ip
*	*	*	AP

$[[[\text{lomi}]_{AP}[\text{elodeba}]_{AP}[\text{irems}]_{AP}]_{ip}]_{IP}$

d. Initial subject topic: SJT ($S_T VO_F$):

		*	IP
*		*	ip
*	*	*	AP

$[[[\text{lomi}]_{AP}]_{ip}[[\text{elodeba}]_{AP}[\text{irems}]_{AP}]_{ip}]_{IP}$

e. Sentence focus: STF ($S_F VO_F$):

		*	IP
*		*	ip
*	*	*	AP

$[[[\text{lomi}]_{AP}]_{ip}[[\text{elodeba}]_{AP}[\text{irems}]_{AP}]_{ip}]_{IP}$

These generalisations, with which the Georgian data are consistent, can be captured using three equally-ranked strong constraints: ***APHI***, ***DIipH*** and ***IPHF***, defined in [**28**], [**29**] and [**30**].

28) ***APHI***

Align all discourse items with the head of an AP phrase.

29) ***DIipH***

Align all discourse-inactive items minimally with the head of an ip phrase.

30) ***IPHF***

Align IP heads with a focus.

The constraints ***APHI*** and ***DIipH*** capture the generalisation proposed in chapter 2 that all unaccented discourse referents, including both arguments and predicates, should be treated as discourse-active, whether as a result of explicit previous mention in the discourse or by a process of pragmatic accommodation. This approach, which does not require reference to larger syntactic phrases for accent distribution, I argued to be a simplification of syntax-mediated accounts of accentuation such as Selkirk (1995), according to which accents are borne by arguments of syntactic phrase heads, if available, and otherwise to the heads themselves. As discussed, such accounts in addition face the problem of accounting for predicate accentuation in those languages in which evidence for a VP phrase is lacking, which Wier (2014) shows include Georgian. The constraint ***IPHF*** captures the observation that, in sentences featuring multiple foci, only one is generally aligned with the head of an IP phrase, whereas the others are aligned minimally with the heads of ip phrases. The interaction of these constraints is shown in the tableau in Table 70. The optimal candidate [**a**] meets each of the constraints: each discourse item is aligned with the head of an AP phrase, each discourse-inactive item with the head of an ip phrase and the head of the IP phrase is aligned with a focus. Candidate [**b**] violates ***APHI***, as the verb is not aligned with the head of an AP phrase. Candidate [**c**] fails to align the discourse-inactive subject topic with the head of an ip phrase, thus violating ***DIipH***. Finally, candidate [**d**] violates ***IPHF*** in failing to align the IP phrase head with a focus.

Table 70: Operation of the constraints APHI, DIipH and IPHF

[lomi]$_T$ elodeba [irems.]$_F$ lion-NOM await:PRS:3PSG deer-DAT 'The lion is waiting for the deer.'	***APHI***	***DIipH***	***IPHF***
* IP * * ip * * * AP a. ☞ lomi elodeba irems			
* IP * * ip * - * AP b. lomi elodeba irems	*!		
* IP * ip * * * AP c. lomi elodeba irems		*!	
* IP * * ip * * * AP d. lomi elodeba irems			*!

As pointed out in chapter 2 with reference to other stress languages, the distribution of prosodic structures to focus structures proposed for Georgian in [**27**] is likewise problematic for the 'stress-alignment' account proposed in focus-as-prominence theories, according to which the right boundary of an IP phrase achieves alignment with the IP head, or the focus with which it is aligned, by deletion of prominences which intervene between it and the boundary. As shown in [**27a**] and [**27b**], stress alignment between an IP head-aligned focus and the right boundary of the IP phrase is blocked by intervening prominences in the form of postnuclear AP heads. As discussed, additional evidence for the presence of these intervening heads is provided by both my and other analyses of Georgian, such as Skopeteas *et al.* (2009), who find that Georgian, more so than other stress languages, fails to delete postnuclear pitch accents in the majority of cases. Similarly problematic for account of focus alignment by prominence deletion are prosodic structures in which additional prenuclear foci are blocked from alignment with the right boundary of an IP phrase by the alignment of the intervening nuclear focus with the IP head, as shown in [**27e**]. As pointed out in chapter 2 with reference to the German and English data, including the prosodic structure of postnuclear prominent topic constructions proposed by Calhoun (2007), the relationship between phrase heads and alignment in the model proposed for Georgian instead conforms to a different constraint, according to which phrase heads may be separated from their corresponding boundary maximally by phrase heads at least two phrase levels beneath them. Reference to the prosodic structures in [**27**] shows that this constraint captures both cases mentioned above: IP heads are separated from their right boundary maximally by AP heads, whereas ip heads, which are only one phrase level above AP heads, may not be separated from their right boundaries by these and appear adjacent to it. This can be articulated as the inviolable constraint, ***HSEP***, defined in [**31**], which ranks equally with ***APHI***, ***DIipH*** and ***IPHF***.

31) ***HSEP***
Any phrase heads separating the head of a phrase from its right phrase boundary must be at least two phrase levels beneath it.

I propose ***HSEP*** in conjunction with the equally ranked constraint ***EXHAUSTIVEPROSODICPARSING*** proposed by Féry (2011), defined in [**32**]. Together, ***HSEP*** and ***EXHAUSTIVEPROSODICPARSING*** ensure that sentences are fully parsed into prosodic phrases. Whereas ***HSEP*** ensures that all prosodic phrase heads are contained within their own prosodic phrase, ***EXHAUSTIVEPROSODICPARSING*** ensures that any remaining material in the sentence is contained within a headless phrase.

32) ***EXHAUSTIVEPROSODICPARSING (EPP)***
A grammatical sentence is parsed entirely in prosodic domains

(Féry 2011:1909)

The operation of ***HSEP*** and ***EXHAUSTIVEPROSODICPARSING*** (henceforth ***EPP***) is shown in the tableau in Table 71. The optimal candidate [**a**] satisfies both constraints; no phrase head is separated from its right boundary by a head less than two phrasing levels below it, and the sentence is fully parsed into prosodic phrases. Candidate [**b**] is fully parsed into prosodic phrases, but, as highlighted, the ip head with which the focused verb is aligned is separated from the right boundary of its ip phrase by the AP head with which the direct object is aligned; as the AP head is only one phrasing level below the ip head, this violates ***HSEP***. Candidate [**c**] is likewise fully parsed into prosodic phrases, but, although the ip head aligned with the focused verb is adjacent to the right boundary of its ip phrase, the IP head with which it is aligned is separated from the right boundary of its ip phrase by a further ip head only one phrasing level below it, with which the object is aligned; this again violates ***HSEP***. Finally, candidate [**d**] satisfies ***HSEP*** but violates ***EPP***, as the final direct object is not contained within a further (headless) ip phrase.

Table 71: Interaction of the constraints HSEP and EXHAUSTIVEPROSODICPARSING (EPP) (head configurations in violation of HSEP are highlighted in grey)

[lomi]$_{T}$ [elodeba]$_{F}$ irems. lion-NOM await:PRS:3PSG deer-DAT ‘The lion is waiting for the deer.’	***HSEP***	***EPP***

* IP
   *   * ip
   *   *   * AP
a. ☞ [[[lomi]$_{AP}$]$_{ip}$ [[elodeba]$_{AP}$]$_{ip}$ [[irems]$_{AP}$]$_{ip}$]$_{IP}$		

* IP
   *   * ip
   *   *   * AP
b. [[[lomi]$_{AP}$]$_{ip}$ [[elodeba]$_{AP}$ [irems]$_{AP}$]$_{ip}$]$_{IP}$
	*!	

* IP
   *   *   * ip
   *   *   * AP
c. [[[lomi]$_{AP}$]$_{ip}$ [[elodeba]$_{AP}$]$_{ip}$ [[irems]$_{AP}$]$_{ip}$]$_{IP}$
	*!	

* IP
   *   * ip
   *   *   * AP
d.[[[lomi]$_{AP}$]$_{ip}$ [[elodeba]$_{AP}$]$_{ip}$ [irems]$_{AP}$]$_{IP}$
		!*

Excessive prosodic phrasing is militated against by a further constraint proposed by Féry (2011), ***NOPHRASE*** (henceforth ***NOP***), defined in [**33**].

33) ***NOPHRASE (NOP)***
Avoid the proliferation of prosodic domains; higher ones are worse than lower ones.

(Adapted from Féry 2011:1910)

This constraint, which ranks below the others introduced so far in this section, accounts for a dispreference of any phrasing not essential to the fulfilment of the other constraints. An important interaction between this constraint and ***HSEP*** can be shown for cases where discourse-inactive topics and prenuclear foci are, for the purposes of additional emphasis, aligned not just with the head of an ip phrase, but with the head of an IP phrase; as discussed in chapter 2, such cases are identified in English by Ladd (2008) and are a possible analysis in the case of the Georgian data presented above, in which prominent topics and prenuclear foci may aligned, not only with the right boundary of an ip phrase, but also with that of an IP phrase. This option for additional emphasis is captured here with the constraint ***EMPH***, defined in [**34**].

34) ***EMPH***
Align a discourse-inactive constituent minimally with the head of an IP phrase.

EMPH is satisfied by candidate [**a**] in the tableau in Table 72, in which the subject is aligned with an IP phrase head. This candidate also satisfies the constraints ***EPP*** and ***HSEP***, and only violates ***NOP*** to the extent that is required to satisfy the other constraints introduced. Candidate [**b**], in which the right boundary of the leftmost IP phrase is shifted from the right of the subject to the right of the verb, likewise satisfies the stronger constraints, including ***HSEP***, because the IP phrase head is separated from its right boundary only by additional AP phrase head two phrasing levels lower. As a similar rightward shift of the right ip boundary from the right of the subject to the right of the verb would result in the ip head violating ***HSEP*** (see candidate [**c**]), however, the inclusion of the verb in an additional (headless) ip phrase is necessitated in order to satisfy ***EPP*** (see candidate [**d**]); the presence of this additional phrase incurs an additional, unnecessary violation of ***NOPHRASE***, which results in the candidate being dispreferred. In *5.2.3.2* below I will show that the same interaction of ***HSEP***, ***NOPHRASE*** and ***EPP*** accounts for the distribution of prosodic phrase boundaries in English postnuclear topic constructions as analysed by Calhoun (2007).

Table 72: Interaction of the constraints EMPH and NOP with HSEP and EPP

[lomi]$_{EMPHT}$ elodeba [irems.]$_{F}$ lion-NOM await:PRS:3PSG deer-DAT 'The lion is waiting for the deer.'	***EPP***	***EMPH***	***HSEP***	***NOP***
* * IP * * ip * * * AP a.☞[[[[lomi]$_{AP}$]$_{ip}$]$_{IP}$ [[[elodeba]$_{AP}$ [irems]$_{AP}$]$_{ip}$]$_{IP}$]$_{IP}$				**(IP) *(ip)
* * IP * * ip * * * AP b. [[[[lomi]$_{AP}$]$_{ip}$ [[elodeba]$_{AP}$]$_{ip}$]$_{IP}$[[[irems]$_{AP}$]$_{ip}$]$_{IP}$]$_{IP}$				**(IP) **(ip)
* * IP * * ip * * * AP c. [[[[lomi]$_{AP}$ [elodeba]$_{AP}$]$_{ip}$]$_{IP}$[[[irems]$_{AP}$]$_{ip}$]$_{IP}$]$_{IP}$			!*	
* * IP * * ip * * * AP d. [[[[lomi]$_{AP}$]$_{ip}$ [elodeba]$_{AP}$]$_{IP}$ [[[irems]$_{AP}$]$_{ip}$]$_{IP}$]$_{IP}$	!*			

As was shown by candidate [**c**] in the tableau in Table 71, ***HSEP*** prevents the occurrence of additional ip heads between the IP head and its right boundary, thus accounting in part for the non-permissibility of postnuclear prominent topics in Georgian as indicated by my data. That Georgian does not appear to employ 'double-IP' constructions to realise postnuclear prominent topics, which, as discussed in chapter 2, Calhoun (2007) argues are employed by English and which themselves conform to the ***HSEP*** constraint, can be accounted for with the constraint ***DITINIT*** proposed for Georgian in *5.1.2*. As discussed in chapter 3, the strength of ***DITINIT*** is also supported by the strong contention in the literature that, topics must also precede other material prefocally, a pattern which cannot be accounted for with ***HSEP***. In *5.2.3.2* below I will argue that this ranking contrasts with the greater strength of a canonical word order constraint ***CWO*** in English, which results in the placement of prominent topics in postnuclear position and the accommodation of these within a double IP construction to satisfy ***HSEP***, although this entails a further violation of ***NOP***. The interaction of ***DITINIT*** in Georgian with ***HSEP***, ***SJINIT*** and ***NOP*** is shown in the tableau in Table 73 (for space reasons, only the ip and IP phrase levels are displayed). The optimal candidate [**a**], although it violates ***SJINIT***, satisfies the stronger constraints ***DITINIT*** and ***HSEP***, and incurs only a mild violation of ***NOP*** in the form of an extra ip phrase required to mark the prosodic prominence of the initial topic. Candidate [**b**] conforms to ***SJINIT*** but violates ***DITINIT***, as the discourse-inactive topic fails to appear in clause-initial position. Candidate [**c**], although it makes use of a 'double IP' construction which permits it to feature a postnuclear prominent topic without violating ***HSEP***, likewise fails to satisfy ***DITINIT***, and in addition occurs more significant violations of ***NOP***. Finally, candidate [**d**], in which the ip phrase head with which the postnuclear prominent topic is aligned intervenes between the IP head aligned with its focus and its own prosodic boundary, violates both ***DITINIT*** and ***HSEP***.

Table 73: Interaction of strong DITINIT with HSEP, SJINIT and NOP

puls$_T$ vano adzlevs gelas$_F$ money-DAT Vano-NOM give Gela-DAT	***HSEP***	***DITINIT***	***SJINIT***	***NOP***
* IP * * ip a.☞[[puls]$_{ip}$ [vano adzlevs gelas]$_{ip}$]$_{IP}$			*	*(ip)
* IP * * ip b. [[vano puls]$_{ip}$ [adzlevs gelas]$_{ip}$]$_{IP}$		!*		*(ip)
* IP * * ip c. [[[vano adzlevs gelas]$_{ip}$]$_{IP}$[[puls]$_{ip}$]$_{IP}$]$_{IP}$		!*		**(IP)
* IP * * ip d. [[vano adzlevs gelas]$_{ip}$ [puls]$_{ip}$]$_{IP}$	!*	!*		*(ip)

The constraint ***NOP*** can furthermore fulfil the role of and replace another of the linearisation constraints from the set presented in *5.1.2*: the constraint ***ALIGN-FOCUS-R***, originally proposed for Georgian by Féry *et al.* (2010), which I included to capture a preference for foci in Georgian to be linearised clause-finally. ***NOP*** captures the same preference, insofar as linearisation of a focus in clause-final position causes it to be aligned with the right ip phrase boundary with which clause-final constituents are obligatorily aligned, whereas a non-final focus necessitates the inclusion of an additional ip phrase so that the focus may be aligned with such a boundary in non-final position. ***NOP*** can be posited to occupy the same place in the ranking as ***ALIGN-FOCUS-R***; like its predecessor, it is ranked equally with ***FMARK***, which militates against foci occupying clause-final position. This is shown in the tableau in Table 74. Each of the optimal candidates [**a**] and [**b**] violates only one of ***NOP*** and ***FMARK***. Candidate [**c**], in which the focus is linearised postverbally but non-finally, violates both ***NOP*** and ***FMARK***. Finally, candidate [**d**] violates both ***NOP*** and the strong constraint ***XP$_{FOC}$V***.

Table 74: Interaction of the constraint NOP with FMARK and XP$_{FOC}$V

vano [puls]$_{IDF}$ adzlevs datos. vano.NOM money-DAT give.PRS:3PSG dato.DAT 'Vano is giving money to dato.'	***XP$_{FOC}$V***	***FMARK***	***NOP***
a.☞ [[vano puls]$_{ip}$ [adzlevs datos]$_{ip}$]$_{IP}$			*(ip)
b.☞ [[vano adzlevs datos puls]$_{ip}$]$_{IP}$		*	
c. [[vano adzlevs puls]$_{ip}$[datos]$_{ip}$]$_{IP}$		*	*(ip)
d. [[puls]$_{ip}$[vano adzlevs datos]$_{ip}$]$_{IP}$	*!		*(ip)

In this section I have presented a new set of constraints in the Optimality-Theoretic framework to account for the distribution of prosodic to focus structures in my analysis of Georgian. The first constraints presented, ***APHI***, ***DIipH*** and ***IPHF***, reflect my arguments made in chapter 2 that the informational status of discourse referents is best articulated in terms of their alignment with the heads of prosodic phrases, which is consistent with the Georgian data. The constraints ***HSEP*** and ***NOPHRASE*** (***NOP***), the latter of which I adopted from Féry (2011), likewise reflect my arguments from chapter 2 that 'stress alignment' is better replaced with constraints on the permissible configurations of prosodic heads separating the head of a phrase from its boundary, which I have shown likewise applies to my analysis of the Georgian data. In addition, I proposed that the strong constraint ***DITINIT*** accounts for the non-permissibility of postnuclear prominent topics in Georgian as indicated by my data. Also included in the set are the constraints ***EXHAUSTIVEPROSODICPARSING*** (***EPP***), employed by Féry (2011), and the constraint ***EMPH***.

The full set of constraints proposed for Georgian in both this section and in *5.1.2* is summarised in Table 75, which shows their ranking in blocks. The first block contains the stronger constraints, which may not be violated, and the second block the weaker constraints which may be violated, particularly in order to satisfy the stronger constraints or other weaker constraints.

Table 75: Strong and weak constraints proposed for Georgian in the present chapter

Strong	***EXHAUSTIVEPROSODICPARSING*** (***EPP***) (Féry 2011) ***APHI*** ***DIipH*** ***IPHF*** ***EMPH*** ***HSEP*** $\boldsymbol{XP_{FOC}V}$ (Skopeteas *et al.* 2009) ***DITINIT*** ****DAPINIT*** $\boldsymbol{S_{DF}<IO,DO_{DF}}$ $\boldsymbol{(IO_{DF}<DO_{DF})V}$
Weak	****DNPRSINIT*** ***NOPHRASE*** (***NOP***) (Féry 2011) ***FMARK*** ***SJINIT*** ***GINIT*** ***PROMSEP*** ***CONSTINT***

These constraints will be incorporated into the Lexical-Functional Grammar model of Georgian presented in the next chapter. In the next section I will show that the proposed constraints can also account for the distribution of prosodic to focus structures, both in other ‘stress’ languages like Georgian, and in ‘alignment languages’, dispensing with the need to treat them in different terms.

5.2.3.2 Other Languages

In the previous section I noted that the interaction between prosody and information structure in Georgian, both in mine and in previous analyses, is similar to that identified by the literature in other ‘stress languages’ like German and English. As I concluded in chapter 2, the distribution of prosodic to focus structures in these languages is problematic, both for the focus-as-alignment and for the focus-as-prominence accounts discussed there. With respect to the former, foci, as pointed out by Féry (2013), align with the right boundary of an ip phrase, but not obligatorily with the right boundary of an IP phrase, as she argues to be the case with ‘alignment languages’ like French. With respect to the latter, a ‘stress alignment’ account, according to which foci or the IP heads with which they align are aligned with the right boundary of an IP phrase by deletion of intervening prominences, faces the problem of word-level AP heads which intervene between a nuclear focus and this boundary, and of additional prenuclear foci which are separated from this boundary both by intervening AP heads and by the IP head with which the rightmost, nuclear focus is aligned. As I argued, the alignment of phrase heads with prosodic boundaries can instead be captured with a constraint which I presented in the previous section as ***HSEP***, which accounts both for the alignment of IP heads and of ip heads with their respective right boundaries in the examples discussed.

HSEP, together with the three ‘head-alignment’ constraints proposed in the previous section, ***APHI***, ***DIipH*** and ***IPHF***, can be applied straightforwardly to the German data discussed by Féry (2013) which I introduced in chapter 2. In the tableau in

Table 76, the optimal candidate [**a**] aligns the right boundary of an ip phrase to the right of the focused object, thus satisfying ***HSEP***. By contrast, ***HSEP*** is violated by candidate [**b**], in which the entire sentence is contained within a single ip phrase.

Table 76: The constraints HSEP, DIiph and IPHF applied to German

Ein [Mann]$_F$ schneidet die Melone. A man cut the melon ‘A man cuts the melon.’	***HSEP***	***DIiph***	***IPHF***
* IP * ip * * * AP a. ☞ [[[ein MANN]$_{AP}$]$_{ip}$ [[schneidet]$_{AP}$ [die Melone]$_{AP}$]$_{ip}$]$_{IP}$			
* IP * ip * * * AP b. [[[Ein MANN]$_{AP}$ [schneidet]$_{AP}$ [die Melone]$_{AP}$]$_{ip}$]$_{IP}$	*!		

Likewise in the tableau in Table 77, candidate [**b**], unlike candidate [**a**], violates ***HSEP*** in that the ip phrase head aligned with the prominent subject topic is followed by the head of an AP phrase only one level below it.

Table 77: The constraints HSEP, DIiph and IPHF, German prominent subject topic

Der [Mann]$_T$ tritt einen [Stuhl]$_F$. The man kick a chair 'The man is kicking a chair.'	***HSEP***	***DIipH***	***IPHF***
* IP * * ip * * * AP a. ☞ [[[Der MANN]$_{AP}$]$_{ip}$ [[tritt einen STUHL]$_{AP}$]$_{ip}$]$_{IP}$			
* IP * * ip * * * AP b. [[[Der MANN]$_{AP}$ [tritt]$_{AP}$]$_{ip}$ [[einen STUHL]$_{AP}$]$_{ip}$]$_{IP}$	*!		

As discussed, ***HSEP*** likewise accounts for the prosodic structure of postnuclear prominent topic structures in English as analysed by Calhoun (2007) on the basis of her data. As shown in the tableau in Table 78, ***HSEP*** is violated by the single-IP construction in candidate [**b**], in which an ip head only one phrase level below the IP head intervenes between it and its right boundary; the necessity of the two IP phrases posited in this construction and featured in the optimal candidate [**a**] is thus accounted for in the same way as phrasing in the previous constructions. Candidate [**c**], in which the right boundary of the leftmost IP phrase is shifted from the right of the subject to the right of the verb, incurs an additional violation of ***NOP*** in necessitating the creation of an additional ip phrase and is thus dispreferred, as with candidate [**c**] in the tableau in Table 71 in the case of Georgian.

Table 78: The constraints HSEP and NOP, English postnuclear prominent topic structure

[Norma]$_F$’s coming [tomorrow]$_T$.	***HSEP***	***NOP***
* IP * IP * * ip * * * AP a. ☞ [[[NORMA’s]$_{AP}$]$_{ip}$]$_{IP}$[[[[coming]$_{AP}$[TOMORROW]$_{AP}$]$_{ip}$]$_{IP}$]$_{IP}$		**(IP) *(ip)
* IP * * ip * * * AP b. [[[NORMA’s]$_{AP}$]$_{ip}$ [[coming]$_{AP}$ [TOMORROW]$_{AP}$]$_{ip}$]$_{IP}$	*!	*(ip)
* IP * IP * * ip * * * AP c. [[[[NORMA’s]$_{AP}$]$_{ip}$ [[[[coming]$_{AP}$]$_{IP}$[TOMORROW]$_{AP}$]$_{ip}$]$_{IP}$]$_{IP}$		**(IP) **(ip)

In the previous section I posited that the apparent non-occurrence of similar ‘double IP’ constructions in Georgian is prevented by a much stronger constraint ***DITINIT***, which forces discourse-inactive topics in Georgian to precede any other constituents. Whereas a similarly ranked ***DITINIT*** constraint can be posited for German to account for its similarity to Georgian in this respect, such a constraint appears to have far less force in English. The fronting of discourse-inactive topics which are non-subject arguments appears permissible only in highly marked constructions in which the fronted topic is attributed a contrastive interpretation, which indicates that ***DITINIT*** is outranked in English a by an equivalent to the ***SJINIT*** constraint, or to the canonical word order (***CWO***) constraint proposed for Georgian by Féry (2013), which I propose in English permits adverbs which are discourse-inactive topics to appear in a canonical postverbal position, even though to satisfy the ***HSEP*** constraint this necessitates a ‘double IP’ construction which entails additional violations of ***NOP***, which ***CWO*** must also outrank. This interaction is shown in the tableau in Table 79. Candidate [**a**] is optimal in that it violates neither ***HSEP*** nor ***CWO***, although the additional IP phrases incur additional violations of

NOP. Candidate [**b**], although it also satisfies ***HSEP*** and is preferable from the point of view of ***NOP***, violates ***CWO***.

Table 79: Interaction of constraints HSEP, CWO and NOP in English

[Norma]$_F$'s coming [tomorrow]$_T$.	HSEP	CWO	NOP
* IP * IP * * ip * * * AP a. ☞ [[[[NORMA's]$_{AP}$]$_{ip}$]$_{IP}$[[[[coming]$_{AP}$[TOMORROW]$_{AP}$]$_{ip}$]$_{IP}$]$_{IP}$			**(IP)
* * * * * * b. [[[Tomorrow]AP]ip [[Norma's]AP]ip [[coming]AP]ip]IP		*	**(ip)

As I pointed out in chapter 2, the approach articulated in the set constraints presented here captures not only the distribution of prosodic to focus structures in 'stress languages', but also those in 'alignment languages' like French. As discussed, the distribution of prosodic phrasings to focus structures in French indicates that, contrary to Féry (2013), the 'target' with which the right boundary of an IP phrase seeks to align is not focus directly, but rather the head of an IP phrase. This prominence-orientated distribution of phrasings supports the application of the constraints ***APHI***, ***DIipH*** and ***IPHF*** in French. In contrast to stress languages, in which only discourse-inactive items are aligned with ip phrase heads and discourse-active items maximally with the head of an AP phrase, even if they are postnuclear and occupy a headless ip phrase, French is described as being unable to deaccent postnuclear given items; as discussed, this is argued to be a motivation for the extraction of postnuclear given material to the right of the VP to mark it as non-focal. This obligatory headedness of ip phrases can be captured in the proposed account with the constraint ***H(ip)***, defined in [**35**].

35) ***H(ip)***
All ip phrases must be headed.

From the obligatory headedness of ip phrases in French it can, in turn, be seen that right boundary alignment in French conforms to the ***HSEP*** constraint. As shown in the tableau in Table 80, the optimal candidate [**a**], in aligning the right boundary of an IP phrase to the right of the focused subject, prevents the obligatory ip head aligned with the postfocal material from intervening between it and the focus-aligned head of the IP, which is the case in candidate [**b**]. Candidate [**c**] avoids violating ***HSEP*** by removing the head of the rightmost ip, which however results in a violation of ***H(ip)***. Candidate [**d**], in which the right IP phrase boundary is shifted from the right of the focused subject to the right of the verb, likewise violates ***HSEP***, because the obligatory inclusion of the verb within an additional ip phrase (see candidate [**c**] in Table 71 and Table 78 above) in turn necessitates the presence on the verb of an intervening ip phrase head, in compliance with ***H(ip)***.

Table 80: Constraints HSEP and H(ip) with French initial subject focus

C’est l’[homme]$_{F}$ qui pousse la voiture. ‘The man is pushing the car.’	***HSEP***	***H(ip)***
* IP * IP * * ip * * * AP a. ☞ [[[[C’est l’HOMME]$_{AP}$]$_{ip}$]$_{IP}$ [[[qui pousse]$_{AP}$ [la voiture]$_{AP}$]$_{ip}$]$_{IP}$]$_{IP}$		
* IP * * ip * * * AP b. [[[C’est l’HOMME]$_{AP}$]$_{ip}$ [[[qui pousse]$_{AP}$ [la voiture]$_{AP}$]$_{ip}$]$_{IP}$	*!	
* IP * - ip * * * AP c. [[[C’est l’HOMME]$_{AP}$]$_{ip}$ [[qui pousse]$_{AP}$ [la voiture]$_{AP}$]$_{ip}$]$_{IP}$		*!
* IP * IP * * * ip * * * AP d. [[[[C’est l’HOMME]$_{AP}$]$_{ip}$ [[[qui pousse]$_{AP}$]$_{ip}$]$_{IP}$ [[[la voiture]$_{AP}$]$_{ip}$]$_{IP}$]$_{IP}$	!*	

A further language type discussed by Féry (2013) in terms of alignment for which the alternative constraints proposed here can be shown to account is represented by Nłeʔkepmxcin (Thompson River Salish). In the example repeated in [**36**], the nuclear prominence of the sentence falls, not on the focus, but on the rightmost accentable item in the sentence. The focus, is aligned in a cleft construction in a separate p-phrase to the left of the p-phrase containing the nuclear prominence. As Féry (2013) argues, the dissociation of focus from nuclear prominence in the language supports her proposed FA theory of focus prosody.

36) (x) (x) i-phrase
(x) (x) (x) p-phrase
Téʔe. [qwúʔ]$_F$ ƛ'uʔ e s-ʔúqweʔ-kt.
NEG. water just DET NOM-drink-1PL.POSS
'No. We'll just drink [water]F.'
(more literally: 'No, the thing that we will drink is just water.')

(Féry 2013:704, from Koch 2008b:251)

In chapter 2 I argued that the cleft focus constructions in the Nłeʔkepmxcin data can be understood, not as the result of a constraint according to which foci must be aligned with the left boundary of an IP phrase, as proposed by Koch's (2008a, 2008b) and by Féry (2013), but instead as special syntactic constructions which serve to distinguish narrow from broad focus. This can be captured with the constraint ***CLFOC***, defined in [**37**], which outranks ***IPHF***.

37) ***CLFOC***
Mark a narrow focus by realising it in a cleft construction.

I posited that the absence in the Nłeʔkepmxcin data of double IP phrase constructions of the kind identified in French, which permit a non-final focus to be associated with the head of an IP phrase followed by a headless IP phrase, thus satisfying ***HSEP***, can be captured with a constraint in Nłeʔkepmxcin stipulating that all phrases, including IPs, must be headed. This can be captured by positing the further constraint ***H(IP)***, defined in [**38**].

38) ***H(IP)***

All IP phrases must be headed.

As shown in the tableau in Table 81, the optimal candidate [**a**] satisfies the constraints ***CLFOC***, ***HSEP*** and ***H(IP)***, but violates ***IPHF*** which the others outrank. Candidate [**b**] satisfies ***CLFOC*** and ***IPHF*** in aligning all IP heads with focus, but requires the deletion of the head of the rightmost IP in order to satisfy ***HSEP***, which incurs a violation of ***H(IP)***.

Table 81: Constraint H(IP) in Nłeʔkepmxcin

[qwúʔ]$_{F}$ ƛ’uʔ e s-ʔúqweʔ-kt. water just DET NOM-drink-1PL.POSS ‘We’ll just drink water.’	***CLFOC***	***HSEP***	***H(IP)***	***IPHF***
* IP * * ip a. ☞ [[[qwúʔ ƛ’uʔ]$_{ip}$]$_{IP}$ [[e s-ʔúqweʔ-kt]$_{ip}$]$_{IP}$]$_{IP}$				*
* IP * IP * * ip b. [[[qwúʔ ƛ’uʔ]$_{ip}$]$_{IP}$ [[e s-ʔúqweʔ-kt]$_{ip}$]$_{IP}$]$_{IP}$			!*	

I have proposed that the distribution of prosodic phrasings to focus structures in the Georgian and other language data discussed so far can be captured for all phrase levels using the constraint ***HSEP*** in conjunction with the constraints ***NOP*** and constraints on the headedness of the different phrase types. On the other hand, the existence of the same constraint at the left rather than the right boundaries of some prosodic phrases, as identified in chapter 2 in the case of Japanese and English, necessitates the division of the ***HSEP*** constraint, not only into separate versions specifying left and right alignment, but into versions specifying alignment on different phrasing levels. The resulting constraints, ***HSEPIPR***, ***HSEPipR***, ***HSEPIPL***, ***HSEPipL***, ***HSEPAPR*** and ***HSEPAPL*** are defined below.

39) ***HSEPIPR***
Any phrase heads separating the head of an IP phrase from its right boundary must be at least two phrase levels beneath it.

40) ***HSEPipR***
Any phrase heads separating the head of an ip phrase from its right boundary must be at least two phrase levels beneath it.

41) ***HSEPIPL***
Any phrase heads separating the head of an IP phrase from its left boundary must be at least two phrase levels beneath it.

42) ***HSEPipL***
Any phrase heads separating the head of an ip phrase from its left boundary must be at least two phrase levels beneath it.

43) ***HSEPAPR***
Any phrase heads separating the head of an AP phrase from its right boundary must be at least two phrase levels beneath it.

44) ***HSEPAPL***
Any phrase heads separating the head of an AP phrase from its left boundary must be at least two phrase levels beneath it.

The Japanese data discussed in chapter 2 can be shown to conform to the constraints ***HSEPIPR*** and ***HSEPipL***. It can be seen that no additional ip heads occur between the focus-aligned IP head and its right boundary, and that no additional material occurs between ip heads and their left boundaries. In addition, the lack of additional ip phrases to the right of the IP head is consistent with the operation in Japanese of the constraint ***H(ip)***, introduced above for French. The operation of these constraints is shown in the tableau in Table 82, the candidates of which are displayed separately due to spatial limitations. Candidate [**a**] satisfies the constraints ***HSEPipL***, ***HSEPIPR*** and ***H(ip)***, whereas candidate [**b**], in retaining postfocal ip phrases which are headless, violates ***H(ip)***, and candidate [**c**], in retaining headed postfocal ip phrases, satisfies ***H(ip)*** but violates ***HSEPIPR***.

* IP
* * * - - ip
a. ☞ [[Náoko wá]$_{ip}$ [nichiyóobi]$_{ip}$ [Nágoya$_{F}$ dé Mári ní átta]$_{ip}$]$_{IP}$

* IP
* * * - - ip
b. [[Náoko wá]$_{ip}$[nichiyóobi]$_{ip}$[Nágoya$_{F}$ dé]$_{ip}$[Mári ní]$_{ip}$[átta]$_{ip}$]$_{IP}$

* IP
* * * * * ip
c. [[Náoko wá]$_{ip}$[nichiyóobi]$_{ip}$[Nágoya$_{F}$ dé]$_{ip}$[Mári ní]$_{ip}$[átta]$_{ip}$]$_{IP}$

Table 82: Interaction of the constraints HSEPipL, HSEPIPR and H(ip) in Japanese

	HSEPipL	***HSEPIPR***	***H(ip)***
a.☞			
b.			!*
c.		!*	

The applicability of the constraint ***HSEPAPL*** to examples of ‘non-isomorphic’ English constructions discussed in chapter 2 is shown in [**45**].

* (IntP)
* * * (PhP)
* * * (PW)
* * * * * * * * * * * * * (syll)
45) (IntP (PhP (PW 'æ.nə.wəz.)) (PhP (PW 'stʌ.di.ɪŋ.ət.də.ju.nə.)) (PhP (PW 'vɜː.sə.ti)))

In order to capture the difference between prosodic phrasing in natural speech of the kind shown in [**45**] and more careful speech, to which the previously considered ‘isomorphic’ examples of English and German can be attributed, the constraint ***WALIGN*** can be posited, which I define in [**46**].

46) ***WALIGN***
In careful speech, align prosodic phrase boundaries with the edges of words.

As shown in the tableau in Table 83, ***WALIGN*** outranks ***HSEPAPL*** in English, forcing an alignment in the optimal candidate [**a**] in which syllable heads intervene between the AP head and its left boundary, unlike in candidate [**b**]. ***WALIGN*** can also be seen to outrank

NOP, as it forces the creation of additional AP phrases. It does not, however, outrank ***HSEPIPR*** or ***HSEPipR***, which must be adhered to in either kind of speech.

‘Anna was studying at the university$_{F}$.’ (careful speech)

```
                                                                                   *
                  *                             *                                  *
                  *                             *                                  *
                  *  *               *          * * *        *       *       *  *  *  * *
a. (IntP (PhP (PW 'æ.nə. ) ) (PhP (PWwəz.) (PW 'stʌ.di.ɪŋ)) ((PW.ət.) (pWdə.) (PWju.nə.'vɜː.sə.ti )PhP)IntP)
```

```
                                                                         *
                  *                      *                               *
                  *                      *                               *
                  *  *  *                *  * * *   * *  *               * * *
b. (IntP (PhP (PW 'æ.nə.wəz. ) ) (PhP (PW 'stʌ.di.ɪŋ.ət.də.ju.nə. ) ) (PhP (PW 'vɜː.sə.ti )))
```

Table 83: Interaction of the constraints WALIGN and HSEPAPL with HSEPIPR, HSEPipR and NOP in English

	HSEPIPR	***HSEPipR***	***WALIGN***	***HSEPAPL***	***NOP***
a. ☞				*	***(AP)
b.			!*		

In this section I have shown that the constraints proposed in section *5.2.3.1* for Georgian, which reflect the approach to accounting for the distribution of prosodic phrasings to focus structures cross-linguistically which I articulated in chapter 2, can successfully be applied not only to other ‘stress’ languages like Georgian, but also to ‘alignment’ languages like French, if some additional constraints are applied to take into account features more specific to them. In particular I have shown that the constraint ***HSEP*** can, in combination with separately supported heading constraints, capture the facts in both types of language, eliminating the need for different concepts of alignment, and captures a generalised pattern across phrasing levels in these languages. Division of ***HSEP*** into a larger group of constraints is however required to capture languages such as Japanese, which shows different directionality in head alignment between higher phrasing levels, as well as

English, which has been shown to exhibit left-alignment preferences at the AP level in more natural speech. Further work is required in order to establish whether the approach embodied in the constraints proposed in this chapter can successfully be applied to further language types.

The eleven additional constraints proposed in this subsection are summarised in Table 84.

Table 84: Additional constraints proposed in this section for other languages

HSEPIPR
HSEPipR
HSEPIPL
HSEPipL
H(ip)
CLFOC
H(IP)
WALIGN
CWO
HSEPAPR
HSEPAPL

After presenting a Lexical-Functional Grammar model of Georgian the next chapter which incorporates the constraints proposed in *5.1.2* and *5.2.3.1*, I will show how some of the constraints proposed in the present section can likewise be incorporated into an LFG model, permitting the facts for other languages to be captured within the same approach.

5.2.4 Summary and Conclusions

In this chapter I have presented new models of how information structure is expressed in Georgian syntax and prosody. I began in section *5.1* by presenting a fuller set of Optimality-Theoretic constraints which more fully reflect the available syntactic data, including my own from a production experiment conducted in Tbilisi in 2011. These included constraints to account for the preferential fronting of discourse-active and discourse-inactive constituents, a wider range of verb-initial constructions and the linearisation of post-verbal foci.

In section *5.2* I then turned to the prosodic realisation of discourse relations. Here I presented more new data from a production experiment conducted in Stuttgart in October 2014 designed to test a set of hypotheses formulated following my review of the existing literature in chapter 4. These new data support hypothesis *1*, indicating that focused constituents in Georgian are aligned to the right rather than to the left of an ip phrase boundary, and hypothesis *2*, indicating that the same is true of discourse-inactive topics, and that identical prosodic phrase structures resulting from this alignment are disambiguated by an additional prosodic feature, in the form of intensity. The data relating to hypothesis *3* were more problematic, but on balance indicated that Georgian, unlike English, does not permit postnuclear prominences. Finally, I showed that the relationship between information structure and prosody in Georgian as indicated by these data can be captured straightforwardly using a new set of prominence configuration constraints reflecting the approach that I proposed in chapter 2 as a preferable alternative to the focus-as-alignment theory recently proposed by Féry (2013). I then showed that the same constraints can be successfully applied to data from other 'stress' languages like English and German, as well as to 'alignment' languages like French, in conjunction with other independently motivated constraints.

The Optimality-Theoretical constraints for Georgian syntax and prosody proposed in this chapter form a component of the fuller LFG model proposed in the next chapter.

6. A Lexical-Functional Grammar Model

In the preceding chapter I presented a new model of the relationship between syntax, prosody and information structure in Georgian within the Optimality-Theoretic framework. This model was proposed following a review of existing models and analyses of these relationships, which I found to vary in the extent to which they capture the syntactic and prosodic data available from the existing literature reviewed in chapters 3 and 4. On the basis of this variation, I formulated and tested some alternative hypotheses, the results of which, also presented in the previous chapter, informed my own model. In the present chapter, I present a first model of the relationship between syntax, prosody and information structure in Georgian within the Lexical-Functional Grammar framework. As appropriate to the central questions addressed in this thesis of how discourse relations are expressed cross-linguistically and in Georgian in particular, the parallel architecture of LFG permits an explicit articulation of how levels of sentence structure interact in a given language, including the extent to which each contributes to the encoding of discourse relations in sentence form.

I begin in *6.1* by modelling the relationship in Georgian between information structure and syntax. I first revisit the LFG models of Georgian presented by Meurer (2007, 2009) and by Wier (2014) which were introduced in chapter 3. I first discuss in more detail how these reflect the interaction in LFG between c(onstituent)-structure and f(unctional)-structure, and show how Meurer's modelling of this relationship can be expressed in a non-computational framework with annotations based on O'Connor (2006). I then discuss in more detail how these models reflect the relationship in LFG between these levels and i(nformation)-structure and s(emantic)-structure, again elaborating them with annotations based on the proposals of Dalrymple and Nikolaeva (2011). Having outlined the content and representation of i-structure that I assume for my own model of Georgian, which is based on the proposals of Butt and King (2000) and of Mycock and Lowe (2014a, 2014b), I then discuss modifications to Meurer's (2007, 2009) and to Wier's (2014) models necessary to capture my own analysis of Georgian, on the basis of which I propose a phrase structure for Georgian with a number of fully elaborated annotations which reflect the syntactic OT constraints proposed in the previous chapter, one set of which is inviolable and the other violable. In order to capture the violability of the latter set, I introduce and adopt the integration of Optimality Theory into LFG architecture proposed by Frank *et al.* (1998).

The annotations which I propose in *6.1* capture the limited extent to which discourse relations in Georgian are syntactically encoded within my analysis. According to my proposals, it is prosody, and, in particular, alignment with the heads of prosodic phrases, which plays the key role in the encoding of discourse relations, both in Georgian and in other languages. In *6.2* I turn to modelling the relationship in Georgian between information structure and prosody, which has received far less formal treatment in the existing literature and, to my knowledge, none within LFG. I begin in *6.2.1* by introducing LFG's p(rosodic)-structure and its relationship with the levels of structure discussed in the preceding section. Here I give particular attention to recent modifications to p-structure and to its interaction with other structures proposed by Dalrymple and Mycock (2011) and by Mycock and Lowe (2013). In a way similar to the proposals of Féry (2013) and others discussed in chapter 2, these emphasise the role of alignment with the edges of prosodic phrases in the expression of discourse and other features. I show that, in doing so, these face similar problems to those I pointed out for the formerly discussed analyses. To overcome these, I first propose some further modifications to p-structure to represent the headedness of prosodic constituents independently of edge-alignment, which capture the constraint on prominence configuration which I articulated in the previous chapter as ***HSEP***. Together with modified phrase structure rules I present annotations to prosodic phrase heads which make these, rather than alignment, central to how discourse relations are realised, both prosodically and in terms of sentence form. These proposals capture the essential part of my model of the interaction between information structure and prosody in Georgian. I complement them with additional annotations to syntactic phrase structure, including annotations which reflect my proposed restriction of the 'projection' of discourse relations to an f-structural phenomenon applicable only to more specific cases. I complete my model of Georgian with a final set of p-structural annotations specifying the prosodic features by which the heads and phrase boundaries of the p-structure proposed for Georgian are expressed, in accordance with my analysis in the previous chapter; this includes an account of the role of boundary tones in signalling the distinction between declaratives and yes-no questions.

Finally in *6.2.2*, I show how the model presented for Georgian can be adapted to accommodate some of the other languages discussed in the previous chapter, which I showed can be modelled with the same or similar Optimality-Theoretic constraints proposed for Georgian there. Beginning with English, I first show how most of the data discussed from this other 'stress language' can be modelled using the same p-structural rules and annotations proposed for Georgian. I then propose a further modification to the LFG architecture proposed by Dalrymple and Mycock (2011) and Mycock and Lowe (2013) to permit it to represent a level of prosodic organisation beneath the syllable, so that the constraint ***HSEPAPL*** can be articulated. I then turn to the alignment languages French and Nłeʔkepmxcin (Thompson River Salish). Whilst, as I discussed already, their prosodic structures can be shown to conform to the same constraints of 'stress' languages, which I capture here with modified p-structure rules, the nature of their prosodic structures has the consequence that whilst all discourse-inactive items are aligned minimally with prominence, not all prominences are aligned with discourse-inactive items. In order to accommodate these languages within the proposed LFG model, I propose solutions to this issue in the form of modified p-structural annotations in the case of French and modified syntactic annotations in the case of Thompson River Salish. These and the other proposals made in this chapter are summarised in *6.3*, in which I draw together areas for future research identified throughout.

6.1 Word Order

The Optimality-Theoretic model of Georgian information structure that I presented in the preceding chapter consists of 14 constraints, repeated in Table 85, of which ten are inviolable and four violable. These constraints reflect my conclusions that the major role in expressing information structure in Georgian is fulfilled by prosody, in agreement with the findings of Skopeteas *et al.* (2009). In agreement with my own conclusions from chapter 2 concerning the cross-linguistic expression of information structure, the constraints reflect that this is achieved primarily by the alignment of discourse referents with the heads of prosodic phrases, as captured by the proposed constraints ***APHI***, ***DIipH*** and ***IPHF***. The set simultaneously reflects the lesser role that my analysis attributes to syntax in this respect. In agreement with the majority of the literature which I have reviewed, the influence of syntax in the expression of discourse relations in Georgian, with the exception of constraints such as ****DAPINIT***, can be expressed chiefly in the form of constraints on the linearisation of particular items in particular positions, such as ***$XP_{FOC}V$*** and ***SJINIT***, which only in more specific cases serve to identify particular discourse relations, as I will discuss in *6.1.2* below.

The LFG model of this syntax-IS relationship presented in what follows is likewise intended to capture both the extent and the limitations of the role of syntax with respect to how discourse relations in Georgian are expressed. I begin by revisiting the two existing LFG models of Georgian information structure discussed in chapter 3, proposed by Meurer (2007, 2009) and by Wier (2014) respectively, which are chiefly concerned with how discourse relations in Georgian realised configurationally. I will then discuss in greater detail how each of the models reflects the LFG architecture's ability to capture variation between languages with respect to the encoding, first of grammatical relations in *6.1.1*, then of discourse relations in *6.1.2*, providing a more explicit implementation for each in line with the predictions made in each case. Following a discussion of some modifications to these models necessary in order to capture my own analysis, in *6.1.2.1* and *6.1.2.2* I then present my own LFG model of the syntax-information structure relationship in Georgian.

Table 85: Inviolable and violable constraints proposed for Georgian in the previous chapter

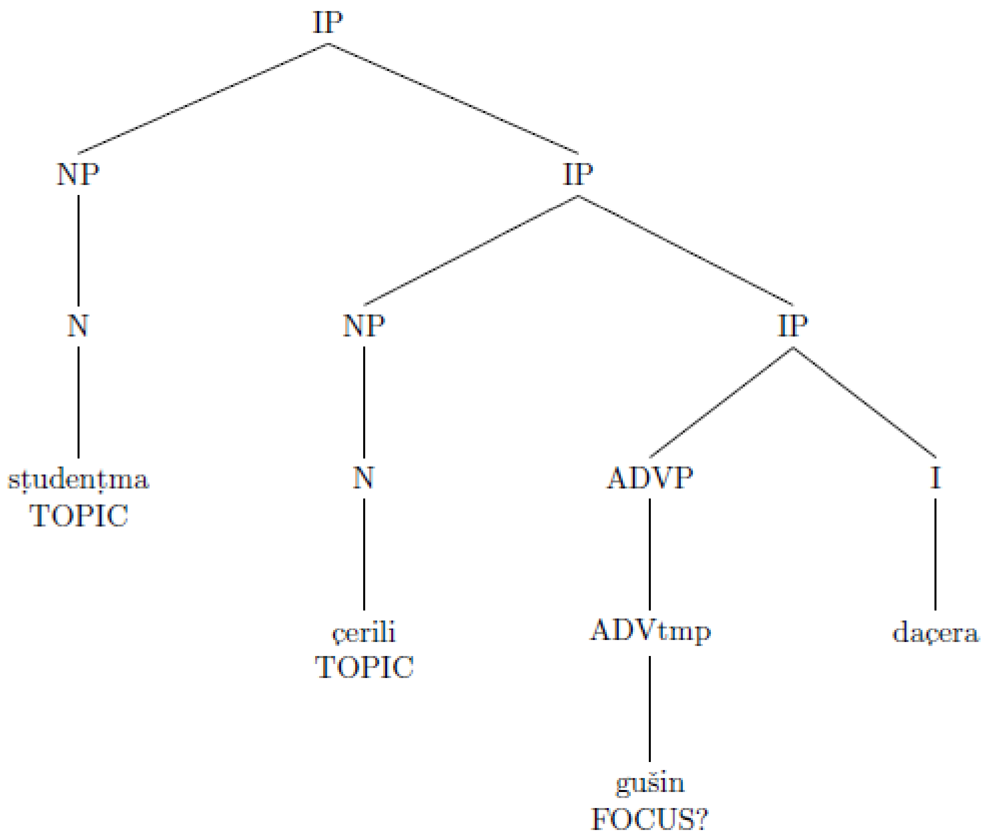
Inviolable	***EXHAUSTIVEPROSODICPARSING*** (***EPP***) (Féry 2011) *A grammatical sentence is parsed entirely in prosodic domains*
	APHI *Align all discourse items with the head of an AP phrase.(maximally?align all non-dropped?)*
	DIipH *Align all discourse-inactive items minimally with the head of an ip phrase.*
	IPHF *Align IP heads with a focus.*
	EMPH *Align a discourse-inactive constituent minimally with the head of an IP phrase.*
	HSEP *Any phrase heads separating the head of a phrase from its right phrase boundary must be at least two phrase levels beneath it.*
	$\boldsymbol{XP_{FOC}V}$ (Skopeteas *et al.* 2009) *No non-focal constituent may intervene between a preverbal focused constituent and the verb.*
	DITINIT *Discourse-inactive topics precede other constituents.*
	****DAPINIT*** *Discourse-active predicates may not appear in sentence-initial position.*
	$\boldsymbol{S_{DF}<IO,DO_{DF}}$ *A subject precedes other arguments with the same discourse function.*
	$\boldsymbol{(IO_{DF}<DO_{F})V}$ *An indirect object precedes a direct object with the same discourse function preverbally.*
Violable	****DNPRSINIT*** *A declarative non-presentational predicate may not appear in sentence-initial position.*
	NOPHRASE (***NOP***) (Féry 2011) *Avoid the proliferation of prosodic domains; higher ones are worse than lower ones.*
	FMARK *Increase the prominence of foci by linearising them in a marked position (preverbally).*
	SJINIT *Subjects precede other constituents.*
	GINIT *A given constituent precedes non-given constituents.*
	PROMSEP *Realise a prominent constituent in separation from other material.*
	CONSTINT *Constituents may not be discontinuous.*

6.1.1 Grammatical Relations

The LFG model of Georgian presented by Meurer (2009:7) contains the set of phrase structure rules repeated in [**1**]. According to these rules, Georgian phrase structure consists minimally of an endocentric IP phrase [**1b**]; this minimally contains an intermediate projection I' [**1c**], which in turn minimally contains the IP head I, which contains the finite verb [**1e**]. Any additional XPs appearing within the I' projection are realised within an exocentric phrase S [**1d**], which appears as a sister of I to its right [**1f**]. As for additional items to the left of the finite verb, foci or question phrases are associated with a special IP specifier position which is sister to the intermediate projection I' [**1b**], which may also be occupied by a topicalized constituent if sentence-initial; Meurer (2007, 2009) points out that this as a focus position may be ambiguous if constituents both precede and follow the verb; topic and focus are not coded exclusively configurationally in his model, as for example heavy focused constituents may follow the verb or be sentence-final, and focused verbs tend to precede the argument. Any additional constituents to the left of the immediately preverbal IP specifier position occupy the specifier positions of additional, recursively adjoined IPs [**1a**]; as shown in Figure 83, Meurer (2007) associates these positions with topicalised constituents.

1) a) IP → XP IP
   b) IP → XP I'
   c) IP → QP + I'
   d) I' → I (S)
   e) I → *Vinfl*
   f) S → XP+

(Meurer 2009:7)



sṭudenṭ-ma   çeril-i   [gušin]$_F$ daçera
student-ERG letter-NOM yesterday write.PST-3SG
'The student wrote the letter yesterday.'

Figure 83: Proposed LFG phrase structure for Georgian with annotations (Meurer 2007:sl 29)

The LFG phrase structure proposed for Georgian by Wier (2014) is somewhat different. As illustrated in Figure 84, this consists minimally of an exocentric phrase S, which in turn contains minimally the finite verb V, and which may contain additional XPs on either side of the finite verb. The minimal exocentric phrase S may in turn appear within a complementiser phrase CP as sister to a complementiser C which is the head of the phrase. Within S, an XP immediately preceding V is annotated as the position for a negative phrase, whereas an XP preceding this is annotated as the position for a focused item. A final annotated position in the proposed phrase structure is an XP preceding CP within a larger S phrase, which is annotated for topical items.

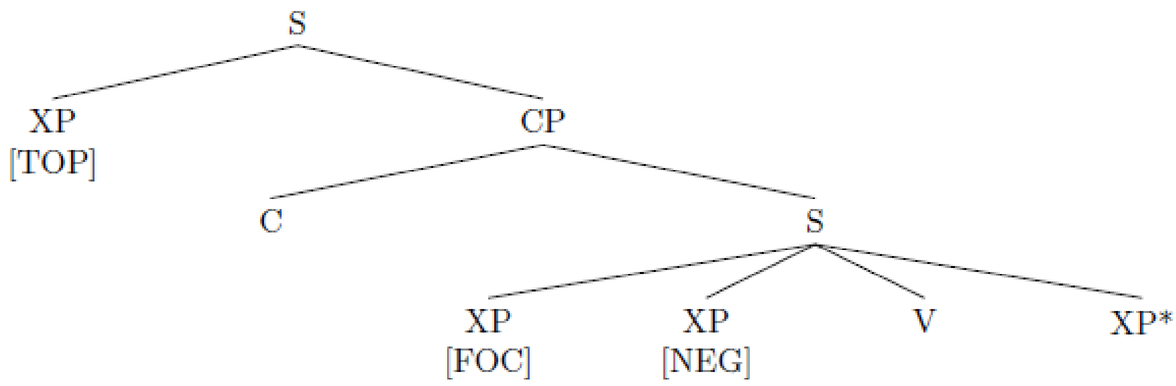


Figure 84: Proposed LFG phrase structure for Georgian with annotations (Wier 2014:49)

Like the phrase structure proposed for Georgian by Skopeteas and Fanselow (2010a, 2010b) in the Minimalist framework, which I also discussed in chapter 3, the LFG phrase structures presented by Meurer (2007, 2009) and by Wier (2014) are based on the principles of X-bar theory (Jackendoff 1977, Chomsky 1986). According to this theory, the lexical and functional items which make up a sentence string are organised within a number of interconnecting phrases with the same internal structural principles. As illustrated in Figure 85, each phrase is organised around a head (a lexical or functional item from the string), which projects a number of phrasal levels (labelled X', X'' and so on), each of which may be occupied by other phrases. The uppermost phrasal level projected by the head is its maximal projection, which has the label XP. The first level X' projected by the head in addition accommodates a complement phrase (YP), which is sister to the head. The maximal projection of the head, XP, contains, in addition to an intermediate projection level such as X', a specifier phrase (ZP) which is sister to this projection level.

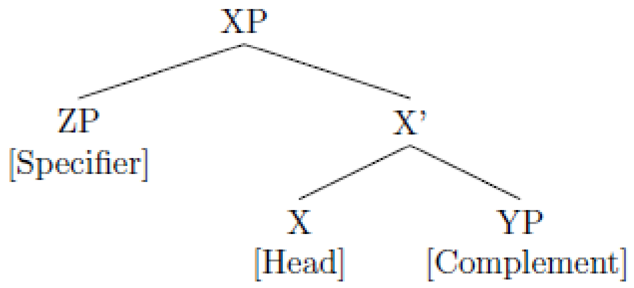


Figure 85: X-bar phrase structure

Although both LFG and Minimalism employ X-bar phrase structure, the role played by phrase structure in each of the frameworks is quite different. Within Minimalism's transformational architecture, phrase structure forms the central level of representation for sentence structure. Particular features borne by words, such as grammatical relations, are associated with them as the result of them occupying specific configurational positions (head, specifier and complement) within this phrase structure at some level of derivation. A word bearing the role of direct object, for example, has typically acquired this role by being generated as the complement of the verbal head within a VP phrase, whereas a word bearing the subject role has typically acquired this role by being generated in the VP specifier position (see Figure 86).

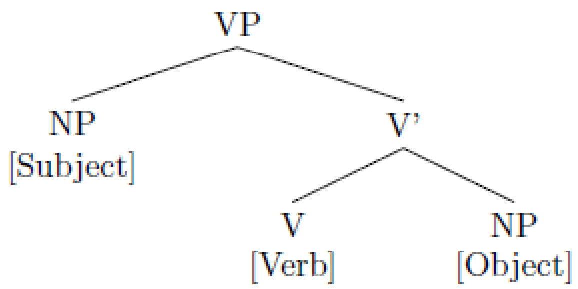


Figure 86: Association of grammatical roles with configurational positions in Minimalism

Variability in word order in some languages which is inconsistent with words bearing these grammatical relations occupying these configurational positions is accounted for in Minimalism as the result of the movement of these words to other phrase-structural positions at subsequent stages of the derivation. This is the case within the Minimalist model presented for Georgian by Skopeteas and Fanselow (2010a, 2010b). As discussed in chapter 3, this model posits that the verb is generated in VP head position, with the object as its complement and the subject in VP specifier position, in the order SOV. The occurrence of linearisations which vary from these base-generated positions is then accounted for as the result of optional scrambling to other positions in subsequent derivations; some of these transformations are illustrated in Figure 87. In the case of a preverbal focus or a focused verb, the verb moves to the head of a functional projection FP and a preverbal focus to a preceding FP specifier position. Other constituents may be scrambled to the specifier position of a higher tense projection TP, and topicalised constituents to the specifier position of a higher CP projection.

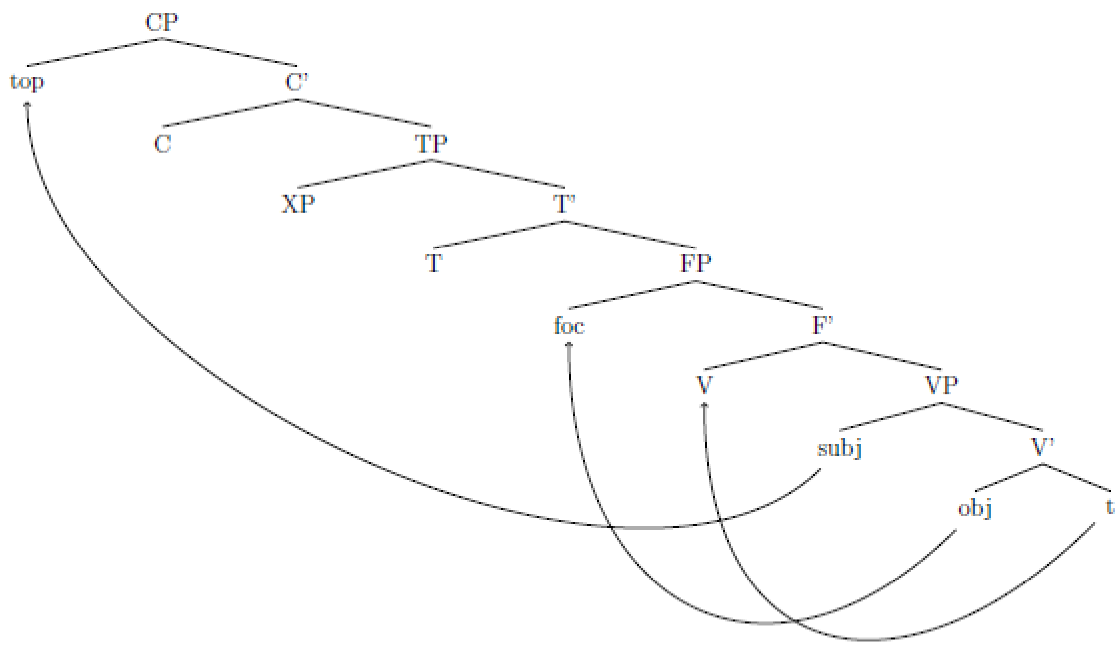


Figure 87: Minimalist phrase structure for Georgian as described by Skopeteas and Fanselow (2010a, 2010b), showing transformations from base-generated positions

In contrast with the Minimalist model presented by Skopeteas and Fanselow (2010a, 2010b), in neither of the LFG models of Georgian presented by Meurer (2007, 2009) and by Wier (2014) are the nodes of syntactic phrase structure associated with specific grammatical relations, although, as shown in Figure 83 and Figure 84, they are in several cases associated with discourse relations. Rather than employ phrase structure as the central level of representation in combination with transformations which 'move' words between nodes, the LFG architecture, which is non-transformational, employs multiple levels of representation for different aspects of linguistic organisation in addition to syntactic phrase structure (in LFG, c(onstituent)-structure), which exist in parallel. Although these structural levels are constructed on differing lines as appropriate to the linguistic information they represent, the correspondences between them are well-defined. It is in this way that the LFG architecture is able to model explicitly the significance of each structural level as a contributor of linguistic information.

Information about grammatical relations and other syntactic properties, including tense, mood and person, have a separate representation in the LFG architecture, in abstraction from the formal means by which they are encoded in the sentence, at the level of f(unctional)-structure. The content of f-structure comprises a set of attribute-value matrices (AVMs), each consisting minimally of an attribute with a unique value[58]. This format provides LFG with a built-in precision which has made it desirable for the expression of grammatical rules and constraints. The f-structure in Figure 88 is provided by O'Connor (2006) for the English sentence '*The child saw the elephant*'. This f-structure contains information about the finite verb, which is the f-structural head, and the arguments for which it subcategorises. At f-structure, the verb and its arguments are identified in terms of their semantic forms, which in each case are the value of the corresponding PRED attribute. The PRED value of the finite verb includes the grammatical relations of the arguments for which it subcategorises, in this case SUBJ(ect) and OBJ(ect). Further

[58] As such, the f-structure is a function from attributes to their values.

information about the verb is provided beneath its PRED AVM, as values of attributes such as TENSE. The values of the attributes SUBJ and OBJ are further AVMs which contain their semantic forms as the values of their PRED attributes. In addition, these may in turn contain values for attributes such as NUM(ber) and DEF(initeness).

$$\begin{bmatrix} \text{PRED} & \text{`see}\left\langle \uparrow \text{SUBJ}, \uparrow \text{OBJ} \right\rangle\text{'} \\ \text{TENSE} & \text{PAST} \\ \text{SUBJ} & \left[\text{PRED 'child'}\right] \\ \text{OBJ} & \left[\text{PRED 'elephant'}\right] \end{bmatrix}$$

Figure 88: F-structure for ‘The child saw the elephant.’ (Adapted from O’Connor 2006:23)

The availability of a separate level of structure for the representation of this information in LFG has the consequence that the role of c-structure, rather than being used to capture the association of grammatical roles and other information with constituent words, is instead restricted to one of representing the facts about phrase structure particular to the language in question, including the precise extent to which configurationality contributes information about grammatical relations in that language. This in turn has consequences for the range of phrase structures permitted in LFG in comparison to other frameworks such as Minimalism. An illustration of how LFG captures the different means by which languages contribute information about grammatical relations to f-structure is provided by O’Connor (2006), who contrasts models of English, a relatively configurational language, and of Malayalam (Mohanan 1982), a relatively non-configurational language, in which grammatical relations are instead marked by morphological features. As f-structure represents grammatical information in abstraction from how it is encoded in sentence form, the format of f-structural representations is largely invariant between languages[59]. O'Connor (2006) attributes largely the same f-structure in Figure 88 to [**2**], the Malayalam equivalent of the English sentence represented above. Although in both cases, English is used as a meta-language to represent the semantic forms which are the values of the PRED attributes, this has no theoretical significance; the role of meta-language could equally be fulfilled by Malayalam or any other language.

2) kuʈʈi aanaye kaɳʈu
child.NOM elephant.ACC see.PAST
'The child saw the elephant.'

Although, as represented in the f-structure in Figure 89, the distribution of grammatical relations is the same in English and in Malayalam, the means by which this distribution is encoded in sentence form is quite different between the two. As illustrated by O'Connor (2006), this is captured in LFG by how the information at f-structure is related to these other levels. This linking is achieved by means of mapping functions to f-structure from c-structure and other dimensions encoding this information, such as morphological structure (or m-structure)[60].

$$\begin{bmatrix} \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'elephant'} \\ \text{CASE} & \text{ACC} \end{bmatrix} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'child'} \\ \text{CASE} & \text{NOM} \end{bmatrix} \\ \text{PRED} & \text{'see} \left\langle \uparrow \text{SUBJ}, \uparrow \text{OBJ} \right\rangle \text{'} \\ \text{TENSE} & \text{PAST} \end{bmatrix}$$

Figure 89: f-structure for Malayalam sentence [2] (adapted from O'Connor 2006:25)

English, which is one of the group of languages from work on which the Minimalist framework was developed, is an example of a language in which grammatical relations are

[59] F-structures for some languages may however include information about grammatical distinctions which do not figure in other languages.
[60] For further discussion of the nature of m-structure, see for example Dalrymple (2001).

encoded configurationally. Similarly to the Minimalist association between phrase-structural nodes and grammatical relations illustrated in Figure 87, the association between configurational positions and grammatical relations in English is modelled at the level of c-structure by a mapping function φ from c-structure to f-structure, represented by the annotation to phrase-structural nodes of the f-structural AVMs to which these correspond, shown in **[3]**. English phrase structure is modelled using the Inflectional Phrase, IP. This has the daughters NP, which occupies the IP specifier position, and I', which is its complement. The daughters of I' are in turn the head of the Inflectional Phrase and its complement, the verb phrase, the daughters of which are the verb phrase head, V, and the noun phrase NP. The label beneath the NP occupying the IP specifier position specifies that the f-structure associated with the c-structural node in question, designated ↓, corresponds to the value of the SUBJ attribute of the f-structure of the present node's mother node, designated ↑. Similarly, the label beneath the NP occupying the V complement position specifies that this node is associated with an f-structure which is the value of the OBJ attribute of the f-structure corresponding to its mother node. The ↑=↓ label annotated to the remaining nodes specifies that in each case, the f-structure corresponding to the node in question shares the same f-structure with its mother node. These show that SUBJ and OBJ belong to the same f-structure.

3) a) $\mathrm{IP} \rightarrow \underset{(\uparrow\mathrm{SUBJ})=\downarrow}{\mathrm{NP}} \quad \underset{\uparrow=\downarrow}{\mathrm{I'}}$

b) $\mathrm{I'} \rightarrow \underset{\uparrow=\downarrow}{\mathrm{I}} \quad \underset{\uparrow=\downarrow}{\mathrm{VP}}$

c) $\mathrm{VP} \rightarrow \underset{\uparrow=\downarrow}{\mathrm{V}} \quad \underset{(\uparrow\mathrm{OBJ})=\downarrow}{\mathrm{NP}}$

d) $\mathrm{NP} \rightarrow \underset{\uparrow=\downarrow}{\mathrm{D}} \quad \underset{\uparrow=\downarrow}{\mathrm{N}}$

(O’Connor 2006:22)

The phrase structure rules in **[3]** build trees like the one shown in Figure 90, each node in which is additionally numbered as having a correspondent at f-structure. These rules together with the annotations to c-structure nodes build an f-description (see [**4**]), a set of functional equations which has as its solution the f-structure corresponding to the c-structural representation.

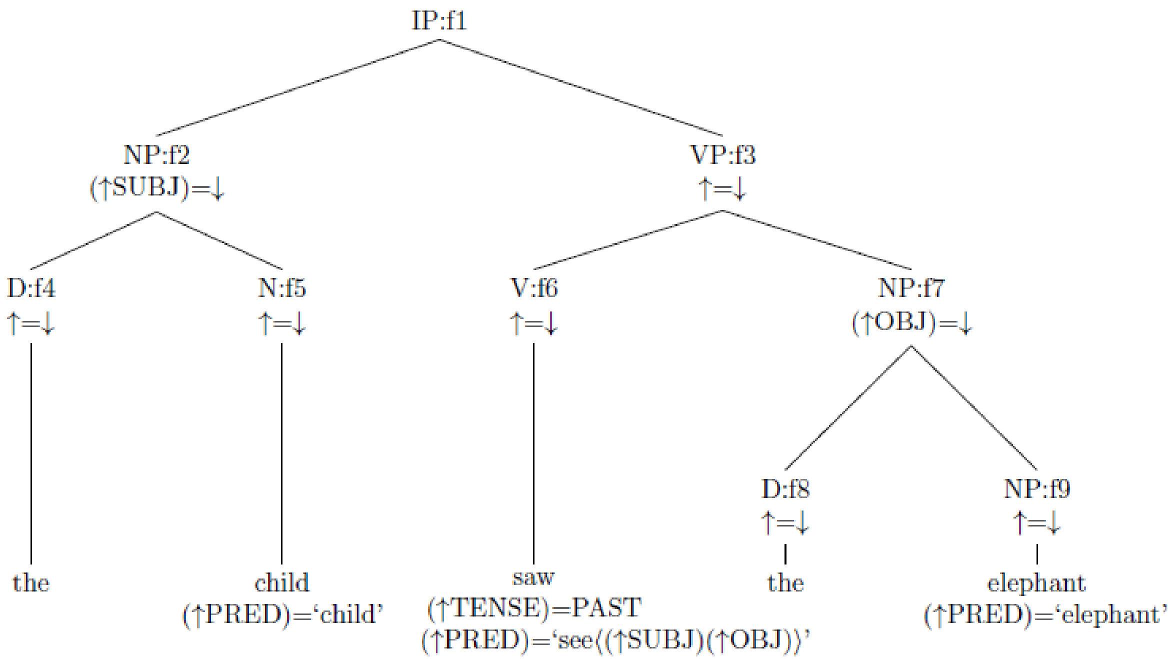


Figure 90: C-structure for English with annotations to f-structure (O’Connor 2006:22)

4) F-description:

$(f_1 \text{SUBJ})=f_2$	from rule [**3a**]
$f_1=f_3$	from [**3a**,**b**] (since the I node is absent)
$f_2=f_4$	from [**3d**]
$f_2=f_5$	from [**3d**]
$f_3=f_6$	from [**3c**]
$(f_3 \text{OBJ})=f_7$	from [**3c**]
$(f_2 \text{PRED})$ = ‘child’	from the lexical entry for *child*
$(f_6 \text{TENSE})$ = PAST	from the lexical entry for *saw*
$(f_6 \text{PRED})$ = ‘see<(↑SUBJ)(↑OBJ)>’	from the lexical entry for *saw*
$(f_7 \text{PRED})$ = ‘elephant’	from the lexical entry for *elephant*

The f-structure in Figure 91 is the solution to this f-description.

$$
f_1, f_3, f_5 \begin{bmatrix} \text{PRED} & \text{`see}\left\langle \text{SUBJ, OBJ} \right\rangle\text{'} \\ \text{TENSE} & \text{PAST} \\ \text{SUBJ} & f_2, f_4 \begin{bmatrix} \text{PRED 'child'} \end{bmatrix} \\ \text{OBJ} & f_6, f_7 \begin{bmatrix} \text{PRED 'elephant'} \end{bmatrix} \end{bmatrix}
$$

Figure 91: F-structural solution to [4] (Adapted from O’Connor 2006:23)

In contrast to English, word order in Malayalam is far less constrained; according to Mohanan (1982), the verb, which is clause-final, may be preceded by arguments in any order. This relative lack of configurationality is represented in the phrase structure rule in [**5**]. In place of the endocentric category IP, used in [**3**] to capture the significance to English word order of the finite verb, this phrase structure employs the headless or exocentric category S, and specifies that S contains the verb in final position, preceded by any number of NP phrases, as represented by the Kleene star operator *. These NP phrases are unordered with respect to one another. The phrase structure rule for Malayalam likewise makes use of annotations to nodes detailing how c-structure corresponds to f-structure, but, whereas the finite verb is similarly annotated ↑=↓ to show that it shares the same f-structure with its mother S, preceding NPs are annotated (↑GF)=↓; this captures the fact that, although the NPs correspond to some grammatical function within the f-structure of their mother, the precise grammatical functions are specified, not by position at c-structure, but by some other level of structure; for Malayalam, this is case morphology.

5) $\mathrm{S} \rightarrow \underset{(\uparrow \mathrm{GF})=\downarrow}{\mathrm{NP}^{*}} \quad \underset{\uparrow=\downarrow}{\mathrm{V}}$

(O'Connor 2006:24)

The first part of the link in Malayalam between the morphological features of words and their associated grammatical relations at f-structure is achieved by the annotation of the lexical entries of items bearing these morphemes for the cases they are consequently associated with at f-structure, according to the schema in [**6a**]. The cases associated with the morphemes *–Ø* and *–e* are provided in [**6b**].

6) a) $(\uparrow \mathrm{CASE})=K$

b) -ø: $(\uparrow \mathrm{CASE})=\mathrm{NOM}$
-e: $(\uparrow \mathrm{CASE})=\mathrm{ACC}$

(O'Connor 2006:24)

Nodes at c-structure can then be annotated with the conditional functional schemata in [**7**], which link occupying NPs to a grammatical function at f-structure according to their associated case.

7) a) $(\downarrow \mathrm{CASE})=\mathrm{NOM} \Rightarrow (\uparrow \mathrm{SUBJ})=\downarrow$

b) $(\downarrow \mathrm{CASE})=\mathrm{ACC} \Rightarrow (\uparrow \mathrm{OBJ})=\downarrow$

(O'Connor 2006:24)

From these, the tree in Figure 92 can be assembled. This yields the functional description in [**8**], which contrast with the English f-description in [**4**] with respect to the sources from which various information is derived. The solution to this functional description is the f-structure in Figure 93.

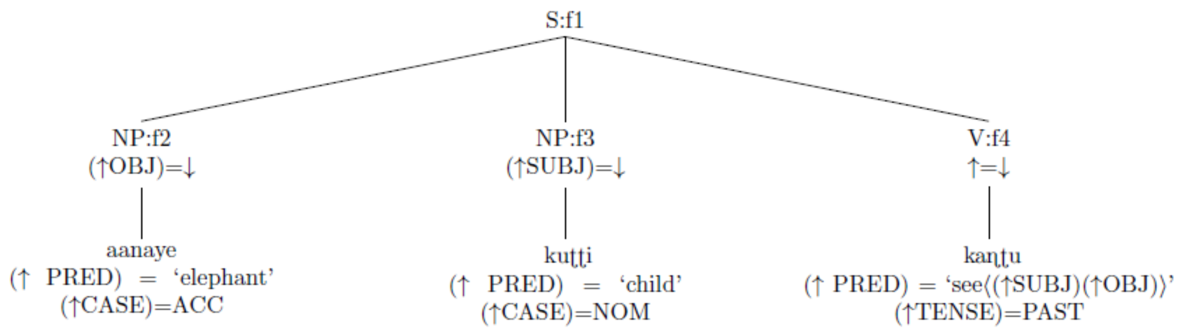


Figure 92: C-structure for Malayalam with annotations to f-structure (O'Connor 2006:25)

8) F-description:

$(f_1 OBJ)=f_2$	from rule [**5**]/ schema [**6b**]
$(f_1 SUBJ)=f_3$	from rule [**5**]/ schema [**6a**]
$f_1=f_4$	from rule [**5**]
$(f_2 PRED)$ = 'elephant'	from the lexical entry for *aana-*, 'elephant'
$(f_2 CASE)$ = ACC	from the lexical entry for *-e*
$(f_3 PRED)$ = 'child'	from the lexical entry for *kuṭṭi*, 'child'
$(f_3 CASE)$ = NOM	from the lexical entry for *-Ø*
$(f_4 PRED)$ = 'see<(↑SUBJ)(↑OBJ)>'	from the lexical entry for *kaṇṭu*, 'saw'
$(f_4 TENSE)$ = PAST	from the lexical entry for *kaṇṭu*, 'saw'

$$
f_1, f_4 \left[\begin{array}{ll}
\text{PRED} & \text{'see}\langle\text{SUBJ, OBJ}\rangle\text{'} \\
\text{TENSE} & \text{PAST} \\
\text{SUBJ} & f_3 \left[\begin{array}{l} \text{PRED 'child'} \\ \text{CASE NOM} \end{array}\right] \\
\text{OBJ} & f_2 \left[\begin{array}{l} \text{PRED 'elephant'} \\ \text{CASE ACC} \end{array}\right]
\end{array}\right]
$$

Figure 93: F-structural solution for [8] (Adapted from O'Connor 2006:25)

In addition to illustrating how LFG permits the explicit modelling of how varying languages express information about grammatical relations, O'Connor (2006) further uses the English and Malayalam examples discussed above to highlight some respects in which the phrase structure employed in LFG varies, in association with its more specific role in this architecture, from the Minimalist use of X-bar theory upon which it is based. Whereas, in this version of X-bar theory, all structural positions associated with a given phrase must be represented even if not occupied by any sentential material, the English phrase structure shown in Figure 90 differs from this practice in omitting both the IP head I and the VP specifier position. Transformational theories derive the various possible sentences of a language by means of operations which include the movement of lexical items from underlying structural configurations in which they are assigned the syntactic and semantic properties with which they are associated. As such, the significance of these c-structural positions requires that they feature in the representation even when not occupied by a lexical or functional item in the surface derivation. As LFG has only a surface representation and makes use of f-structure (and others) to represent these properties, nodes which are not filled by lexical or functional items are omitted from c-structure. This requirement is articulated as the Principle of Economy of Expression, given in [**9**].

9) The Principle of Economy of Expression:
‘[a]ll syntactic phrase structure nodes are optional and are not used unless required by independent principles’.

(Adapted from Bresnan (2001a:91))

Another difference is that, whereas within standard X-bar theory, all phrases are organised around a lexical or functional head, LFG c-structure permits both headed or endocentric phrasal categories and the headless or exocentric category S. This category has been used in place of the endocentric category IP of original X-bar theory in analyses of languages which allow greater freedom of ordering amongst their major sentential constituents, together with non-binary branching, another feature of LFG phrase-structure.

Meurer (2007, 2009) and Wier (2014), both of whom make use of the exocentric category S in their proposed phrase structures for Georgian, comment on the lack of configurationality in the language[61]. Meurer (2007, 2009) in addition presents a detailed model of the mapping between grammatical functions and both case and verbal affixes in his computational grammar of Georgian which employs XLE (the Xerox Linguistic Environment) developed by the Palo Alto Research Center. Case, together with other morphologically encoded information, is parsed from lexical forms to produce analyses like that in [**10**].

10) *ġvino* 'wine'
→ ġvino+N+Nom+Sg

(Meurer 2009:2)

This information is used by f-structure equations attached to the lexical entries of verbs to identify the correct recipients of the grammatical functions subcategorised for by the verb at f-structure. Figure 94 illustrates the mapping in the sentence in [**11**] of the nominative case-marked *ç̣erili*, which occupies an IP-specifier position annotated (↑GF)=↓ like the Malayalam phrase structure rule in [**5**], to the role of OBJ in the f-structure of the verb form *daç̣era,* which subcategorises for an object with nominative case. The argument fulfilling the SUBJ role is elided and therefore absent from c-structure; instead, it is represented at f-structure with the PRED value 'pro' and information about it supplied in part by the morphological features of the verb.

11) ç̣eril-i daç̣era
letter-NOM write.AOR.3SG
'He wrote a letter.'

[61] An exception is the ordering of question phrases according to their grammatical role, which both acknowledge.

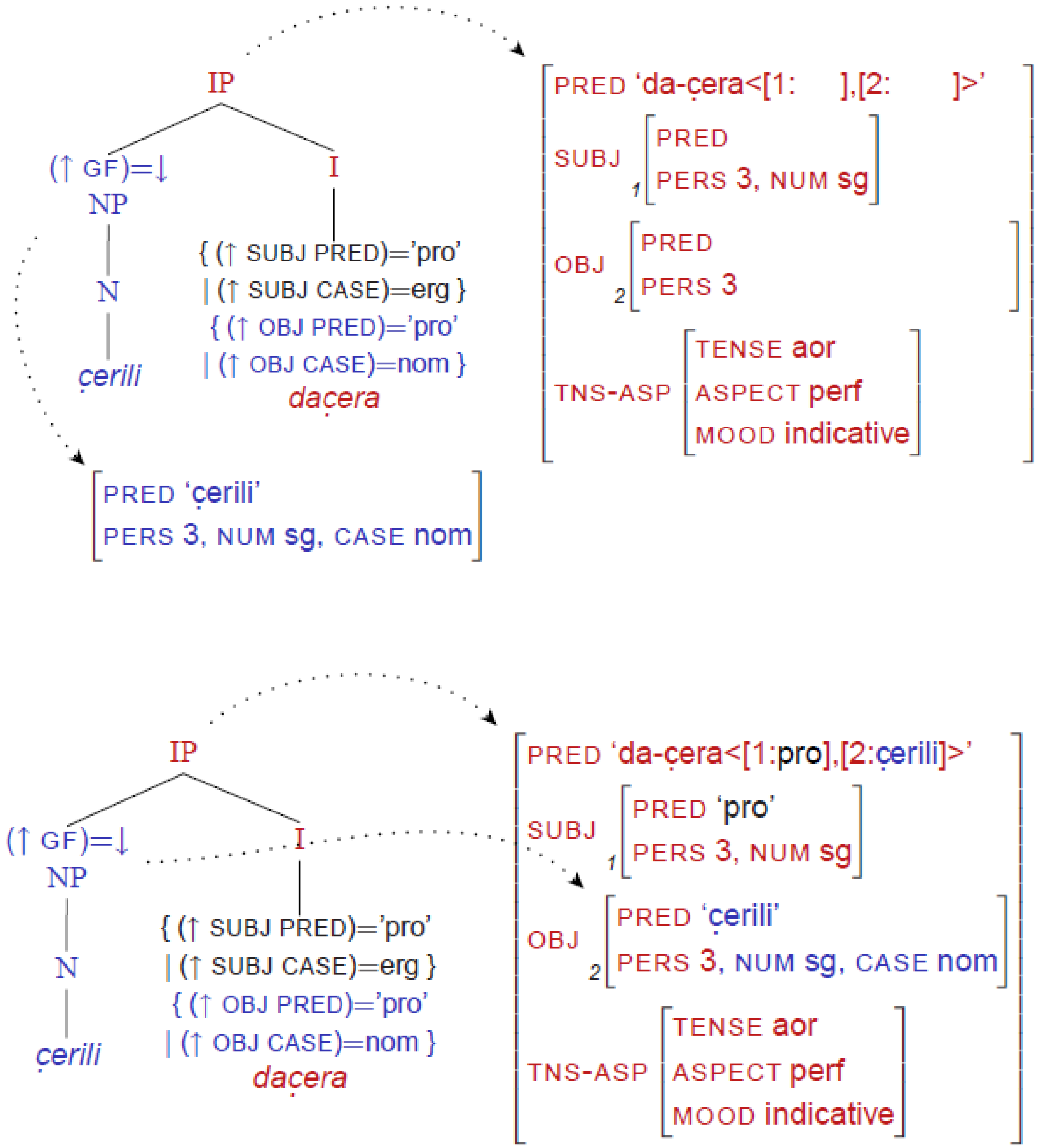


Figure 94: Mapping to grammatical functions at f-structure (Meurer 2007:sl. 34 and 35)

Whereas, in the annotations in [7] discussed by O'Connor (2006) for Malayalam, the association between arguments and grammatical functions is based on case alone, this association in Georgian depends, as discussed in chapter 3, not only on case but also on the class of the verb and the tense of the verb form. A simplified version of the equation employed by Meurer to code pro-drop and subject case alignment for verbs belonging to classes 1 and 3 is provided in Figure 95. This states that, if the tense group of the verb is present, then the case of the subject is nominative, and if the tense group of the verb is aorist, then the case of the subject is ergative or dative.

$$
\begin{array}{l}
\{\ (\uparrow \text{ SUBJ PRED}) = \text{‘pro’} \\
\mid @(\textit{ifelse}\ (\uparrow \text{ \_TENSEGROUP}) =_c \text{pres} \\
\qquad [\ (\uparrow \text{ SUBJ CASE}) = \text{nom}\ ] \\
\qquad [\ @(\textit{ifelse}\ (\uparrow \text{ \_TENSEGROUP}) =_c \text{aor} \\
\qquad\qquad [\ (\uparrow \text{ SUBJ CASE}) = \text{erg}\ ] \\
\qquad\qquad [\ (\uparrow \text{ SUBJ CASE}) = \text{dat}\ ]\ )\ ]\ )\ \}.
\end{array}
$$

Figure 95: Mapping from grammatical functions to case (Meurer 2007: sl. 20)

The same dependencies in the mapping from case to grammatical functions can be expressed in the format of my own model by modifying the conditional annotations used by O’Connor (2006) for Malayalam. Whereas the relationship between morphology and case in Georgian can be captured with the annotations to lexical entries for case forms in [**12**], and the relationship between narrative case and subjecthood with the annotation to NP nodes in [**13a**], the annotation to NP nodes in [**13b**] specifies that the grammatical role OBJ is associated with the head of an NP only if both the head noun bears nominative case and if the value of the TENSE attribute of the NP’s mother’s f-structure is PAST. This, as discussed in chapter 3, is because the nominative case in combination with non-past verb forms marks the grammatical relation of subject.

12) a) -m(a): $(\downarrow\text{CASE})=\text{NARR}$

b) -i/ø: $(\downarrow\text{CASE})=\text{NOM}$

13) a) $(\downarrow\text{CASE})=\text{NARR}\Rightarrow(\uparrow\text{SUBJ})=\downarrow$

b) $(\downarrow\text{CASE})=\text{NOM}\wedge(\uparrow\text{TENSE})=\text{PAST}\Rightarrow(\uparrow\text{OBJ})=\downarrow$

From the rules in [**12**] and [**13**], in combination with the annotations to Meurer’s (2007, 2009) phrase-structure rules in [**14**], the annotated c-structural representation in Figure 96 can be assembled for the sentence in [**15**].

14) a) $\mathrm{IP} \rightarrow \underset{(\uparrow \mathrm{GF})=\downarrow}{\mathrm{XP}} \quad \underset{\uparrow=\downarrow}{\mathrm{IP}}$

b) $\mathrm{IP} \rightarrow \underset{(\uparrow \mathrm{GF})=\downarrow}{\mathrm{XP}} \quad \underset{\uparrow=\downarrow}{\mathrm{I}'}$

c) $\mathrm{IP} \rightarrow \underset{(\uparrow \mathrm{GF})=\downarrow}{\mathrm{QP}} + \underset{\uparrow=\downarrow}{\mathrm{I}'}$

d) $\mathrm{I}' \rightarrow \underset{\uparrow=\downarrow}{\mathrm{I}} \quad \underset{\uparrow=\downarrow}{(\mathrm{S})}$

e) $\mathrm{I} \rightarrow \underset{\uparrow=\downarrow}{\mathrm{Vinfl}}$

f) $\mathrm{I}' \rightarrow \underset{\uparrow=\downarrow}{\mathrm{S}} \quad \underset{(\uparrow \mathrm{GF})=\downarrow}{\mathrm{XP}+}$

15) spilo-0 bavshv-ma dainaxa.
elephant-NOM child-NARR see.SG.PST
‘The child saw the elephant.’

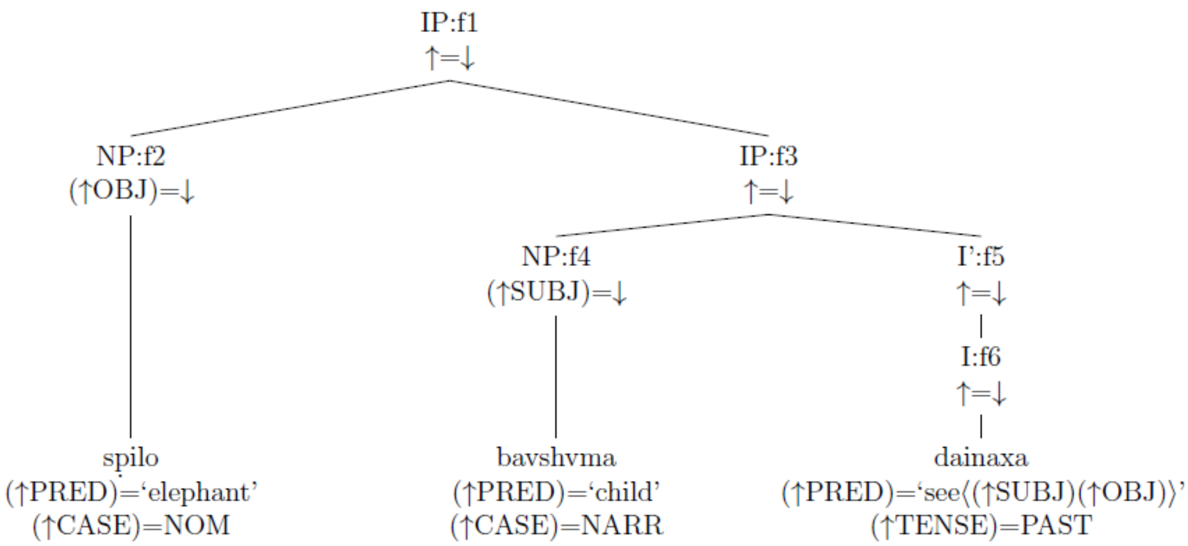


Figure 96: C-structure for Georgian with annotations to f-structure

This yields the f-description in [**16**].

16) F-description:

$(f_1 OBJ) = f_2$	from rule [**14a**]/schema [**13b**]
$f_1 = f_3$	from rule [**14a**]
$(f_3 SUBJ) = f_4$	from rule [**14b**]/schema [**13a**]
$f_3 = f_5$	from rule [**14b**]
$f_5 = f_6$	from rule [**14d**]
$(f_2 PRED) =$ ‘elephant’	from the lexical entry for *sp̣ilo*, ‘elephant’
$(f_2 CASE) =$ NOM	from the lexical entry for *–i/Ø*
$(f_4 PRED) =$ ‘child’	from the lexical entry for *bavshv-*, ‘child’
$(f_4 CASE) =$ NARR	from the lexical entry for *–m(a)*
$(f_6 PRED) =$ ‘see<(↑SUBJ)(↑OBJ)>’	from the lexical entry for *dainaxa*, ‘saw’
$(f_6 TENSE) =$ PAST	from the lexical entry for *dainaxa*, ‘saw’

The solution to the f-description in [**16**] is the f-description in Figure 97.

$$f1,f3,f5,f6 \left[\begin{array}{ll} \text{PRED} & \text{`see}\left\langle\text{SUBJ, OBJ}\right\rangle\text{'} \\ \text{TENSE} & \text{PAST} \\ \text{CLASS} & 4 \\ \text{SUBJ} & f4\left[\begin{array}{ll}\text{PRED} & \text{'child'} \\ \text{CASE} & \text{NARR}\end{array}\right] \\ \text{OBJ} & f2\left[\begin{array}{ll}\text{PRED} & \text{'elephant'} \\ \text{CASE} & \text{NOM}\end{array}\right] \end{array}\right]$$

Figure 97: F-structural solution for [16]

In this section I have introduced the LFG structural levels c-structure and f-structure and the mapping between the two, with reference to the models proposed by Meurer (2007, 2009) and by Wier (2014). In the next section I will introduce the levels s-structure and i-structure and the relationship between these levels in the representation of discourse information.

6.1.2 Information Structure

In contrast to grammatical relations, discourse relations are associated with c-structural nodes both in Meurer's (2007, 2009) and in Wier's (2014) models. As shown in Figure 83, Meurer (2007) labels the IP specifier position immediately to the left of the finite verb for its association with focus, and states that it may also host topical constituents; additional IP specifier positions to the left of this are labelled for a topic interpretation. As shown in Figure 84, Wier (2014) labels constituents preceding the finite verb and any intervening negative particle within the S phrase for an association with focus, and his CP specifier position is labelled for a topic interpretation.

Similarly to the lack of annotation to nodes with respect to grammatical relations, however, in neither model is the association with discourse relations further formally articulated beyond the labelling of nodes. In addition, the labelling appears to have a different significance in each set of proposals; whereas the node labels in Wier's (2014) appear to signify that these are the only configurational positions in which focus and topic respectively may appear within the clause, this is not the case with Meurer's (2007) focus label, as he makes it clear that focused constituents may also appear clause-finally. In what follows, I will discuss some more fully formalised models of information structure in LFG before showing how Meurer's (2007, 2009) and Wier's (2014) models can be similarly elaborated. With this basis for comparison in place I will then present a model capturing my own, differing analysis.

As is the case with information about grammatical relations, information about discourse relations in a sentence is represented in the LFG architecture in abstraction from how it is expressed in sentence form, at the level of i(nformation)-structure. Amongst the first to propose the addition of this structural level was King (1997), who in earlier work follows the proposals of Bresnan and Mchombo (1987) in representing the discourse relations focus and topic in certain examples at f-structure; Bresnan and Mchombo (1987) refer to these as grammaticized discourse functions, which reflects the use of special syntactic constructions to realise them in the constructions in question; the appropriate c-structural nodes are likewise annotated with these functions. Figure 98 shows an example f-structure in which the topicalised object ‘Inna’ is represented both as the value of an f-structural TOPIC attribute and, by means of a linking line, as the value of the OBJ attribute within the subordinate clause.

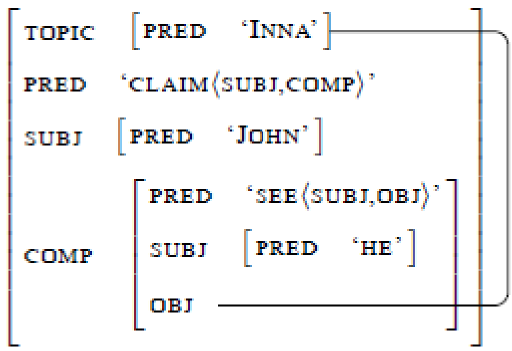


Figure 98: F-structure for ‘Inna, John claimed that he saw (at the beach)’ (King 1995:199)

In subsequent work, King (1997) identifies some problems which result from the practice of representing focus and topic at f-structure, even if they rely for their formal expression on some level of sentence grammar other than syntax, such as prosody. This is a strategy adopted by several sets of proposals in this period, including those of Choi (1999) and of Butt and King (2000). Taking examples such as [**17**], in which the focus includes the finite verb, which is the f-structural head, King (1997) points out two problems which result from the use of annotations from c-structural nodes to focus at f-structure of the kind shown in Figure 99 and f-structures of the kind in Figure 100.

17) Prochitala li ty knigu?
read.PST.SG q.PART you.NOM book.ACC
'Did you read the book?'

. (Adapted from King 1997:4)

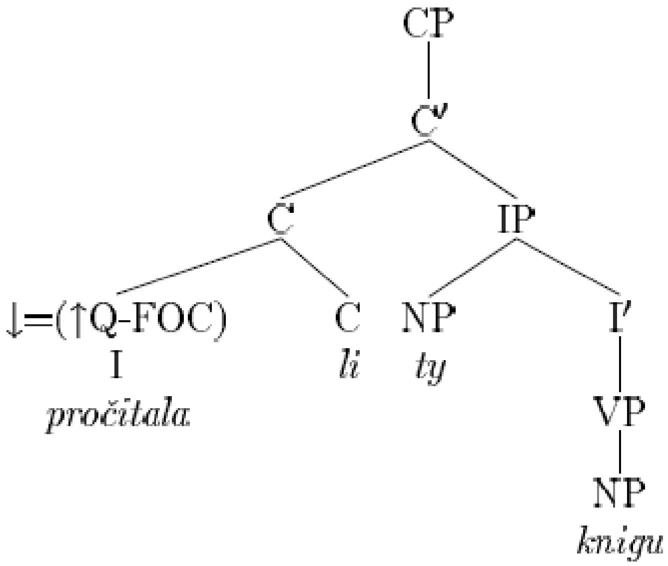


Figure 99: F-structural Q-FOC annotation to initial finite verb (King 1997:4)

The first of these is that focusing the f-structure corresponding to the finite verb, which contains the entire clause, results in the circularity of the focus containing itself, as shown in Figure 100.

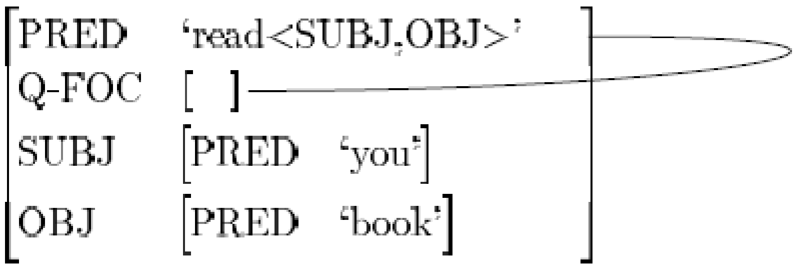


Figure 100: F-structural representation in which focused verb contains itself (King 1997:5)

The second is that this focusing of the entire clause may also result in the inclusion within the focus of clausal material other than the finite verb which bears a different discourse relation. This is illustrated by King (1997) with the example in [**18**], in which the verb alone is contrastively focused. An annotation like ↓∈(↑FOC), denoting that the f-structure of the verb is a member of the FOC set, again results in the focus containing itself, together with the rest of the clause, which is not in focus[62]. An alternative annotation, (↓PRED)∈(↑FOC), is also problematic according to King (1997), because the PRED value of the finite verb includes the arguments for which it subcategorises, as shown in Figure 101.

18) Ona PROČITALA knigu
she.NOM read.PST.3SG.FG book.ACC
'She read the book.'

(Adapted from King 1997:5)

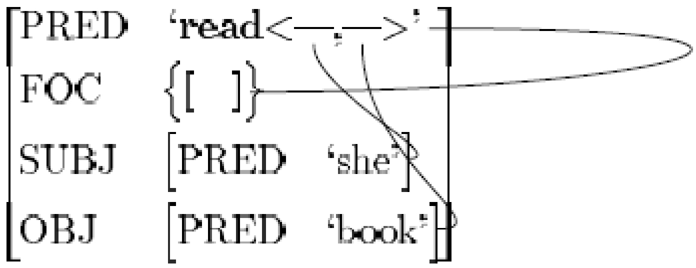


Figure 101: F-structure for [18] showing inclusion of subcategorised-for arguments in focus set (King 1997:5)

The first part of King's (1997) solution to these problems is to represent information about discourse relations, not at f-structure, but using a separate structural level, i(nformation)-structure. In support of this proposal, King (1997) points out that not all constituents at f-structure correspond to constituents at i-structure. Taking the example in [**19**], she shows that, although the entire NP in the response is clefted, and would therefore be represented as the value of the grammaticized discourse function FOCUS at f-structure, only the noun 'tie' is focused. F-structures and i-structures for this clefted NP are shown in Figure 102.

[62] King (1997) assumes that, in the case of the yes/no question in [**12**], the entire clause is in focus.

19) Q: Was it the ex-convict with the red SHIRT that he was warned to look out for?
A: No, it was an ex-convict with a red [TIE]$_{focus}$ that he was warned to look out for.

(King 1997:8 from Jackendoff 1972:232)

F-structure

$$\left[\begin{array}{ll} \text{PRED} & \text{`ex-convict'} \\ \text{ADJUNCT} & \left\{\begin{array}{ll} \text{PRED} & \text{`with<OBJ>'} \\ \text{OBJ} & \left[\begin{array}{ll} \text{PRED} & \text{`tie'} \\ \text{ADJUNCT} & \left\{\text{PRED `red'}\right\} \end{array}\right] \end{array}\right\} \end{array}\right]$$

$$\left[\begin{array}{ll} \text{FOC} & \left\{\text{TIE}\right\} \\ \text{BCK} & \left\{\begin{array}{l} \text{EX-CONVICT} \\ \text{WITH} \\ \text{RED} \end{array}\right\} \end{array}\right]$$

Figure 102: F-structure and i-structure for [19] (King 1997:8 and 9)

The second part of King’s (1997) solution is to focus only the core meaning of PRED for the verb, excluding its arguments. This core meaning is what Kaplan and Maxwell (1996) term PRED FN. She demonstrates this two-part solution with a new analysis of the Russian sentence given in [**18**], which has the c-structural representation in Figure 103 and the f-structural and i-structural representations in Figure 104. The annotations in Figure 103 specify that the PRED FN value of the subject *ona* is a member of the TOP set at i-structure, the PRED FN value of the verb *pročitala* is a member of the FOC set, and the PRED FN value of the object *knigu* is a member of the set BCK (background)[63].

[63] This set will be discussed below.

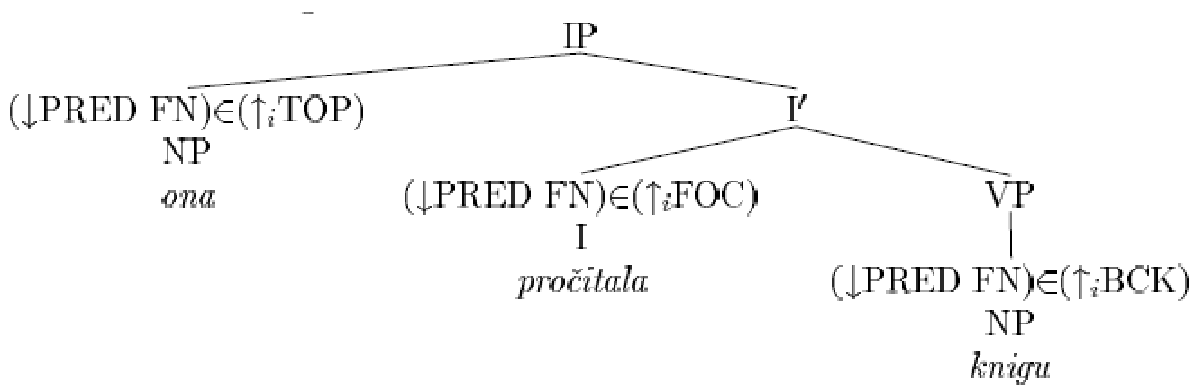


Figure 103: PRED FN annotations to i-structural sets for [18] (King 1997:11)

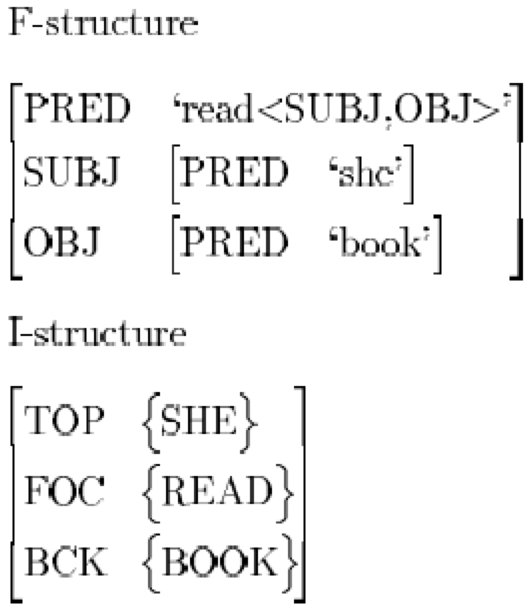


Figure 104: F-structure and i-structure for [18] (King 1997:11)

Whereas the (↓PRED FN)∈(↑*i*TOP) annotation on the subject in Figure 103 is one to c-structural rules, which captures King's (1997) association of the IP specifier position in Russian with membership the TOP set, The (↓PRED FN)∈(↑*i*FOC) annotation on the verb is not one to c-structure, but instead reflects the assignment of items to this set under the 'focus rule', which makes reference to whether an individual word is prosodically stressed, as is the verb in this case, or whether the sentence is accompanied by 'neutral intonation', in which case the focus annotation is applied to c-structural nodes from the right of the sentence to the left, with the extent of the application dependent on context. The (↓PRED

FN)∈(↑*i*BCK) annotation to the object reflects the default assignment of items to this set which are not assigned a separate discourse function. In *6.2* below I will discuss p(rosodic)-structure, which has been developed in more recent years as a component of the LFG architecture, together with annotations from it to i-structure of the kind proposed by O'Connor (2006) and others, which I will use in my model of Georgian. In the present section, I will take a similar strategy to King (1997) in avoiding the use in my proposals of annotations from c-structure to i-structure which inappropriately attribute the marking of the discourse functions of words to syntactic nodes.

King's (1997) emphasis in her proposals on semantic values of words as distinct from the words themselves as syntactic units is elaborated in more recent proposals by Dalrymple and Nikolaeva (2011). In this case, the units of information-structural representation are taken, not from c-structure or from f-structure, but explicitly from s(emantic)-structure, where the meanings of words are represented together with the discourse role with which they are associated in the sentence. An additional level of i(nformation)-structure groups these meanings into corresponding sets according to the discourse role each bears. The meaning, or semantic structure, corresponding to an individual word is projected from the corresponding f-structure of this word by the function σ. A semantic structure forms the right-hand component of what Dalrymple and Nikolaeva (2011) define as a meaning constructor, of which the left-hand component is a simple representation of a word or phrase's meaning. In [**20**], the meaning constructor corresponding to the word 'John', which forms part of its entry in the LFG lexicon, the right-hand component is the semantic structure $\uparrow_\sigma$, which is projected from the f-structure of the node dominating the word 'John' (↑) by the projection function σ.

20) $john: \uparrow_\sigma$

(Dalrymple and Nikolaeva 2011:76)

In order to model how the meaning of an utterance is derived from combining the meanings of its parts, LFG makes use of linear logic and the ‘glue’ approach to meaning derivation (Dalrymple 1999, 2001, Asudeh 2004), by which meaning constructors are assembled from component meaning constructors. In the semantic structure of ‘marry’, given in [**21**], the meaning component on the left-hand side uses functional application to represent how the word’s meaning is derived from its combination with two arguments, a subject and an object. In the corresponding semantic structure on the right-hand side, the equivalent to functional application used is linear implication. This expression can be decomposed into the semantic structures representing the semantic values of the subject (↑SUBJ)σ, the object (↑OBJ)σ and of ‘marry’ (↑σ), and the linear logic operator ⊸, denoting linear implication. This semantic structure for ‘marry’ in [**21**] is paraphrased by Dalrymple and Nikolaeva (2011:76) as follows: ‘If I am provided with the semantic structure of my subject and then the semantic structure of my object, I produce the semantic structure of the sentence.’

21) $\lambda x.\lambda y.marry(x, y) : (\uparrow \textsc{subj})_\sigma \multimap ((\uparrow \textsc{obj})_\sigma \multimap \uparrow_\sigma)$

(Dalrymple and Nikolaeva 2011:76)

The correspondence in meaning assembly between functional application and linear implication is shown in the proof in Figure 105.

$$\dfrac{\dfrac{john : s_\sigma \quad \lambda x.\lambda y.marry(x, y) : s_\sigma \multimap (o_\sigma \multimap m_\sigma)}{\lambda y.marry(john, y) : o_\sigma \multimap m_\sigma} \quad rosa : o_\sigma}{marry(john, rosa) : m_\sigma}$$

Figure 105: Correspondence between functional application and linear implication (Dalrymple and Nikolaeva 2011:77)

In addition to the semantic structures in [**20**] and [**21**] above, Dalrymple and Nikolaeva (2011) propose that s-structural representations of words should contain other semantic information about them, including the discourse function with which the word is associated. Part of the lexical entry that they propose for 'John' is given in Figure 106. The expression on the upper line, (↑ PRED) = 'JOHN', specifies that the f-structure which corresponds to the node dominating the word 'John' has a PRED attribute with the value 'JOHN'. As for the expression on the lower line, **john** $\in (\uparrow_{\sigma\iota}\ (\uparrow_{\sigma}$ DF)), this specifies that the meaning constructor **john**, which is an abbreviation of the expression *john*:$\uparrow_{\sigma}$ of the kind introduced above, is a member of a set at i-structure, this correspondence signified $\uparrow_{\sigma\iota}$, which corresponds to the value of the discourse function associated with **john** at s-structure, as signified $\uparrow_{\sigma}$ DF. The expression $\uparrow_{\sigma\iota}$ uses the composition $_{\sigma\iota}$ of the functions σ from f-structure to s-structure and ι from s-structure to i-structure, whereas the expression $\uparrow_{\sigma}$ DF can be compared with the expression ↑GF introduced in the previous subsection, which signifies a grammatical relation within the dominating f-structure.

John	N	$(\uparrow \textsc{pred}) = \text{`}\textsc{John}\text{'}$
		$\mathbf{john} \in (\uparrow_{\sigma\iota}\ (\uparrow_{\sigma}\ \textsc{df}))$

Figure 106: Proposed lexical entry for 'John' (Dalrymple and Nikolaeva 2011:81)

In Dalrymple and Nikolaeva's (2013) proposals, the DF associated with a meaning constructor can have one of four values: TOPIC, FOCUS, BACKGROUND or COMPLETIVE. This set of four discourse functions is based on a set with the same names proposed by Butt and King (2000). Whereas FOCUS is defined in a way similar to Lambrecht's (1994) definition of focus, introduced in chapter 2, which I have adopted in this thesis, TOPIC corresponds more closely to Lambrecht's (1994) discourse-inactive topic. BACKGROUND includes both referential and non-referential discourse-active items, whereas COMPLETIVE is defined by Butt and King (2000) as material which, like focus, is new to the addressee but, unlike focus, is not part of the pragmatic assertion.

Association of these discourse functions with words proceeds in a way similar to that of grammatical functions with words as discussed in the previous subsection. For English, Dalrymple and Nikolaeva (2013) propose the annotations to c-structure nodes illustrated in [**22**]. The expression $\uparrow_{\sigma\iota}=\downarrow_{\sigma\iota}$ annotated to the NP nodes in [**22a**] and [**22d**], analogously to the expression $\uparrow=\downarrow$ introduced in the previous subsection, signifies that the information structure corresponding to the NP is the same information structure corresponding to the entire utterance. The expression $((\downarrow_{\sigma}$ DF)=TOPIC) annotated to the NP occupying IP specifier position in [**22a**] then signifies the proposed contribution of information-structural information from syntax; namely that a word occupying this syntactic position is associated with the discourse function TOPIC at s-structure and therefore appears within the topic set at i-structure.

22) a) $$\mathrm{IP} \longrightarrow \begin{array}{c} \mathrm{NP} \\ (\uparrow \text{SUBJ})=\downarrow \\ \uparrow_{\sigma\iota}=\downarrow_{\sigma\iota} \\ ((\downarrow_{\sigma}\ \text{DF})=\text{TOPIC}) \end{array} \quad \begin{array}{c} \mathrm{I}' \\ \uparrow=\downarrow \end{array}$$

b) $$\mathrm{I}' \longrightarrow \left(\begin{array}{c} \mathrm{I} \\ \uparrow=\downarrow \end{array}\right) \begin{array}{c} \mathrm{VP} \\ \uparrow=\downarrow \end{array}$$

c) $$\mathrm{VP} \longrightarrow \begin{array}{c} \mathrm{V}' \\ \uparrow=\downarrow \end{array}$$

d) $$\mathrm{V}' \longrightarrow \begin{array}{c} \mathrm{V} \\ \uparrow=\downarrow \end{array} \left(\begin{array}{c} \mathrm{NP} \\ (\uparrow \text{OBJ})=\downarrow \\ \uparrow_{\sigma\iota}=\downarrow_{\sigma\iota} \end{array}\right)$$

(Dalrymple and Nikolaeva 2011:85)

The annotation to the NP in [**22a**] yields a partial functional description, shown in Figure 107 for an occupant *John*, from which the corresponding f-structure, s-structure and i-structure, shown alongside, can be assembled.

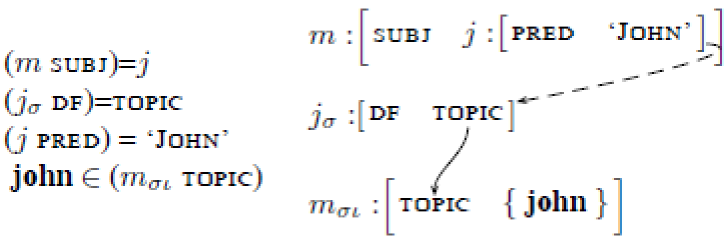


Figure 107: F-description from [22a] with corresponding f-, s- and i-structures (Dalrymple and Nikolaeva 2011:84)

Both King's (1995, 1997) and Dalrymple and Nikolaeva's (2011) proposed representations of LFG i-structure treat discourse relations like TOPIC and FOCUS as atomic relations which are not further broken down into component features[64]. Whilst, as I will show below, representations of this kind can be used to capture the models of Georgian information structure presented by Meurer (2007, 2009) and by Wier (2014), the account of the relationship between information structure and sentence form which I have proposed in this thesis requires reference both to 'fully specified' discourse relations like these, and to the 'components' of these relations, in the event that sentence form specifies them only partially. This, as discussed in chapter 3, is the case with sentences such as [**23**], in which the alignment of FLOWERS with a secondary accent specifies that it is discourse-inactive, but sentence form does not further specify whether it is topical or focal; it is unclear how such a status should be represented in the versions of i-structure presented by King (1995, 1997) and by Dalrymple and Nikolaeva (2011).

23) I gave FLOWERS to MARY.

An early example of a more fine-grained approach to representing discourse features in LFG is Choi (1999), who employs the features ±NEW and ±PROM(inent). Under her classification, focused referents have the feature +NEW, whereas –NEW characterises

[64] Dalrymple and Nikolaeva (2013) do however propose representations for additional discourse-related features at s-structure.

non-focused referential items. The feature ±PROM, by contrast, is used to distinguish topic and contrastive focus, which have the feature +PROM, from tails, or non-prominent topics, and completive focus, which each have the feature –PROM (as illustrated in Table 86).

Table 86: Correspondence between discourse relations and features (Adapted from Choi 1999:92)

	+NEW	-NEW
+PROM	Contrastive focus	Topic
-PROM	Completive focus	Tail

Choi's (1999) use of the feature ±NEW can be applied straightforwardly to the distinction I have adopted between focused referents, which can again be characterised as +NEW, and discourse-inactive and discourse-active material, each of which can be given the characterisation –NEW. Whilst the feature ±PROM distinguishes discourse-active from discourse-inactive given material in a way that fits my assumptions, however, neither contrastive nor completive focus corresponds to the definition of focus that I assume, rendering the use of this system problematic. The same features ±NEW and ±PROM are however used differently by Butt and King (2000) to define the four discourse relations TOPIC, FOCUS, BACKGROUND and COMPLETIVE which also feature in the proposals of Dalrymple and Nikolaeva (2011) discussed above. Whereas, similarly to Choi (1999), FOCUS and COMPLETIVE are defined as +NEW and TOPIC and BACKGROUND have the definition –NEW, ±PROM, in contrast to Choi's (1999) proposals, is used to distinguish FOCUS and TOPIC, which are +PROM, from BACKGROUND and COMPLETIVE, which are –PROM. This distinction between +PROM and -PROM corresponds closely to the distinction between discourse inactive referents and discourse active referents which Lambrecht (1994) uses to differentiate focused and prominent topical referents from given but non-prominent referents, and which I have adopted as a feature in this thesis as a feature to capture for example the contribution of secondary prominences and to characterise certain constraints. With the exception of the feature combination +NEW, –PROM used to characterise completive focus, which I do not touch on in this thesis, the features ±NEW and ±PROM as defined by Butt and King (2000) therefore provide a means of representing all the distinctions relevant to my own approach to information structure in my analyses of Georgian and other languages.

Although the feature sets ±NEW and ±PROM as defined by Butt and King (2000) are compatible with my requirements, their proposed representations of discourse information in the LFG architecture make use of sets which correspond, not to these features, but instead to the four discourse relations defined using them. By contrast, whereas Choi's (1999) proposed representation does employ these features, these are represented as the AVMs of grammatical functions at f-structure, as illustrated in Figure 108 for the sentence in [**24**]. For the reasons pointed out by King (1997), this is undesirable for my own model[65].

24) [Hans]$_{\mathrm{TOP}}$ hat [dem Schüler]$_{\mathrm{FOC}}$ [das Buch]$_{\mathrm{TAIL}}$ gegeben.

'Hans gave the book to the student.'

[65] Choi (1999) also states that these features should be represented at a separate structural level, although she leaves this to future work.

$$\left[\begin{array}{ll}
\text{PRED} & \text{`geben(x,y,z)'} \\
\text{GF}_1 & \left[\begin{array}{l} \text{``Hans''} \\ \text{New} \; - \\ \text{Prom} \; + \end{array}\right]_x \\
\text{GF}_2 & \left[\begin{array}{l} \text{``dem Schüler''} \\ \text{New} \; - \\ \text{Prom} \; - \end{array}\right]_y \\
\text{GF}_3 & \left[\begin{array}{l} \text{``das Buch''} \\ \text{New} \; + \\ \text{Prom} \; - \end{array}\right]_z \\
\text{TENSE} & \text{`Past'}
\end{array}\right]$$

Figure 108: F-structural representation of [24] (Choi 1999:122)

A more recent feature-based approach to discourse relations at LFG, which, unlike Choi (1999) and Butt and King (2000), represents discourse features at i-structure in the place of atomic discourse values, and which also makes use of some of the proposals of Dalrymple and Nikolaeva (2011), is that proposed by Mycock and Lowe (2014a, 2014b). These proposals assume three primitive binary features: ±UPDATE, which is concerned with whether the item concerned develops the communication by providing an information update, ±ABOUT, which describes whether the item represents a matter of current concern, and ±INFORM, which is concerned with the role of the item in conveying new information. On the basis of these, four discourse functions are defined. Topic$_E$, or 'topic establisher', which corresponds to Lambrecht's (1994) discourse-inactive topic, has the features +UPDATE, +ABOUT and –INFORM. (New information) focus has the features +UPDATE, -ABOUT and +INFORM. Topic$_C$, or continuing topic, which corresponds to

Lambrecht's discourse-active topics, has the features –UPDATE, +ABOUT and –INFORM. Finally, Background info, which corresponds to Lambrecht's non-topical discourse-active material, has the features –UPDATE, -ABOUT and –INFORM. The features defining each discourse function are summarised in Table 87.

Table 87: Features defining discourse functions (Mycock and Lowe 2014a:1)

	UPDATE	ABOUT	INFORM
Topic$_E$	+	+	–
Focus (NI)	+	–	+
Topic$_C$	–	+	–
Background Info.	–	–	–

Like the mapping from sentence form to i-structure proposed by Dalrymple and Nikolaeva (2011), the mapping presented by Mycock and Lowe specifies the set membership of semantic forms at i-structure based on their s-structural attributes. Whereas Dalrymple and Nikolaeva achieve this using annotations like **john** $\in (\uparrow_{\sigma\iota}\ (\uparrow_{\sigma}\ \text{DF}))$ shown in **Fig. 106**, Mycock and Lowe use, instead of this, the set of rules in [**25**]. These apply to every lexical item, and specify the set membership of the lexical item's meaning constructor (**mc**) at i-structure based on the nature of its semantic attributes (SA) at s-structure.

25) $$\begin{aligned}\textsc{istruc}(\mathbf{mc},\textsc{sa}) = \quad & (\uparrow_{\sigma}\ \textsc{sa about}) = + \Rightarrow \mathbf{mc} \in (\uparrow_{\sigma\iota}\ \textsc{about})\\ & (\uparrow_{\sigma}\ \textsc{sa update}) = + \Rightarrow \mathbf{mc} \in (\uparrow_{\sigma\iota}\ \textsc{update})\\ & [(\uparrow_{\sigma}\ \textsc{sa about}) = - \wedge (\uparrow_{\sigma}\ \textsc{sa update}) = -] \Rightarrow \mathbf{mc} \in \uparrow_{\sigma\iota}\end{aligned}$$

(Mycock and Lowe 2014a:5)

In contrast to Dalrymple and Nikolaeva's (2011) proposed mapping, the rules in [**25**] permit meaning constructors to be members of more than one set at i-structure. A meaning constructor may be a member of either or both of the i-structural sets ABOUT and UPDATE, or be a member of neither. As shown in Figure 109, focused constituents are members only of the UPDATE set, continuing topics members only of the ABOUT set, topic establishers are members of both sets and background items members of neither. As the INFORM set is identical to the complement of ABOUT in UPDATE, Mycock and Lowe do not represent it at i-structure.

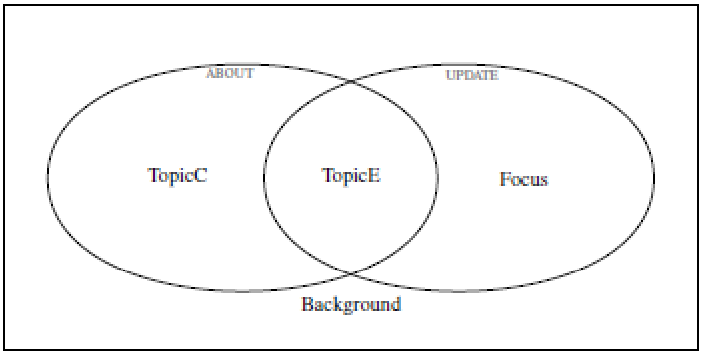


Figure 109: Feature-based i-structural representation (Mycock and Lowe 2014a:4)

The set of features ±UPDATE, ±ABOUT, ±INFORM proposed by Mycock and Lowe, and their representation of i-structure based on the two features ±UPDATE and ±ABOUT, do not match the set of information-structural distinctions that I have adopted in this thesis. Whilst the feature +UPDATE corresponds to +PROM in characterising my distinction between discourse-inactive topic and focus on one hand and given on the other, and +INFORM corresponds to +NEW in distinguishing focal from topical and given referents, the feature ±ABOUT is used not only to distinguish focus from topic establishers and continuing topics, but also to distinguish the two topic types from background. In my assumptions, continuing topic and background instead form a single category defined above as -NEW and –PROM, as distinct from discourse-inactive topics which are –NEW and +PROM and from focus which is +NEW and +PROM. I assume that non-referential material can also be +UPDATE[66], and so can have the same set membership as referential items. As such, Mycock and Lowe's system of features is able to represent the distinctions relevant to my assumptions, although I do not require the set background. To avoid

[66] Although I must leave this question to future research, the availability of the +UPDATE feature to non-referential items is suggested by examples such as 'We're talking about what I saw him ON. And I saw him ON the DECKCHAIR'; here, the preposition appears to have the values +UPDATE, +ABOUT and –INFORM.

confusion, however, I will stick to the simpler two-feature set ±NEW and ±PROM which, as discussed above, straightforwardly captures my distinctions without the need to change any definitions. Whilst I do not adopt Mycock and Lowe's sets as employed in their representation of i-structure, their use of feature-based sets and a mapping that permits multiple set membership is suitable for my own needs. Although they do not discuss the representation at their i-structure of meaning constructors which, as in [**21**], have their set membership only partly specified, a possible way of representing an item specified only as having a feature +PROM, as with *FLOWERS* in [**23**], is shown in Figure 110, in which it is left unspecified whether such an item is a member of both the ABOUT and UPDATE sets or only of the UPDATE set.

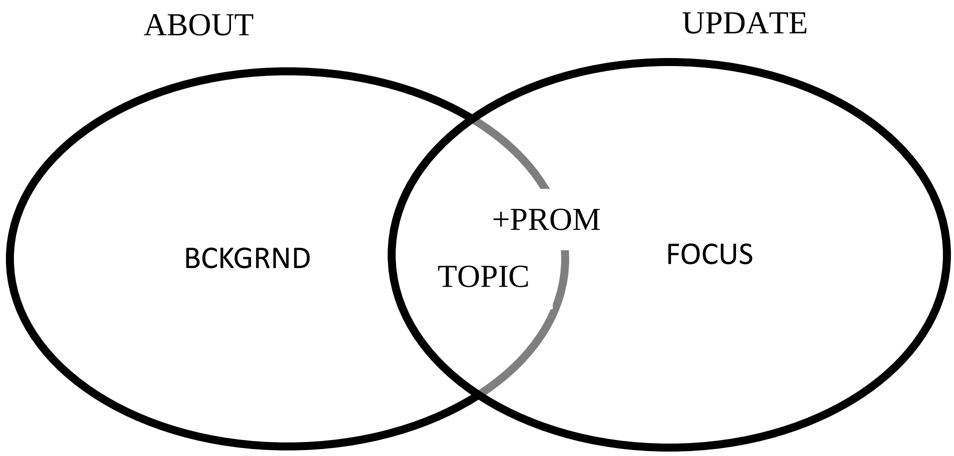


Figure 110: Possible representation for items with partially specified discourse features (+PROM) in Mycock and Lowe's (2014a) i-structure

Rather than use the Venn diagram-style representation for i-structure proposed by Mycock and Lowe (2014a), I will follow Dalrymple and Nikolaeva (2011) in using a more compact AVM format, but one in which, following Mycock and Lowe's (2014a, 2014b) proposals, discourse referents may be represented as members of more than one set. This i-structure represents the value sets for each of four discourse features: +PROM, +NEW, -PROM and

–NEW. An example of an i-structural representation of this kind, which represents discourse information about the sentence in [**26**], is shown in Figure 111. As in Figure 110, whilst other discourse items are fully specified in terms of the features ±PROM and ±NEW, *lion* is represented only as a member of the set +PROM; this captures the extent to which its informational properties are expressed in sentence form by virtue of its association maximally with the head of an ip phrase.

26) [lom-i]T [elodeba]G [irem-s]$_F$
lion-NOM await.PRS.3SG deer-DAT
'The lion is waiting for the deer.'

$$\begin{bmatrix} +\text{ PROM} & \begin{bmatrix}\text{lion}\\ \text{deer}\end{bmatrix} \\ +\text{ NEW} & \begin{bmatrix}\text{deer}\end{bmatrix} \\ \text{- PROM} & \begin{bmatrix}\text{await}\end{bmatrix} \\ \text{- NEW} & \begin{bmatrix}\text{await}\end{bmatrix} \end{bmatrix}$$

Figure 111: my proposed representation of i-structure

A straightforward mapping to these i-structural sets from s-structural attributes can be achieved by modifying the lexical rules proposed by Mycock and Lowe (2014a) in [**25**] to those in [**27**]. These specify that the corresponding s-structure of the f-structure of the node dominating the word in question is a member of one of four sets at i-structure: +PROM, -PROM, +NEW and –NEW, depending upon the respective + or – values of its semantic attributes PROM and NEW.

27) ISTRUC(**mc**,sa) =

$$\uparrow_\sigma \text{SA PROM} = + \rightarrow \mathbf{mc} \in (\uparrow_{\sigma\iota}\ +\text{PROM})$$

$$\uparrow_\sigma \text{SA PROM} = - \rightarrow \mathbf{mc} \in (\uparrow_{\sigma\iota}\ -\text{PROM})$$

$$\uparrow_\sigma \text{SA NEW} = + \rightarrow \mathbf{mc} \in (\uparrow_{\sigma\iota}\ +\text{NEW})$$

$$\uparrow_\sigma \text{SA NEW} = - \rightarrow \mathbf{mc} \in (\uparrow_{\sigma\iota}\ -\text{NEW})$$

In what follows, I will first show how Meurer's (2007, 2009) and Wier's (2014) LFG models of syntax and information structure in Georgian can be more fully articulated using the formal apparatus presented by Dalrymple and Nikolaeva (2011). I will then turn to modelling my own analysis, for which I will use the feature-based approach to i-structure outlined above, together with annotations to c-structure based on the lexical rules presented in [**27**].

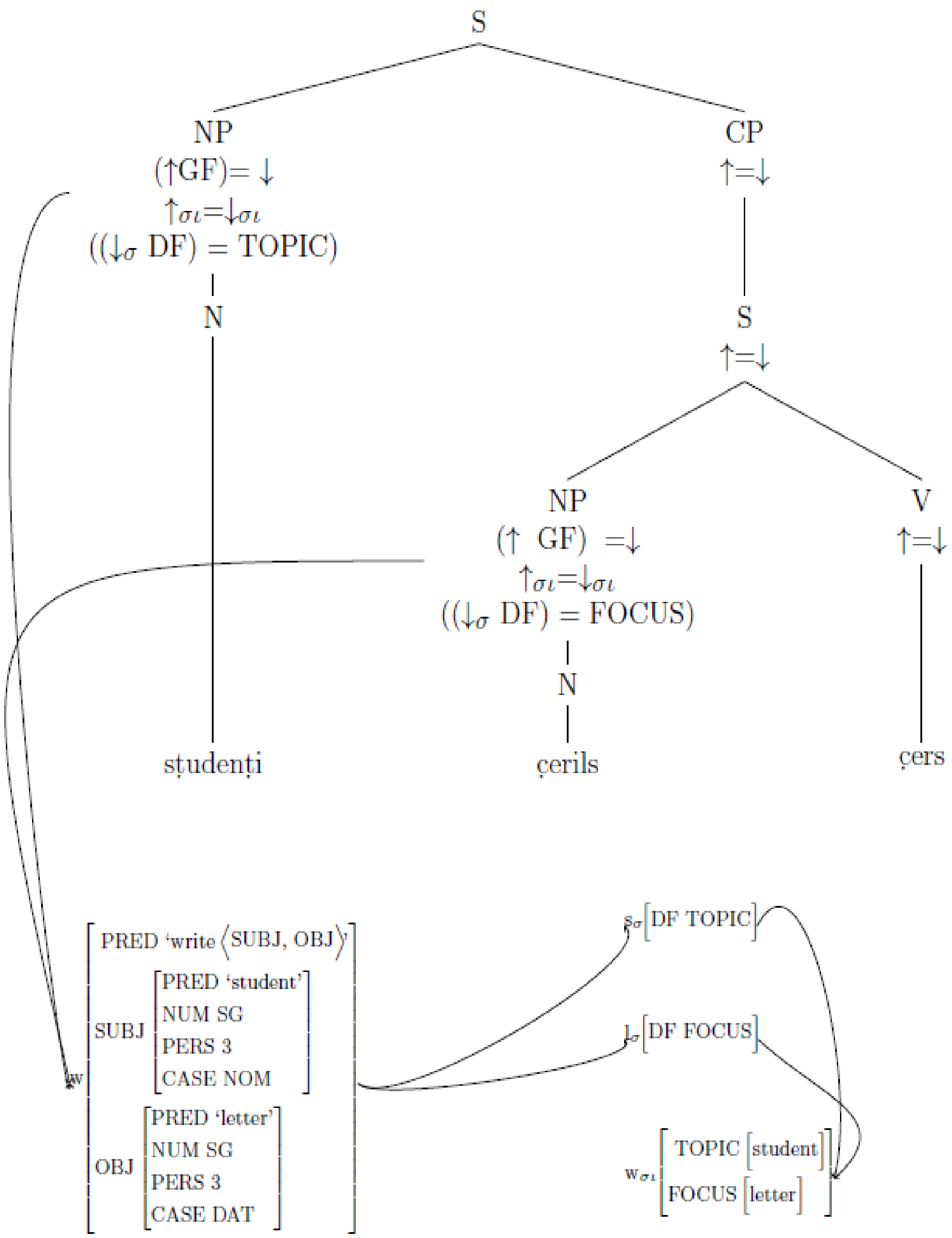
As mentioned above, neither Meurer (2007, 2009) nor Wier (2014) is similarly explicit as to how information structure is formally represented in their respective models, or as to how its relationship with other levels is formally implemented; both make use only of TOPIC and FOCUS labels to the nodes of their proposed c-structures for Georgian, the significance of which appears to vary. The relationship between information structure and syntax as described in each of their models can however be articulated using the formal representation proposed by Dalrymple and Nikolaeva (2011). In Wier's (2014) model, the realisation of focus and topic is fully syntactic; focus and topic are each associated with a specific phrase-structural position and their expression in sentence form attributed to their occupying these positions. As such, the label [FOC], which is annotated in his model to an XP preceding the finite verb in the S layer, can be replaced with the label (($\downarrow_{\sigma}$ DF) = FOCUS); this signifies that the meaning constructor corresponding to an XP occupying this node is associated with the discourse function FOCUS at s-structure. The label $\uparrow\sigma\iota$=$\downarrow\sigma\iota$ also annotated to this node signifies that the XP belongs to the same information structure as its mother, S. The label [TOP] annotated to the complement position of CP can similarly be replaced with the annotation (($\downarrow\sigma$ DF) = TOPIC), together with $\uparrow\sigma\iota$=$\downarrow\sigma\iota$. These annotations are featured in the phrase structure rule in [**28**], which states that category S consists either of a sequence XP CP or of a sequence XP V, each with the appropriate annotations. The additional optional XP in immediately preverbal position has the value -

for the attribute POL(arity); this captures the posited immediately preverbal position of any negatives.

28)

$$\mathrm{S} \rightarrow \left\{ \begin{array}{cc|cccc} \begin{array}{c} \mathrm{XP} \\ (\uparrow \mathrm{GF})=\downarrow \\ \uparrow\sigma\iota=\downarrow\sigma\iota \\ ((\downarrow_{\sigma}\mathrm{DF})=\mathrm{TOPIC}) \end{array} & \mathrm{CP} & \begin{array}{c} \mathrm{XP} \\ (\uparrow \mathrm{GF})=\downarrow \\ \uparrow\sigma\iota=\downarrow\sigma\iota \\ ((\downarrow_{\sigma}\mathrm{DF})=\mathrm{FOCUS}) \end{array} & \left(\begin{array}{c} \mathrm{XP} \\ ((\downarrow \mathrm{POL})=-) \end{array} \right) & \begin{array}{c} \mathrm{V} \\ \uparrow=\downarrow \end{array} & \mathrm{XP}^{*} \end{array} \right\}$$

Figure 112 provides an example of how these annotations to c-structural nodes link corresponding structures at f-structure, s-structure and i-structure.



sṭudenṭ-i çeril-s çers
student-NOM letter-DAT write.PRS-3SG
'The student is writing the letter.'

Figure 112: Wier's (2014) discourse annotations to phrase structure elaborated following Dalrymple and Nikolaeva (2011)

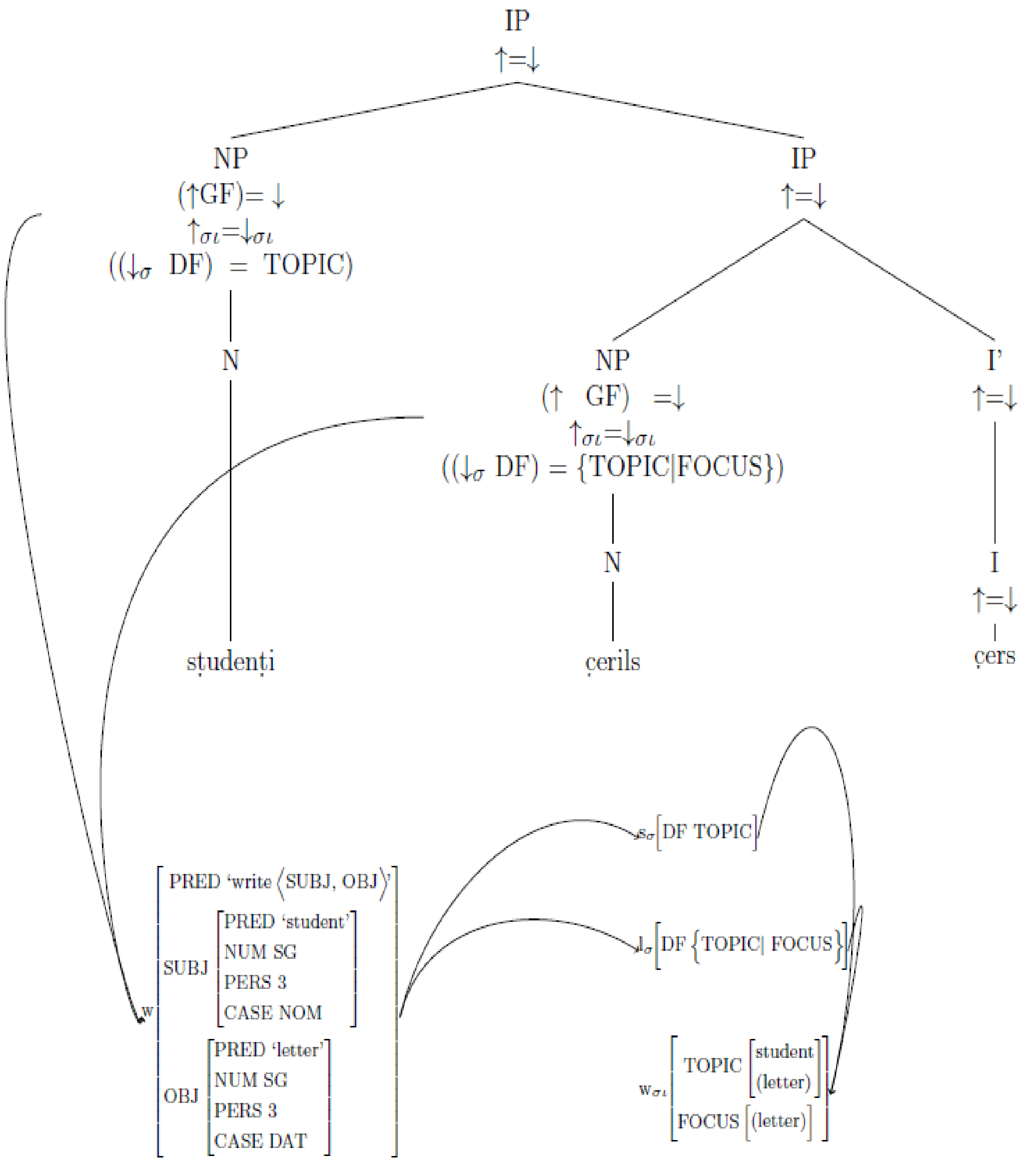
In Meurer's (2007, 2009) model, the label TOPIC, which in this case is annotated to XPs occupying the specifier positions of IPs appended to the obligatory IP in his phrase structure rules (see [**1a**]), can similarly be replaced with the labels $\uparrow\sigma\iota=\downarrow\sigma\iota$ and $((\downarrow\sigma\ \text{DF}) = \text{TOPIC})$, reflecting the discourse function with which words occupying these nodes are associated in his model. A modified phrase structure rule is given in [**29**].

29) $$\text{IP} \longrightarrow \underset{\substack{(\uparrow\text{GF})=\downarrow \\ \uparrow\sigma_\iota=\downarrow\sigma_\iota \\ ((\uparrow_\sigma \text{DF})=\text{TOPIC})}}{\text{XP}} \quad \underset{\uparrow=\downarrow}{\text{IP}}$$

The specifier position of the minimally necessary IP, which precedes the finite verb occupying the IP head I (see [**1b**]), may be associated either with a focused word, or, in the event that the sentence focus is linearised postverbally, with a topical word (see Figure 83). Although the identification of focus is then presumably the task either of prosody or other aspects of sentence form, his model still syntactically excludes other discourse material such as background items from occupying this position, making syntactic annotation specifying this appropriate. This syntactically limited choice of associations can be captured with the label $((\downarrow\sigma\ \text{DF}) = \{\text{TOPIC}|\text{FOCUS}\})$, again in combination with the label $\uparrow\sigma\iota=\downarrow\sigma\iota$, as shown in [**30**].

30) $$\text{IP} \rightarrow \underset{\substack{(\uparrow\text{GF})=\downarrow \\ \uparrow\sigma_\iota=\downarrow\sigma_\iota \\ ((\uparrow_\sigma \text{DF})=\{\text{TOPIC}|\text{FOCUS}\})}}{\text{XP}} \quad \underset{\uparrow=\downarrow}{\text{I}'}$$

The association of these labels with the appropriate c-structural nodes, together with the correspondences between structures that they capture, is illustrated in Figure 113.



sṭudenṭ-i *c̣eril-s* *c̣ers*
student-NOM letter-DAT write.PRS-3SG
'The student is writing the letter.'

Figure 113: Meurer's (2007, 2009) discourse annotations to phrase structure elaborated following Dalrymple and Nikolaeva (2011)

As discussed in chapters 3 and 5, the full model of the interaction between syntax and information structure in Georgian that I have presented in this thesis differs from the models proposed by Meurer (2007, 2009) and by Wier (2014) in several respects. These differences have consequences for the kind of phrase structure and annotations to it that I will argue in what follows to be most appropriate for my model.

The predictions of my model differ from those of Meurer's (2007, 2009) in several respects. Like his model, mine predicts that discourse-inactive, or topicalised, topics precede other material in the clause (my constraint ***DITINIT***), and that foci may appear either in immediately preverbal position (constraints $\boldsymbol{XP_{FOC}V}$ and ***FMARK***), or postverbally, in which case they are linearised preferentially in sentence-final position (the prosodic constraint ***NOPHRASE***). Unlike his model, mine predicts that not only topicalised and focused referents, but also material which is given but discourse-active, may appear in preverbal position in the clause (***GINIT*** and ***SJINIT***). In addition, although his model permits multiple preverbal topics, his annotations do not permit the presence of multiple preverbal focused constituents, which are permitted within my model. A further difference is that, although Meurer states that focused verbs may be fronted, his model does not place constraints on verb-initial constructions, which mine does (constraints ****DAPINIT*** and ****DNPRSINIT***).

Each of the first two differences identified above between Meurer's (2007, 2009) model and my own suggests that the endocentric Inflectional Phrase IP, which he uses in his phrase structure in order to capture the importance of the immediately preverbal position and of additional preverbal positions in Georgian, is less appropriate for my own phrase structure for Georgian, and that an exocentric phrase S of the kind proposed by Wier (2014) in his model is preferable. First, the permissibility in my model of given but discourse-active material preceding the finite verb as well as following it suggests less of a special status for preverbal positions with respect to information structure. An exocentric phrase S of the kind used by Wier in his model would better capture the greater equivalence of preverbal and postverbal positions in this respect. Second, to capture the permissibility of multiple preverbal foci in addition to multiple preverbal topicalised and given referents in my model would require a change to the modified annotations to IP specifier positions proposed for Meurer's model to reflect that both immediately preverbal and additional appended IP specifier positions are marked as being potentially either topical, given or focused, as in [**31**] and [**32**].

31) $$\mathrm{IP} \rightarrow \begin{array}{c}\mathrm{XP}\\ (\uparrow\mathrm{GF}){=}\downarrow\\ \uparrow_{\sigma\iota}{=}\downarrow_{\sigma\iota}\\ ((\downarrow_{\sigma}\mathrm{DF}){=}\{\mathrm{TOPIC}|\mathrm{FOCUS}|\mathrm{BCK}\})\end{array} \quad \begin{array}{c}\mathrm{IP}\\ \uparrow{=}\downarrow\end{array}$$

32) $$\mathrm{IP} \rightarrow \begin{array}{c}\mathrm{XP}\\ (\uparrow\mathrm{GF}){=}\downarrow\\ \uparrow_{\sigma\iota}{=}\downarrow_{\sigma\iota}\\ ((\downarrow_{\sigma}\mathrm{DF}){=}\{\mathrm{TOPIC}|\mathrm{FOCUS}|\mathrm{BCK}\})\end{array} \quad \begin{array}{c}\mathrm{I}'\\ \uparrow{=}\downarrow\end{array}$$

Altering the annotations in this way has the consequence, however, that the strong verbal adjacency constraint on preverbal foci is no longer articulated, as it is by Meurer's proposed annotations shown in Figure 83, because intervening non-foci would be possible. This undermines the argument for using a phrase structure with the IP and its special preverbal IP specifier position in preference to the exocentric phrase S employed by Wier (2014), and originally considered by Meurer for his Georgian phrase structure. It is for these reasons that I will follow Wier (2014) in proposing a phrase structure for Georgian based on the exocentric category S. I propose that basic Georgian phrase structure is assembled using the phrase structure rule in [**33**]. This specifies that an exocentric category S contains, in addition to the finite verb and a negative phrase NegP which optionally immediately precedes it, any number of XPs on either side of the finite verb. Each XP is annotated for an unspecified grammatical function.

33) $$\mathrm{S} \rightarrow \begin{array}{c}\mathrm{XP}^{*}\\ (\uparrow\mathrm{GF}){=}\downarrow\end{array} \quad (\mathrm{NegP}) \quad \begin{array}{c}\mathrm{V}\\ \uparrow{=}\downarrow\end{array} \quad \begin{array}{c}\mathrm{XP}^{*}\\ (\uparrow\mathrm{GF}){=}\downarrow\end{array}$$

As discussed, Wier's (2014) model likewise differs in several respects from mine. Like his model, mine permits not only focused and topical but also given constituents to be linearised preverbally. Unlike his model, mine permits focused constituents to appear, not only in immediately preverbal position, but also following the verb. Similarly, topical constituents in my model may appear, not only left-adjacent to a complementiser, as sister to a CP phrase, but also following complementisers, as long as they precede other material within the clause. In addition, his model again allows only for single topics and single foci. Like Meurer (2007, 2009), he doesn't make any reference to restrictions on verb-initial constructions in his formalism. The phrase structure rule in [**33**] therefore requires different annotations to those presented in [**28**] to reflect Wier's (2014) model.

6.1.2.1 Inviolable Constraints

The syntactic constraints to be captured in annotations to the phrase structure in [**33**] are repeated once more in Table 88.

Table 88: Inviolable and violable syntactic constraints presented in chapter 5

Inviolable	***$XP_{FOC}V$*** (Skopeteas *et al.* 2009) *No non-focal constituent may intervene between a preverbal focused constituent and the verb.*
	DITINIT *Discourse-inactive topics precede other constituents.*
	S_{DF}<IO,DO_{DF} *A subject precedes other arguments with the same discourse function.*
	(*IO_{DF}<DO_F)V* *An indirect object precedes a direct object with the same discourse function preverbally.*
	****DAPINIT*** *Discourse-active predicates may not appear in sentence-initial position.*
Violable	***PROMSEP*** *Realise a prominent constituent in separation from other material.*
	CONSTINT *Constituents may not be discontinuous.*
	****DNPRSINIT*** *A declarative non-presentational predicate may not appear in sentence-initial position.*
	FMARK *Increase the prominence of foci by linearising them in a marked position (preverbally).*
	SJINIT *Subjects precede other constituents.*
	GINIT *A given constituent precedes non-given constituents.*

The first constraint to be modelled is the inviolable constraint ***$XP_{FOC}V$***, according to which no non-focal constituent may intervene between a preverbal focused constituent and the finite verb. The annotations in [**34**] to the finite verb and any XPs on either side of it in the phrase structure rule from [**33**][67] specify that these share the i-structure of their mother node S. The additional annotation, which applies to any XP within the S layer which precedes the finite verb, states that, if there is node x which is a member of the set of terminal nodes (T)[68] contained within the current node's mother (*^) and which precedes the terminal nodes of the current node (*), and which has the features PROM = + and

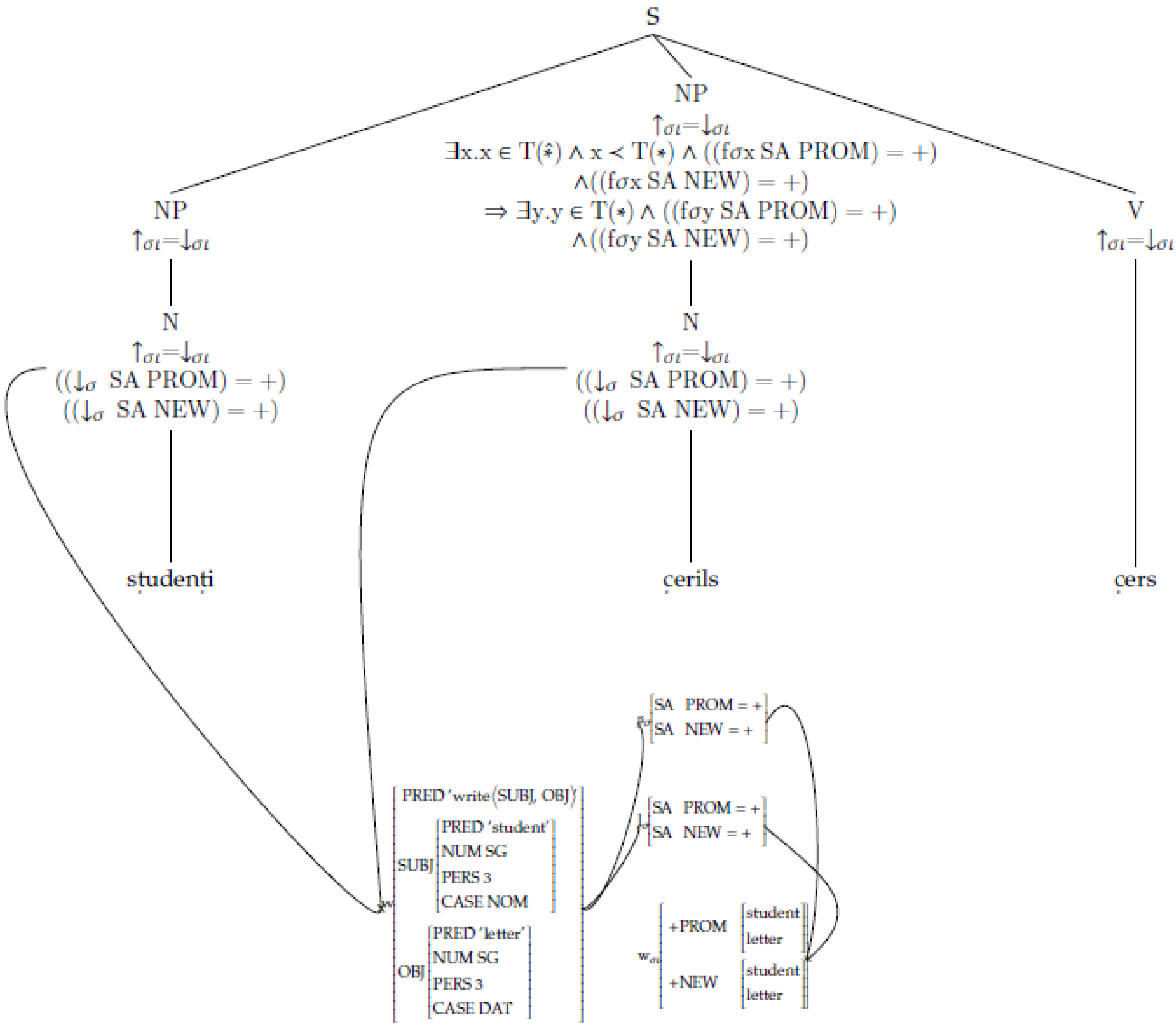
[67] For reasons of space I omit NegP and the annotations to f-structure.
[68] I adopt reference to this set from annotations presented by Mycock and Lowe (2013), which I discuss in more detail in *6.2.1* below.

NEW = + at s-structure, then there is a node y which is a member of the current node's terminal nodes and which has the features PROM = + and NEW = + at s-structure.

34)

$$
\begin{array}{llcc}
S \rightarrow & \text{XP*} & \text{V} & \text{XP*} \\
& \uparrow\sigma\iota = \downarrow\sigma\iota & \uparrow\sigma\iota = \downarrow\sigma\iota & \uparrow\sigma\iota = \downarrow\sigma\iota \\
& \exists x.x \in T(\hat{*}) \wedge x \prec T(*) \wedge ((f\sigma x \text{ SA PROM}) = +) \wedge ((f\sigma x \text{ SA NEW}) = +) & & \\
& \Rightarrow \exists y.y \in T(*) \wedge ((f\sigma y \text{ SA PROM}) = +) \wedge ((f\sigma y \text{ SA NEW}) = +) & &
\end{array}
$$

Formulated in this way, the annotation in [**34**] performs the role of the ***XP$_{FOC}$V*** constraint, whilst, in contrast with the annotations to phrase structure proposed by Meurer (2007, 2009) and by Wier (2014), also being compatible with the presence of multiple preverbal foci within the S layer. In addition, it captures the limited extent to which syntax, via this constraint, contributes to the identification of focal constituents preverbally in Georgian in my model, according to which the role of identifying discourse relations in sentence form is performed primarily by prosody. As discussed above in the case of King (1995) for Russian, an annotation identifying focus with a specific syntactic position of the kind in Wier is less appropriate in this case. An exception to this, which the annotation in [**34**] captures, is one in which multiple constituents are linearised preverbally and a non-verb-adjacent one is otherwise marked as being in focus. In such a case, any constituents intervening between this focus-marked constituent and the verb are themselves identified as foci by virtue of the syntactic constraint. This constraint-based identification is illustrated in Figure 114. Identification of the set membership of discourse items on the basis of their s-structural features proceeds via the lexical rules given in [**27**].



sṭudenṭ-i ceril-s cers
student-NOM letter-DAT write.PRS.3SG
'The student is writing the letter.'

Figure 114: Syntactic focus identification via the annotation in [34]

A similar formulation can be used to capture the next of the inviolable constraints proposed, ***DITINIT***, according to which discourse-inactive topics must precede other constituents. The conditional annotation in [**35**] applies to the S node, reflecting the clausal scope of this constraint. It states that, if there is a node x which is a member of the set of daughters (D[69]) of S, and if there is a y which is a member of the set of terminal nodes of S and which follows the set of terminal nodes of x, and which has PROM = + and NEW = -

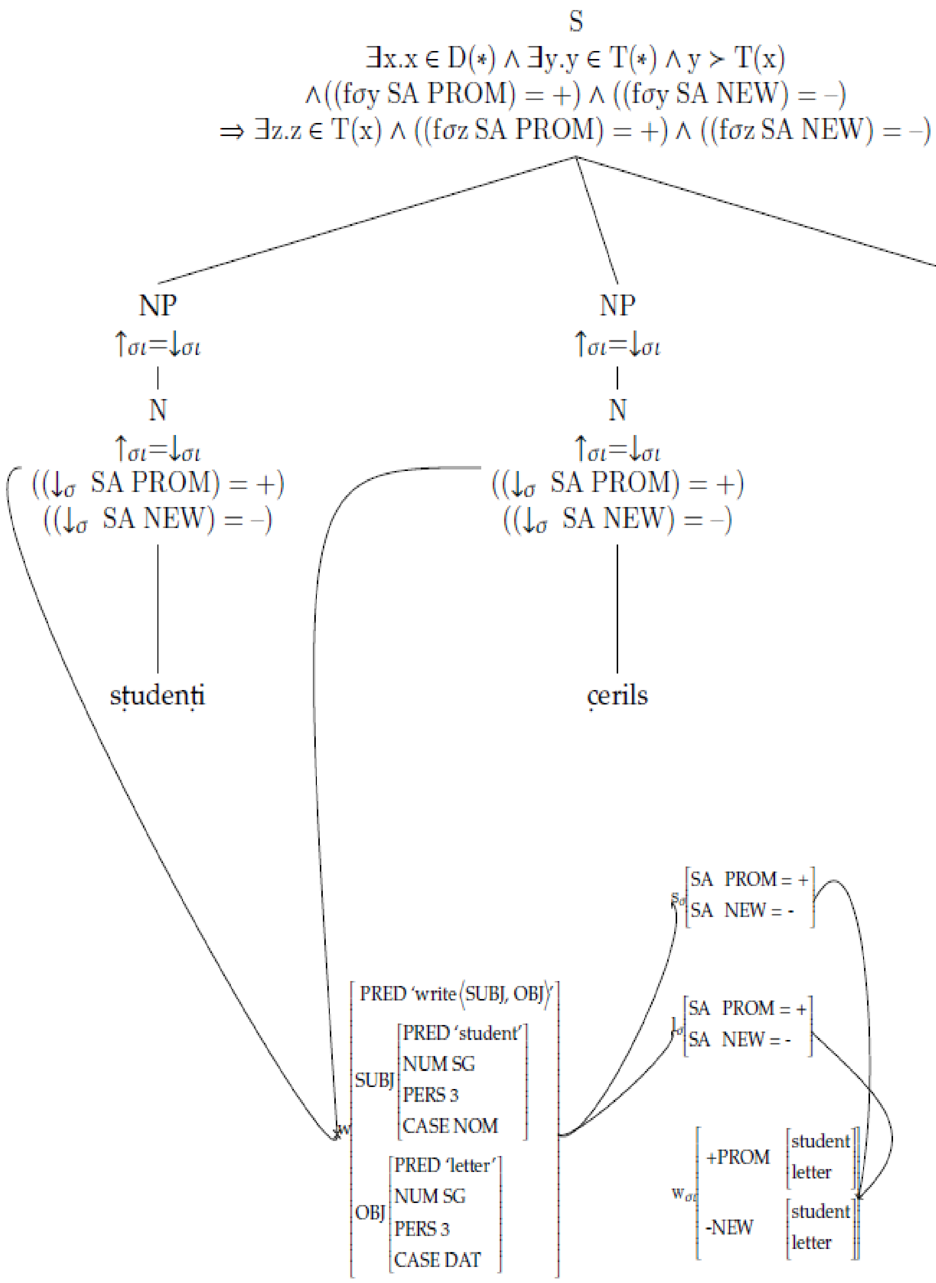
[69] This set is likewise adopted from the proposals of Mycock and Lowe (2013), which I discuss in more detail in *6.2.1* below.

as features at s-structure, then there is a node z which is a member of the set of terminal nodes of x and which has PROM = + and NEW = - as features at s-structure.

35)

$$\begin{array}{ccccc} \underset{\substack{\exists x.x\in D(*)\wedge\exists y.y\in T(*)\wedge y\succ T(x) \\ \wedge((f\sigma y\ SA\ PROM)=+)\wedge((f\sigma y\ SA\ NEW)=-) \\ \Rightarrow\exists z.z\in T(x)\wedge((f\sigma z\ SA\ PROM)=+)\wedge((f\sigma z\ SA\ NEW)=-)}}{\mathrm{S}} & \rightarrow & \underset{\uparrow\sigma\iota=\downarrow\sigma\iota}{\mathrm{XP}^*} & \underset{\uparrow\sigma\iota=\downarrow\sigma\iota}{\mathrm{V}} & \underset{\uparrow\sigma\iota=\downarrow\sigma\iota}{\mathrm{XP}^*} \end{array}$$

As with [**34**], the annotation in [**35**] captures the ***DITINIT*** constraint and allows for the presence of multiple clause-initial discourse-inactive topics. Analogously to [**34**], it also reflects the potential role of this syntactic constraint in identifying as containing a discourse-inactive topic any constituent which precedes one otherwise marked as containing a discourse-inactive topic; such a case is illustrated in Figure 115.



sțudenț-i *çeril-s* *çers*
student-NOM letter-DAT write.PRS-3SG
'The student is writing the letter.'

Figure 115: Syntactic discourse-inactive topic identification via the annotation in [35]

In limiting the focus-identifying role attributed to syntax to the specific cases illustrated in Figure 114 and Figure 115, the focus and topic constraint annotations in [**34**] and [**35**] compare favourably to an alternative means of expressing the same ***XP$_{FOC}$V*** and ***DITINIT*** constraints. This, shown in [**36**], is to divide XPs preceding the finite verb in the phrase structure rule into three ordered groups, each annotated for the associated discourse features; the first corresponds to discourse-inactive topics, the second to discourse-active given items, and the third to focused items.

36)

$$
\begin{array}{llllll}
\mathrm{S} \rightarrow & \mathrm{XP}^{*} & \mathrm{XP}^{*} & \mathrm{XP}^{*} & \mathrm{V} & \mathrm{XP}^{*} \\
 & \uparrow_{\sigma\iota}=\downarrow_{\sigma\iota} & \uparrow_{\sigma\iota}=\downarrow_{\sigma\iota} & \uparrow_{\sigma\iota}=\downarrow_{\sigma\iota} & \uparrow_{\sigma\iota}=\downarrow_{\sigma\iota} & \uparrow_{\sigma\iota}=\downarrow_{\sigma\iota} \\
 & ((\downarrow\sigma \text{ SA PROM})=+) & ((\downarrow\sigma \text{ SA PROM})=-) & ((\downarrow\sigma \text{ SA PROM})=+) & & \\
 & ((\downarrow\sigma \text{ SA NEW})=-) & ((\downarrow\sigma \text{ SA NEW})=-) & ((\downarrow\sigma \text{ SA NEW})=+) & &
\end{array}
$$

Whilst this representation captures the ***XP$_{FOC}$V*** and ***DITINIT*** constraints, and permits multiple or zero instances preverbally of referents marked with each set of discourse features, it does not make explicit that the marking of discourse features is primarily the role of prosody, with the exception of the more specific cases illustrated in Figure 114 and Figure 115. For this reason I prefer the annotations in [**34**] and [**35**].

In addition to the benefits discussed, another feature of the annotations in [**34**] and [**35**] is that they capture the ***XP$_{FOC}$V*** and ***DITINIT*** constraints, both in cases like those illustrated in Figure 114 and Figure 115, in which the XP constituents involved each contain only a single terminal node, and in cases like [**37**] and [**38**]. In [**37**], each of the preverbal XPs contains multiple terminal nodes, of which only one in each is in focus. Similarly, in [**38**], each of the clause-initial XPs contains multiple terminal nodes, of which only one in each is a discourse-inactive topic.

37) [maghal-ma]$_F$ [ḳac-ma]$_G$ [maghal-i]$_F$ [qal-i]$_G$ dainaxa
tall-NARR man-NARR tall-NOM woman-NOM see.PST.3SG
'A tall man saw a tall woman.'

38) [maghal-ma]$_T$ [ḳac-ma]$_G$ [maghal-i]$_T$ [qal-i]$_G$ dainaxa.
tall-NARR man-NARR tall-NOM woman-NOM see.PST.3SG
'The tall man saw the tall woman.'

More complex cases such as these have not been the subject of empirical investigation in this thesis or in the literature, and are in need of further study. The annotations in [**34**] and

[**35**], which do not assume the projection of discourse features to dominating phrases, are formulated to be compatible with both these and the former pair of examples in a way which reflects my proposals that discourse features are projected only vertically and at f-structure, from the f-structures of terminal nodes to the f-structures of their mothers, and only within the f-structures of nouns, rather than in f-structures corresponding to other phrases such as PPs which are also subject to the $\boldsymbol{XP_{FOC}V}$ and ***DITINIT*** constraints. I provide a separate formalisation for this restricted version of feature projection in *6.2* below. In *6.1.2.2* I present annotations to reflect the violable constraints ***PROMSEP*** and ***CONSTINT***, which are concerned with discontinuous constituency in Georgian.

In addition to the annotation reflecting the ***DITINIT*** constraint in [**35**], I propose an additional annotation for those constituents which are syntactically identified as discourse-inactive topics by their position in the CP specifier position preceding a complementiser, as exemplified in [**39**].

39) [ameriḳashi]$_T$ rom çavida, y̯velaperi šeicvala.

America=in COMP go.PST.3SG everything-NOM change.PST.3SG

'When he went to America, everything changed.'

The annotation in [**40**] specifies that the specifier position of a CP phrase may be occupied by any number of XP phrases, and that any such XP phrases precede a complementiser C and each contains at least one terminal node with the features PROM = + and NEW = -.

40) $$\mathrm{CP} \rightarrow \underset{\exists x.x\in T(*)\wedge((fx_\sigma DF)=TOPIC}{\underset{T(*)\prec C}{XP^*}} \quad C'$$

The syntactic identification of discourse-inactive topics via [**40**] is illustrated in Figure 116.

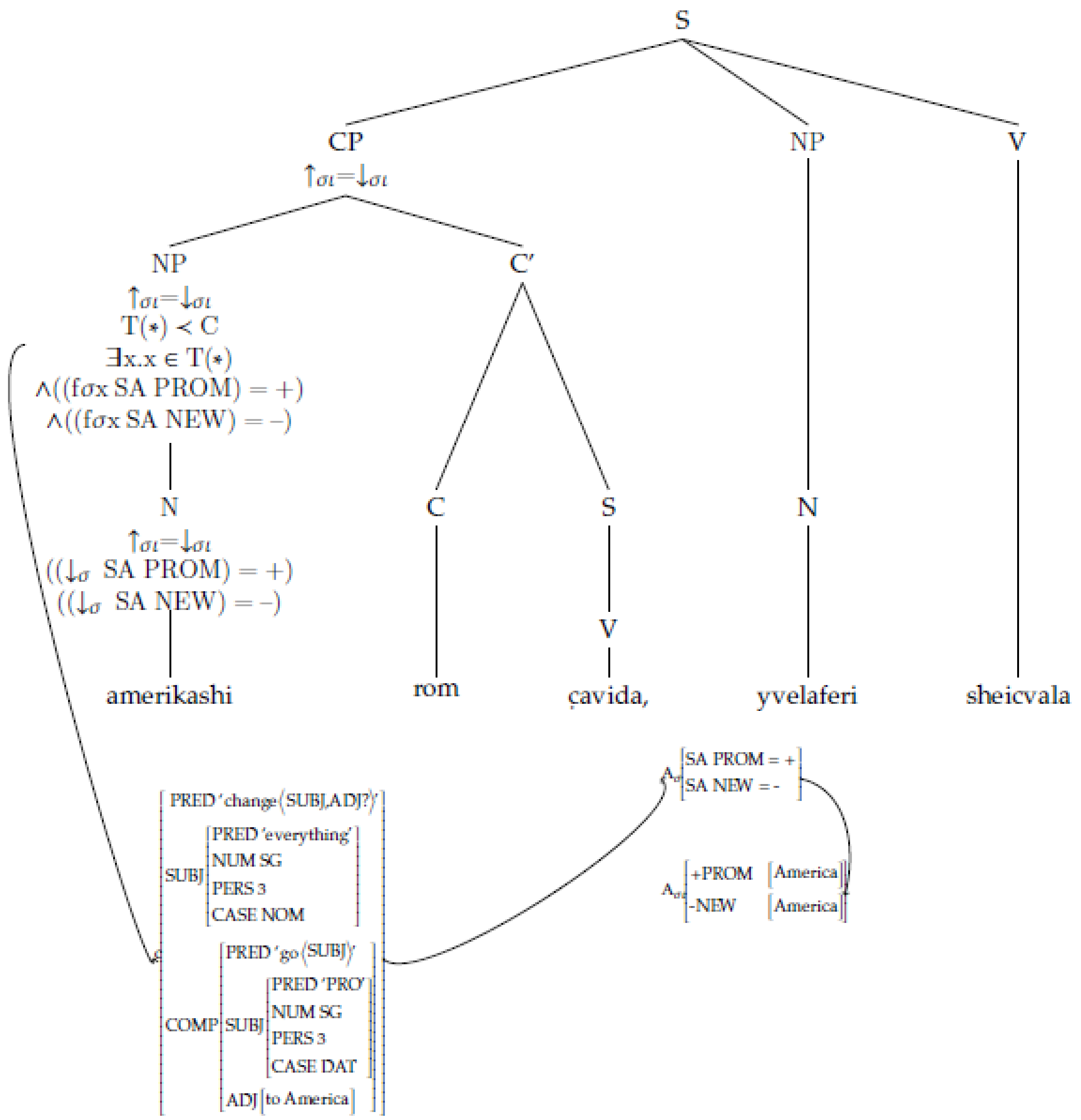


Figure 116: discourse-inactive topic identification via [40] for the sentence in [39]

The next constraints to be modelled are the inviolable constraints ***S_{DF}<O_{DF}***, according to which a subject must precede other arguments which have the same discourse function, and ***(IO_{DF}<DO_F)V***, according to which an indirect object must precede a direct object with the same discourse status preverbally. These were proposed in chapter 3 to account for exceptions to the word order freedom motivating the flat structure above; these are the statistically significant preference for subject-initiality in all-new ditransitive sentences found by Skopeteas *et al.* (2009), in addition to the fixed subject-initial linearisation of multiple wh-constituents, negative words and indefinite quantifiers identified by Amiridze (2006) and Skopeteas et al. (2009). Whereas Meurer (2007, 2009) captures the preverbal linearisation of wh-constituents with an optional QP constituent in the IP specifier position (see [**1c**]), I propose to capture all of the above phenomena with c-structural annotations capturing the observation that all are in focus. The annotation to S in [**41**] states that, if a terminal node x which corresponds to a grammatical function at f-structure is preceded by a terminal node y which also corresponds to a grammatical function at f-structure, and both x and y have the same SA PROM and SA NEW features at s-structure, then x does not correspond to the grammatical function SUBJECT of the f-structure corresponding to S. Similarly to the preverbal focus and clause-initial topic annotations in [**34**] and [**35**], which specify the limited extent to which syntax contributes to the encoding of discourse features, this annotation specifies the limited extent to which syntax determines grammatical relations, which are otherwise expressed in Georgian by morphology.

41)

$$\underset{\substack{\exists \mathrm{x.x} \in \mathrm{T}(\hat{*}) \wedge (\downarrow \mathrm{GF}) = \mathrm{fx} \\ \wedge \exists \mathrm{y.y} \in \mathrm{T}(\hat{*}) \wedge (\downarrow \mathrm{GF}) = \mathrm{fy} \\ \wedge \mathrm{f}\sigma\mathrm{xSAPROM} = \mathrm{f}\sigma\mathrm{ySAPROM} \\ \wedge \mathrm{f}\sigma\mathrm{xSANEW} = \mathrm{f}\sigma\mathrm{ySANEW} \wedge \mathrm{y} \prec \mathrm{x} \\ \Rightarrow ((\mathrm{fx}) \neq \downarrow \mathrm{SUBJ}}}{\mathrm{S}} \quad \rightarrow \mathrm{XP}^* \ \mathrm{V} \ \mathrm{XP}^*$$

The annotation in [**42**] to preverbal XPs specifies that, if there is a terminal node x which corresponds to a grammatical function at f-structure and is followed by a terminal node y which also corresponds to a grammatical function at f-structure, and both x and y have the same SA PROM and SA NEW features at s-structure, then x does not correspond to the grammatical function OBJECT. An additional annotation to postverbal XPs specifies that the attribute PARAM[70] of their corresponding f-structure has the empty set value. This

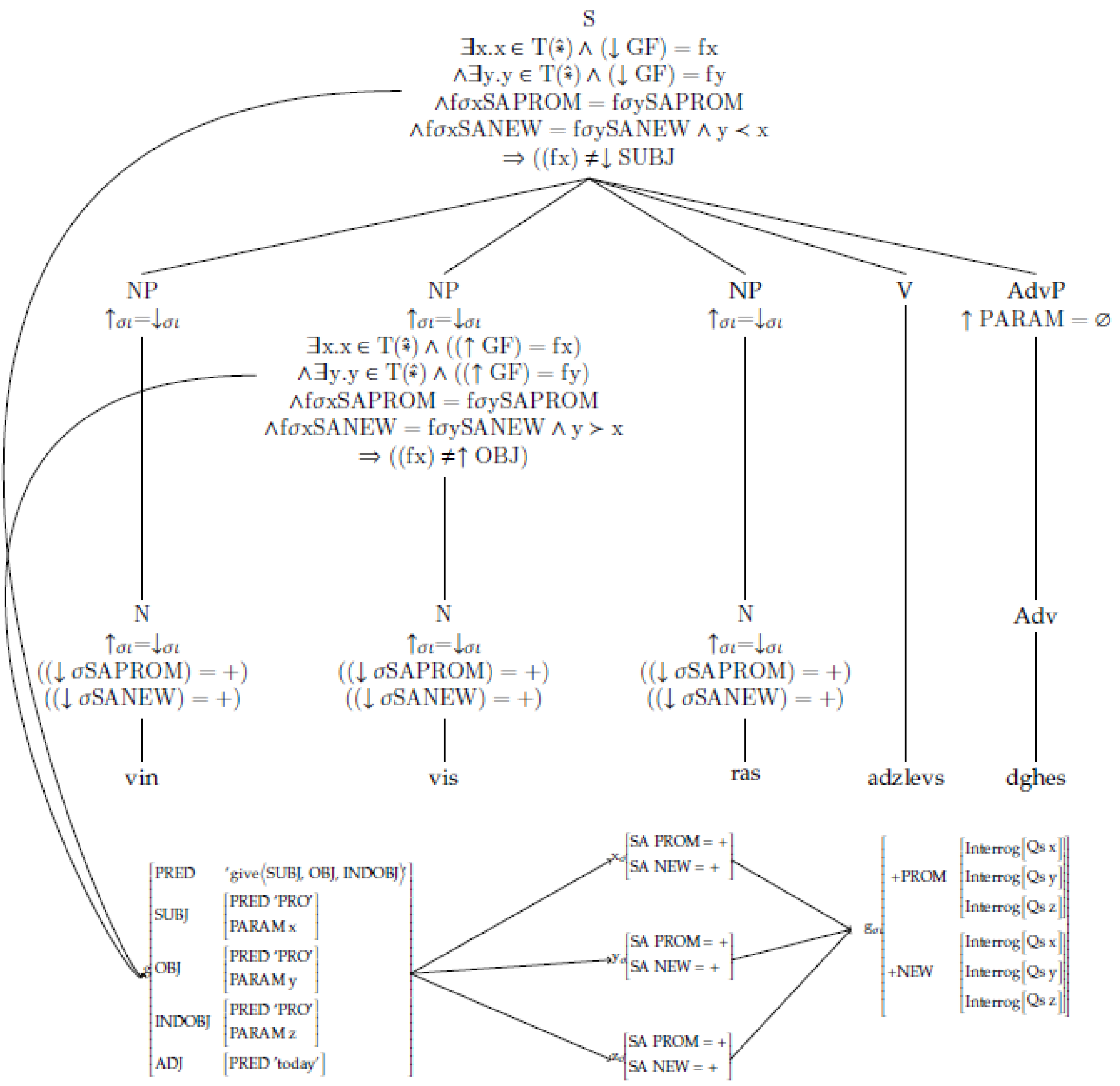
[70] This f-structural feature for wh-constituents is proposed by Mycock (2006).

performs the role of ensuring that wh-constituents, which have the feature +PARAM, are linearised only in preverbal position.

42) $$\mathrm{S} \rightarrow \quad \begin{array}{c} \mathrm{XP}^{*} \\ \exists x.x{\in}T(\hat{*}){\wedge}((\uparrow \mathrm{GF}){=}fx) \\ {\wedge}\exists y.y{\in}T(\hat{*}){\wedge}((\uparrow \mathrm{GF}){=}fy) \\ {\wedge}f\sigma x\mathrm{SAPROM}{=}f\sigma y\mathrm{SAPROM} \\ {\wedge}f\sigma x\mathrm{SANEW}{=}f\sigma y\mathrm{SANEW}{\wedge}y{\succ}x \\ {\Rightarrow}((fx){\neq}{\uparrow}\mathrm{OBJ}) \end{array} \quad \begin{array}{c} \mathrm{V} \\ \\ \end{array} \quad \begin{array}{c} \mathrm{XP}^{*} \\ \downarrow\mathrm{PARAM}{=}\emptyset \end{array}$$

Formulated in this way, the annotations in [**41**] and [**42**] capture restrictions observed on the ordering of arguments in sentence focus and of multiple wh-constituents, negative words and indefinite quantifiers. Figure 117 features a sentence containing multiple preverbal wh-constituents. Whilst the annotation to postverbal XPs ensures that each of the wh-constituents is linearised preverbally, the annotations to S and to preverbal XPs ensure that these constituents occur in the order S, DO, IO. The preverbal focus annotation in [**34**], which is not included here, ensures that no non-focal constituents intervene between the wh-constituents in this position[71].

[71] Following Mycock (2006), I assume that, in a wh-question, only wh-constituents are in focus.



vin vi-s ra-s aẓlevs dges?
who.NOM who-DAT what-DAT give.PRS.3SG today
'Who gives what to whom today?'

Figure 117: Annotations in [41] and [42] with a multiple wh-constituent question

The last of the inviolable syntactic constraints requiring representation in my LFG model is the inviolable syntactic constraint ***DAPINIT**, according to which discourse-active predicates may not appear in clause-initial position. Of the constraints presented, this represents the most direct role played by Georgian syntax in identifying the discourse attributes of a referent. This identification is however only partial; it specifies that a clause-initial finite verb is discourse-inactive, but not whether it has the status of a focused or of a discourse-inactive topical referent. The phrase-structural annotation to the finite verb in [**43**] makes use of the feature set ±PROM, which as discussed above I adopt for my proposals together with the set ±NEW, as defined by Butt and King (2000), partly in order to permit a partial specification of discourse features in cases such as these. It states that, if there is no constituent x which is a member of the set of terminal nodes of the current node V's mother S (T(*ˆ)) and which is linearised to the left of V (< *), then V's meaning constructor has the discourse feature +PROM at s-structure.

43) $$\mathrm{S} \rightarrow \mathrm{XP}^* \qquad \underset{\substack{\neg\exists \mathrm{x}.\mathrm{x}\in \mathrm{T}(\hat{*})\wedge \mathrm{x}\prec * \\ \Rightarrow((\downarrow_\sigma \ \mathrm{SA\ PROM})=+)}}{\mathrm{V}} \qquad \mathrm{XP}^*$$

The partial identification of the finite verb's discourse attributes by virtue of this annotation is illustrated in Figure 118 for the sentence in [**44**].

44)	c̣ers	sṭudenṭ-i	c̣eril-s
	write.PRS.3SG	student-NOM	letter-DAT

'The student is writing the letter.'

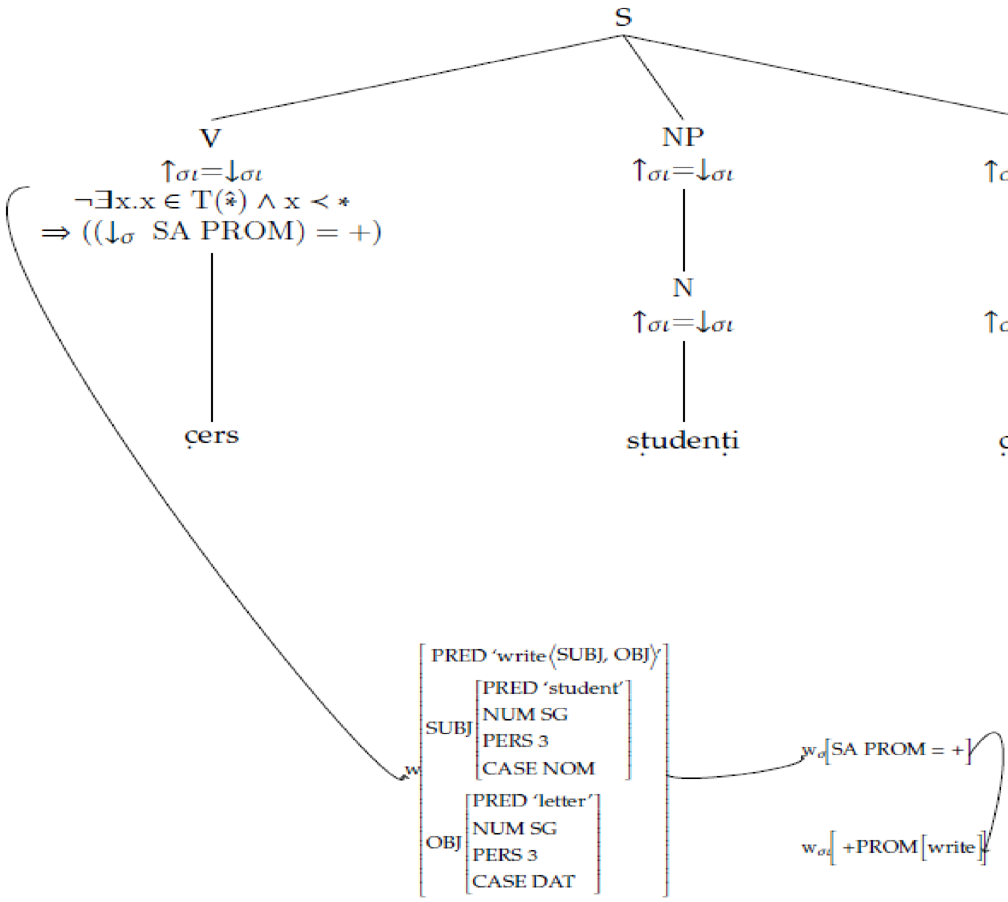


Figure 118: The annotation in [43] with a clause-initial finite verb ([44])

In this section I have presented several annotations to the Georgian phrase structure proposed in [**33**]. These reflect the set of 5 inviolable syntactic constraints presented in the previous chapter: ***XP$_{FOC}$V***, ***DITINIT***, ***S$_{DF}$<IO,DO$_{DF}$***, (***IO$_{DF}$<DO$_{F}$)V*** and ****DAPINIT***. The annotations presented are formulated to reflect the limited role played by Georgian syntax in expressing discourse features, according to my proposed analysis. In the next section I will propose further c-structural annotations to capture the set of 6 violable syntactic constraints presented in the previous chapter.

6.1.2.2 Violable Constraints

The remaining 6 syntactic constraints to be modelled in this section are the equally ranked violable constraints ***PROMSEP***, ***CONSTINT***, ***SJINIT***, ***GINIT***, ****DNPRSINIT*** and ***FMARK***, the definitions of which are repeated in Table 89.

Table 89: Violable syntactic constraints presented in the previous chapter

Violable	***PROMSEP*** *Realise a prominent constituent in separation from other material.*
	CONSTINT *Constituents may not be discontinuous.*
	****DNPRSINIT*** *A declarative non-presentational predicate may not appear in sentence-initial position.*
	FMARK *Increase the prominence of foci by linearising them in a marked position (preverbally).*
	SJINIT *Subjects precede other constituents.*
	GINIT *A given constituent precedes non-given constituents.*

In contrast to the inviolable constraints $\boldsymbol{XP_{FOC}V}$, ***DITINIT***, $\boldsymbol{S_{DF}<O_{DF}}$, $\boldsymbol{(IO_{DF}<DO_{F})V}$ and ****DAPINIT*** modelled in the previous section, which took the form of straightforward annotations of the kind proposed by Dalrymple and Nikolaeva (2011), these violable constraints require annotations which reflect their varying degrees of optimality. One approach to modelling Optimality Theory in LFG is that of Frank *et al.* (1998), who integrate Optimality Theory into the LFG architecture by means of an additional structural level, o(ptimality)-structure, which comprises a set of ordered optimality marks which may be associated with a particular structure. Such an ordering of optimality marks is shown in [**45**]; in this case, the most positive mark is MARK1 and the most negative is MARK4.

NEUTRAL is associated with any element of structure not associated with one of the other marks.

45)

$$\mathrm{OPTIMALITYRANKING} \quad \mathrm{MARK1}\ \ \mathrm{MARK2}\ \ \mathrm{NEUTRAL}\ \ \mathrm{MARK3}\ \ \mathrm{MARK4}.$$

Frank *et al.* (1998:3)

Optimality marks are associated with particular constructions by means of o-descriptions, in the form of annotations to c-structure. In Figure 119, o-descriptions associate a VP-internal PP with MARK1 at o-structure if its corresponding f-structure performs the role OBL within the f-structure of its mother, and with MARK2 at o-structure if its corresponding f-structure performs the role of an ADJUNCT within the f-structure of its mother.

$$\mathrm{VP} \rightarrow \mathrm{V} \left(\begin{array}{c} \mathrm{NP} \\ (\uparrow \mathrm{OBJ}) = \downarrow \end{array} \right) \begin{array}{c} \mathrm{PP}* \\ \left\{ \begin{array}{c} (\uparrow \mathrm{OBL}\ ) = \downarrow \\ \mathrm{MARK1} \in o* \\ \\ \downarrow \in (\uparrow \mathrm{ADJUNCTS}) \\ \mathrm{MARK2} \in o* \end{array} \right\} \end{array}$$

Figure 119: Optimality mark annotations (Frank et al 1998:3)

The o-structure of a phrase unifies the o-structures of its constituents. Parsing of a phrase produces a set of candidates, the winning candidate of which is the one which features in its o-structure the fewest instances of the most negative mark or, if a winner cannot be identified in this way, the one which features the fewest instances of the next most negative mark, and so on, until a winner is identified. If no candidates are associated with negative marks, the winning candidate is the one associated with the most positive marks. Of the two structures displayed in Figure 120, the former candidate, in which the prepositional phrase performs the OBL role in the f-structure of its mother, is preferable to the latter, in which the prepositional phrase performs the role ADJUNCT within its mother's f-structure.

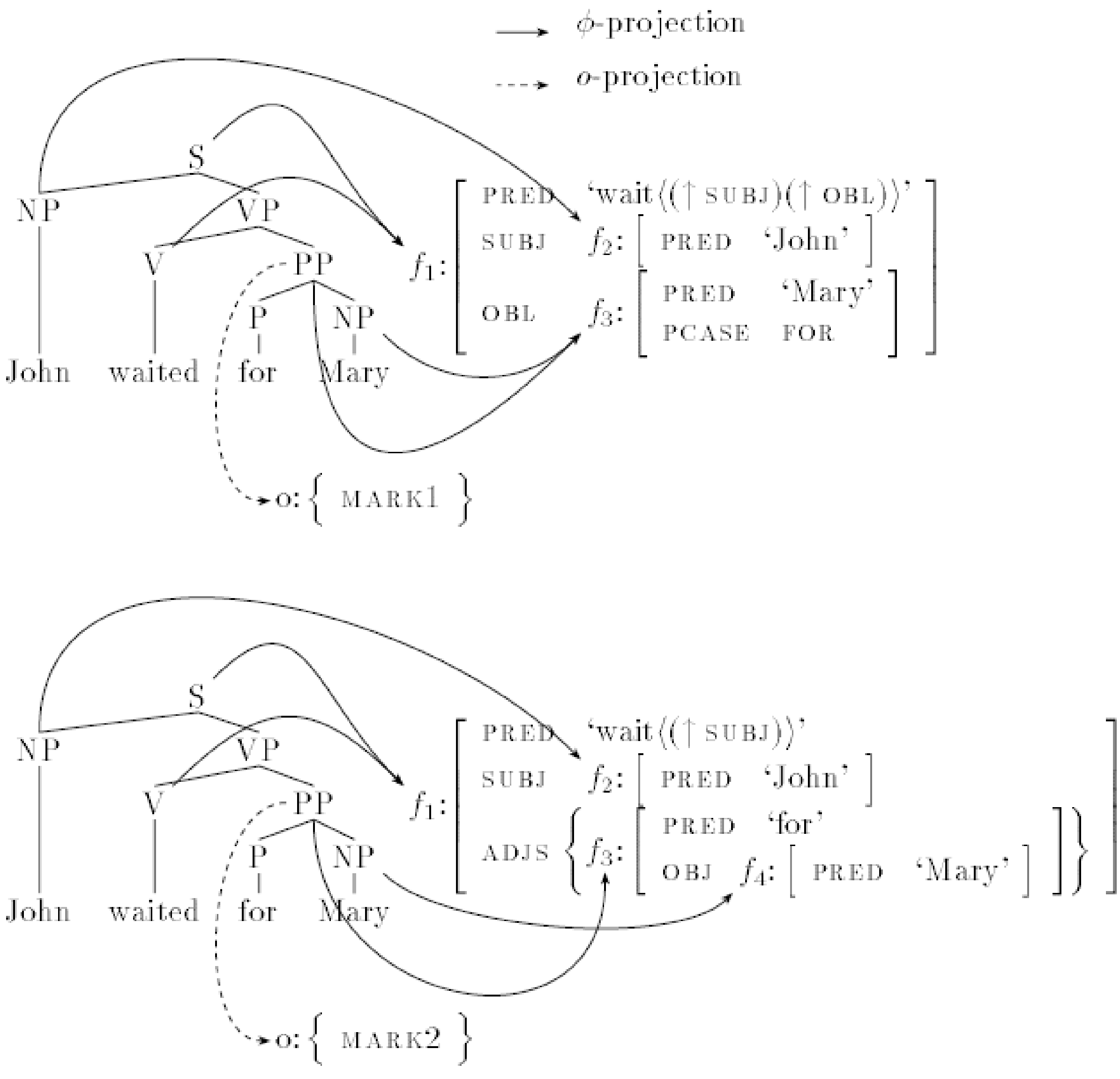


Figure 120: Candidates according to the annotated phrase structure rule in Fig. 119 with associated optimality marks (Frank et al. 1998:4)

The violable constraints for Georgian in Table 89 can be modelled within the LFG architecture in a similar way. I begin with the violable constraint ***SJINIT***, according to which subjects precede other constituents; in contrast to the inviolable constraint ***S_{DF}<IO,DO_{DF}***, this applies to arguments regardless of their discourse features. The

annotation to preverbal XPs in [**46**] states that, if there is a node x which is a daughter of S and which corresponds to the subject of the f-structure of S, and if there is a node y which is a daughter of S and which precedes x, then MARK3 is a member of the set of optimality marks at o-structure. Formulated in this way, this constraint is compatible with cases in which the subject is elided and not present at c-structure.

46) $$\underset{\substack{\exists x.x\in D(*)(fx=(\downarrow \mathrm{SUBJ})) \\ \wedge\exists y.y\in D(*)\wedge y\prec x \\ \rightarrow \mathrm{MARK3}\in o*}}{\mathrm{S}} \rightarrow \quad \mathrm{XP}^* \quad \mathrm{V} \quad \mathrm{XP}^*$$

The annotation in [**47**], which is likewise to the S node, captures the ***GINIT*** constraint, according to which a non-focal constituent should appear sentence-initially if there is one present. This states that, if there is a constituent x which is a daughter of the S node, and if there is no constituent y that is a terminal node of x and which has the discourse feature +NEW at semantic structure, and if there is a node z containing a terminal node a which does have the +NEW feature, then, if there is no node b which is a terminal daughter of S and which precedes the terminal nodes of z, then MARK3 is a member of the set of optimality marks at o-structure. This formulation ensures that, as long as non-focal constituents are present at c-structure, only one need appear clause-initially for the negative MARK3 to be avoided; it is not necessary for all such constituents to precede all constituents containing a focus.

47) $$\underset{\substack{\exists x.x\in D(*)\wedge\neg\exists y.y\in T(x)\wedge(f\sigma y\ \mathrm{SA\ NEW})=+) \\ \wedge\exists z.z\in D(*)\wedge\exists a.a\in T(z)\wedge(f\sigma a\ \mathrm{SA\ NEW})=+) \\ \wedge\neg\exists b.b\in T(*)\wedge b\prec T(z) \\ \Rightarrow \mathrm{MARK3}\in o*}}{\mathrm{S}} \rightarrow \quad \mathrm{XP}^* \quad \mathrm{V} \quad \mathrm{XP}^*$$

The interaction of the annotations in [**46**] and [**47**] is shown in Figure 121 and Figure 122. These can be compared with the tableaux displaying the interaction between ***SJINIT*** and ***GINIT*** in Table 90 and Table 91. In Figure 121, the first candidate satisfies the ***SJINIT*** constraint, but violates the ***GINIT*** constraint; as per the annotation in [**47**], this incurs a MARK3 at o-structure. The second candidate satisfies ***GINIT*** but violates ***SJINIT***, and so, as per the annotation in [**46**], also incurs a MARK3 at o-structure. Both candidates are therefore equally ranked with respect to o-marks. By contrast, in Figure 122 the first candidate violates neither constraint, whereas the second violates both and so incurs two instances of MARK3 at o-structure, with the result that the first candidate is the winner.

Table 90: SJINIT and GINIT constraints with focused subject

[lom-i]$_F$ lok'avs bok'ver-s. lion-NOM lick.PRS:3PSG cub-DAT 'The lion is licking the cub.'	*SJINIT*	*GINIT*
a. ☞ lomi lok'avs bok'vers.		*
b. ☞ bok'vers lok'avs lomi.	*	

Table 91: SJINIT and GINIT constraints with focused object

lom-i lok'avs [bok'ver-s.]$_F$ lion-NOM lick.PRS:3PSG cub-DAT 'The lion is licking the cub.'	*SJINIT*	*GINIT*
a. ☞ lomi lok'avs bok'vers.		
b. bok'vers lok'avs lomi.	*	*

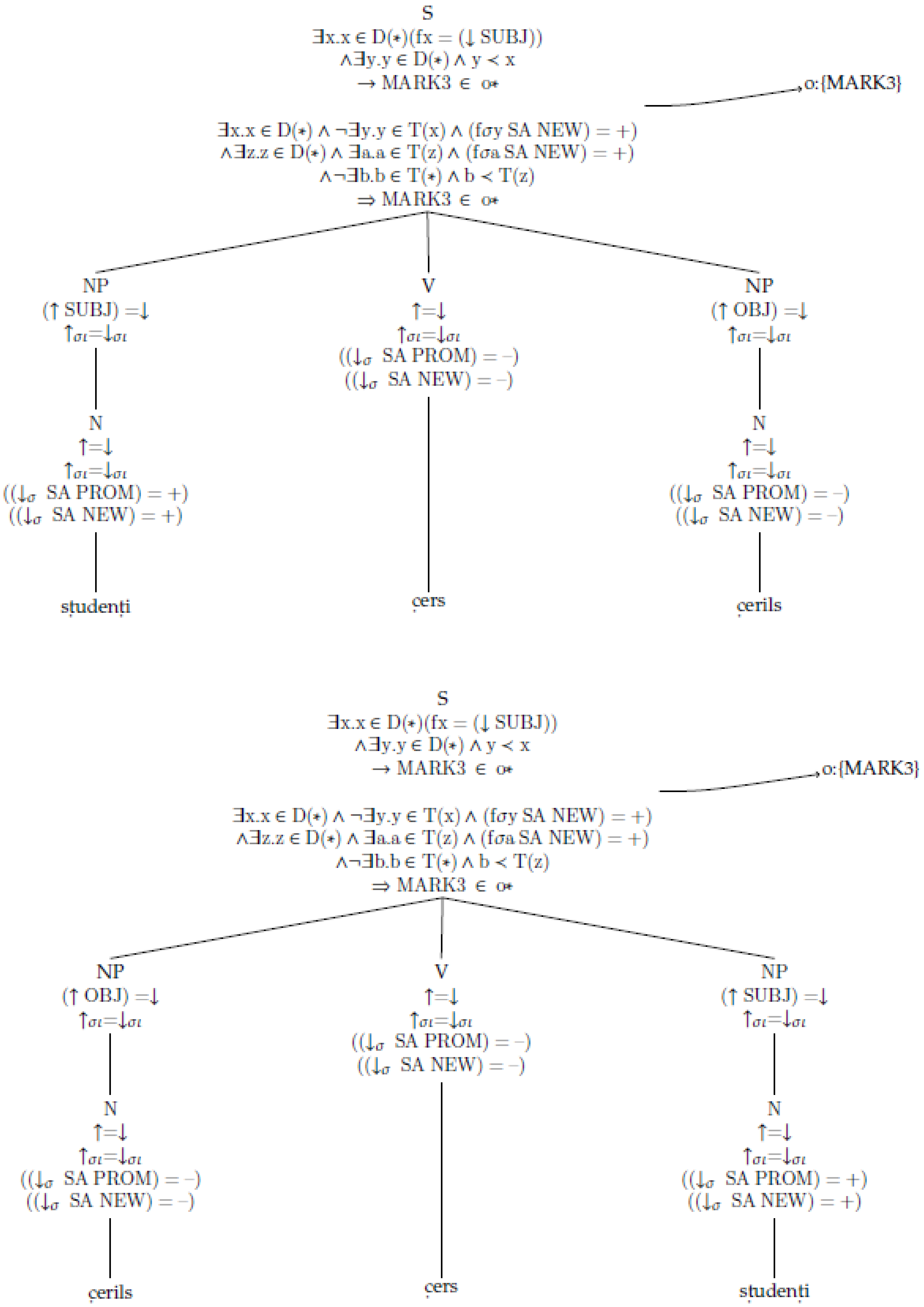


Figure 121: O-structures for candidates SfVOg and OgVSf

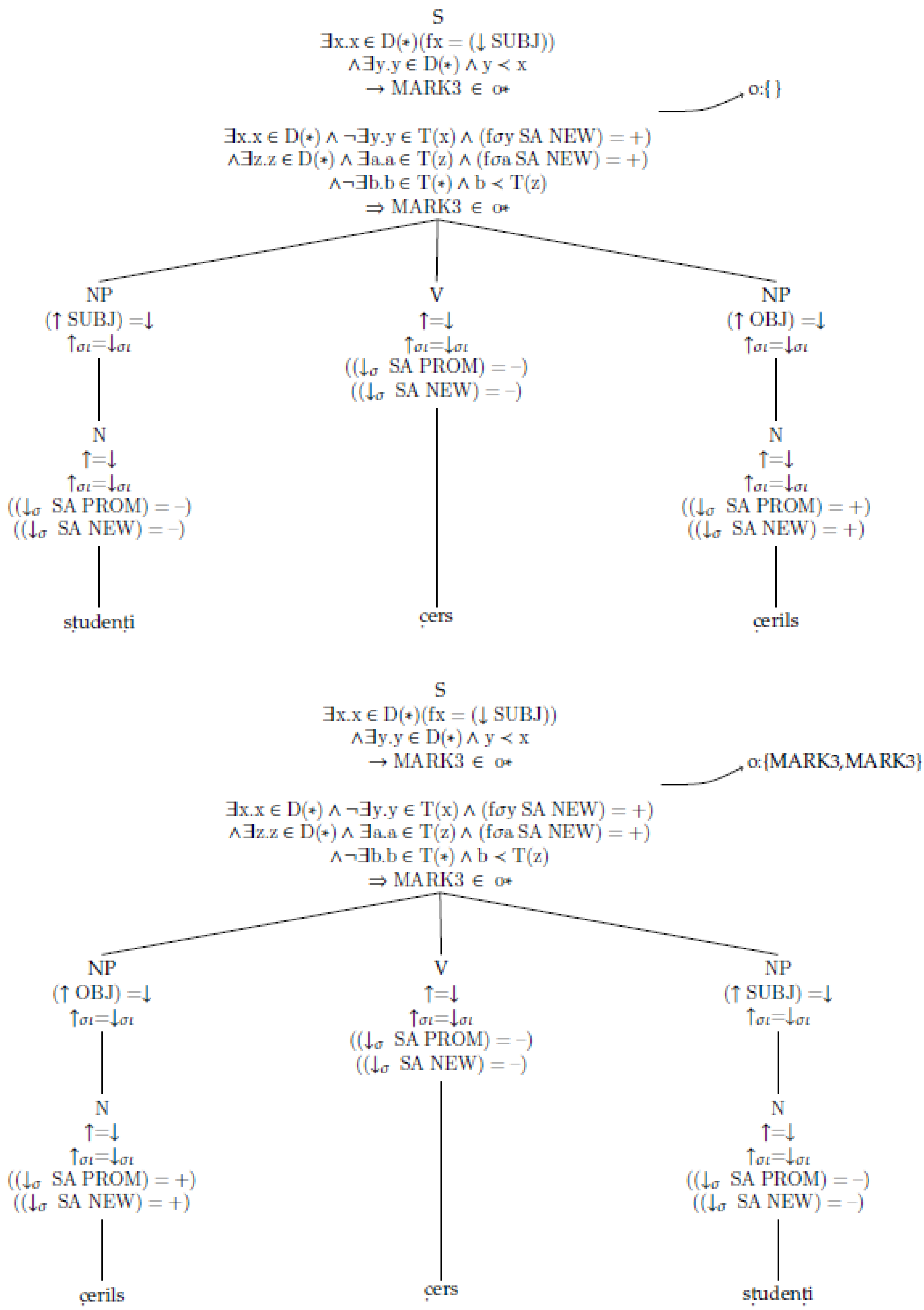


Figure 122: O-structures for candidates SgVOf and OfvSg

The next of the violable constraints to be captured is ***DNPRSINIT**, according to which the finite verb may only be linearised in clause-initial position either if it is one of a set of presentational verbs, or if it is appearing within a yes-no question. This can be captured with an annotation similar to that presented in [**43**] to model the inviolable ***DAPINIT** constraint, according to which only discourse-inactive finite verbs may appear clause-initially. The annotation to the finite verb in [**48**] specifies that, if there is no x which is a terminal node of S and which precedes the finite verb, and if both the verb's meaning constructor has the value - for the semantic attribute PRST (presentational), and the meaning constructor of S does not have the PolarInt value, which denotes a yes/no question (Dalrymple and Mycock 2011), for the semantic attribute SEM (semantics), then MARK3 is a member of o-structure.

48) $$\mathrm{S} \rightarrow \mathrm{XP}^* \quad \underset{\substack{\neg\exists x.x\in T(\hat{*})\wedge x\prec * \\ \wedge(((\downarrow\sigma\ \mathrm{SA\ PRST})=-)\wedge((\uparrow\sigma\ \mathrm{SA\ SEM})\neq \mathrm{PolarInt})) \\ \rightarrow \mathrm{MARK3}\in o*}}{\mathrm{V}} \quad \mathrm{XP}^*$$

In *6.2.1.3* I will present annotations to model the mapping of the PolarInt, QCInt and Decl SEM values from prosodic features associated at p-structure with the heads of prosodic phrases.

Likewise straightforward to model is the constraint ***FMARK***, according to which focal constituents should be linearised in preverbal position for additional emphasis; this was proposed in the preceding chapter to account for the increased preference for linearising identificational foci in preverbal as opposed to postverbal position. This constraint can be articulated by means of the annotation in [**49**] to postverbal XPs, according to which the presence postverbally of a terminal node with the discourse feature +NEW results in MARK3 being present at o-structure.

49) $S \rightarrow XP^* \quad V \quad \underset{\substack{\exists x.x\in T(*)\wedge((f\sigma x \text{ SA NEW})=+) \\ \Rightarrow MARK3\in o*}}{XP^*}$

In the section *6.2.1.2* I will present an annotation to Georgian phrase structure rules articulating the violable constraint ***NOPHRASE***, which ranks equally with and militates against ***FMARK***.

The final violable syntactic constraints to be captured are ***PROMSEP***, according to which a discourse-inactive constituent should be realised in separation from other material, and ***CONSTINT***, according to which syntactic constituents should not be discontinuous. These constraints are motivated by examples from the literature discussed in chapter 3 of discontinuous constituency in Georgian such as those repeated in [**50**]. Whilst these constructions require further investigation, [**50a**] and [**50b**] appear to indicate topicalisation, whereas [**50c**] and [**50d**] are consistent with the separation of a preverbal focus from other constituent- internal material both to its right, as in [**50c**], and to its left, as in [**50d**]. This separation from preceding as well as from following material indicates that discontinuous constituency is motivated by a separate tendency to those captured with the constraints ***XP$_{FOC}$V*** and ***DITINIT*** and with the annotations in [**34**] and [**35**], which prevent the occurrence of non-focal material between a preverbal focus and the verb and of clause-internal non-topical material to the right of a discourse-inactive topic respectively; as discussed in the previous subsection, the annotations in [**34**] and [**35**] permit such material in both cases if it occurs within the same XP as the focused or topical terminal node.

50) a) Ramden=ze ilaparaḳa piṭer-ma naxaṭ=ze
how.many=about speak.PST.3SG Peter-NARR icon=about
'How many icons did Peter speak about?'

b) ç̣inadadeba piṭer-s bevr-i akvs garčeuli
sentence.NOM Peter-DAT many-NOM have.PRS.3SG analyse.PSTP
'Peter has analysed many sentences.'

c) ç̣itel-i naxa piṭer-ma sam-i ç̣ign-i
red-NOM see.PST.3SG Peter-NARR three-NOM book-NOM
'Peter saw three red books.'

(Adapted from Fanselow and Féry 2006:73,49)

d) gvar-i ar vutxari čem-i
surname-NOM NEG tell-PAST-1SG my-NOM
'I didn't tell him my surname.'

(Meurer 2009:8)

The annotation to preverbal XPs in [**51**] specifies that, if the XP contains a terminal node with the value + for its semantic attribute PROM, and if the XP has more than one terminal node, then MARK3 is a member of o-structure. This performs the role of ***PROMSEP*** by penalising the appearance of foci and discourse-inactive topics as part of complex constituents.

51) $$\mathrm{S} \rightarrow \underset{\substack{\exists x.x \in T(*) \wedge (f\sigma X \text{ SA PROM})=+) \\ \wedge |T(*)|>1 \\ \Rightarrow \text{MARK3} \in o*)}}{\mathrm{XP}^*} \quad \mathrm{V} \quad \mathrm{XP}^*$$

PROMSEP is opposed by the equally ranked constraint ***CONSTINT***, which militates against discontinuous constituents. Meurer (2007, 2009) demonstrates the usefulness of the LFG framework for representing the discontinuous constituent in [**50d**] as two separate constituents at c-structure which nonetheless map to the same f-structure; this is illustrated in Figure 123.

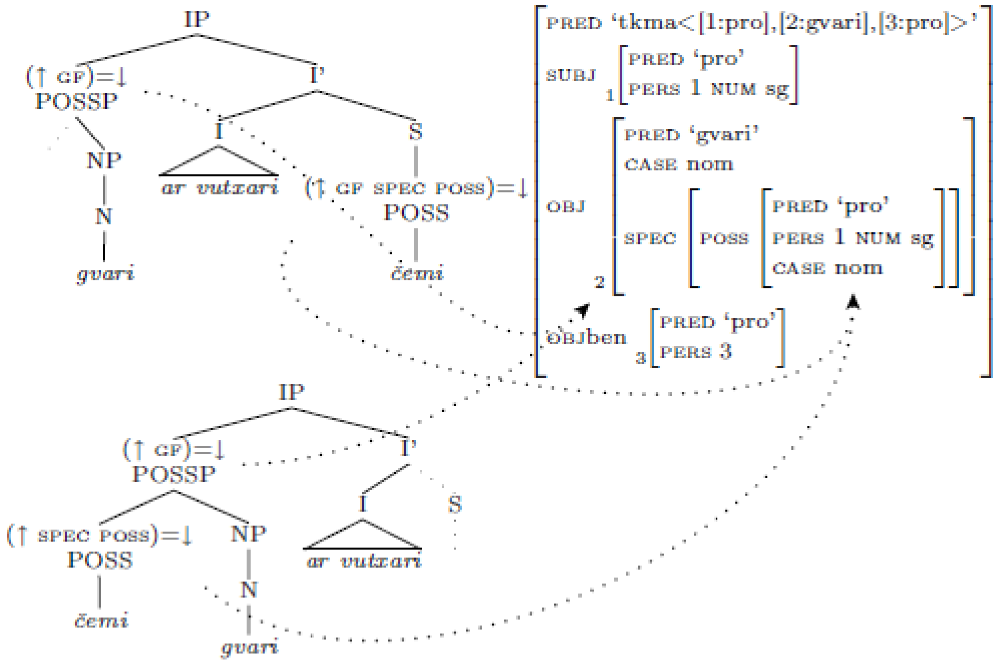


Figure 123: Mapping of discontinuous constituent to f-structure (Meurer 2009:9). Reprinted by permission from Springer Nature: Springer, Berlin, Heidelberg, *Logic, Language, and Computation: 7th International Tbilisi Symposium on Logic, Language, and Computation, TbiLLC 2007, Tbilisi, Georgia, October 1-5, 2007. Revised Selected Papers*, A Computational Grammar for Georgian, Paul Meurer, 2009, https://doi.org/10.1007/978-3-642-00665-4_1

The shared sub f-structures of discontinuous constituents in examples like these forms the basis for the annotation to S in [**52**]. This states that, if a daughter of S is not a grammatical function within the corresponding f-structure of S, then MARK3 is a member of the optimality mark set of the clause's associated o-structure.

52) $$\underset{\substack{\exists x.x \in D(*) \wedge fx \neq \downarrow GF \\ \Rightarrow MARK3 \in o*}}{S} \rightarrow XP^{*} \quad V \quad XP^{*}$$

The interaction of the annotations in [**51**] and [**52**] is shown in Figure 124. On the assumption that the object *gvari* is in focus in this construction and its associated possessor *chemi* part of the background material, the first candidate satisfies PROMSEP but violates CONSTINT, so, as per the annotation in [**52**], incurs a MARK3 at o-structure. Conversely, the second candidate satisfies CONSTINT but violates PROMSEP, and so incurs a MARK3 at o-structure in accordance with the annotation in [**51**].

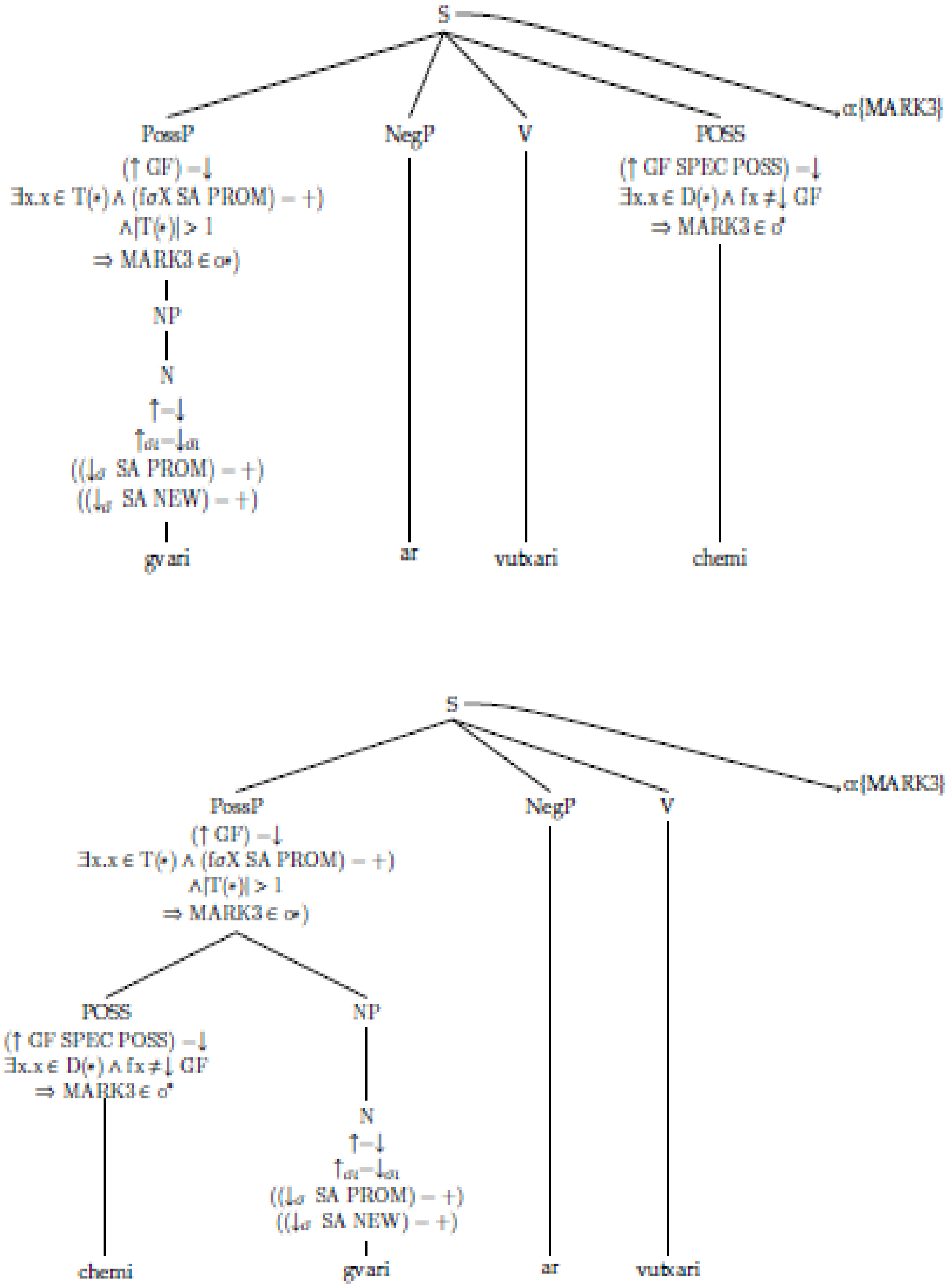


Figure 124: O-structures for discontinuous and continuous constituents

In this subsection I have presented a further 6 annotations to c-structure to capture the set of 6 violable syntactic constraints proposed in the previous chapter: ***SJINIT***, ***GINIT***, ****DNPRSINIT***, ***FMARK***, ***PROMSEP*** and ***CONSTINT***. Together with the annotations proposed for the inviolable constraints in the previous subsection, this completes the articulation of the limited extent to which syntax contributes to the encoding of discourse relations in sentence form in Georgian according to my proposals[72]. In the next section I will turn to modelling the relationship I Georgian between information structure and prosody. As I have argued in this thesis, it is prosodic structure, and the association between words and the heads of prosodic phrases in particular, which performs the major role in expressing discourse features in sentence form, both in Georgian and in other languages.

6.2 Prosody

6.2.1 Georgian

In the previous chapter I presented a set of prosodic Optimality-Theoretic constraints to model the relationship between information structure and prosody in Georgian. These consist of a set of 6 inviolable constraints: ***APHI***, ***DIipH*** and ***IPHF***, ***EXHAUSTIVEPROSODICPARSING*** (***EPP***), adopted from Féry (2011), ***HSEP*** and ***EMPH***, and a single violable constraint, ***NOPHRASE*** (***NOP***), also adopted from Féry (2011); these are repeated with their definitions in Table 92. The first three of these constraints model the association of words with the heads of different prosodic phrases according to their discourse properties, which have argued to be the chief means by which discourse features are realised in the sentence, both in Georgian and in other languages.

[72] An exception is a further set of c-structural annotations presented in the next section, which are required to associate discourse features with a word in accordance with the status of its associated syllables at p(rosodic)-structure.

Table 92: Inviolable and violable prosodic constraints proposed for Georgian

Inviolable	***APHI*** *Align all discourse items with the head of an AP phrase.*
	DIipH *Align all discourse-inactive items minimally with the head of an ip phrase.*
	IPHF *Align IP heads with a focus.*
	EMPH *Align a discourse-inactive constituent minimally with the head of an IP phrase.*
	HSEP *Any phrase heads separating the head of a phrase from its right phrase boundary must be at least two phrase levels beneath it.*
	EXHAUSTIVEPROSODICPARSING (***EPP***) (Féry 2011) *A grammatical sentence is parsed entirely in prosodic domains.*
Violable	***NOPHRASE*** (***NOP***) (Féry 2011) *Avoid the proliferation of prosodic domains; higher ones are worse than lower ones.*

As discussed, neither of the LFG models of Georgian presented by Meurer (2007, 2009) and by Wier (2014) includes the role of prosody in expressing discourse relations, although Meurer for example mentions that topic and focus are not coded exclusively configurationally (that focus may be ambiguous if there are constituents both in front of and following the verb) and that intonation can also be used to mark focus. In what follows I will first discuss the development of the level of p(rosodic)-structure within the LFG architecture, and in particular some more recent proposals from Dalrymple and Mycock (2011) and Mycock and Lowe (2013) with respect to the relationship between p-structure, c-structure and i-structure. I then present my model of prosody and information structure in Georgian, which includes some proposed modifications to these proposals which reflect my arguments from chapter 2 concerning the preferability of head-association to boundary-alignment in modelling the relationship between these levels of structure, as well as the primacy of prosody in this relationship more generally. As in the previous chapter, I then show how these proposals can likewise be used to model both other ‘stress’ languages and ‘alignment’ languages.

In the previous section I discussed several sets of proposals concerning the relationship between c-structure and i-structure, including those of King (1995, 1997) and of Dalrymple and Nikolaeva (2011), both of which discuss the partial dependence of this mapping on the prosodic features of the sentence. One of the first versions of an independent structural level for representing prosodic information in LFG is presented by Butt and King (1998). Their proposed p-structure employs the attribute-value matrix format used in f-structure, s-structure and d-structure to represent prosodic phrases and the tonal features associated with them. This is used to capture the distinctive prosodic realisations of literal and idiomatic readings of Bengali sentences such as [**53**][73].

53) ami b^hut dek^h-l-am.
I ghost see-PST-1SG
a) ‘I was startled.’
b) ‘I saw a ghost.’

(Butt and King 1998:8)

In the idiomatic reading in [**53a**], the object and the verb are taken to form a single phonological phrase together, whereas in the literal reading [**53b**] they are taken to each form separate phonological phrases. Butt and King’s (1998) representation of the idiomatic reading of [**53**] in their proposed p-structure format is shown in Figure 125. Included are representations of the tonal properties of prosodic phrases as values of the attributes TONE and BND-TONE (boundary tone).

[73] The distinctive phonological phrasings are taken to reflect distinctive syntactic constituencies. See Butt and King (1998) for details of the relationship between prosodic and syntactic constituency posited in their analysis.

$$\begin{bmatrix} \text{DOM} & \text{INTONATIONAL - PHRASE} \\ & \left\{ \begin{array}{l} \begin{bmatrix} \text{DOM} & \text{P - PHRASE} \\ & \left\{ \begin{bmatrix} \text{DOM} & \text{P - WORD} \\ \text{P - FORM} & \text{ami} \end{bmatrix} \right\} \end{bmatrix} \\ \begin{bmatrix} \text{DOM} & \text{P - PHRASE} \\ & \left\{ \begin{array}{l} \begin{bmatrix} \text{DOM} & \text{P - WORD} \\ \text{P - FORM} & \text{b}^{\text{h}}\text{ut} \end{bmatrix} \\ \begin{bmatrix} \text{DOM} & \text{P - WORD} \\ \text{P - FORM} & \text{dek}^{\text{h}}\text{lam} \end{bmatrix} \end{array} \right\} \end{bmatrix} \end{array} \right\} \\ \text{TONE} & \text{HIGH} \\ \text{BND - TONE} & \text{LOW} \end{bmatrix}$$

Figure 125: P-structure for idiomatic reading [52a] (Butt and King 1998:8)

Whilst the AVM format proposed by Butt and King (1998) has the benefit of enabling the representation both of information on prosodic constituency and of information on the prosodic attributes of these constituents, O'Connor (2006) argues that a preferable format for LFG p-structure is the tree representation of prosodic structure found in much of the literature on prosody, for example Nespor and Vogel (1986). This format, he points out, permits the direct association of prosodic information with the relevant text, without the necessity of an interface with phonological structure which is a necessity of the AVM format. Much as c-structure is assembled from phrase structure rules, the tree-based representation of p-structure proposed by O'Connor (2006) is assembled from tune structure rules, which specify how hierarchically organised prosodic constituents are constituted in terms of tonal events of the type posited by Autosegmental-Metrical theory. The prosodic phrase structure rules in [**54**] state that an intonational contour consists of an IP boundary tone t% with at least one ip tune, marked by a phrase accent t^-, which in turn contains at least one pitch accent t*. t*, t^- and t% represent unspecified pitch accents, (ip) phrase accents and boundary tones. These may be simplex tones or complex tones.

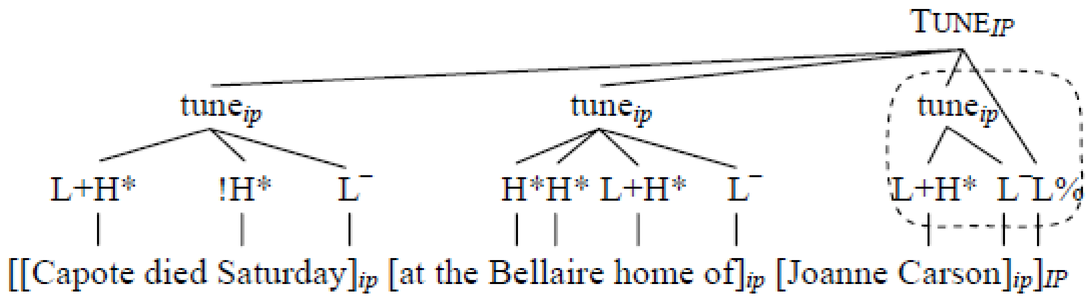
54) $n \geq 1$

a) $\text{TUNE}_{\text{IP}} \rightarrow \text{tune}_{\text{ip}}{}^{n}\ \ t\%$
b) $\text{tune}_{\text{ip}} \rightarrow t^{*n}\ \ t^{-}$

(O’Connor 2006:142)

An example of a tree-based p-structure representation assembled from these tune structure rules is provided in [**55**] below.

55)



(O’Connor 2006:143)

Like the AVM format, the tree format permits the representation both of prosodic constituency and of associated tonal features. In addition, just as phrase structure rules like those proposed by King (1997) permit a straightforward annotation from c-structural nodes to discourse functions at i-structure (as discussed above), so do tune structure rules permit a straightforward annotation from tonal features to d(iscourse)-structure, the level of structure upon which O’Connor (2006) represents information about discourse relations. O’Connor (2006) first proposes the annotation from ip tunes to discourse relations in [**56**]. This specifies that the rightmost ip tune contained within the IP tune of a tonal contour (which may be the only ip tune in the contour) maps to the FOCUS set at d-structure. Any further ip tunes in the contour to the left of the rightmost ip tune (of which there may be several) map to the TOPIC set at discourse structure.

56)

$$\text{TUNE}_{IP} \rightarrow \left(\begin{array}{c}\text{tune}_{ip}\\ \downarrow_d \in \{\uparrow_d\text{TOPIC}\}\end{array}\right)^{*} \quad \begin{array}{c}\text{tune}_{ip}\\ \downarrow_d \in \{\uparrow_d\text{FOCUS}\}\end{array} \quad \text{t\%}$$

(O’Connor 2006:171)

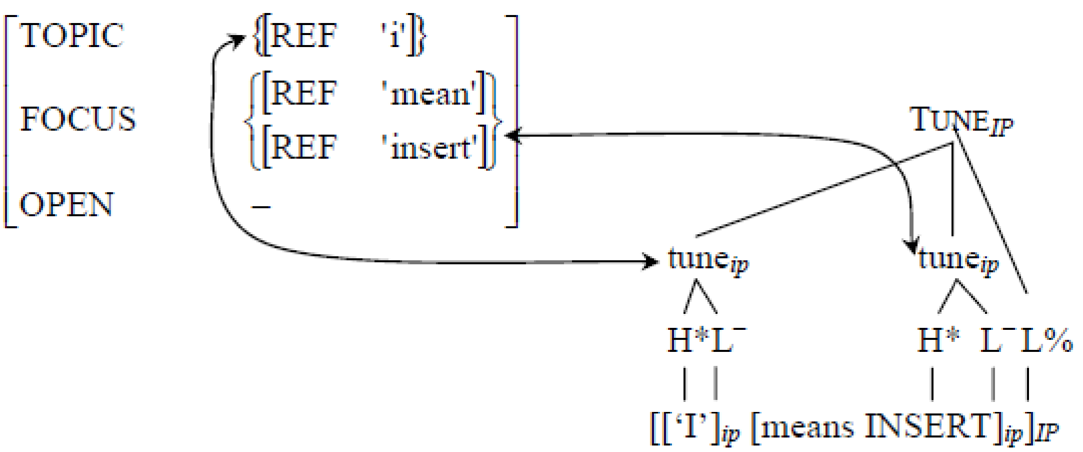
To demonstrate how this mapping works, O’Connor (2006) begins with straightforward examples of double ip tune constructions in which the ip constituents of the sentence correspond directly to TOPIC and to FOCUS sets at d-structure respectively, such as [**57**].

57) [[I]$_{ip}$ [means INSERT]$_{ip}$]$_{IP}$

(Beckman and Ayers 1997:11 (p167))

In [**57**], ‘I’ is an inactive topic and ‘means INSERT’ the focus. This d-structure is captured straightforwardly by the annotations from prosodic constituents proposed in [**53**], and yields the d-structure in [**58**][74].

58)



(Adapted from O’Connor 2006:168)

One of the further aspects of p-structure which O’Connor (2006) annotates for its contribution to d-structure is the pitch accent, t*. This specifies that the ±ACTVN feature of an associated referent is +ACTVN, or discourse-inactive. However, O’Connor (2006)

[74] The value – for the OPEN attribute refers to the declarative status of the utterance (see O’Connor 2006:157)

specifies that such a mapping applies only to pitch accents which are borne by topical referents, arguing on the basis of examples like [**59**] that it is possible for accented focus referents to have the value –ACTVN, making such a mapping inappropriate for them:

59) Q: Among John, Mary and Tom, who is the oldest?
A: TOM is the oldest.

(Kuno 1972: 272)

The annotation from pitch accent to d-structure thus proposed is a conditional mapping given in [**60**]. This annotation specifies that, if the tune$_{ip}$ which contains the t* in question corresponds to a member of the TOPIC set at d-structure, then the pitch accent specifies the feature +ACTVN for that member.

60) tuneip → t* t^-

(↑$_d$ ∈ {(DF↑$_d$) TOPIC}) ⇒ (↑$_d$ACTVN = +)

(O'Connor 2006:175)

O'Connor's (2006) restriction of the prosodic specification of the feature +ACTVN to topic expressions contrasts with Lambrecht's (1994) unified account of sentence accentuation, according to which discourse-inactive items may be topical or focal. A treatment of the feature of discourse-inactiveness as a necessary value both of inactive topics and of foci, as I do by adopting the feature +PROM as a property of both, permits the underspecification of d-structure in some sentence forms to be captured straightforwardly.

Under O'Connor's (2006) proposals, discourse-active referents with the feature –ACTVN at d-structure are not associated with a pitch accent and in fact have no correspondent at p-structure. As such, their discourse properties are specified, not by annotations from p-structure, but instead by c-structure and other dimensions. For example, O'Connor proposes that pronouns are associated with the expression of active referents, and can therefore be annotated ‘($\uparrow_d$ACTVN) = -’, although he leaves the full specification of d-structure from dimensions other than p-structure to further research (O’Connor 2006:181). Whilst pronouns have been associated with ‘active’ referents by Chafe (1976, 1987) and others, it is clear that they may also be associated with ‘inactive’ referents, as the examples in [**61**] demonstrate. In [**61a**] the pronoun has a discourse-inactive topic interpretation, and in [**61b**] a focus interpretation.

61) a) IT’s not the PROBLEM.
    b) I want IT.

As such, it appears it is not the pronominal encoding of the referent that is responsible for its being marked as active, but rather its prosodic status as unaccented. Furthermore, it is unclear how unaccented lexical nouns are to be linked to their active status at d-structure, unless they are to be annotated this way by default in the absence of prosodic information to the contrary.

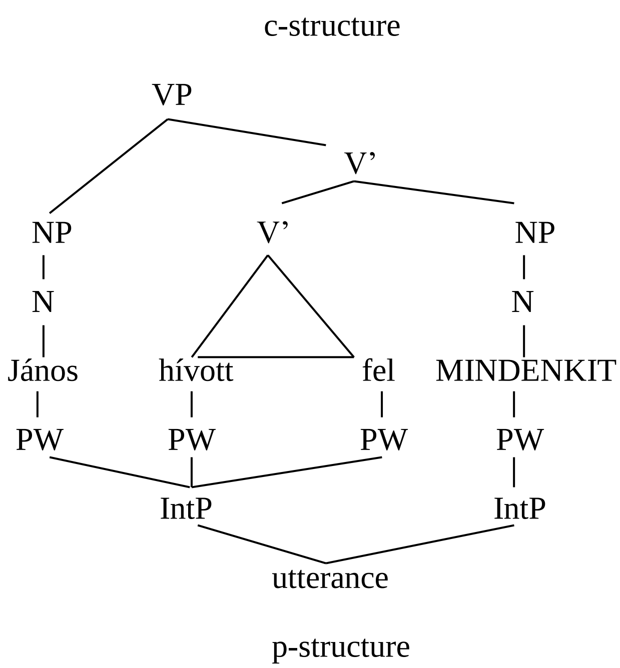
O’Connor’s (2006) proposals for tune structure therefore have the problem that they are unable to capture the crucial role of the absence of tonal features as a prosodic means of marking discourse relations. In addition, the tune structure rules as he proposes them are restricted to capturing the intonational properties of prosody, although he states that p-structure may be extended to capture other aspects of prosody (O’Connor 2006:144-145).

Solutions to both of these problems are provided by the alternative version of p-structure and its mapping to d-structure proposed by Mycock (2006). Noting that O’Connor (2006) models p-structure only insofar as it is manifested in the form of tonal events, Mycock (2006) presents an alternative p-structure which is constructed, not from tonal features, but directly from prosodic constituents. These include as the basic unit of p-structure the prosodic word (PW), which Mycock (2006:72) defines for her purposes as corresponding to an orthographic word in the languages she examines. Shown in **[63]** is a dual representation of the p-structure and c-structure proposed by Mycock (2006) for the Hungarian sentence in [**62**].

62) [János hív-ott fel]$_{IntP}$ [MINDENKI-T]$_{IntP}$
John.NOM call-PAST.3SG VM everyone-ACC
'John called everyone.'

(Adapted from Mycock 2006:74)

63)



(Adapted from Mycock 2006:74)

The prosodic features associated with prosodic phrases, tonal or otherwise, are specified separately as properties of them. Prosodic constituents can be annotated to i-structure based on these properties. The rule in [**64**] states that a prosodic word is a member of the FOCUS set at d-structure if it has an expanded pitch range *e*, and that such a prosodic word may be followed by any number of prosodic words with the property of compressed pitch range *c*. Mycock's (2006) formalism uses the symbol ξ to indicate the mapping function from p-structure. Also to be noted are her use of the symbol β to indicate the mapping function from p-structure to p-form, and of the arrows ↗ and ↙ in place of the arrows ↓ and ↑ respectively to represent the p-structure node in question and its mother in the inverted p-structure representation.

64) Basic rule of American English FP (based on Xu and Xu 2005)

Focus Contour →	PW	PW*
	↙ βPR = e	↙ βPR = c
	↗ ∈ (↙ ξFOCUS)	

(Mycock 2006:76)

This approach to p-structure enables the inclusion of non-tonal prosodic features such as duration which, unlike individual tones, cannot straightforwardly be represented in isolation from the units with which they are associated. Furthermore, this approach permits the discourse status of unaccented material to be marked by virtue of its lack of prosodic prominence, rather than by other aspects of its form.

As discussed in section 5.2.3.2 of the previous chapter, however, Lahiri and Plank (2010) show that the lack of isomorphism between the units of prosody and syntax can be more extensive still, in that syntactic and prosodic words do not always correspond; an illustration of this in English is repeated in [**65**].

65) 'Anna was studying at the university.'
(IntP (PhP (PW 'æ.nə.wəz.)) (PhP (PW 'stʌ.di.ɪŋ.ət.də.ju.nə.)) (PhP (PW 'vɜː.sə.ti)))

(Dalrymple and Mycock 2011:180)

Dalrymple and Mycock (2011) point out that this lack of isomorphism has significant consequences for the mapping in LFG of information from prosodic structure to other levels. Whereas the assumption in Connor's (2006) and in Mycock's (2006) proposals of a one-to-one correspondence between prosodic units and words permits prosodically encoded discourse information about a word to be communicated using annotations to d-structure or to i-structure respectively which are applied directly to the prosodic units corresponding to the words, such annotations are not possible in the case of examples like [**65**]. In response to this issue, Dalrymple and Mycock (2011) propose a set of significant modifications to the LFG architecture which maintain strict modularity whilst still allowing information to be shared between the different levels of structure. Under their proposals, an entry in the LFG lexicon is expanded; rather than providing only a single, syntax-related form as discussed in the previous section, they propose it include a s(yntactic)-form and a p(honological)-form for a given word. As shown in Figure 126 for the sentence in [**65**], whereas the s-form and f-form of a lexical entry include syntactic information, its p-form contains phonologically relevant information, including its segmental composition, syllable structure and stress pattern; this is represented by the annotation of syllables s (strong), w (weak) or unannotated, signifying that stress is unspecified at this level.

(3) Lexical entries

s-form	Anna	was	studying
f-descrip	N (↑PRED) = 'Anna'	I	V (↑PRED) = 'study⟨SUBJ⟩'
p-form	/æ$_S$.nʌ$_W$/	/wɒz/	/stʌ$_S$.di$_W$.ɪŋ$_W$/

at	the	university
P (↑PRED) = 'at⟨OBJ⟩'	D (↑SPEC) = 'the'	N (↑PRED) = 'university'
/æt/	/ði/	/ju$_W$.nɪ$_W$.vɜː$_S$.sɪ$_W$.ti$_W$/

Figure 126: Lexical entries including s-forms and p-forms (Dalrymple and Mycock 2011:177)

Each of the s-forms and p-forms of the lexical items featuring in a sentence projects to corresponding forms in the s-string and in the p-string respectively. The units of the s-string are words, whereas the units of the p-string are syllables. C-structure is projected from the s-string via the pi function. This is illustrated in Figure 127 for the sentence in [**65**].

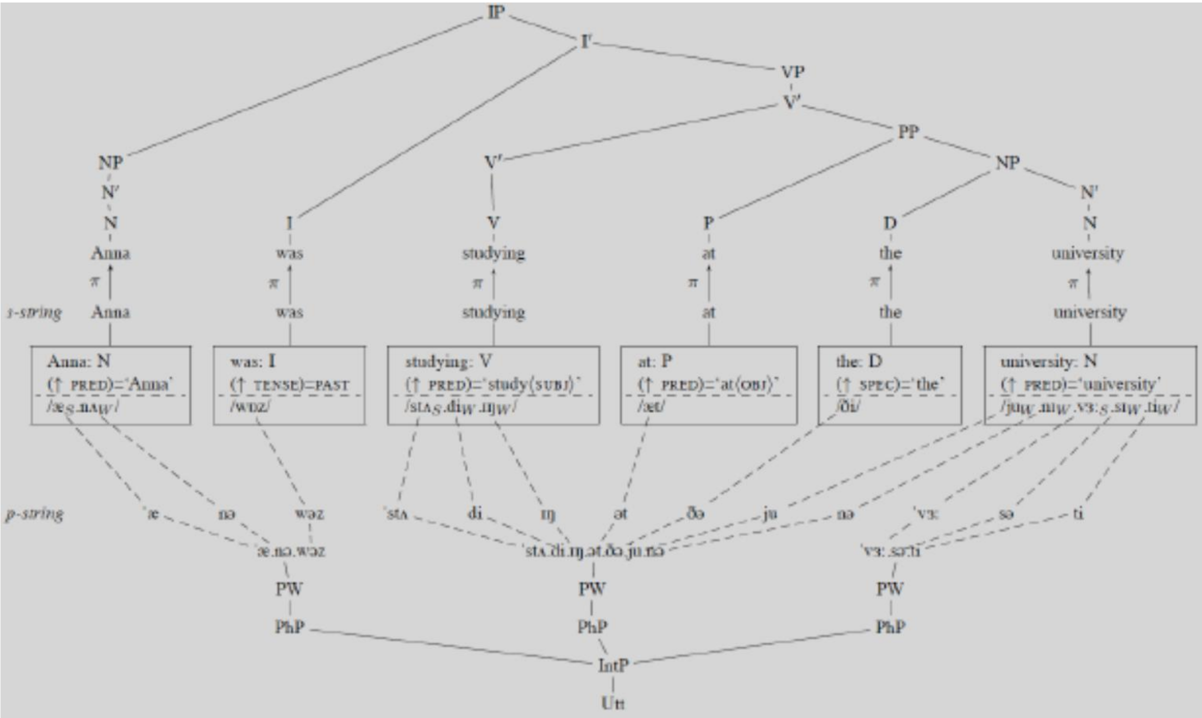


Figure 127: Projection of s-string and p-string from s-forms and p-forms (Dalrymple and Mycock 2011:181)

In order for the syntactic and prosodic aspects of sentence structure to have access to information about each other, Dalrymple and Mycock (2011) propose a further two levels of structure: e(psilon)-structure and chi-structure, upon which interface-relevant information about syntax and prosody is represented. Both each c-structural node and each word in the s-string has an associated e-structure, represented in the form of an AVM, which is projected from these via the ε function. Analogously, p-structural nodes and each of the syllables of the p-string project to chi-structure via the χ function. The proposed architecture is shown in Figure 128.

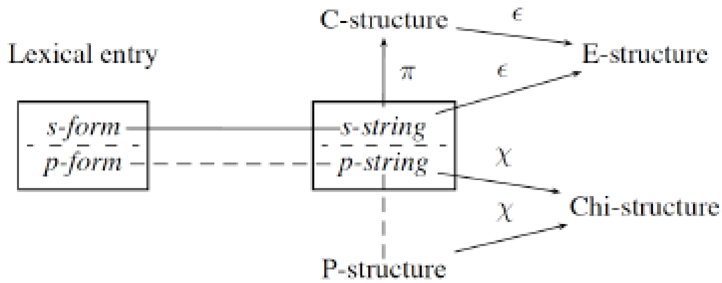


Figure 128: Place of e- and chi-structures in the architecture (Dalrymple and Mycock 2011:184)

Their first illustration of the role played by these structures is the means by which syntactic and prosodic boundaries are permitted to be aligned in careful speech. The rules in [**66**] ensure that information about the syntactic boundaries with which each of these syntactic units is aligned is passed down the c-structure into the relevant unit's e-structure from that of its mother, and finally into the e-structures of the s-string forms corresponding to the c-structure's terminal nodes. Specifically, the e-structural AVM corresponding to a c-structural node contains the names of those units with which the node is left-aligned, including the present node, in an L AVM, and the names of those units which which the node is right-aligned, including itself, in an R AVM.

66)

$$
\begin{array}{llll}
\mathrm{Cat} & \rightarrow & [\quad \Sigma & \Sigma^*] \\
 & & (\uparrow_{\varepsilon} \mathrm{L}) \sqsubseteq (\downarrow_{\varepsilon} \mathrm{L}) & \\
 & \& & [\Sigma^* & \Sigma \quad] \\
 & & & (\uparrow_{\varepsilon} \mathrm{R}) \sqsubseteq (\downarrow_{\varepsilon} \mathrm{R})
\end{array}
$$

For XPs:

$$
\begin{array}{llll}
\mathrm{XP} & \rightarrow & [\quad \Sigma & \Sigma^*] \\
 & & (\uparrow_{\varepsilon} \mathrm{L}) \sqsubseteq (\downarrow_{\varepsilon} \mathrm{L}) & \\
 & & \mathrm{XP} \in (\downarrow_{\varepsilon} \mathrm{L}) & \\
 & \& & [\Sigma^* & \Sigma \quad] \\
 & & & (\uparrow_{\varepsilon} \mathrm{R}) \sqsubseteq (\downarrow_{\varepsilon} \mathrm{R}) \\
 & & & \mathrm{XP} \in (\downarrow_{\varepsilon} \mathrm{R})
\end{array}
$$

(Adapted from Dalrymple and Mycock 2011:193)

Prosodic information is gathered and represented in an analogous way; p-structural nodes and each of the syllables of the p-string project to chi-structure via the χ function, and alignment information passes down through p-structure and ultimately into the p-string according to the rules in [**67**].

67)

$$
\begin{array}{llll}
\mathrm{IntP} & \rightarrow & [\quad \mathrm{PhP} & \mathrm{PhP}^*] \\
 & & \mathrm{IntP} = (\downarrow_{\chi} \mathrm{L}) & \\
 & \& & [\mathrm{PhP}^* & \mathrm{PhP} \quad] \\
 & & & \mathrm{IntP} \in (\downarrow_{\chi} \mathrm{R}) \\
 & & & \\
\mathrm{PhP} & \rightarrow & [\quad \mathrm{PW} & \mathrm{PW}^*] \\
 & & (\uparrow_{\chi} \mathrm{L}) \sqsubseteq (\downarrow_{\chi} \mathrm{L}) & \\
 & & \mathrm{PhP} \in (\downarrow_{\chi} \mathrm{L}) & \\
 & \& & [\mathrm{PW}^* & \mathrm{PW} \quad] \\
 & & & (\uparrow_{\chi} \mathrm{R}) \sqsubseteq (\downarrow_{\chi} \mathrm{R}) \\
 & & & \mathrm{PhP} \in (\downarrow_{\chi} \mathrm{R}) \\
 & & & \\
\mathrm{PW} & \rightarrow & \mathrm{Syll}^{+} & \\
 & & \uparrow_{\chi} \sqsubseteq \downarrow_{\chi} & \\
 & & \mathrm{PW} \in (\downarrow_{\chi} \mathrm{L}) & \\
 & & \mathrm{PW} \in (\downarrow_{\chi} \mathrm{L}) &
\end{array}
$$

(Adapted from Dalrymple and Mycock 2011:192)

The alignment information on s-string and p-string units stored as a result in e-structure and in chi-structure respectively, illustrated in Figure 129, provides a means for the degree of alignment between the kinds of structure to be determined and controlled.

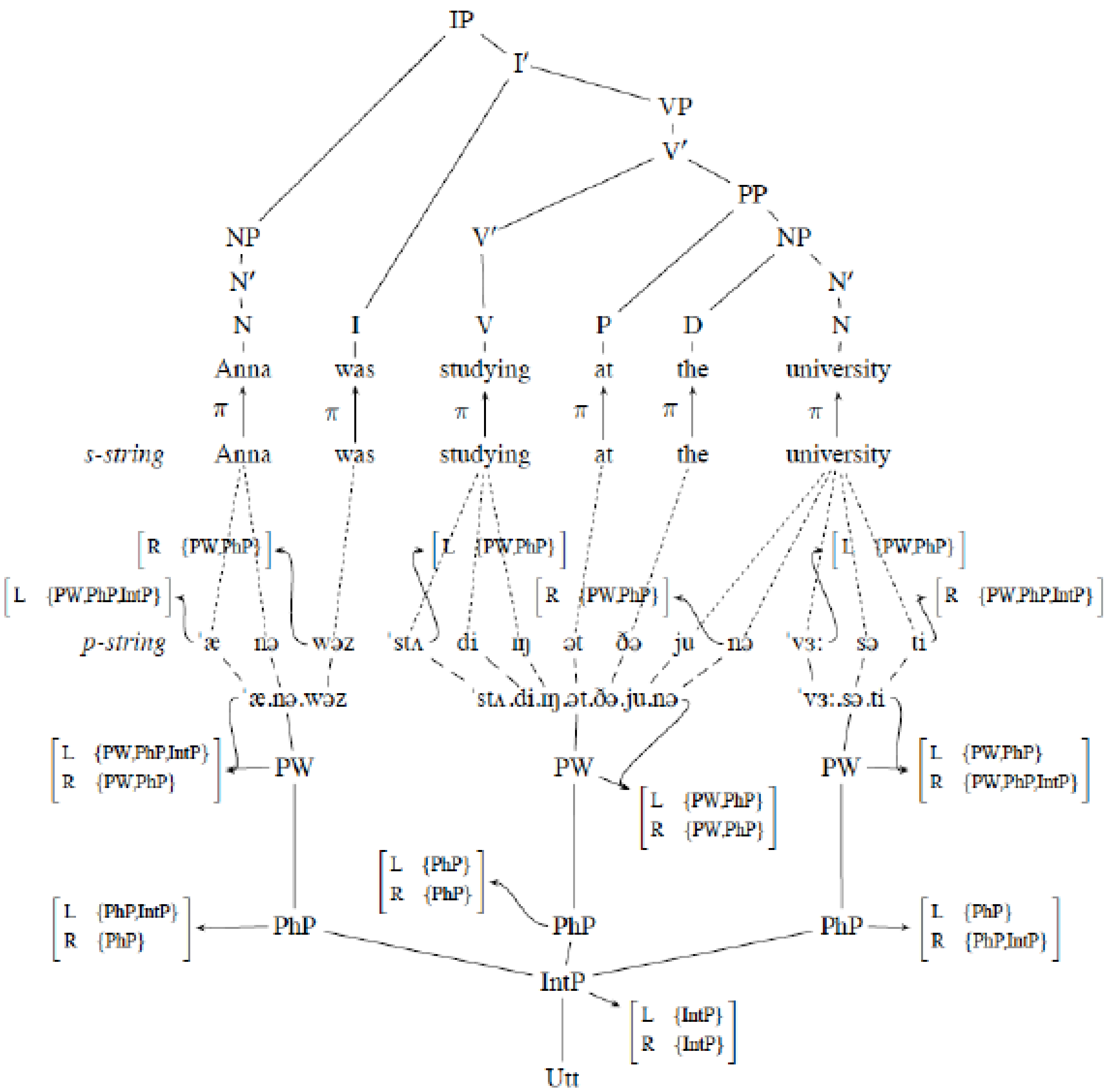


Figure 129: e- and chi-structures with stored phrase boundary information (Dalrymple and Mycock 2011:185)

Dalrymple and Mycock's (2011) second illustration of the role of the e- and chi-structures is the communication of semantic information between s-structure and its p-structural expression. Following Dalrymple and Nikolaeva (2011) discussed above,at upper levels, semantic structure is projected from f-structure, which is projected from c-structure. This is shown in Figure 130.

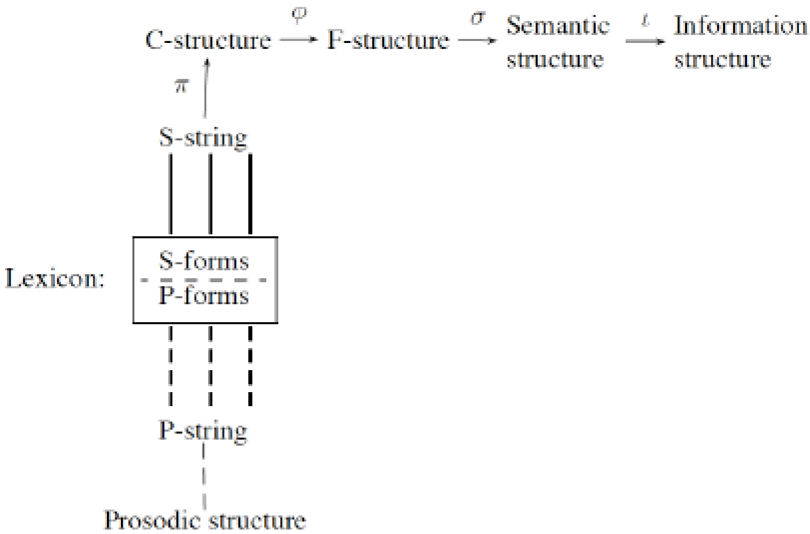


Figure 130: Position of s- and i-structures (Dalrymple and Mycock 2011:178)

In accordance with the architecture in Figure 130, the relationship between semantics and prosody proposed by Dalrymple and Mycock (2011) is not a direct one, as in the proposals of Butt and King (1998), O'Connor (2006) and Mycock (2006), but is instead mediated by f-structure and by c-structure, in addition to e-structure and chi-structure. Sharing of information between the levels of e-structure and chi-structure in a way that maintains the separation between syntactic and prosodic levels of organisation is achieved using the principle of 'semantic harmony'. According to this principle, information about a meaning contribution associated at e-structure with one or both edge AVMs of a word in the s-string is matched by the same information in the chi-structural AVM of the corresponding p-structural syllable, and vice-versa.

Using the example of declarative question intonation, Dalrymple and Mycock (2011) propose that the relevant meaning contribution, [**PolarInt**][75], is annotated at c-

[75] Proper definition $\lambda P.Ques(P)$: $\downarrow_\sigma \multimap \downarrow_\sigma$

structure to the IP node with which it is associated as a feature relating to the semantics of the entire clause; as per Figure 130, this semantic property of the clause has its representation at s-structure, which is projected from f-structure, which in turn is projected from c-structure. In order for the association of the [**PolarInt**] meaning contribution with the c-strutural IP node to be reflected in the prosody of the sentence in these proposals, information about [**PolarInt**] must be shared between syntax and prosody by the principle of semantic harmony. Dalrymple and Mycock propose that a label *Polarintsem* occupies the Right AVM of the c-structural IP node's associated e-structure. As with the communication of constituent alignment information discussed above, this meaning contribution is shared down the c-structure tree in the Right AVMs of those nodes which share the right edge IP in their e-structure AVMs, so that, in Figure 131, the *Polarintsem* label is shared down the right side of the c-structure and, consequently, also in the s-string, where is associated with the right AVM of the word 'university'. The principle of Semantic Harmony then requires that this feature be associated with the right chi-structural AVM of the corresponding prosodic unit: the final syllable of university, /ti/. By the same principles applying to e-structure, this right-hand information must be shared up the right-hand side of the p-structural tree to the right-hand AVMs of those constituents dominating the syllable corresponding to this p-string form. In this way, *Polarintsem* spreads to the right AVM of IntP, which must then exhibit those prosodic features associated with the [**PolarInt**] meaning contribution; in this case, a final rising intonational tune.

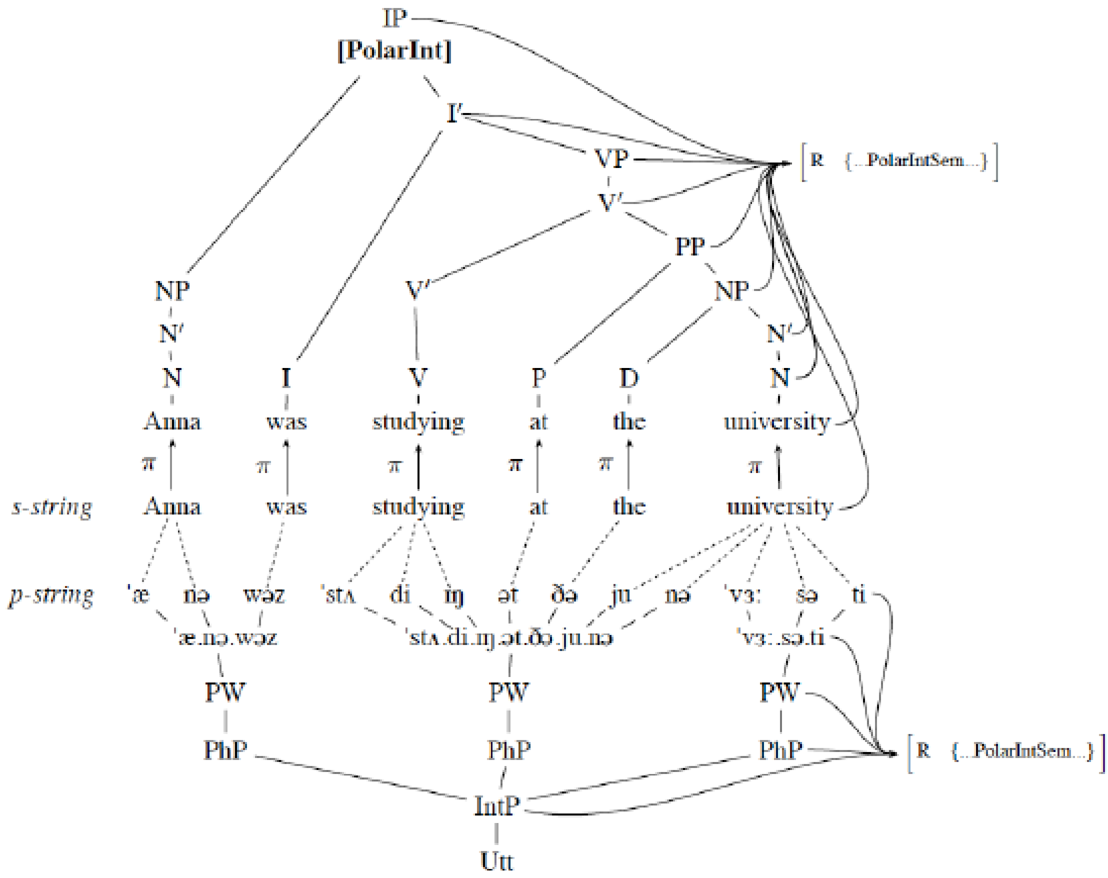


Figure 131: Transmission of the PolarIntSem meaning contribution (Dalrymple and Mycock 2011:188)

The final rising intonational tune which marks the PolarInt feature is associated with it by means of the rules in [**68**]. These specify how tonal information associated with the LBOUNDARY, RBOUNDARY and NUCLEAR attributes of prosodic phrases is shared downward to the same attributes of selected phrases dominated by them. Whilst LBOUNDARY and RBOUNDARY, the latter of which in this case has the high tone H as its value for the IntP phrase, share to the leftmost and rightmost dominated phrases respectively, the value of NUCLEAR, which in this case is a low tone L for the IntP phrase, is shared with 'the stressed syllable of the first prosodic word (PW) of the final phonological phrase (PhP) in the IntP' (Dalrymple and Mycock 2011:179).

68)

Prosodic tune specification

General form of prosodic-structure rules specifying intonational tunes:

(24) IntP $\rightarrow$ [PhP PhP*]
($\uparrow$ LBOUNDARY) = ($\downarrow$ LBOUNDARY)
& [PhP* PhP PhP*]
($\uparrow$ NUCLEAR) = ($\downarrow$ NUCLEAR)
& [PhP* PhP]
($\uparrow$ RBOUNDARY) = ($\downarrow$ RBOUNDARY)

Introducing the interrogative tune at the IntP level.

(25) IntP $\rightarrow$ PhP* PhP
($\downarrow$ NUCLEAR) = L
($\downarrow$ RBOUNDARY) = H
PolarIntSem $\in$ ($\downarrow_{\chi}$ R)

(26) PhP $\rightarrow$ [PW PW*]
($\uparrow$ LBOUNDARY) = ($\downarrow$ LBOUNDARY)
($\uparrow$ NUCLEAR) = ($\downarrow$ NUCLEAR)
& [PW* PW]
($\uparrow$ RBOUNDARY) = ($\downarrow$ RBOUNDARY)

(27) PW $\rightarrow$ [Syll Syll*]
($\uparrow$ LBOUNDARY) = ($\downarrow$ LBOUNDARY)
& [Syll * Syll]
($\uparrow$ RBOUNDARY) = ($\downarrow$ RBOUNDARY)
& [Syll* Syll Syll *]
($\uparrow$ NUCLEAR) $\Rightarrow$
($\downarrow$ SYLLSTRESS) $=_c$ PRIMARY
($\uparrow$ NUCLEAR) = ($\downarrow$ NUCLEAR)

(Dalrymple and Mycock 2011:193)

Dalrymple and Mycock's (2011) principle of semantic harmony is employed by Mycock and Lowe (2013) as the Principle of Interface Harmony to capture the expression in p-structure of discourse relations represented in i-structure. Some modifications are proposed to the architecture introduced above. Dalrymple and Mycock's (2011) e-structure and chi-structure are eliminated, on the grounds that they do not themselves represent aspects of sentential organisation, but instead serve only to mediate between structures which do. The resulting architecture is shown in Figure 132.

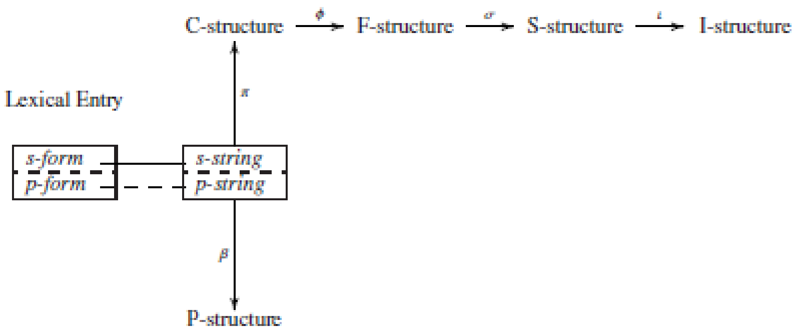


Figure 132: Modified LFG architecture (Mycock and Lowe 2013:446)

The L and R AVMs of e- and chi-structure, together with the information they contain, are instead housed within the members of the s-string and the p-string respectively, which are themselves converted from the atomic elements shown in Figure 126 to AVMs, which include a representation of their form which is the value of an attribute FM. As with the e- and chi-structures, these AVM members of the s- and p-strings form the sole point of contact between the separate prosodic and syntactic aspects of sentential organisation. Whereas, in Dalrymple and Mycock's (2011) proposals, e- and chi-structure are responsible for the sharing of information between tree nodes and string elements on each side of the syntax-prosody divide, their elimination in Mycock and Lowe's (2013) proposals requires that information be passed down from tree nodes to the AVMS of the s-string and p-string by alternative means. The passing of information from a c-structural node down to the relevant s-string AVMs is formally modelled using annotations based on those from c-structure nodes to other levels of structure, of the kind introduced in *6.1.1*. Whereas those make reference to the f-structures corresponding to the current node and its mother using the symbols ↓ and ↑, the annotations proposed by Mycock and Lowe (2013) for passing information downward are ⇙ and ⇘, which refer to the s-string AVMS corresponding to the leftmost and rightmost terminal nodes dominated by the present c-structural node. To formalise the definition of each of these symbols, Mycock and Lowe (2013) first define the relations *Dl* and *Dr* as those members of the set of daughters *D* of the current node which are not preceded by any other daughters to the left ([**69a**]) or to the right ([**69b**]) respectively.

69) a) $D_l(*) \equiv \text{node } n, \text{ where } n \in D(*) \wedge \neg\exists x.x \in D(*) \wedge x < n.$

b) $D_r(*) \equiv \text{node } n, \text{ where } n \in D(*) \wedge \neg\exists x.x \in D(*) \wedge x > n.$

(Mycock and Lowe 2013:448)

Reference to the leftmost and rightmost terminal nodes dominated by the current node is then made with the relations *Tl* and *Tr*; these are defined in [**70**] as the current node in the case that it has no daughters, or, should it have daughters, as the leftmost and rightmost terminal nodes of those daughters.

70) $T_l(*) = \begin{cases} * \text{ if } D(*) = \varnothing \\ \text{else } T_l(D_l(*)) \end{cases}$ b. $T_r(*) = \begin{cases} * \text{ if } D(*) = \varnothing \\ \text{else } T_r(D_r(*)) \end{cases}$

(Mycock and Lowe 2013:448)

On the basis of these definitions, the s-string elements corresponding to the leftmost and rightmost terminal nodes dominated by the current node, $\Swarrow$ and $\Searrow$, are defined in [**71**] as the application of the inverse of the pi function (from s-string AVMS to words) to the leftmost and the rightmost terminal nodes of the current node.

71) $\Swarrow = \pi^{-1}(T_l(*))$ b. $\Searrow = \pi^{-1}(T_r(*))$

(Mycock and Lowe 2013:448)

The symbols $\swarrow$ and $\searrow$, which have an equivalent definition in [**72**] as the inverse of the beta function (from p-string AVMs to syllables) to the leftmost and rightmost terminal nodes of the current p-structural node ◊, are used in annotations p-structural nodes to refer to the p-string AVMs corresponding to the leftmost and rightmost terminal nodes, in this case syllables, dominated by the present node.

72) a. $\swarrow = \beta^{-1}(T_l(\diamond))$ b. $\searrow = \beta^{-1}(T_r(\diamond))$

(Mycock and Lowe 2013:449)

Reference is also made to the p-string AMVs corresponding to the leftmost and rightmost stressed syllables dominated by the present node. This is achieved with the symbols $\swarrow^{s}$ and $\searrow^{s}$. The definitions for these, given in [**73**], are based on the relations *Tls* and *Trs*. *Tls* is defined in [**74a**] as the leftmost terminal syllable of the present p-structural node, if the AVM corresponding to this has the value p(rimary) for its attribute SYLLSTRESS, or otherwise as the syllable corresponding to the next (N) AVM to the right of this. *Trs* is similarly defined in [**74b**] as either the rightmost terminal syllable of the present p-structural node, if the AVM corresponding to this has the value p(rimary) for its attribute SYLLSTRESS, or otherwise as the syllable corresponding to the next (N^{-1}) AVM to the left of this.

73) a. $\swarrow^{s} = \beta^{-1}(T_{ls}(\diamond))$ b. $\searrow^{s} = \beta^{-1}(T_{rs}(\diamond))$

(Mycock and Lowe 2013:449)

74) a. $T_{ls}(\diamond) = \begin{cases} T_l(\diamond) \text{ if } (\beta^{-1}(T_l(\diamond))\text{SYLLSTRESS}) = \text{p} \\ \quad \text{else } T_{ls}(\beta(N(\beta^{-1}(T_l(\diamond))))) \end{cases}$

b. $T_{rs}(\diamond) = \begin{cases} T_r(\diamond) \text{ if } (\beta^{-1}(T_r(\diamond))\text{SYLLSTRESS}) = \text{p} \\ \quad \text{else } T_{rs}(\beta(N^{-1}(\beta^{-1}(T_r(\diamond))))) \end{cases}$

(Mycock and Lowe 2013:449)

The symbols $\Swarrow$ and $\Searrow$, and $\swarrow$ and $\searrow$, are used by Mycock and Lowe (2013) to model the passing of alignment information to s-string and p-string AVMs from those nodes, the boundaries of which are aligned with the syllables to which the AVMs correspond. This takes place according to the rules in [**75**] and [**76**].

75) a. For any XP, XP $\in (\Swarrow_{\text{L}})$ and XP $\in (\Searrow_{\text{R}})$

b. For any X, X $\in (\Swarrow_{\text{L}})$ and X $\in (\Searrow_{\text{R}})$

(Mycock and Lowe 2013:449)

76) for any PhP, PhP $\in (\swarrow_{\text{L}})$ and PhP $\in (\searrow_{\text{R}})$,

(Mycock and Lowe 2013:449)

This passage of edge-information is illustrated in the tree in Figure 133.

Anna hit Norman

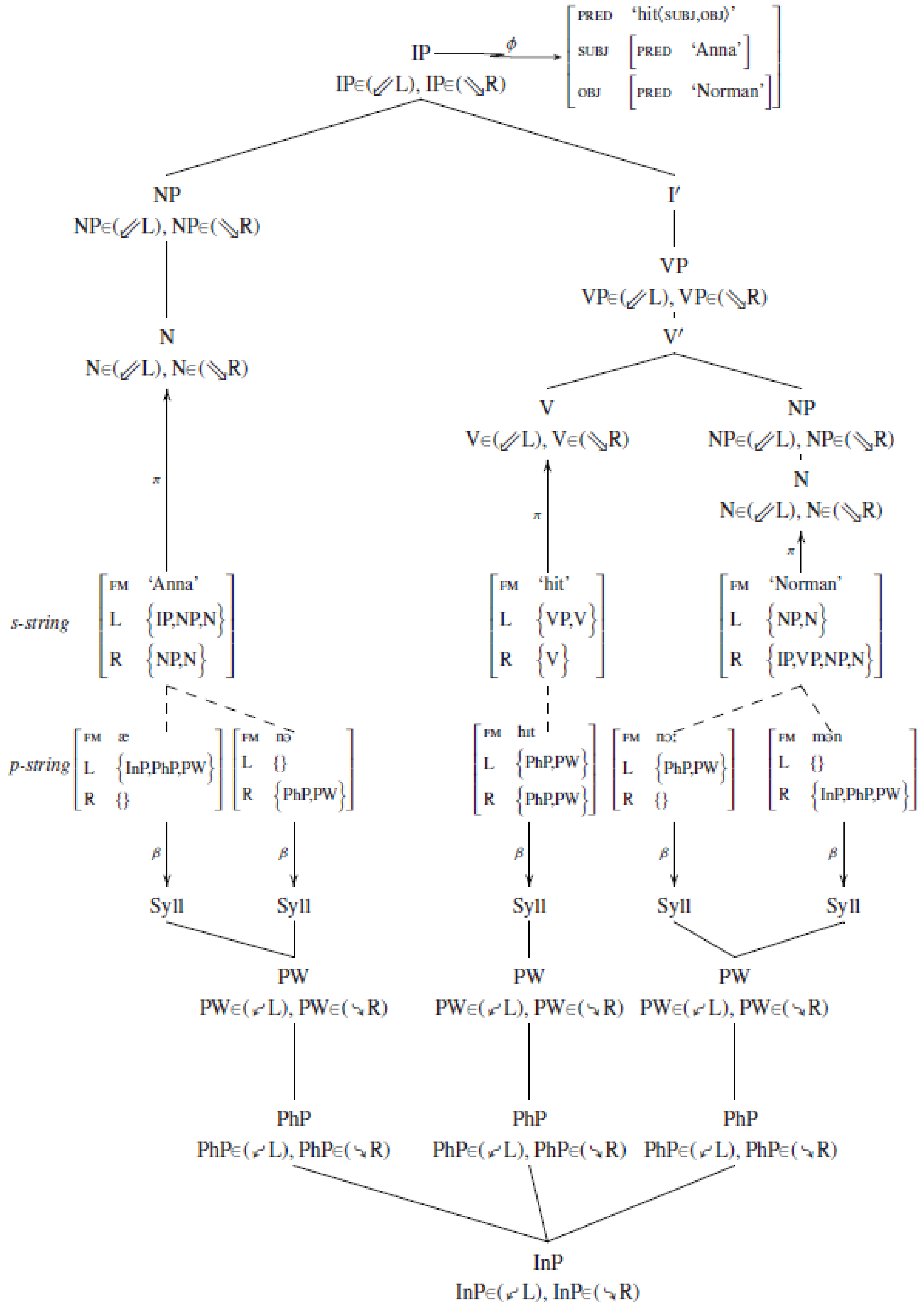


Figure 133: Passage of alignment information from tree nodes to AVMs (Mycock and Lowe 2013:447)

The same symbols are used by Mycock and Lowe (2013) for annotations capturing the prosodic expression of focus in English. The rule in [**77**] states that, if the value of the attribute N_TONE in the AVM corresponding to the rightmost stressed syllable dominated by a prosodic word has the value H, then the label *DF_FOCUS* is a member of the value set of the R attribute of the AVM corresponding to the same syllable.

77)
$$\begin{array}{llccc} \mathrm{PhP} & \rightarrow & \mathrm{PW}^{*} & \mathrm{PW} & \mathrm{PW}^{*} \\ & & & ((\searrow^{s}\textsc{n\_tone}) = \textsc{h}) \Rightarrow & \\ & & & \mathit{DF\_Focus} \in (\searrow^{s}\textsc{r}) & \end{array}$$

(Mycock and Lowe 2013:451)

By the Principle of Interface Harmony, if such a label is present within a p-string AVM, thena corresponding label must be present in the R attribute value set of the corresponding s-string AVM. The syntactic phrase structure rule in [**78**] states that any non-terminal node may be in focus, in which case a label DF_Focus is contributed to the AVM corresponding to its rightmost dominated terminal word. This captures their assumption that focus projects to syntactic phrases from their rightmost terminal daughter. It is in this way that the Principle of Interface Harmony achieves the association between prosodic focus marking of a syllable and the focal status of the corresponding word or phrase.

78)
$$\begin{array}{lll} \Sigma \rightarrow & \Sigma^{*} & \Sigma \\ & & \left(\begin{array}{l} (\uparrow_{\sigma}\textsc{df}) = \textsc{focus} \\ \mathrm{DF\_Focus} \in (\Searrow\textsc{r}) \end{array}\right) \end{array}$$

(Mycock and Lowe 2013:452)

Mycock and Lowe (2013) in addition assume that, if a syntactic phrase is in focus, then focus projects to all the daughters of that phrase. This is captured with the additional rule in [**79**], according to which, for any syntactic node at c-structure, either the meaning constructor of its mother is not focused, or both its mother’s and its meaning constructors are focused.

79) $$\Sigma \quad \rightarrow \quad \underset{\left\{ (\uparrow_{\sigma}\mathrm{DF}) \neq \textsc{focus} \;\middle|\; \begin{array}{c} (\uparrow_{\sigma}\mathrm{DF}) =_{c} \textsc{focus} \\ (\downarrow_{\sigma}\mathrm{DF}) = \textsc{focus} \end{array} \right\}}{\Sigma^{*}}$$

(Mycock and Lowe 2013:452)

In order to account for those cases in which focus does not project beyond a non-phrasal category, such as the focused finite verb, a third rule, given in [**80**], is included; according to this, any non-phrasal category X may have the FOCUS feature associated with its meaning constructor, in which case it contributes the label DF_FOCUS to the AVM corresponding to its rightmost terminal element (itself).

80) $$\Sigma \quad \rightarrow \quad \Sigma^{*} \quad \underset{\left(\begin{array}{l} (\downarrow_{\sigma}\mathrm{DF}) = \textsc{focus} \\ \mathrm{DF\_Focus} \in (\searrow \mathrm{R}) \end{array} \right)}{\mathrm{X}} \quad \Sigma^{*}$$

(Mycock and Lowe 2013:453)

The interaction of the rules in [**78**] and [**79**] is illustrated in Figure 134. The function of the rule in [**80**] is illustrated in Figure 135.

X′ Focus: *Anna [bought fudge] for Norman*

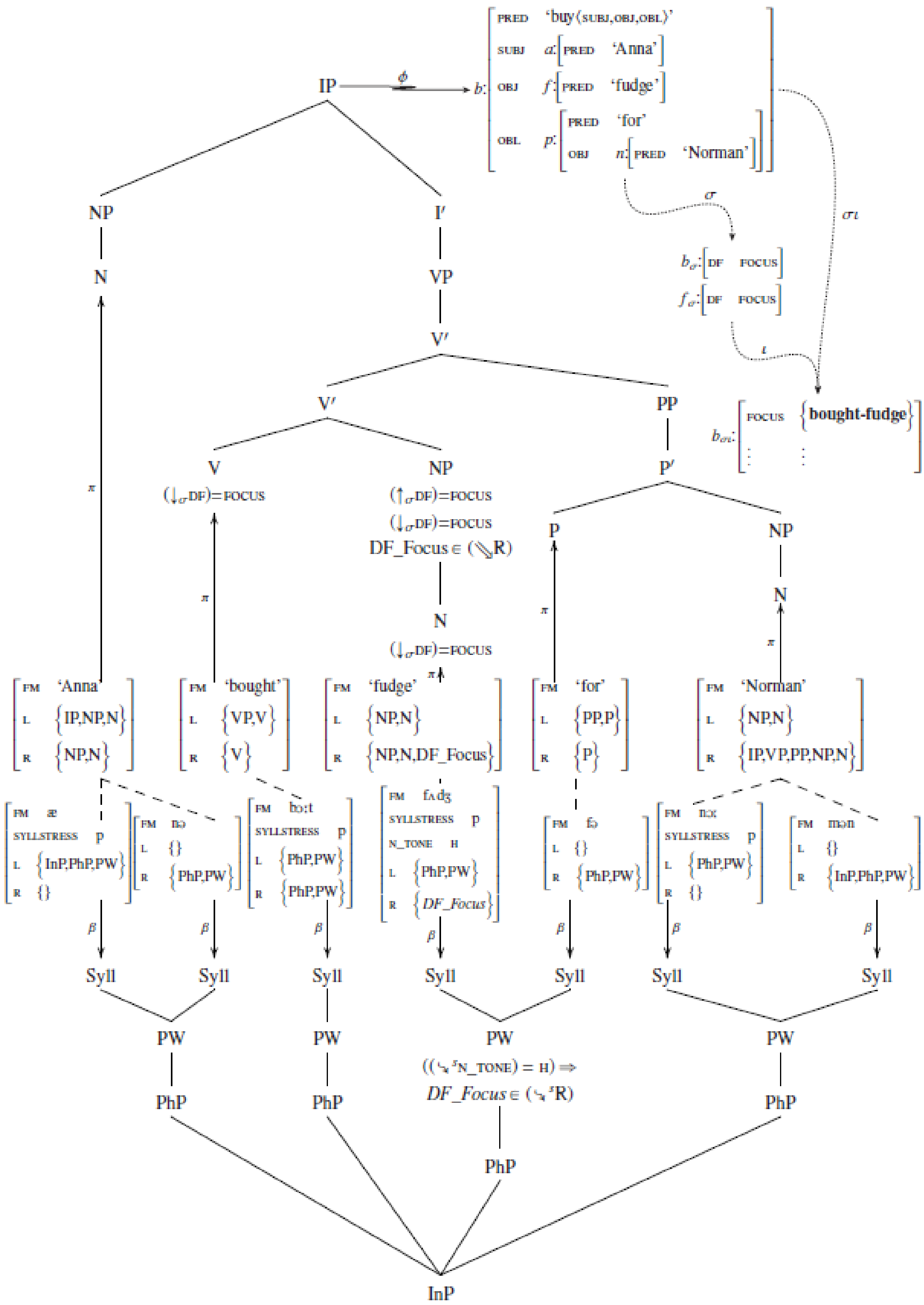


Figure 134: Interaction of the annotations in [78] and [79] (Mycock and Lowe 2013:458)

X^0 Focus: *Anna [hit] Norman*

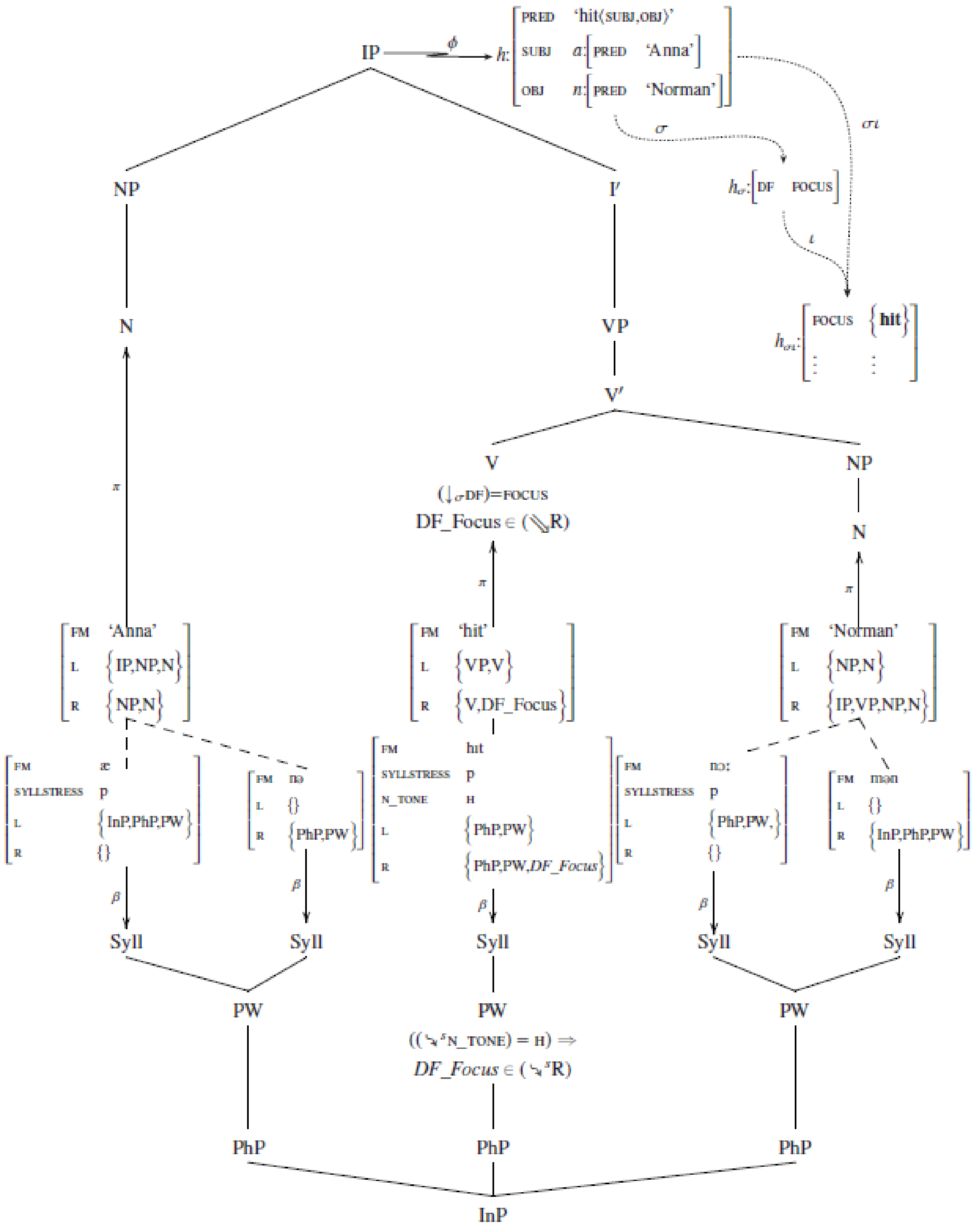


Figure 135: Function of annotation [80] (Mycock and Lowe 2013:459)

In the next section I will propose a modified version of the architecture and annotations to it presented by Mycock and Lowe (2013), which I then use for my model of the prosodic expression of focus in Georgian.

6.2.1.1 Focus and Prominence in Georgian

The alignment-based account of prosodic focus marking reflected in Mycock and Lowe’s (2013) proposed p-structure rules and annotations is similar to the prominence-alignment analyses of German, English and other stress languages proposed by Truckenbrodt (1995), Féry (2013) and others, which I first discussed in chapter 2. These assume that the alignment of focus with the boundary of a prosodic phrase is achieved indirectly in these languages, by the deletion of prominences intervening between the prominence borne by the focus and a prosodic boundary, with the effect that focus is aligned with the phrase-final prominence. As I pointed out in chapter 2, such prominence-alignment accounts face some problematic exceptions, including the occurrence of postnuclear headed PW phrases, as in [**81**], and, in English, of postnuclear headed ip phrases, shown [**82**].

81) Initial subject focus:

*			IP
*			ip
*	*	*	AP

[[[ein MANN]$_{AP}$]$_{ip}$ [[schneidet]$_{AP}$ [die Melone]$_{AP}$]$_{ip}$]$_{IP}$

82) Initial focused subject with postnuclear prominent topic:

*			IP
*			IP
*		*	ip
*	*	*	AP

[[[[NORMA’s]AP]ip]IP[[[[coming]AP[TOMORROW]AP]ip]IP]IP

The former case was found likewise to occur in mine and other analyses of Georgian, as repeated in [**83**]. This is evidenced in mine and other languages by the occurrence of postnuclear pitch accents, and a lesser tendency to deaccent and dephrase postnuclear material, as noted by Skopeteas et al. (2009).

83) Initial narrow focus: SJFOC (S_FVO):

*			IP
*			ip
*	*	*	AP
$[[[\text{lomi}]_{AP}]_{ip}$	$[[\text{elodeba}]_{AP}$	$[\text{irems}]_{AP}]_{ip}]_{IP}$	

lion-NOM await:PRS:3PSG deer-DAT
‘The lion is waiting for the deer.’

In the place of the straightforward rightmost alignment of focus prominences, I identified an alternative constraint on the configuration of prominences, which I argued to be reflected both in these examples and in the data discussed in so-called ‘alignment’ languages. This constraint, according to which prominences intervening between a phrase head and its boundary must be at least two phrasing levels beneath it, I articulated in the previous chapter as the Optimality-Theoretic constraint ***HSEP***. In order to account for variability in the directionality of alignment in some languages, I subsequently split this further into ***HSEPIPR***, ***HSEPipR***, ***HSEPIPL***, ***HSEPipL***, ***HSEPAPR*** and ***HSEPAPL***.

Reference to phrase edges and rightmost stressed syllables in the formalism proposed by Mycock and Lowe (2013) is, for the same reasons, of limited usefulness in finding the relevant AVM with which to associate labels for focus and other discourse relations. The annotation proposed by Mycock and Lowe (2013) to a PW, repeated in [**84**], identifies the label *DF_Focus* with the AVM corresponding to the final stressed syllable of a prosodic word which also bears a nuclear tone H. Whilst focus can be identified with the last stressed syllable of the PW, however, the same annotation cannot be applied to the higher-level phrases PhP[76] and InP, because in both cases their analysis permits stressed syllables following the focus-associated one (see Figure 134 and Figure 135)[77].

[76] For the data discussed in chapter 2, upon which the constraints presented in the previous chapter are based, this is true only of the largest (IP) phrase.
[77] Neither do Mycock and Lowe (2013) discuss cases of postnuclear prominent topics.

<table>
<tr><td>84)</td><td>PhP</td><td>$\rightarrow$</td><td>PW*</td><td>PW
$((\searrow^{s}\mathrm{N\_TONE}) = \mathrm{H}) \Rightarrow$
$\mathit{DF\_Focus} \in (\searrow^{s}\mathrm{R})$</td><td>PW*</td></tr>
</table>

Whereas reference to rightmost and leftmost stressed syllables is of limited usefulness when it comes to generalising focus annotations to p-structural nodes at different levels, the same is not true of reference to the headedness of dominated prosodic constituents. As illustrated in Figure 136 for the sentence in [**85**], the syllable with which focus is associated is the lowest head node ($*^{H}$) such that all nodes from it up to, but not including, the IP node are head nodes. In this way, from any node the focus can be straightforwardly located with reference to that node's lowest 'chain head' and, if necessary, to its uppermost 'chain head', which is the IP. In the case of discourse-inactive topics and additional non-nuclear foci, the feature of discourse-inactivity is associated with any head syllable such that all nodes from it up to, but not including, the ip node are head nodes, permitting reference to be made to it from any node in a similar way.

85) Initial discourse-inactive topic with medial narrow focus

```
             *                        IP
    *        *                        ip
    *        *            *           AP
```

$[[[\text{važi}]_{\text{AP}}]_{\text{ip}}\ [[\text{uvlis}]_{\text{AP}}\ \ [\text{lamas}]_{\text{AP}}]_{\text{ip}}]_{\text{IP}}$
boy-NOM care.for:PRS:3PSG llama
'The boy is caring for the llama.'

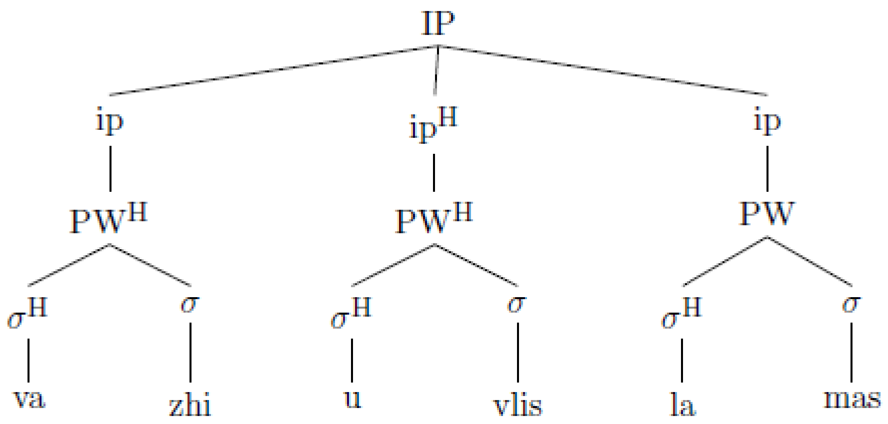


Figure 136: Prosodic structure showing headedness of nodes for [85]

Reference to the p-string AVM corresponding to the rightmost stressed syllable in Mycock and Lowe's proposals can therefore be replaced with reference to the p-string AVM corresponding to the lowest syllable which forms a 'head chain' with the current node, and, where necessary, to the highest p-structure node with which the current node forms a chain.

For this, rules generating prosodic structure are required in which nodes are marked for whether they are the heads of their mother's phrase and themselves have a head daughter, whether they are not the heads of their mother's phrase but have a head daughter, or whether they are neither the heads of their mother's phrase, nor have a head daughter. In the prosodic structure rules for Georgian in [**86**] below, the first kind are marked n^{H}, the second kind have no additional marking and the third kind are marked n^{0}.

86) a) $\mathrm{IP} \rightarrow \mathrm{ip}^{*} \quad \mathrm{ip}^{\mathrm{H}} \quad (\mathrm{ip}^{0})$

b) $\mathrm{ip} \rightarrow \mathrm{AP}^{*} \quad \mathrm{AP}^{\mathrm{H}}$

c) $\mathrm{ip}^{0} \rightarrow \mathrm{AP}^{*}$

d) $\mathrm{AP} \rightarrow \sigma^{*} \quad \sigma^{\mathrm{H}} \quad \sigma^{*}$

For annotations to this modified p-structure referring to the lowest 'chain head', the symbols ⇙ and ⇘ presented by Mycock and Lowe (2013) can be replaced with the symbol $\Downarrow^{H}$, which is derived in a similar way[78]. The relation $D^{H}(*)$ can first be defined in [**87**] as the set of daughters of the present node which are headed; as a prosodic phrase has only one head, only one daughter is a member of this set.

87) $D^{H}(*) \equiv$ node n, where $n \in D(*) \wedge n^{\mathrm{H}}$

From this, the relation $T^{H}(*)$, which locates the terminal 'chain headed' node, such that it and all the nodes between it and the present node are heads, can be defined in [**88**] in a way similar to Mycock and Lowe's (2013) *Tl(*)* and *Tr(*)*. In this case, the terminal 'chain headed' node is the current node in the event that this has no daughters which are heads, or, should it have a headed daughter, it is the terminal 'chain headed' node of the headed daughter.

88) $T^{H}(*) \equiv \begin{cases} * \text{ if } D^{H} = \varnothing \\ \text{else } T^{H}(D^{H}(*)) \end{cases}$

On the basis of [**87**] and [**88**], $\Downarrow^{H}$ can be defined in [**89**] as the AVM located by applying the inverse of the beta function to the terminal 'chain headed' node dominated by the present node.

89) $\Downarrow^{H} \equiv \beta^{-1}(T^{H}(*))$

The Georgian prosodic structure rule in [**86a**] can now be modified as shown in [**90**] by applying the same annotation both to the IP node and to the ip^{H} node. These specify that,

[78] Note of Dalrymple and Mycock that, although their feature passing is edge-based and suffers from same problems, prosodic feature rules provide a means for passing features down in a non-edge based way within their architecture, although they also define 'nuclear' in terms of alignment.

in both cases, the terminal 'chain head' node dominated by the present node has, within the R set of its corresponding AVM[79], the labels +*PROM* and +*NEW*.

90) $\underset{\substack{+PROM \in (\Downarrow^{H}R) \\ +NEW \in (\Downarrow^{H}R)}}{\mathrm{IP}} \rightarrow \mathrm{ip}^{*} \quad \underset{\substack{+PROM \in (\Downarrow^{H}R) \\ +NEW \in (\Downarrow^{H}R)}}{\mathrm{ip}^{H}} \quad (\mathrm{ip}^{0})$

Whilst the annotation in [**90**] is sufficient to identify the focus-associated AVM when applied to IP and ip^H nodes, annotations to non-head ip nodes[80] and to nodes below these must associate the +*PROM* and +*NEW* labels with the AVM corresponding to the present node's lowest 'chain-head' syllable, only in the case that the uppermost 'chain head' node of the present node is the IP. To formalise this condition, reference is required to the 'head mother', M^H, which is defined in [**91**] as a node which is the mother of the present node, which is a member of the set of its mother's headed daughters.

91) $M^H(*) \equiv$ node *n*, where n = $*\wedge \land *^H$

The uppermost 'chain head' node of the present node can then be defined in [**92**] as the present node, on the condition that the present node has no head mother and also has a head daughter, or, if this is not the case, as the uppermost 'chain head' of the present node's 'head mother'.

92) $U^H(*) \equiv \begin{cases} * \text{ if } M^H(*) = \varnothing \land D^H(*) \neq \varnothing \\ \text{else } U^H(M^H(*)) \end{cases}$

The annotations in [**93**], which can be applied to any p-structural node, specify for the AP^H and σ^H nodes that, if their uppermost 'chain head' node is the IP, then the labels +*PROM*

[79] These labels could alternatively occupy the L set of this AVM, or both the R and the L sets; it is important only that the set should have a corresponding set in the corresponding s-string AVM so that, by the Principle of Interface Harmony, this can be occupied by a corresponding syntactic label.
[80] In the case of non-head ip nodes, the modified annotation would fail to identify the IP node as the uppermost 'chain head' of the node, and would not therefore associate the +*PROM* and +*NEW* labels with the AVM corresponding to the node's lowest 'chain head'.

and +*NEW* are members of the R set of the AVM corresponding to that node’s terminal ‘chain head’ node.

93)

$$\begin{array}{cccc} \mathrm{AP}^{\mathrm{H}} & \rightarrow \sigma^{*} & \sigma^{\mathrm{H}} & \sigma^{*} \\ \mathrm{U}^{\mathrm{H}}(*){=}\mathrm{IP} & & \mathrm{U}^{\mathrm{H}}(*){=}\mathrm{IP} & \\ \Rightarrow +PROM \in (\Downarrow^{\mathrm{H}}\mathrm{R}) & & \Rightarrow +PROM \in (\Downarrow^{\mathrm{H}}\mathrm{R}) & \\ \wedge +NEW \in (\Downarrow^{\mathrm{H}}\mathrm{R}) & & \wedge +NEW \in (\Downarrow^{\mathrm{H}}\mathrm{R}) & \end{array}$$

In Mycock and Lowe’s (2013) proposals, the link between the prosodic expression of focus, or focus exponent, and the focusing of the semantic structures of words and phrases, or focus extent, is achieved with the Principle of Interface Harmony, according to which a focus label *DF_FOCUS* present in an AVM within the p-string must be matched with a focus label DF_FOCUS in a corresponding AVM within the s-string, and vice-versa. The annotations to c-structural nodes proposed by Mycock and Lowe (2013) to ensure the availability of corresponding DF_FOCUS labels are repeated for convenience in [**94**]. Whereas the annotation in [**94a**] accounts for cases in which the focus exponent is limited to individual words, such as a focused finite verb, the annotations in [**94b**] and [**94c**] account for cases in which the focus extent comprises a larger phrase. [**94b**] permits any phrase to be focused, in which case the AVM corresponding to its rightmost terminal daughter must include the DF_FOCUS label. [**94c**] causes the semantic structure of any daughter of a node marked for focus to itself be marked for focus, ensuring that not just the semantic structure of the phrase is focused.

94) a) $$\Sigma \rightarrow \Sigma^{*} \quad \begin{array}{c} \mathrm{X} \\ \left(\begin{array}{l} (\downarrow_{\sigma}\mathrm{DF}) = \textsc{focus} \\ \mathrm{DF\_Focus} \in (\Searrow \mathrm{R}) \end{array} \right) \end{array} \quad \Sigma^{*}$$

b) $$\Sigma \rightarrow \Sigma^{*} \quad \begin{array}{c} \Sigma \\ \left(\begin{array}{l} (\uparrow_{\sigma}\mathrm{DF}) = \textsc{focus} \\ \mathrm{DF\_Focus} \in (\Searrow \mathrm{R}) \end{array} \right) \end{array}$$

c) $$\Sigma \rightarrow \begin{array}{c} \Sigma^{*} \\ \left\{ (\uparrow_{\sigma}\mathrm{DF}) \neq \textsc{focus} \;\middle|\; \begin{array}{l} (\uparrow_{\sigma}\mathrm{DF}) =_{c} \textsc{focus} \\ (\downarrow_{\sigma}\mathrm{DF}) = \textsc{focus} \end{array} \right\} \end{array}$$

The assumptions concerning focus projection reflected in the rules in [**94**] differ from the notion of focus projection proposed in chapter 2 which I have assumed in this thesis. According to these proposals, the focus status of an individual word does not depend on its membership of a focused phrase, but is instead reflected directly in its prosodic realisation; unless it is realised with prosodic prominence by direct association with the head of an ip phrase or IP phrase, a word is not in focus[81]. This non-focal status can be the result either of explicit previous mention or of the speaker's assumption that the hearer will be willing to pragmatically accommodate the word as given. This can be expressed with the modified version of Mycock and Lowe's (2013) rule [**94a**], given in [**95**]. This specifies that the meaning constructor corresponding to any terminal node at c-structure may have the + value for both its PROM and its NEW semantic attributes, in which case the labels +PROM and +NEW are members of the R set of the AVM corresponding to the rightmost terminal daughter of the node, which is the AVM corresponding to the annotated node.

95) $$\mathrm{XP} \quad \rightarrow \quad \underset{\begin{pmatrix} \downarrow \sigma \text{ SA PROM} = + \\ \downarrow \sigma \text{ SA NEW} = + \\ +\text{PROM} \in (\searrow \text{R}) \\ +\text{NEW} \in (\searrow \text{R}) \end{pmatrix}}{\mathrm{X}^{*}} \quad /\Sigma$$

The interaction of the p-structural and c-strucural annotations in [**90**], [**93**] and [**95**] in capturing the prosodic marking of initial narrow subject focus in Georgian in the sentence in [**96**] is shown in Figure 137.

96) [važ-i]$_F$ uvlis lama-s
lad-NOM care.for.PRS.3SG llama-DAT
'The lad is caring for the llama.'

[81] An exception are words individually marked for their discourse attributes by special syntactic or other features.

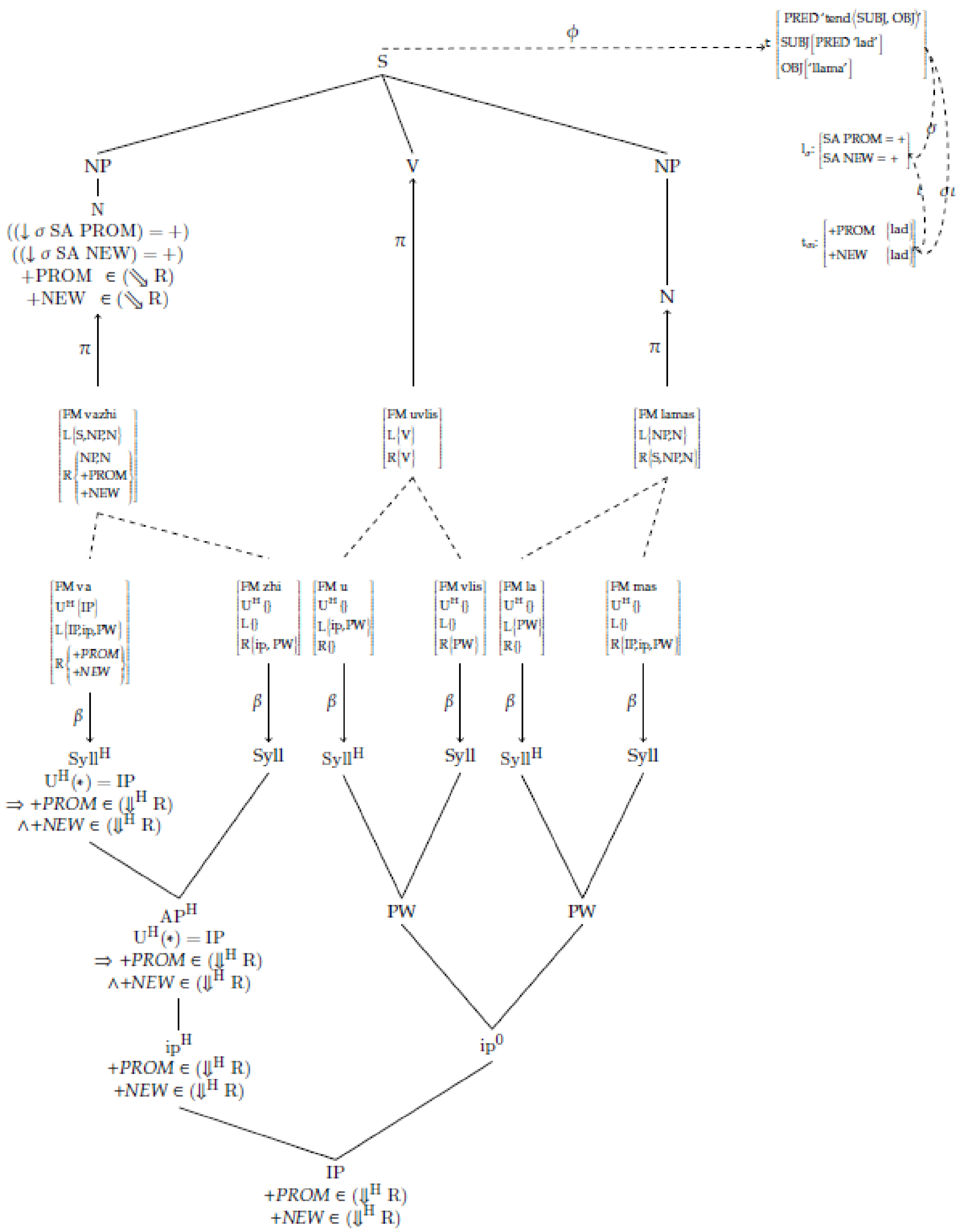


Figure 137: Representation of initial subject focus in [96]

Whilst I adopt Mycock and Lowe's (2013) c-structural annotation in [**94a**] in its modified version in [**95**], their annotations in [**94b**] and [**94c**] reflect assumptions which are less compatible with mine. As discussed, because I assume that words must be individually marked for focal status by prosodic prominence, I do not assume that focus can be projected to other terminal c-structural nodes, and do not therefore make use of an annotation like [**94c**], which projects focus to the daughters of focused phrases. The version of focus projection that I assume in this thesis occurs from the s-structures corresponding to the terminal nodes of noun phrases to the s-structures of those noun phrases. Unlike Mycock and Lowe's (2013) annotation [**94b**], this does not require the terminal daughter from the s-structure of which focus is projected to be the rightmost within the NP, or even for the nominal f-structure to which the focus is projected to be realised at c-structure as a continuous constituent. To capture this alternative notion of focus projection assumed in this thesis, which proceeds to an NP from any focus-marked terminal node within it, I propose the phrase-structural annotation to NPs in [**97**]. This states simply that, if the NP contains a terminal node which has the features +PROM and +NEW at s-structure, then the NP has the features +PROM and +NEW at s-structure.

97)

$$\begin{array}{c} \text{NP} \\ \exists x.x{\in}T(*) \wedge f\sigma x \text{ SA PROM}{=}{+} \\ \wedge f\sigma x \text{ SA NEW}{=}{+} \\ \Rightarrow \downarrow\sigma \text{ SA PROM}{=}{+} \\ \wedge \text{ SA NEW}{=}{+} \end{array}$$

The effect of this annotation is illustrated in Figure 138 for the sentence in [**98**].

98) did-i [vazh-i]$_F$ uvlis lama-s
big-NOM lad-NOM care.for.PRS.3SG llama-DAT
'The big lad is caring for the llama.'

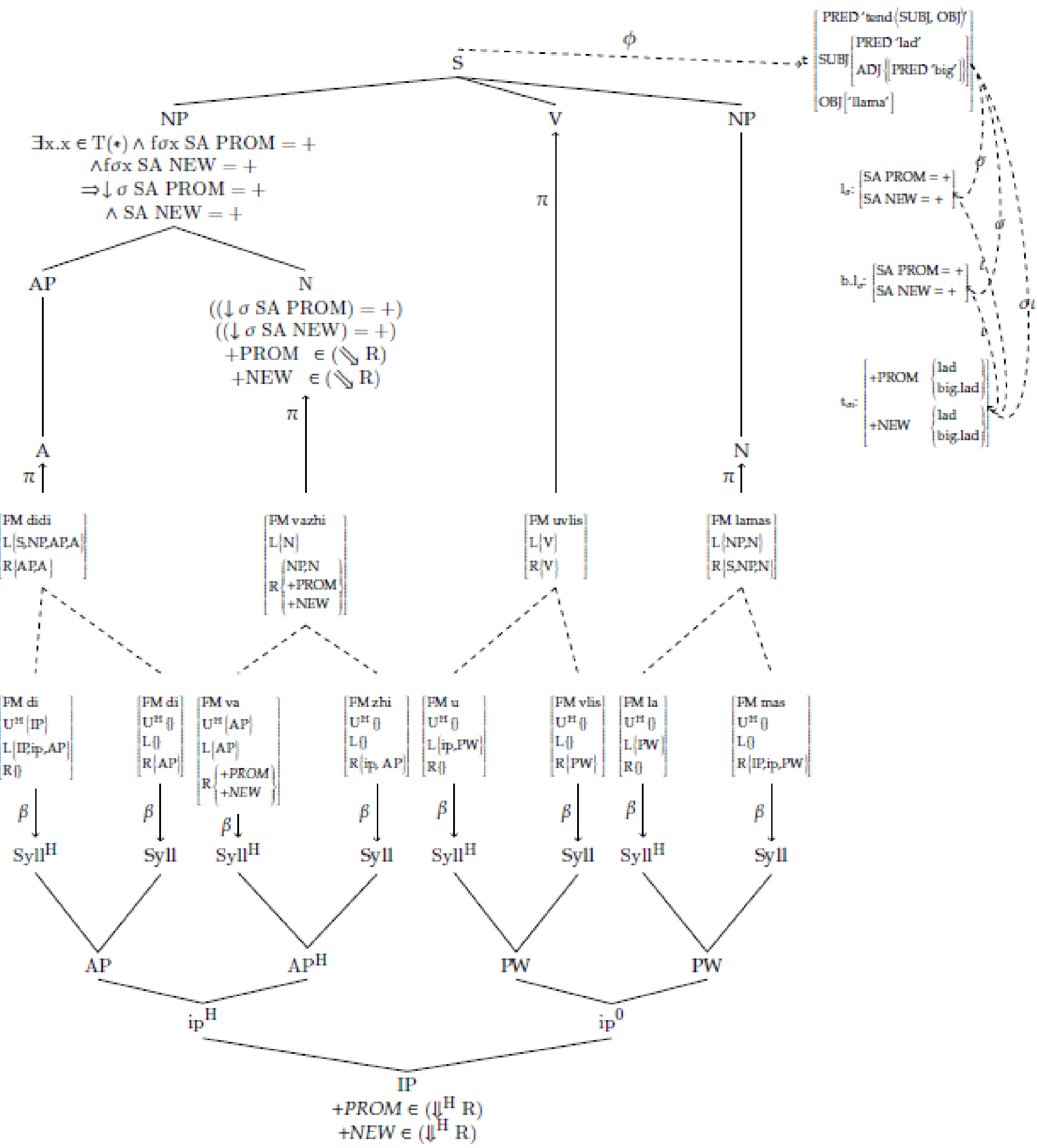


Figure 138: Function of the annotation in [97]

Stated in their present form, the annotations to p-structure in [**90**] and [**93**] and to c-structure in [**95**] and [**97**] capture only mappings to s-structure from a single prosodically marked focus, aligned with the head of an IP phrase. They do not capture mapping for any additional prosodically marked foci present within the sentence, or for any prosodically prominent discourse-inactive topics, or for any prosodically non-prominent discourse-active topics. In the next subsection I will propose additional p-structural annotations, together with modifications to the annotations to c-structure in [**95**] and [**97**] which capture more fully the relationship between prosodic marking and discourse relations. These will be accompanied by appropriate modifications to the ***$XP_{FOC}V$*** and ***DITINIT*** annotations presented in *6.1* above.

6.2.1.2 Secondary Prominences

Whereas, in my assumptions, alignment of a word with the head of an IP phrase expresses, in the majority of cases, the association of that word with focus, a word's alignment maximally with the head of an ip phrase expresses that the word has, in Lambrecht's (1994) terminology, a discourse-inactive status, but does not in itself specify whether the word is topical or focal. As discussed above, this limited information-structural contribution of secondary prominences can be captured straightforwardly using the discourse feature ±PROM, which I adopted for my LFG model together with ±NEW in *6.1.2*. The annotations in [**99**] state that non-head ip phrases, and AP head nodes which have the ip as their uppermost heading node, contribute a label +PROM to the R value set of the p-string AVM corresponding to their lowest headed syllable.

99)
$$\underset{+PROM\ \in\ (\Downarrow^{\mathrm{H}}\mathrm{R})}{\mathrm{ip}} \quad \rightarrow \quad \mathrm{AP}^{*} \quad \underset{\substack{\mathrm{U}^{\mathrm{H}}(*)=\mathrm{ip}\Rightarrow \\ +PROM\ \in\ (\Downarrow^{\mathrm{H}}\mathrm{R})}}{\mathrm{AP}^{\mathrm{H}}}$$

As with the p-structural IP head annotations [**90**] and [**93**], [**99**] requires a corresponding c-structural annotation to provide a syntactic +PROM label to match the prosodic *+PROM* label that it provides, and to map the word thus marked to the +PROM set at i-structure. The annotation in [**100**], which replaces [**95**], makes use of the ignore operator / (Kaplan and Kay 1994), followed by sigma, which signifies that instances of the annotated X category to its left may be interspersed with any number of phrases of any category. Each instance of this X category then *either* has both the features +PROM and +NEW at s-structure, and contributes the labels +PROM and +NEW to the AVM corresponding to its rightmost terminal daughter, *or* it has only the feature +PROM at s-structure, and contributes only the label +PROM to the AVM corresponding to its rightmost terminal daughter.

100)
$$\text{XP} \quad \rightarrow \quad \underset{\left(\left\{\begin{array}{c|c} \downarrow\sigma\ \text{SA PROM} = + & \downarrow\sigma\ \text{SA PROM} = + \\ +\text{PROM} \in (\searrow \text{R}) & \downarrow\sigma\ \text{SA NEW} = + \\ & +\text{PROM} \in (\searrow \text{R}) \\ & +\text{NEW} \in (\searrow \text{R}) \end{array}\right\}\right)}{\text{X}^{*}} \quad /\Sigma$$

In this way, [**100**] provides matching labels at c-structure, and words marked for the appropriate s-structural features, for the p-structural labels provided both by primary prominences as per [**90**] and [**93**] and by secondary prominences as per [**99**]. In accordance with the p-structure rules in [**86**], this formulation is compatible with the occurrence of an unrestricted number of secondary prominences, whilst the same p-structure rules ensure that each sentence can feature only one primary prominence and therefore only one corresponding syntactic word marked in this way for focus. The matching of labels provided in the two rules is illustrated in Figure 139 for sentence [**101**], together with the underspecified representation of *lad* at i-structure simply as +PROM, as straightforwardly permitted by the adopted i-structural format.

101) [važ-i]$_{T/F}$ uvlis [lama-s]$_{F}$
lad-NOM care.for.PRS.3SG llama-DAT
'The lad is caring for the llama.'

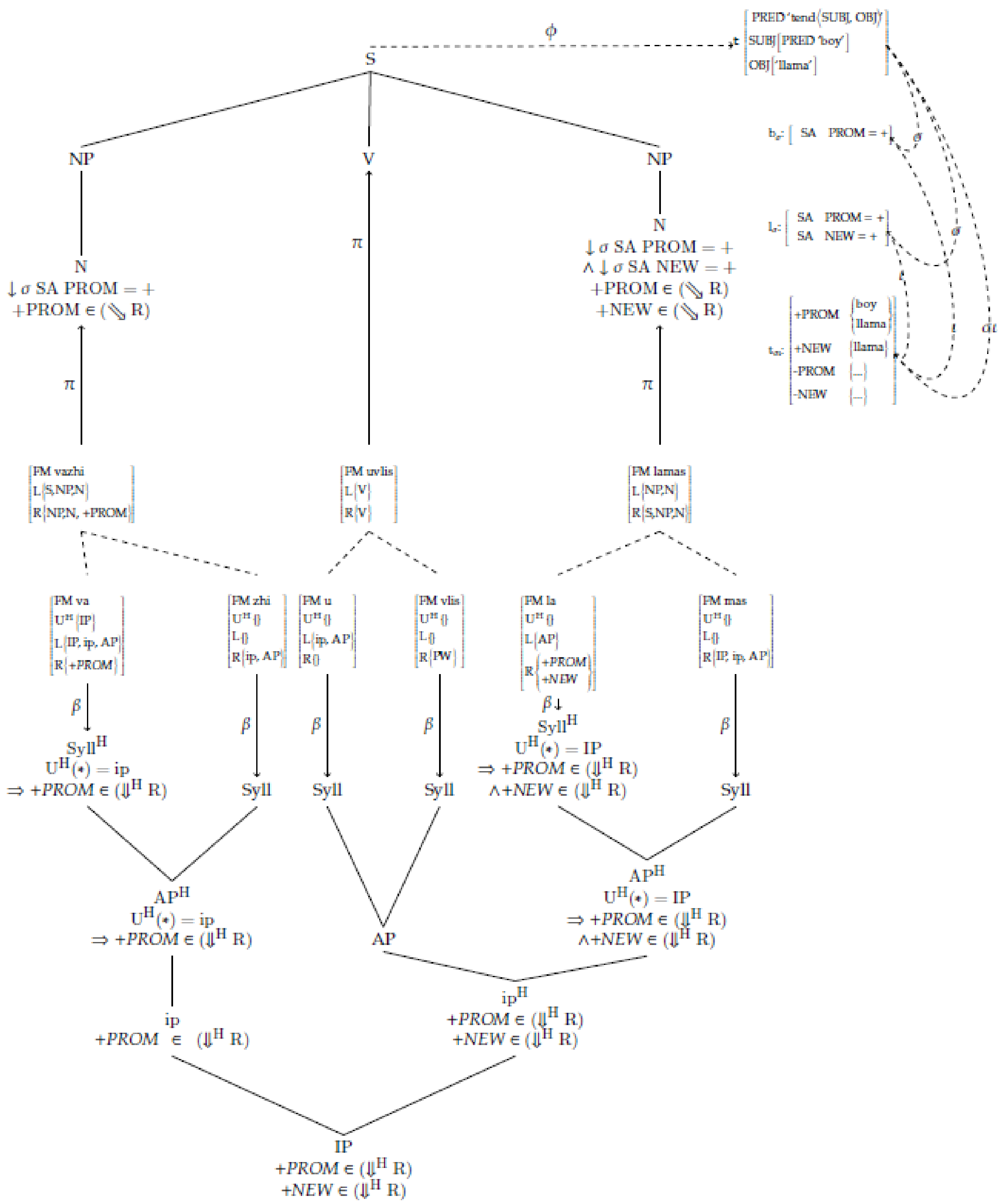


Figure 139: Function of annotations [99] and [100]

The Principle of Interface Harmony necessitates modifications to the annotated phrase structure rules [**34**] and [**35**], which I proposed in *6.1.2* to capture the constraints ***XP$_{FOC}$V*** and ***DITINIT*** respectively. Rule [**34**], capturing the constraint ***XP$_{FOC}$V***, can be reformulated as the rule in [**102**]. As with its previous formulation, this states that, if any preverbal XP is preceded within the phrase it occupies by an XP dominating a constituent which has the attributes +PROM and +NEW in its semantic structure, the XP in question must also dominate a constituent which has the attributes +PROM and +NEW in its semantic structure. It also states that, in this case, the same XP also passes either the label +PROM, or the labels +PROM and +NEW, to the R set of the corresponding s-string AVM of that terminal constituent. In this way, [**102**] ensures that any preverbal foci are associated with the appropriate prosodic prominence, whether this the head of an ip phrase or the head of an IP phrase.

102)

$$
\begin{array}{llll}
S \rightarrow & \text{XP}^{*} & \text{V} & \text{XP}^{*} \\
& \uparrow_{\sigma\iota} = \downarrow_{\sigma\iota} & \uparrow_{\sigma\iota} = \downarrow_{\sigma\iota} & \uparrow_{\sigma\iota} = \downarrow_{\sigma\iota} \\
& \exists x.x \in T(\hat{*}) \wedge x \prec T(*) \wedge ((f\sigma x \text{ SA PROM}) = +) \wedge ((f\sigma x \text{ SA NEW}) = +) & & \\
& \Rightarrow \exists y.y \in T(*) \wedge ((f\sigma y \text{ SA PROM}) = +) \wedge ((f\sigma y \text{ SA NEW}) = +) & & \\
& \wedge ((+\text{PROM} \in \beta^{-1}(y)R) \vee (+\text{PROM} \wedge +\text{NEW} \in \beta^{-1}(y)R)) & &
\end{array}
$$

The combination in [**102**] of a semantic structure contribution +PROM,+NEW with a +PROM label for a corresponding prosodic marking captures the additional role performed by this constraint on c-structure, which I discussed briefly in *6.2.1*, of fully specifying the discourse attributes of items in this configuration which are otherwise marked only +PROM by their association with the head of an ip phrase.

Rule [**35**], which I proposed to capture the strong constraint ***DITINIT***, that discourse-inactive topics must precede other constituents within the clause, is reformulated in [**103**]. This states that, if an XP in preverbal position is followed by an XP which dominates a constituent with the semantic structure attributes +PROM and –NEW, it too must dominate a constituent with the semantic structure attributes +PROM and –NEW, and contribute the label +PROM to the R set of the corresponding s-string AVM of that constituent. This, in the same way as the preverbal focus constraint annotation in [**102**], ensures that any such constituent receives the appropriate prosodic marking by association of a syllable within it maximally with the head of an ip phrase.

103)

$$\underset{\substack{\exists \mathrm{x}.\mathrm{x}\in \mathrm{D}(*)\wedge\exists \mathrm{y}.\mathrm{y}\in \mathrm{T}(*)\wedge \mathrm{y}\succ \mathrm{T}(\mathrm{x}) \\ \wedge((\mathrm{f}\sigma \mathrm{y}\ \mathrm{SA\ PROM})=+)\wedge((\mathrm{f}\sigma \mathrm{y}\ \mathrm{SA\ NEW})=-) \\ \Rightarrow\exists \mathrm{z}.\mathrm{z}\in \mathrm{T}(\mathrm{x})\wedge((\mathrm{f}\sigma \mathrm{z}\ \mathrm{SA\ PROM})=+)\wedge((\mathrm{f}\sigma \mathrm{z}\ \mathrm{SA\ NEW})=-) \\ \wedge +\mathrm{PROM}\in\beta^{-1}(\mathrm{z})\mathrm{R}}}{\mathrm{S}} \quad \rightarrow \quad \underset{\uparrow\sigma\iota=\downarrow\sigma\iota}{\mathrm{XP}^*} \quad \underset{\uparrow\sigma\iota=\downarrow\sigma\iota}{\mathrm{V}} \quad \underset{\uparrow\sigma\iota=\downarrow\sigma\iota}{\mathrm{XP}^*}$$

Also like [**102**], this annotation captures the role of this c-structural constraint in further specifying the discourse attribute of a constituent in this configuration which has only that prosodic marking.

Finally, the annotation presented in [**43**] to capture the ***DAPINIT*** constraint is updated in [**104**] to specify that, in addition to having the value + for its semantic attribute PROM at s-structure, a clause-initial finite verb also has the +PROM label in the R set of its corresponding s-string AVM.

104) $$\mathrm{S} \rightarrow \mathrm{XP}^* \quad \underset{\substack{\neg\exists \mathrm{x}.\mathrm{x}\in \mathrm{T}(\hat{*})\wedge \mathrm{x}<* \\ \Rightarrow((\downarrow_\sigma\ \mathrm{SA\ PROM})=+) \\ +\mathrm{PROM}\in\Searrow \mathrm{R}}}{\mathrm{V}} \quad \mathrm{XP}^*$$

The discourse feature projection annotation to NPs presented in [**97**] likewise requires modification, to reflect the assumption that an NP inherits a focus interpretation from a focused terminal node, if there is one present, or otherwise a discourse-inactive topic interpretation from a terminal node with these features, if there is one present, or otherwise a +PROM interpretation from a present +PROM terminal node which does not have a specified ±NEW feature. The annotation in [**105**] states that, if the meaning constructor of a terminal node within the NP has the value +PROM, then the NP's meaning constructor has the value +PROM, and that the same is true of the value +NEW. It also specifies that, if there is no terminal node associated with the value +NEW, and if there is a terminal node associated both with the values +NEW and +PROM, then the NP's meaning constructor is associated with the value +NEW. This formulation ensures that all three above-mentioned possibilities are provided for in the correct ranking.

105)

$$\begin{array}{c} \mathrm{NP} \\ \exists x.x{\in}T(*)\wedge fx\sigma\ \mathrm{SA\ PROM}{=}{+}\Rightarrow{\downarrow}\sigma\ \mathrm{SA\ PROM}{=}{+} \\ \exists x.x{\in}T(*)\wedge fx\sigma\ \mathrm{SA\ NEW}{=}{+}\Rightarrow{\downarrow}\sigma\ \mathrm{SA\ NEW}{=}{+} \\ \neg\exists x.x{\in}T(*)\wedge fx\sigma\ \mathrm{SA\ NEW}{=}{+} \\ \wedge\exists y.y{\in}T(*)\wedge f\sigma y\ \mathrm{SA\ NEW}{=}{-}\wedge f\sigma y\ \mathrm{SA\ PROM}{=}{+}\Rightarrow{\downarrow}\sigma\ \mathrm{SA\ NEW}{=}{-} \end{array}$$

In the next subsection I will propose a final version of this annotation to permit the feature combination –PROM and –NEW, associated with the given, discourse-inactive discourse role, to be projected to the NP.

6.2.1.3 Background

The final discourse items which I have dealt with in this thesis are those which are part of the presupposition but discourse-active; this corresponds to the discourse function BACKGROUND, and to the discourse feature combination –PROM and -NEW. In the approach to discourse marking that I proposed in chapter 2 and have assumed in this thesis, these discourse attributes characterise any items within a sentence which are prosodically non-prominent; this, I argued, is the result either of explicit previous mention or of a process of pragmatic accommodation of the kind assumed in more restricted cases by Rochemont (2013).

In my analysis of Georgian and in other stress languages, such items are associated maximally with the head of an AP phrase. Within the LFG architecture employed here, one approach to modelling this association would be to provide non-head AP nodes at p-structure with annotations similar to those proposed in the preceding subsections for the nodes of IP and ip phrases. These could specify that the p-string AVM corresponding to the terminal headed syllable within the AP has the labels –PROM and –NEW as members of its set R. Whilst annotations of this kind are compatible with the analysis of the Georgian data presented in the previous chapter, in which each word is realised within an individual AP phrase, such annotations are problematic for cases of mismatch between prosodic and syntactic words of the kind discussed in *6.2.1* above. These may have the result that certain syntactic words appear within a word-level prosodic phrase but are not aligned with its head, and so do not receive the desired discourse interpretation. Alternatively, a word featuring more than one lexically stressed syllable may be associated with conflicting feature labels associated with the AVMs corresponding to these syllables, in the event that each is associated with the head of a different prosodic phrase; in this case, it is unclear by what mechanism the desired labels would outrank the non-desired ones.

To avoid such problems, the association of the –PROM and –NEW semantic attribute values with the meaning constructors of prosodically non-prominent words can instead be achieved with a further modification to the syntactic phrase structure rule presented in [**100**]. The annotation in [**106**] specifies that any terminal c-structure node X is associated either with the semantic attribute +PROM, and has the label +PROM in the R set of its corresponding s-string AVM, or it is associated with the attributes +PROM and +NEW, and contributes both the labels +PROM and +NEW to its AVM, or it is associated with the attributes –PROM and –NEW, and contributes neither the label +PROM, nor the label +NEW to its AVM. In this way, the association of the discourse features –PROM and –NEW is achieved by default.

106)

$$
\mathrm{XP} \quad \rightarrow \quad \underset{\left\{\begin{array}{l|c|c} \downarrow \sigma\ \mathrm{SA\ PROM} = + & \downarrow \sigma\ \mathrm{SA\ PROM} = + & \downarrow \sigma\ \mathrm{SA\ PROM} = - \\ +\mathrm{PROM} \in (\Searrow \mathrm{R}) & \wedge \downarrow \sigma\ \mathrm{SA\ NEW} = + & \wedge \downarrow \sigma\ \mathrm{SA\ NEW} = - \\ & +\mathrm{PROM} \in (\Searrow \mathrm{R}) & +\mathrm{PROM} \notin (\Searrow \mathrm{R}) \\ & \wedge + \mathrm{NEW} \in (\Searrow \mathrm{R}) & \wedge + \mathrm{NEW} \notin (\Searrow \mathrm{R}) \end{array}\right\}}{\mathrm{X}^{*}} \quad /\Sigma
$$

The functioning of the annotation in [**106**] is illustrated in Figure 140, in which the finite verb is associated with the discourse features –PROM and –NEW.

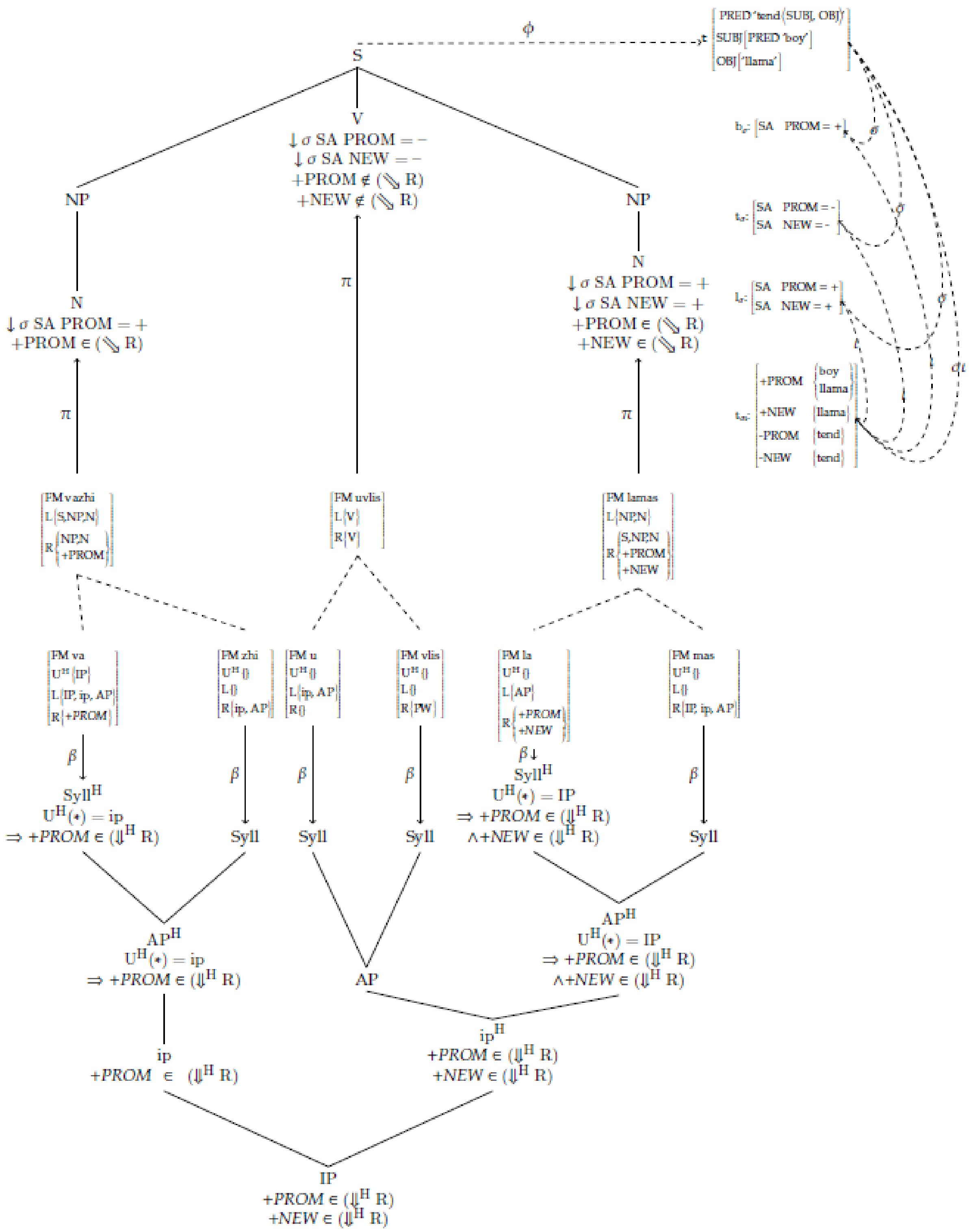


Figure 140: Function of the annotation in [106]

A final modification of the annotation to NPs is required to model the transmission of the features -PROM and –NEW to them; under my assumptions, this occurs in the event that no terminal node within the NP has the feature +PROM. The annotation in [**107**] modifies the previous annotation with the addition of a specification that, if the NP does not contain a terminal node with the feature +PROM at s-structure, then the NP has the features –PROM and –NEW at s-structure. Formulated in this way, [**107**] ensures that all NP phrases have one of four possible characterisations at i-structure: as a member of the sets +PROM and +NEW, the sets +PROM and –NEW, just the set +PROM or of the sets –PROM and –NEW.

107)

$$\begin{array}{c} \mathrm{NP} \\ \exists x.x \in T(*) \wedge fx\sigma \text{ SA PROM}=+ \Rightarrow \downarrow\sigma \text{ SA PROM}=+ \\ \exists x.x \in T(*) \wedge fx\sigma \text{ SA NEW}=+ \Rightarrow \downarrow\sigma \text{ SA NEW}=+ \\ \neg\exists x.x \in T(*) \wedge fx\sigma \text{ SA NEW}=+ \\ \wedge\exists y.y \in T(*) \wedge f\sigma y \text{ SA NEW}=- \wedge f\sigma y \text{ SA PROM}=+ \Rightarrow \downarrow\sigma \text{ SA NEW}=- \\ \neg\exists x.x \in T(*) \wedge fx\sigma \text{ SA PROM}=+ \Rightarrow \downarrow\sigma \text{ SA PROM}=- \wedge \downarrow\sigma \text{ SA NEW}=- \end{array}$$

Whereas the annotations presented in [**106**] and [**107**] ensure that the meaning constructors of words present at c-structure are associated where required with the –PROM and –NEW discourse features, I have not yet provided a means of associating the same features with elided arguments and verbs, which are necessarily associated with these features. This can be achieved by means of the annotation in [**108**] to lexical entries of words, which is additional to the annotations presented in [**27**] specifying the i-structure set membership of the meaning constructors corresponding to words based on their semantic attributes. The annotation in [**108**] specifies that, if the pred value of a word at f-structure is ‘pro’, as the result of it being elided, then its corresponding meaning constructor has the value – both for its semantic attribute PROM and for its semantic attribute NEW at s-structure. The association of this word with the corresponding sets at i-structure is then ensured by the annotations given in x.

108) $\uparrow$PRED = ‘pro’ $\rightarrow \uparrow_{\sigma}$ SA PROM = - $\wedge \uparrow_{\sigma}$ SA NEW = -

The LFG model of Georgian prosody and its interaction with information structure presented in this section captures the full set of inviolable prosodic constraints proposed in chapter 5, with the exception of ***EMPH***, which I must leave to future research. Furthermore, the constraints ***EPP*** and ***HSEP*** are embodied within the prosodic structure rules in [**86**], whereas the p-structural and c-structural annotations presented capture the constraints ***APHI***, ***DIipH*** and ***IPHF.*** The remaining constraint to be modelled is the violable constraint ***NOPHRASE*** adopted from Féry (2011), which militates against excessive prosodic phrasing. According to this cumulative constraint, each occurrence of an ip phrase beyond one constitutes a separate violation, and each occurrence of an IP phrase beyond one a stronger violation. This can again be modelled with the o-structural annotations proposed by Frank *et al.* (1998) which I used in *6.1.2.2* to model the set of violable syntactic constraints. The annotations in [**109a**] to any ip phrases which occur in addition to the obligatory headed ip^{H} specify that each results in the addition of a MARK3 to o-structure, whereas the annotations in [**109e**] to any IP phrases in addition to the one obligatory IP phrase per sentence specify that each results in the addition of a MARK4 to o-structure.

109) a) $\mathrm{IP}^{/\mathrm{H}} \rightarrow \underset{\mathrm{MARK3}\in o*}{\mathrm{ip}^*} \quad \mathrm{ip}^{\mathrm{H}} \quad \left(\underset{\mathrm{MARK3}\in o*}{\mathrm{ip}^0}\right)$

b) $\mathrm{ip} \rightarrow \mathrm{AP}^* \quad \mathrm{AP}^{\mathrm{H}}$

c) $\mathrm{ip}^0 \rightarrow \mathrm{AP}^*$

d) $\mathrm{AP} \rightarrow \sigma^* \quad \sigma^{\mathrm{H}} \quad \sigma^*$

e) $\mathrm{IP} \rightarrow \underset{\mathrm{MARK4}\in o*}{\mathrm{IP}^*} \quad \mathrm{IP}^{\mathrm{H}} \quad \left(\underset{\mathrm{MARK4}\in o*}{\mathrm{IP}^0}\right)$

f) $\mathrm{IP}^0 \rightarrow \mathrm{ip}^*$

As discussed, ***NOPHRASE*** militates against the equally ranked violable constraint ***FMARK***, according to which a focus should be linearised preverbally for increased emphasis, and which I articulated with the c-structural annotation [**49**] in *6.1.2.2*. The interaction between ***FMARK*** and ***NOPHRASE*** in the LFG model is illustrated in Figure 141 and Figure 142. In Figure 141, a postverbal but non-final focus violates both ***FMARK*** and ***NOPHRASE***, and so, as per the annotations in [**49**] and [**109a**], incurs two MARK3 optimality marks at o-structure. By contrast, the sentence-final focus in Figure 142 violates only ***FMARK***, and so incurs only one MARK3 optimality mark.

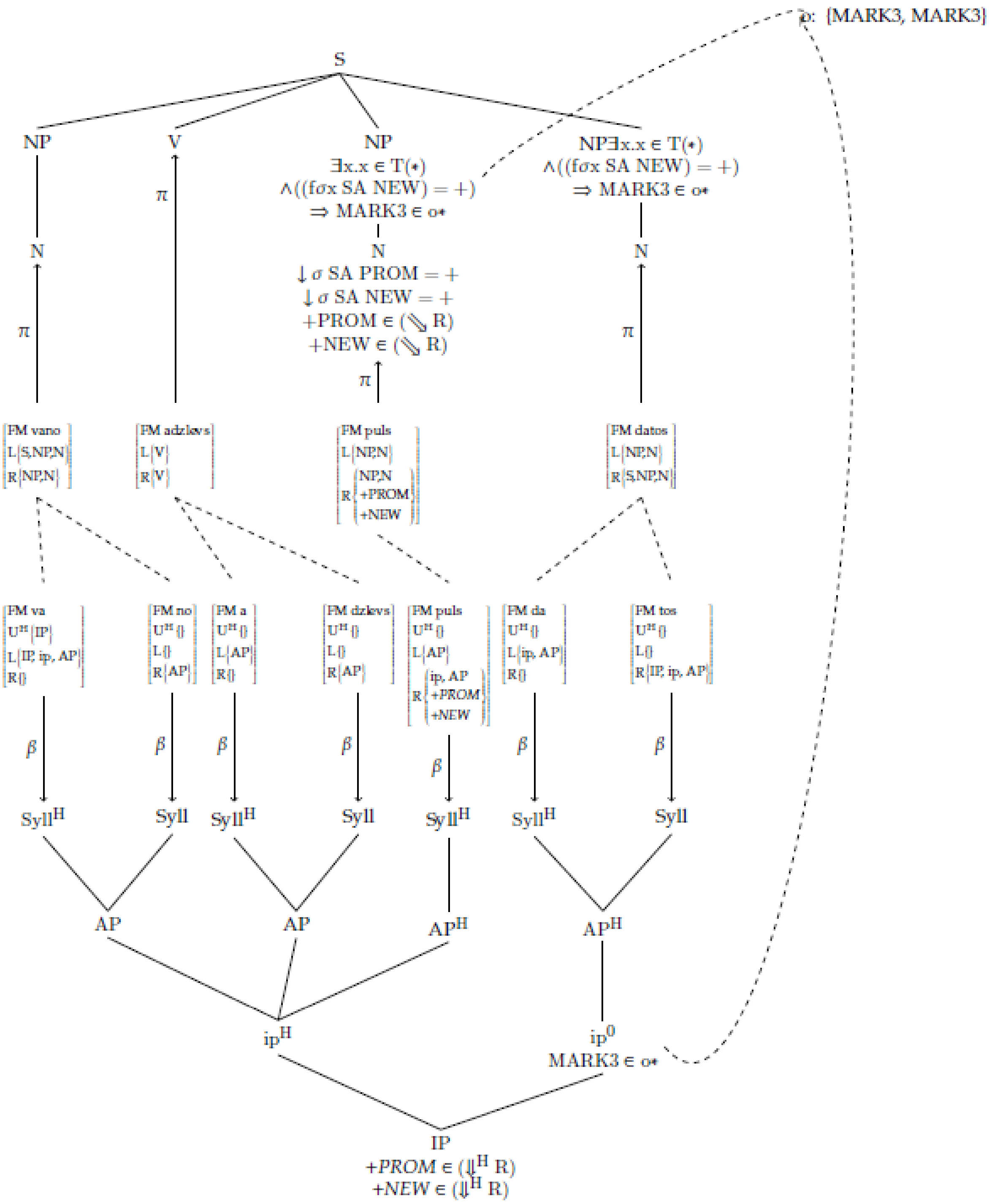


Figure 141: Constraints FMARK and NOPHRASE

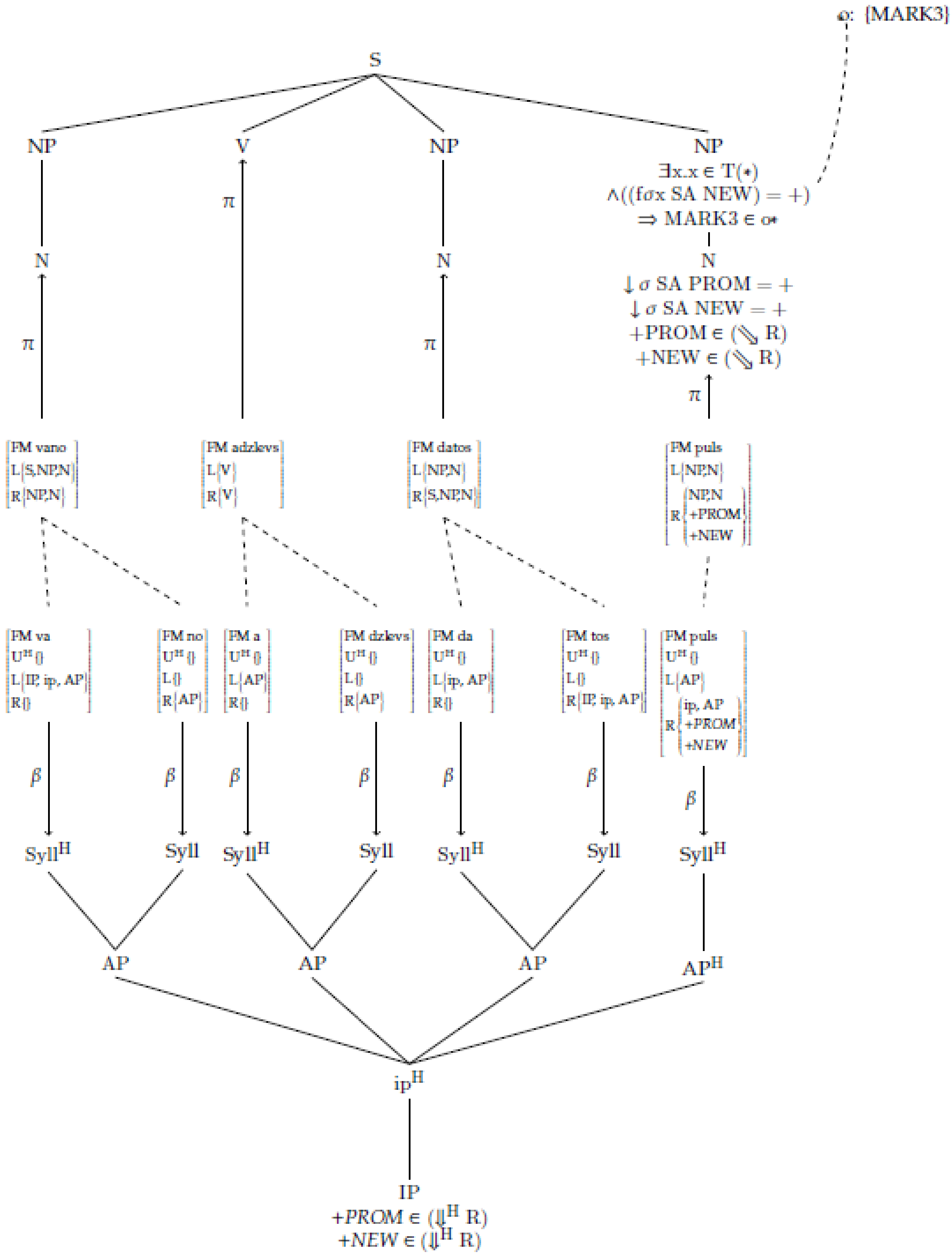


Figure 142: Constraints FMARK and NOPHRASE

The LFG model of the interaction between information structure, syntax and prosody in Georgian presented in this chapter reflects my argument that in Georgian, as in other languages, information structural relations are most directly expressed in sentence form by the association of words with the heads of prosodic phrases, rather than with their boundaries. In the next section I will supplement the model with a final component comprising further annotations detailing how these prosodic heads are associated with the specific prosodic features which express these in Georgian.

6.2.1.3 Prosodic Features

The LFG model of Georgian presented in the previous sections captures the prosodic expression of discourse relations by associating the words carrying them with the heads of prosodic phrases; this reflects my assumption that these are the chief underlying means of prosodically expressing discourse relations cross-linguistically. In my approach, prosodic heads are in turn expressed in individual languages by the association of these heads with prosodic features. In this section, I will present a final set of annotations to the Georgian prosodic structure rules proposed in [**86**] which specify those prosodic features by means of which the heads and boundaries of prosodic phrases are themselves expressed, in accordance with the analysis of Georgian prosodic structure presented in the previous chapter. In addition, I will model a way in which prosodic features are directly responsible for expressing information: the tonal expression of the distinction between declarative and interrogative sentence types.

The model of prosodic focus realisation in English proposed by Mycock and Lowe (2013) uses annotations directly associating focus with prosodic features. In the annotation repeated in [**110**], the DF_FOCUS label is associated with the rightmost stressed syllable of a PW phrase in the event that it bears a high (H) nuclear tone.

110) (13)
$$\begin{array}{cccccc} \mathrm{PhP} & \rightarrow & \mathrm{PW}^{*} & \mathrm{PW} & \mathrm{PW}^{*} \\ & & & ((\searrow^{S}\mathrm{N\_TONE}) = \mathrm{H}) \Rightarrow & \\ & & & \mathit{DF\_Focus} \in (\searrow^{S}\mathrm{R}) & \end{array}$$

In the analysis of Georgian prosody presented in the previous chapter, I identified a set of prosodic features associated with the heads and boundaries of prosodic phrases. The first of these, shown in Table 93, is increased amplitude, which I found to be associated with the heads of IP phrases.

Table 93: Proposed phrasings by focus context

Focus context	Proposed phrasing and intensity feature (bold)
VF	$[[[S]_{AP}\ [\mathbf{V}_{F}]_{AP}]_{ip}\ [[O]_{AP}]_{ip}\ ]_{IP}$
SJF	$[[[\mathbf{S}_{F}]_{AP}]_{ip}\ [[V]_{AP}[O]_{AP}]_{ip}\ ]_{IP}$
OF	$[[[S]_{AP}\ [V]_{AP}\ [\mathbf{O}]_{AP}]_{ip}\ ]_{IP}$
SJT	$[[[S_{T}]_{AP}]_{ip}\ [[V]_{AP}[\mathbf{O}_{F}]_{AP}]_{ip}\ ]_{IP}$
STF	$[[[S_{F}]_{AP}]_{ip}\ [[V]_{AP}[\mathbf{O}_{F}]_{AP}]_{ip}\ ]_{IP}$
SJFQ, OFQ	$[[[S]_{AP}]_{ip}\ [[\mathbf{V}_{\mathbf{F}}]_{AP}]_{ip}\ [[O]_{AP}]_{ip}\ ]_{IP}$

The second of these is tone, which takes a number of forms. The proposed tonal inventory, which consists of pitch accents, phrase accents and boundary tones for different prosodic phrases, is repeated in Table 94.

Table 94: Proposed Tonal Inventory for Georgian

Tone type	Tones
Pitch accent	L*, H*
Phrase accent	H+L
AP boundary tone	Ha, L+Ha
ip boundary tone	H-, L-, !L-, L+H-
IP boundary tone	L%, HL%
Combination boundary tones	La+H-, L-+HL%

As discussed in the previous chapter, the combinations in which the identified tones may occur are dependent on several factors, which must be reflected in the p-structural annotations to be proposed. I begin with a set of annotations to IP phrases. IP phrases in my analysis can end in either of two boundary tones, which are realised on the IP-final syllable: a low tone L%, or a complex high-low tone HL%. Whereas the first of these can occur either in declaratives or in yes/no questions, the second occurs only in yes-no questions[82]. In addition, the syllable corresponding to the head of an IP or IP^{H} (but not of an IP^{0}) phrase is realised with a feature of additional amplitude. The $\mathrm{IP}^{/\mathrm{H}}$ annotation in [**111**] specifies first that the AVM corresponding to the continuously headed terminal syllable of the IP has the value + for its attribute AMP(litude), and then that either L% or HL% are members of the set TONE within the AVM corresponding to its rightmost syllable, represented with Mycock and Lowe's (2013) symbol $\searrow$ introduced in *6.2.1*. Finally, it states that, if HL% is a member of the set TONE, then the label *PolarIntSem* is a member of the set R within the AVM corresponding to its rightmost syllable; this is the label which Dalrymple and Mycock (2011) associate with yes-no questions.

111)

$$\begin{array}{c} \mathrm{IP} \\ ((\Downarrow^{\mathrm{H}}\mathrm{AMP})=+) \\ \mathrm{L\%}\vee\mathrm{HL\%}\in\searrow\mathrm{TONE} \\ (\mathrm{HL\%}\in\searrow\mathrm{TONE})\Rightarrow \mathit{PolarIntSem}\ \in\searrow\mathrm{R} \end{array}$$

Below I will provide an additional component to this IP phrase annotation to capture how the prosodic distinction between statements and yes-no questions is marked in the event that the IP phrase ends in an L% boundary tone. The distinction in this case is a matter of the boundary tones realised on ip phrases, which are specified in the next set of annotations.

As shown in Table 94, an ip phrase in my analysis can end in one of four boundary tones: a high ip boundary tone H-, a low ip boundary tone L-, an upstepped low ip boundary tone !L- or a combination low and high boundary tone L+H-, the low tone of which is realised on the penultimate syllable of the ip phrase; the latter complex boundary tone marks the sentence in which it appears as a yes-no question. In the event that an ip phrase shares its final syllable with that of an IP phrase, the boundary tone borne by this syllable is that of

[82] This IP boundary tone is also often realised in wh-questions, although several native speakers expressed the opinion that this is not correct Georgian.

the latter. Whereas the association of the first three ip boundary tones with the TONE attribute of the AVM corresponding to the ip-final syllable can be modelled using the same symbol $\searrow$ used in the IP annotation in [**111**], the component tones of the fourth, complex ip boundary tone must be associated with the TONE AVMs both of the final and of the penultimate syllables of the ip. Reference to the AVM of the ip-penultimate syllable can be achieved using the symbol $\searrow$ ***pn***, which I define in [**112**]. Similarly to Mycock and Lowe's (2013) symbol $\searrow^{s}$ defined in [**73b**], which locates the AVM corresponding to the rightmost stressed syllable of the prosodic phrase in question, $\searrow$ ***pn*** is defined as the function β applied to the application of the function N-1 to the application of β^{-1} to the rightmost terminal node dominated by the current node; this locates the AVM corresponding to the penultimate terminal syllable dominated by the present node.

112) $\searrow^{\mathrm{pn}} \equiv \beta(\mathrm{N}^{-1}(\beta^{-1}(\mathrm{Tr}(\diamond))))$

The ip annotation in [**113**] states first that, if neither of the IP boundary tones L% or HL% are members of the TONE set of the AVM corresponding to the ip-final syllable, then one of the tones L-, !L- or H- is a member of this set. It then states that, if H- is a member of the TONE set of the ip-final AVM, then L- either is or isn't a member of the TONE set of the ip-penultimate AVM.

113)
$$\begin{array}{c} \mathrm{ip}/^{\mathrm{H}} \\ \neg\exists x.x{=}\mathrm{L\%}\vee\mathrm{HL\%}\wedge x\in\searrow\mathrm{TONE}\Rightarrow \\ ((\searrow\mathrm{TONE}){=}\mathrm{L}^{-}\vee!\mathrm{L}^{-}\vee\mathrm{H}^{-}) \\ ((\searrow\mathrm{TONE}){=}\mathrm{H}^{-})\Rightarrow\mathrm{L}^{-}\in\vee\notin\searrow^{\mathrm{pn}}\mathrm{TONE} \end{array}$$

If L- is a member of the TONE set of the ip-penultimate AVM of one of the ips in a sentence, then the sentence is marked as a yes-no question. This can be captured with the additional annotations to the IP phrase presented in [**114**]. The first of these states that, if HL% is a member of the TONE set of the AVM corresponding to the IPs rightmost syllable, or if there is an AVM which corresponds to the penultimate syllable of an ip phrase and which contains an L- tone as a member of its TONE set, then the label *PolarIntSem* is a member of the R set of the AVM corresponding to the IP-final syllable. The second of these states that, if HL% is not a member of the TONE set of the IP's rightmost syllable AVM, and if there is no such AVM containing an ip phrase L- boundary tone, then either the label *DeclSem*, associated with a declarative sentence, or the label *ConstIntSem*, associated with a wh-question, is a member of the R set of the AVM corresponding to the IP-final syllable.

114)

$$\begin{gathered}
\mathrm{IP} \\
((\Downarrow^{\mathrm{H}}\mathrm{AMP}){=}{+}) \\
\mathrm{L\%} \vee \mathrm{HL\%} \in \searrow \mathrm{TONE} \\
(\mathrm{HL\%} \in \searrow \mathrm{TONE}) \vee (\exists x.x \equiv \beta^{-1}(\beta(\mathrm{N}^{-1}(\beta^{-1}(\mathrm{T_r}(\mathrm{ip}))))) \wedge \mathrm{L}^{-} \in\ x) \\
\Rightarrow \mathit{PolarIntSem}\ \in \searrow \mathrm{R} \\
(\mathrm{HL\%} \notin \searrow \mathrm{TONE}) \wedge (\neg\exists x.x \equiv \beta^{-1}(\beta(\mathrm{N}^{-1}(\beta^{-1}(\mathrm{T_r}(\mathrm{ip}))))) \wedge \mathrm{L}^{-} \in\ x) \\
\Rightarrow \mathit{DeclSem}\ \in \searrow \mathrm{R} \vee \mathit{ConstIntSem}\ \in \searrow \mathrm{R}
\end{gathered}$$

The c-structural annotation in [**115**] to the S node provides syntactic labels to match those prosodic labels provided by the IP annotation in [**114**]. This states that the meaning constructor corresponding S has the value +, either for a semantic attribute DeclSem, in which case the s-string AVM corresponding to its rightmost terminal node has the label DeclSem in its R set, or for a semantic attribute ConstIntSem, in which case a label corresponding to this is a member of that AVM, or for a semantic attribute PolarIntSem, in which case the label corresponding to this is a member of that AVM. This ensures that the Principle of Interface Harmony is satisfied and that the prosodic communication of this feature is accounted for.

115)

$$\begin{gathered}
\mathrm{S} \\
\left\{ \begin{array}{c|c|c}
\downarrow \sigma\ \mathrm{SA\ DeclSem} = + & \downarrow \sigma\ \mathrm{SA\ ConstIntSem} = + & \downarrow \sigma\ \mathrm{SA\ PolarIntSem} = + \\
\mathrm{DeclSem} \in (\searrow \mathrm{R}) & \mathrm{ConstIntSem} \in (\searrow \mathrm{R}) & \mathrm{PolarIntSem} \in (\searrow \mathrm{R})
\end{array} \right\}
\end{gathered}$$

The final set of annotations to be presented is to AP phrases, which are associated with several prosodic features. The AP phrase in my analysis has one of two boundary tones: a high Ha boundary tone on the AP-final syllable, or a combination L+Ha boundary tone which, like the combination L+H- ip boundary tone, is spread across the penultimate and final syllables of the AP phrase. It also features one of three pitch accents: a low L* or upstepped low !L* pitch accent, which appear in combination with a high boundary tone from an AP (Ha), ip (H-) or IP (HL%) phrase, or a high (H*) pitch accent, which appears in combination with a low ip boundary tone L-. Finally, the AP may also feature a phrase accent H+L, which is spread across the antepenultimate and penultimate syllables of the phrase. Whereas an AP boundary tone is replaced by an ip or IP boundary tone occupying the same syllable, I do not assume that an AP pitch accent occurring on the same syllable as a higher-level boundary tone is replaced by it, or that either of the tones of a phrase accent is replaced.

In order to make reference to the antepenultimate syllable of the AP phrase, an additional symbol $\searrow$ ***apn*** is required. This is defined in [**116**] as the application of the function β to the application of the function N^{-2} to the inverse of β applied to the rightmost terminal syllable of the present node; this locates the AVM corresponding to the antepenultimate syllable.

116) $\searrow^{\mathrm{apn}} \equiv \beta(\mathrm{N}^{-2}(\beta^{-1}(\mathrm{Tr}(\diamond))))$

The first of the AP annotations in [**117**] states that, if there is no IP or ip tone which is a member of the TONE set of the AVM corresponding to the AP-final syllable, then the AP boundary tone Ha is a member of that set. The second states that, if there is no ip boundary tone or pitch accent which is a member of the TONE set of the AVM corresponding to the AP-penultimate syllable, then the AP boundary tone La either is or is not a member of that set. The third states that, if either of the Ha, H- or HL% boundary tones is a member of the TONE set of the AVM corresponding to the AP-final syllable, then either of the pitch accents L* or !L* is a member of the AVM corresponding to the head syllable of the AP, and the fourth that, should the TONE set of the AVM corresponding to the AP-final syllable feature an L- boundary tone, then the pitch accent H* is a member of the AVM corresponding to the head syllable of the AP. The fifth and final annotation states that, if the second phrase accent tone Lpa is a member of the TONE set of the AVM corresponding to the AP-penultimate syllable, then the first phrase accent tone Hpa is a member of the TONE set of the AVM corresponding to the AP-antepenultimate syllable.

117)

$$\begin{gathered}
\mathrm{AP}^{/\mathrm{H}} \\
\neg\exists x.x{=}\mathrm{T\%}\vee\mathrm{T}^{-}\wedge x\in\searrow\mathrm{TONE}\Rightarrow\mathrm{H}^{a}\in\searrow\mathrm{TONE} \\
\neg\exists x.x{=}\mathrm{L}^{-}\vee\mathrm{T}^{*}\wedge x\in\searrow^{pn}\mathrm{TONE}\Rightarrow\mathrm{L}^{a}\in\vee\notin\searrow^{pn}\mathrm{TONE} \\
\mathrm{H}^{a}\vee\mathrm{H}^{-}\vee\mathrm{HL\%}\in\searrow\mathrm{TONE}\Rightarrow\mathrm{L}^{*}\vee!\mathrm{L}^{*}\in\Downarrow^{\mathrm{H}}\mathrm{TONE} \\
\mathrm{L}^{-}\in\searrow\mathrm{TONE}\Rightarrow\mathrm{H}^{*}\in\Downarrow^{\mathrm{H}}\mathrm{TONE} \\
\mathrm{L}_{pa}\in\searrow^{pn}\mathrm{TONE}\Rightarrow\mathrm{H}_{pa}\in\searrow^{apn}\mathrm{TONE}
\end{gathered}$$

The operation of the annotations presented in this subsection is illustrated in Figure 143, which represents the yes-no question in [**118**].

118) lom-i elodeba irem-s?
lion-NOM await.PRS.3SG deer-DAT
'Is the lion waiting for the deer?'

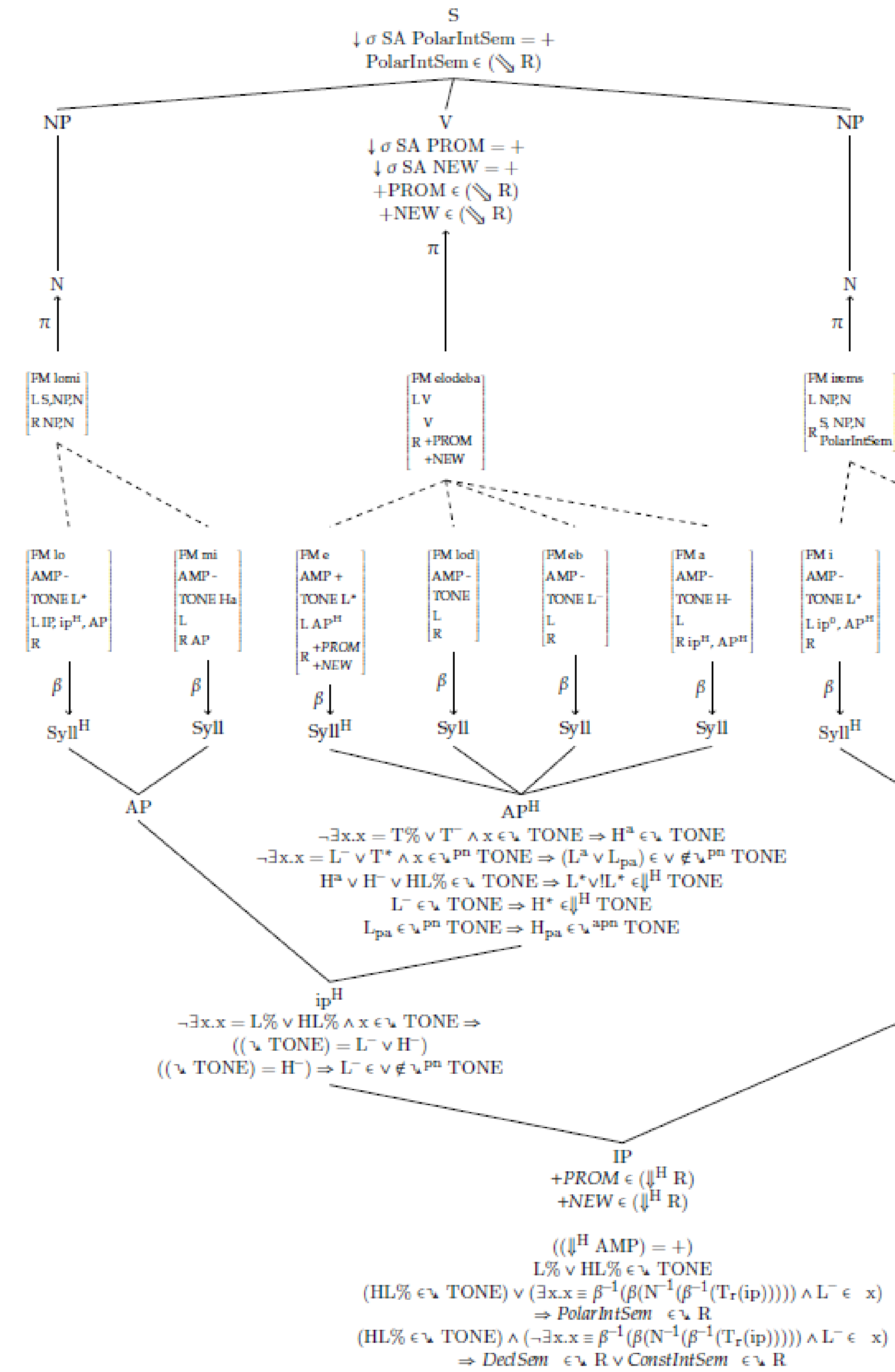


Figure 143: Effect of prosodic feature annotations for Georgian

The annotations presented in this subsection complete the LFG model of the interaction between syntax, prosody and information structure presented in this chapter. In the next section I will show how the same prominence-based model can be applied, with some modifications, to some of the other languages discussed in the previous chapter.

6.2.2 Other Languages

In chapter 2 I argued that the proposed prominence-based account of the relationship between information structure and sentence form which forms the basis of the LFG model of Georgian presented in this chapter is compatible with the data discussed there, both for 'stress languages' like English and German, and for 'alignment languages' like French. In chapter 5, I showed that the set of Optimality-Theoretic constraints proposed there to model Georgian within this account could, with modifications in the form of some additional constraints which I repeat in Table 95, likewise be used to model other languages of both kinds.

Table 95: Additional constraints proposed in chapter 5 for other languages

HSEPIPR *Any phrase heads separating the head of an IP phrase from its right boundary must be at least two phrase levels beneath it.*
HSEPipR *Any phrase heads separating the head of an ip phrase from its right boundary must be at least two phrase levels beneath it.*
HSEPIPL *Any phrase heads separating the head of an IP phrase from its left boundary must be at least two phrase levels beneath it.*
HSEPipL *Any phrase heads separating the head of an ip phrase from its left boundary must be at least two phrase levels beneath it.*
H(ip) *All ip phrases must be headed.*
H(IP) *All IP phrases must be headed.*
WALIGN *In careful speech, align prosodic phrase boundaries with the edges of words.*
CWO *Subjects must precede objects.*
HSEPAPR *Any phrase heads separating the head of an AP phrase from its right boundary must be at least two phrase levels beneath it.*
HSEPAPL *Any phrase heads separating the head of an AP phrase from its left boundary must be at least two phrase levels beneath it.*

In the present section I show how some similar adjustments to the LFG approach proposed above for Georgian permit it to likewise be extended to the other languages discussed in chapters 2 and 5. I first show how English can be captured within these proposals as an example of another ‘stress language’. I then show how the model can be adjusted to accommodate problematic features of the ‘alignment languages’ French and Nłeʔkepmxcin (Thompson River Salish).

6.2.2.1 English

As discussed in chapter 2 and in *6.2.1* above, English, which is a ‘stress’ language like Georgian, provides examples of constructions which are problematic for an alignment or stress-alignment based account of focus realisation. In addition to constructions analogous to the Georgian examples discussed, in which syllables which are the heads of prosodic words intervene between a non-final focus and the right boundary of an IP phrase, and in which a nuclear focus aligned with the head of an IP phrase intervenes between a preceding prenuclear focus and the right boundary of an IP phrase, English permits constructions like [**119**] in which postnuclear prominent topics, aligned with the head of an ip phrase, intervene between the nuclear focus and the right boundary of a larger IP phrase.

119)

```
   *                                          IP
   *                                          IP
   *                     *                    ip
   *          *          *                    AP
[[[[NORMA’s]AP]ip]IP[[[[coming]AP[TOMORROW]AP]ip]IP]IP
```

As with the Georgian data, whereas these constructions are problematic for the alignment-based LFG model of focus prosody proposed by Mycock and Lowe (2013), which identifies focus with the final stressed syllable within an IP, they are compatible with the prominence-based annotations to prosodic structure proposed in *6.2.1*, which associate focus with the lowest ‘head-chain’ syllable dominated by an IP node and the feature +PROM(inent) with the lowest such syllable dominated by an ip node. The compatibility of the proposed approach with the postnuclear prominent topic construction in [**119**], which did not occur in my Georgian data, can be illustrated first with the annotated prosodic structure rule in [**120**]. This specifies that an IP phrase may contain further IP phrases, in the form of an obligatory IP^{H} phrase, which may be followed by a single headless IP^{0} phrase.

Both the IP and IP^{H} phrases carry the same annotation as the Georgian IP phrase in the rule presented in [**86**], which specifies that the p-string AVM corresponding to the terminal ‘chain head’ syllable of each has the labels *+PROM* and *+NEW* as members of its set R. The prosodic structure rule in [**121**] specifies that a headless IP^{0} phrase contains a single, non-head ip phrase; as with the Georgian ip and ip^{H} phrases in [**88**], the annotation to this specifies that the label +PROM is a member of the R set of the p-string AVM corresponding to the terminal ‘chain head’ syllable of the ip. As with the Georgian prosodic structure rules in [**109**], these rules are also annotated to reflect Fery’s (2011) constraint ***NOPHRASE***, according to which additional higher-level phrases are dispreferred. Whereas the annotation to the ip phrase in [**121**] specifies that its occurrence results in a MARK3 being a member of o-structure, the annotations to the IP and IP^{0} phrases in [**120**] and [**121**] specify that their occurrence results in the addition of a MARK4 to o-structure, reflecting a greater dispreference for these larger phrases.

120)
$$\begin{array}{c} \mathrm{IP} \\ +PROM \in (\Downarrow^{\mathrm{H}}\mathrm{R}) \\ +NEW \in (\Downarrow^{\mathrm{H}}\mathrm{R}) \\ \mathrm{MARK4}{\in}o* \end{array} \rightarrow \begin{array}{c} \mathrm{IP}^{\mathrm{H}} \\ +PROM \in (\Downarrow^{\mathrm{H}}\mathrm{R}) \\ +NEW \in (\Downarrow^{\mathrm{H}}\mathrm{R}) \\ \end{array} \left(\begin{array}{c} \mathrm{IP}^{0} \\ \mathrm{MARK4}{\in}o* \end{array} \right)$$

121)
$$\begin{array}{c} \mathrm{IP}^{0} \\ \mathrm{MARK4}{\in}o* \end{array} \rightarrow \begin{array}{c} \mathrm{ip} \\ +PROM \in (\Downarrow^{\mathrm{H}}\mathrm{R}) \\ \mathrm{MARK3}{\in}o* \end{array}$$

As shown in chapter 2, the construction in [**119**], like the other constructions discussed, conforms to the constraint on prominence configurations which I articulated in the previous chapter as the inviolable constraint ***HSEP***. In combination with the strict constraint on canonical word order in English, embodied in the LFG model in the form of the annotations from c-structural nodes to f-structure discussed in *6.1.1*, ***HSEP***, which is reflected in the form of the prosodic structure rules in [**118**] and [**119**], accounts for the occurrence of constructions like these in English in spite of the violations of the ***NOPHRASE*** constraint that they entail.

The application of these constraints to postnuclear prominent topic constructions like [**119**] is illustrated in Figure 144. Although the ip annotation in [**121**] specifies only association of the *+PROM* label, which is compatible either with a topic or with a focus reading, an interpretation of focus rather than topic for a postnuclear item associated with this label is prevented by the existence of an alternative means of prominence association for double focus constructions in which the former focus is aligned with an ip head and the latter focus is aligned with the IP head; as this alternative is realised within a single IP phrase, fewer violations of ***NOPHRASE*** are incurred.

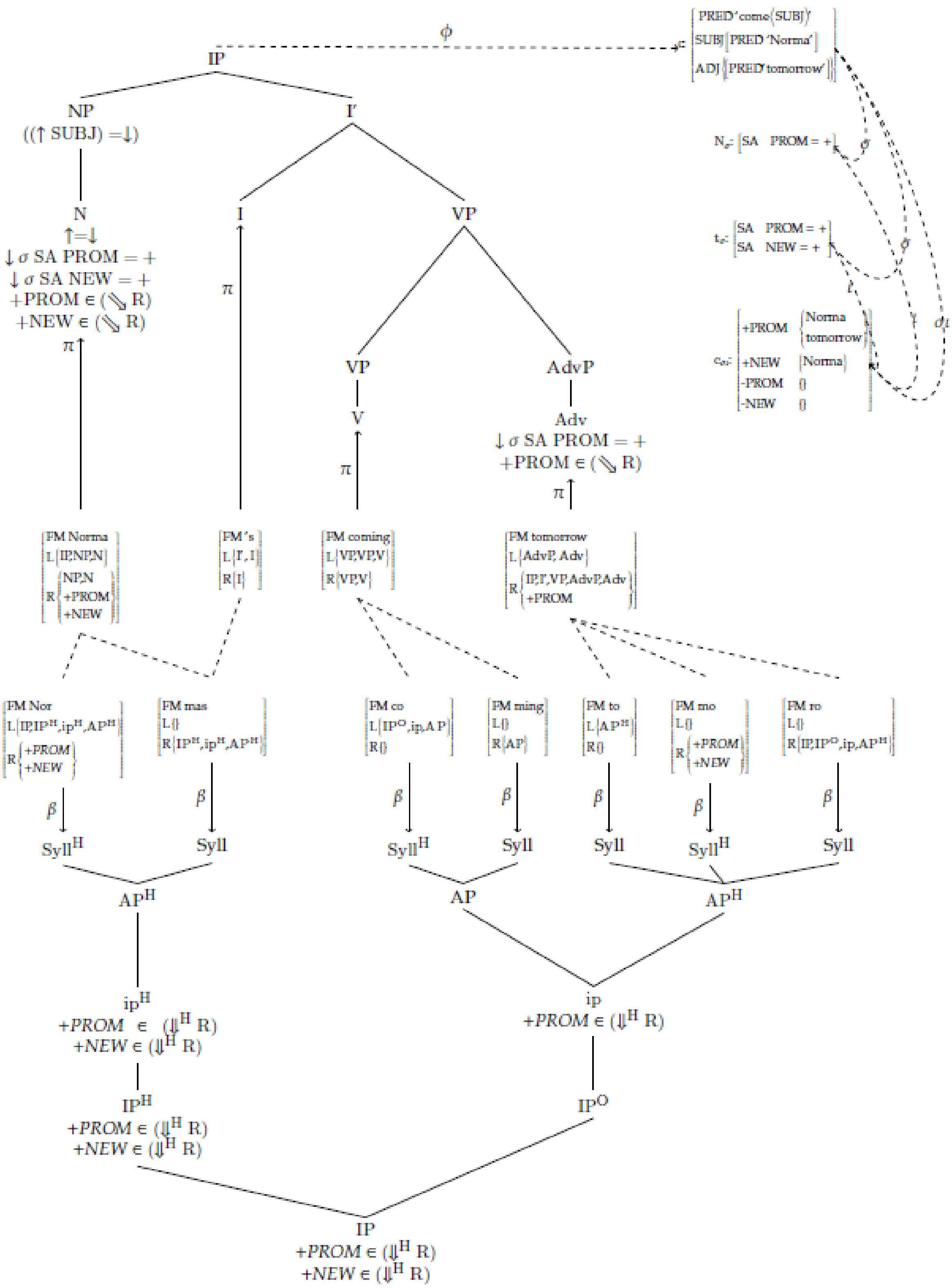


Figure 144: Function of the annotations in [120] and [121]

As discussed, that postnuclear prominent topic constructions do not occur in Georgian can be accounted for as the result of the inviolable constraint ***DITINIT***, according to which discourse-inactive topics may not be preceded by other material, in combination with weaker canonical word order constraints; these result in the fronting of prominent topics.

A problem for the annotations proposed is presented by the possibility of additional prenuclear IP phrases, which may precede a nuclear IP phrase within a larger IP phrase in examples of emphatic speech. In such examples, the heads of such prenuclear IP phrases are associated, not with focus, as specified by the present annotations, but with the feature +PROM, like the heads of prenuclear ip phrases in non-emphatic speech. Whilst a more detailed treatment of constructions like these must be left to future research, these associations can be captured with the modified annotations to IP phrases in [**122**]; these specify that the label +PROM is associated with the AVM of the IP's lowest 'chain head' syllable, and that the label +NEW is as well, on the condition that the IP has no mother node.

122)

$$\begin{array}{cccc}
\begin{array}{c}\mathrm{IP}\\ \mathit{+PROM} \in (\Downarrow^{\mathrm{H}}\mathrm{R})\\ \mathit{+NEW} \in (\Downarrow^{\mathrm{H}}\mathrm{R})\\ \mathrm{MARK4}{\in}o*\end{array} & \rightarrow & \begin{array}{c}\mathrm{IP}*\\ \mathit{+PROM} \in (\Downarrow^{\mathrm{H}}\mathrm{R})\\ \mathrm{M}(*){\equiv}\emptyset{\Rightarrow}\mathit{+NEW} \in (\Downarrow^{\mathrm{H}}\mathrm{R})\\ \mathrm{MARK4}{\in}o*\end{array} & \begin{array}{c}\mathrm{IP}^{\mathrm{H}}\\ \mathit{+PROM} \in (\Downarrow^{\mathrm{H}}\mathrm{R})\\ \mathit{+NEW} \in (\Downarrow^{\mathrm{H}}\mathrm{R})\end{array} \quad \left(\begin{array}{c}\mathrm{IP}^{0}\\ \mathrm{MARK4}{\in}o*\end{array}\right)
\end{array}$$

Other English constructions discussed in chapters 2 and 5 are more problematic for the LFG model in a different way. As discussed in *6.2.1*, the modified LFG architectures proposed by Dalrymple and Mycock (2011) and Mycock and Lowe (2013) which I have used in modelling Georgian are motivated by examples of English utterances from the analyses of Lahiri and Plank (2010) like [**123**], in which the lack of isomorphism between syntactic and prosodic phrasing extends to the level of the word.

123)

‘Anna was studying at the university.’
(IntP (PhP (PW 'æ.nə.wəz.)) (PhP (PW 'stʌ.di.ɪŋ.ət.də.ju.nə.)) (PhP (PW 'vɜː.sə.ti)))

(Dalrymple and Mycock 2011:180)

In chapter 2, I argued that examples like these can likewise be shown to conform to the prominence constraints which I articulated in chapter 5 as the inviolable constraint ***HSEPipR***, according to which the heads of ip (or here, PhP) phrases may be separated from their right boundary maximally by prosodic heads at least two phrasing levels beneath them, and the violable constraint ***HSEPAPL***, according to which the heads of AP (or here, PW) phrases may only be separated from their left boundary by prosodic heads at least two phrasing levels beneath them; in this case, this means that the heads of syllables may not intervene between PW heads and their left boundaries, thus accounting for their placement. These configurations are illustrated in [**124**]. I proposed that, in careful speech, ***HSEPAPL*** is outranked by a constraint ***WALIGN***, according to which prosodic phrase boundaries must be aligned with the edges of words.

124)

```
                                                                        *      (IntP)
          *                   *                                         *      (PhP)
          *                   *                                         *      (PW)
          *  *  *             *  * *  *  *  *  *                        *  * * (syll)
(IntP (PhP (PW 'æ.nə.wəz. ) ) (PhP (PW 'stʌ.di.ɪŋ.ət.də.ju.nə. ) ) (PhP (PW 'vɜː.sə.ti )))
```

In the LFG architectures proposed by Dalrymple and Mycock (2011) and Mycock and Lowe (2013), the terminal nodes of p-structure, to which the AVMs of the p-string correspond, are syllables. Whilst this permitted me to capture the effect of the prominence configuration constraints proposed to account for my Georgian data, which require reference maximally to headed syllables, to model the effect of the constraint ***HSEPAPL*** in English requires the use of an LFG p-structure in which the terminal nodes are not syllables, but the prosodic units beneath them which can constitute the heads of syllables; it is these consonantal and vocal segments which, according to ***HSEPAPL***, may not occur between the syllabic head of an AP phrase and its left boundary.

The prosodic rules for such a p-structure are given in [**125**]. These embody both the ***HSEPipR*** constraint ([**125a**]) and the ***HSEPAPL*** constraint ([**125b**]).

125) a) $\mathrm{AP}/^{\mathrm{H}} \rightarrow \sigma^{\mathrm{H}} \quad \sigma^{*}$

b) $\sigma/^{\mathrm{H}} \rightarrow \mathrm{seg}^{*} \quad \mathrm{seg}^{\mathrm{H}} \quad \mathrm{seg}^{*}$

A partial representation of a p-structure built from these rules is shown in Figure 145. In this representation, the AVMs which comprise the p-string correspond, not to syllables, but to the sub-syllabic segments which comprise the terminal nodes of p-structure as per the prosodic structure rules in [**125**]. Although the fuller implications of such a modification to the LFG architecture must be left to future research, independent support for lexical entries in which the p-forms of words comprise these segments instead of syllables is provided by Mycock and Lowe's example in Figure 146, in which one syllable is spread between two words.

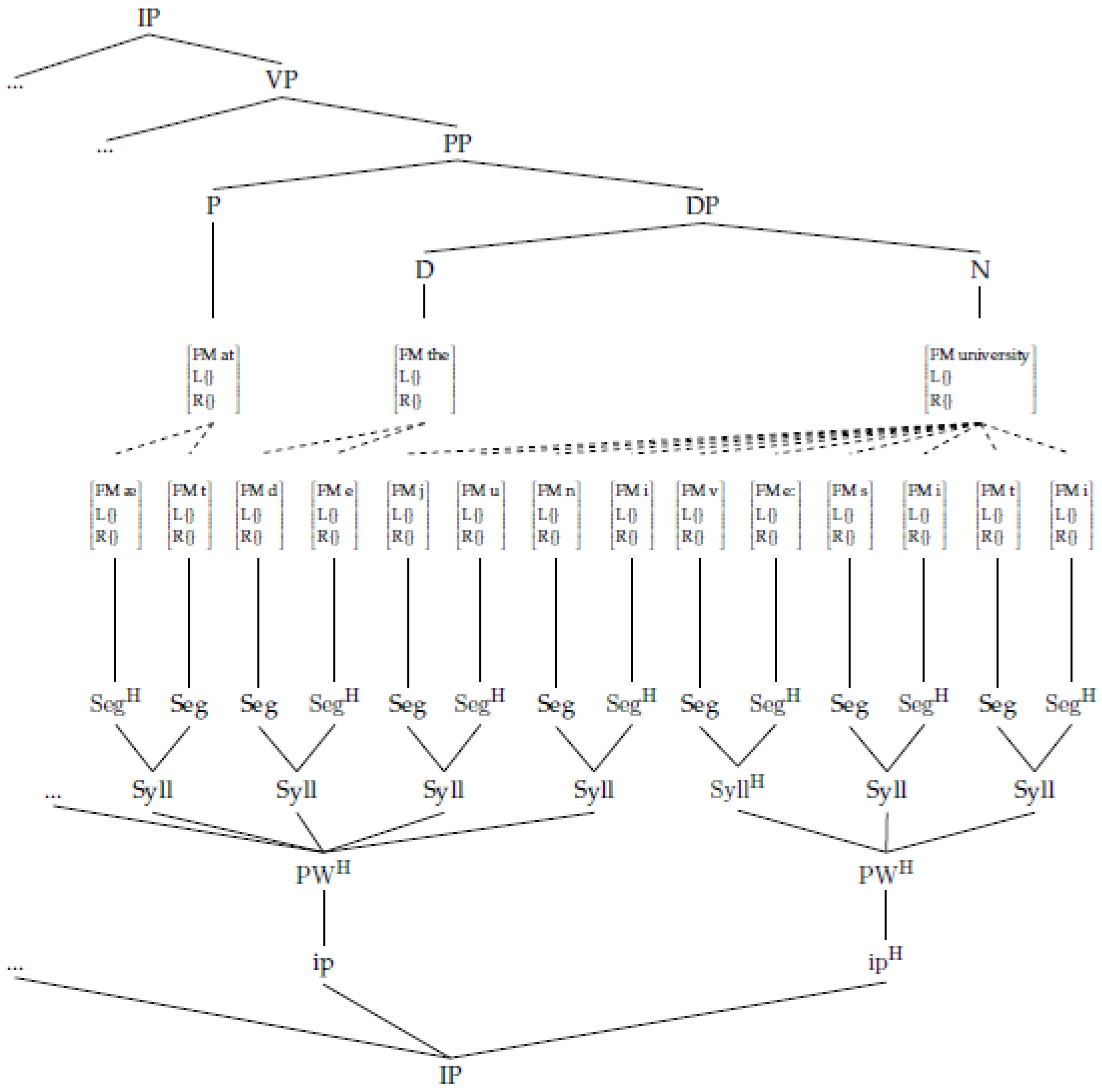


Figure 145: Sub-syllabic p-structural representation (partial) in English

Single-Syllable Exponent>Extent: *[Kay]'s gone*

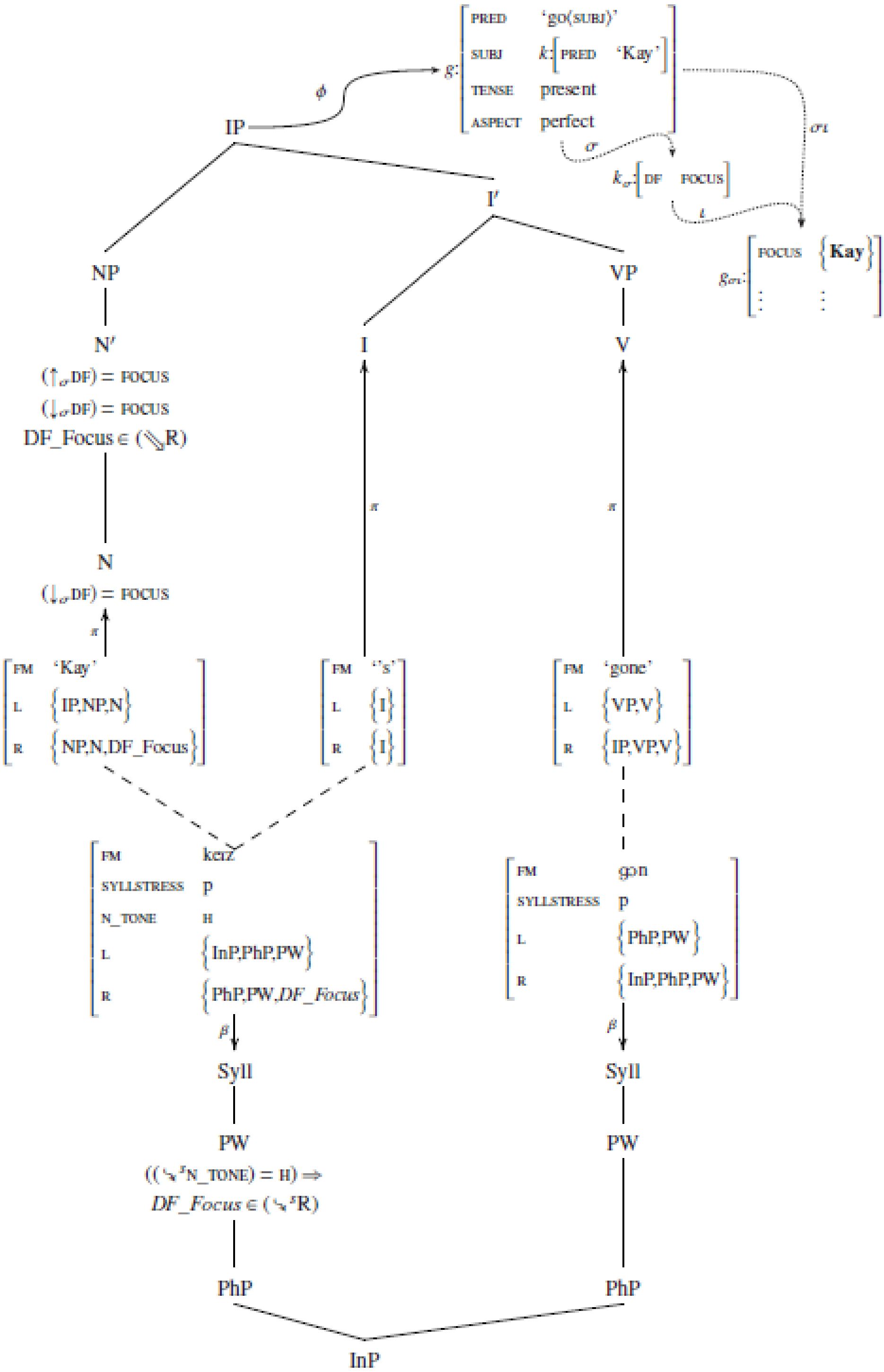


Figure 146: Correspondence of one syllable to two words (Mycock and Lowe 2013:460)

6.2.2.2 Alignment Languages

In chapter 2 I argued that the data discussed for ‘alignment languages’ like French and Nłeʔkepmxcin (Thompson River Salish) can be shown to be subject to the same prominence constraints to which the stress language data were shown to conform. In the case of French, the unavailability of deaccenting for postnuclear phrases motivates the existence of a constraint ***H(ip)***, according to which all ip phrases must have heads; this in turn accounts for the obligatory alignment of nuclear focus, which is associated with the head of an IP phrase, with the right boundary of an IP phrase, to prevent the obligatory heads of ips from intervening between the IP head and its right boundary, which would violate the ***HSEP*** constraint. Similarly to the case of English postnuclear topics discussed in the preceding subsection, the occurrence of headed ip phrases following the non-final nuclear focus in French again makes problematic an LFG annotation to prosodic phrases of the kind proposed by Mycock and Lowe (2013), which associates focus with the AVM corresponding to the rightmost stressed syllable of the phrase in question. Although such an annotation can be used to locate the nuclear focus within the smaller IP containing it, the same annotation cannot be used to locate the focus within the larger IP containing the two smaller IPs. By contrast, the annotations to prosodic structure nodes which I have proposed, which seek the lowest continuously headed element within a phrase, can be successfully applied both to these IP phrases to identify the focus, and to the rightmost smaller IP phrase, in which there is no focus to locate. These annotations are applied to p-structure rules for French in [**126**], which again embody the ***HSEP*** constraint.

126) $\underset{\substack{+PROM \in (\Downarrow^{H}R) \\ +NEW \in (\Downarrow^{H}R}}{\text{IP}} \rightarrow \underset{\substack{+PROM \in (\Downarrow^{H}R) \\ +NEW \in (\Downarrow^{H}R}}{\text{IP}^{H}} \left(\underset{\substack{+PROM \in (\Downarrow^{H}R) \\ +NEW \in (\Downarrow^{H}R}}{\text{IP}^{0}} \right)$

Although these focus-identifying annotations can be straightforwardly applied to French, however, the same is not true of those annotations proposed for Georgian and English which associate headed prosodic nodes which have the ip as their uppermost head with the label +*PROM*. This is because, in accordance with the constraint ***H(ip)***, all ip phrases in French must have heads, with the consequence that not only discourse-inactive but also discourse-active items may be associated with the heads of ip phrases. This obligatory ip alignment may motivate the use of the resumptive pronoun in examples like [**127a**], which Féry (2013) points out marks the extraposed indirect as an anti-topic or tail in the sense of Vallduví (1992), as opposed to an afterthought, which is its interpretation in [**127b**].

127) a) $(((\text{Marie})_{\Phi}\ (\text{lui donne un gâteau}_{F})_{\Phi})_{\iota}.\ (\text{à son frère})_{\Phi})_{\iota}$

b) $(((\text{Marie})_{\Phi}\ (\text{donne un gâteau}_{F})_{\Phi})_{\iota},\ (\text{à son frère})_{\Phi})_{\iota}$

(Adapted from Féry 2013:699)

It is therefore necessary to modify the ip annotations for French so that the label +*PROM* is associated only with the heads of prenuclear ip phrases, which, unlike postnuclear ip phrase heads, are not ip phrase heads as the direct result of the ***H(ip)*** constraint. This can be achieved with the conditional annotations in [**128**], which specify that the +PROM label is associated with the R set of AVMS corresponding to syllables with ip as their upper head, only on the condition that these are not contained within a headless IP^{0} phrase[83].

[83] An alternative formulation could make the association of a +*PROM* label dependent upon the absence of a resumptive pronoun. Such a possibility must be left to future research.

128)

$$\begin{array}{cccc} \text{ip} & \rightarrow & \text{AP}^{*} & \text{AP}^{\text{H}} \\ \text{U}^{\text{H}}(*)\text{=ip} \;\; \wedge \;\; \text{M}(\text{U}^{\text{H}}(\diamond))\neq\text{IP}^{0} & & & \text{U}^{\text{H}}(*)\text{=ip} \;\; \wedge \;\; \text{M}(\text{U}^{\text{H}}(\diamond))\neq\text{IP}^{0} \\ \Rightarrow +PROM \;\; \in \;\; (\Downarrow^{\text{H}}\text{R}) & & & \Rightarrow +PROM \;\; \in \;\; (\Downarrow^{\text{H}}\text{R}) \end{array}$$

A representation for the French sentence repeated in [**129**], incorporating the annotations to French p-structure in [**126**] and [**128**] is shown in Figure 147. Here, I apply Mycock and Lowe's (2013) proposal that the s-structural AVM corresponding to the verb *'s* in Figure 146 is prevented from containing a label to match the *DF_FOCUS* label within the R set of its corresponding p-string AVM by its lexical entry, given in Figure 148, which specifies that the DF_FOCUS label may not be a member of its s-string R set. I assume that the pronoun *c'* and the determiner *l'*, which share syllables with their following words, are similarly prevented by their lexical entries from matching any similar label present in their corresponding p-string AVM.

129)	C'est		[l'	homme]$_{\text{F}}$	qui	pousse	la	femme.
	it	be.PRS.3SG	DET	man	who	push.PRS.3SG	DET	woman

'The man is pushing the woman.'

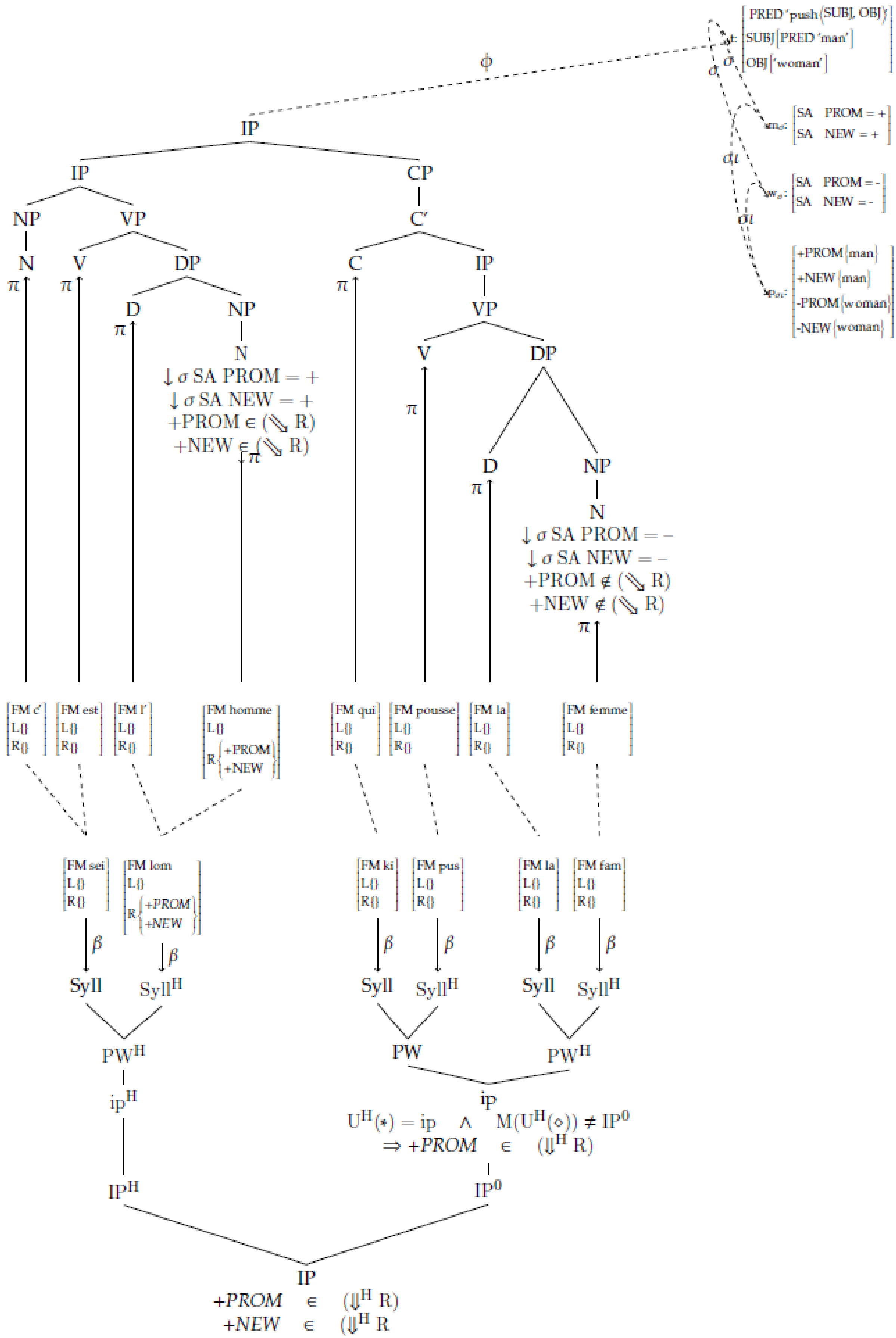


Figure 147: Function of annotations [126] and [128] in French

$(\bullet \textsc{fm}) = \text{‘’s’}$
$\bullet_{\pi} = \mathrm{I}$
$(\bullet_{\pi\phi}\ \textsc{tense-aspect}) = \textsc{pres-perf}$
$\text{DF\_Focus} \notin (\bullet \mathrm{R})$
$(\bullet \textsc{fm}) = /z/$

Figure 148: Lexical entry for ‘s (Mycock and Lowe 2013:454)

For Nłeʔkepmxcin (Thompson River Salish), it is again the case that an annotations which associate +PROM and +NEW labels with the AVM corresponding to the rightmost stressed syllable of the prosodic phrase in question are inappropriate for the larger IP. As discussed in chapter 2, Koch (2008a,b) finds that, whereas all-new and VP focus sentences are realised with a canonical VSO word order, in which the sentence-final nuclear prominence is aligned with the object, narrowly focused arguments are in a large majority of cases realised in nominal predicate and cleft constructions, in which they are linearised at or close to the left edge of the sentence whilst the nuclear prominence remains sentence-final; no deaccenting effect is found. Koch proposes that the prosodic realisation of focus in Nłeʔkepmxcin is achieved, not by aligning the focused constituent with the head of an IP phrase, but instead by aligning the phonological phrase (corresponding to an ip phrase) containing the focus with the left boundary of an IP phrase . Within such an analysis my proposed annotation, which associates a focus label with the AVM corresponding to the syllable which is the lowest continuous head of an IP phrase, is also problematic. By contrast, the alignment-based formalism proposed by Mycock and Lowe, and in particular the symbol $\swarrow$, can be used to locate and associate focus with the p-string AVM corresponding to the leftmost syllable in the IP phrase (assuming that unfocused items are excepted).

I argued in chapter 2 that the Nłeʔkepmxcin data demonstrate greater compatibility with the proposed prominence alignment account than with Koch’s (2008a,b) proposed left-alignment account, and that the nominal predicate and cleft-constructions, in which the focus is aligned with the head of an intermediate phonological phrase rather than with the head of the major intonational phrase, are better accounted for as special syntactic strategies of marking narrow focus in which the normal strategy of alignment with the IP head is overridden. Such constructions may be motivated by the lack of availability of deaccentuation as a strategy in the language, which is also consistent with the elision of arguments in examples discussed. As argued in chapter 2, this rigid distribution of prominces can be accounted for as the result of a constraint, articulated in the previous chapter as ***H(IP)***, according to which all IP phrases in Nłeʔkepmxcin must be headed; in combination with the ***HSEP*** constraint on prominence configuration, this has the result that a similar 'double-IP' strategy to that observed in French, which is subject to the ***H(ip)*** constraint, is unavailable.

The effect of the nominal predicate and cleft constructions 'overriding' the discourse-features associated with the heads of prosodic phrases can be captured in the LFG framework using a solution similar to that proposed by Mycock and Lowe (2013) to model the clitic *'s*. Whereas they propose that the lexical entry for this clitic form specifies that the label *DF_FOCUS* cannot be a member of the R set of its corresponding p-string AVM, thus preventing a matching DF_FOCUS label in the corresponding c-string AVM and a resulting focus interpretation of the clitic, I propose annotated phrase structures rules for Nłeʔkepmxcin cleft structures like that in [**130**]. Following Koch (2008a), this states that a cleft construction is contained within a TP phrase which consists of a VP phrase, within which the clefted portion of the construction is realised, and a DP phrase within which the residual part of the construction is realised. The annotations to the VP phrase specify that the meaning constructor corresponding to its rightmost terminal node, which is the focus, has the semantic attributes +PROM and +NEW, and that its corresponding c-string AVM contains the label +PROM in its R set; this matches the *+PROM* label in one of its corresponding p-string AVMs provided by the ip phrase head with which it is aligned. By contrast, the annotations to the DP phrase specify that the meaning constructor of each of its terminal nodes has the attributes –PROM and –NEW, and that no corresponding p-string AVM contains the labels +PROM or +NEW. This ensures that no *+PROM* or *+NEW* labels provided by the IP or ip heads aligned with words in this residual clause are matched on the syntactic side, and that their effect is consequently overridden.

130) $$\begin{array}{lll} \mathrm{TP} \quad \rightarrow & \mathrm{VP} & \mathrm{DP} \\ & f\sigma(\mathrm{Tr}(*))\ \mathrm{SA\ PROM}{=}+ & \forall x.x{\in}\mathrm{T}(*){\Rightarrow}f\sigma x\ \mathrm{SA\ PROM}{=}{-}{\wedge}f\sigma x\ \mathrm{SA\ NEW}{=}{-} \\ & f\sigma(\mathrm{Tr}(*))\ \mathrm{SA\ NEW}{=}+ & \neg\exists x.x{\in}\mathrm{T}(*){\wedge}{+}\mathrm{PROM} \in \pi^{-1}(x)\mathrm{R} \\ & +\mathrm{PROM} \in \pi^{-1}(\mathrm{Tr}(*))\mathrm{R} & \neg\exists x.x{\in}\mathrm{T}(*){\wedge}{+}\mathrm{NEW} \in \pi^{-1}(x)\mathrm{R} \end{array}$$

The effect of the annotations in [**130**] is illustrated in Figure 149.

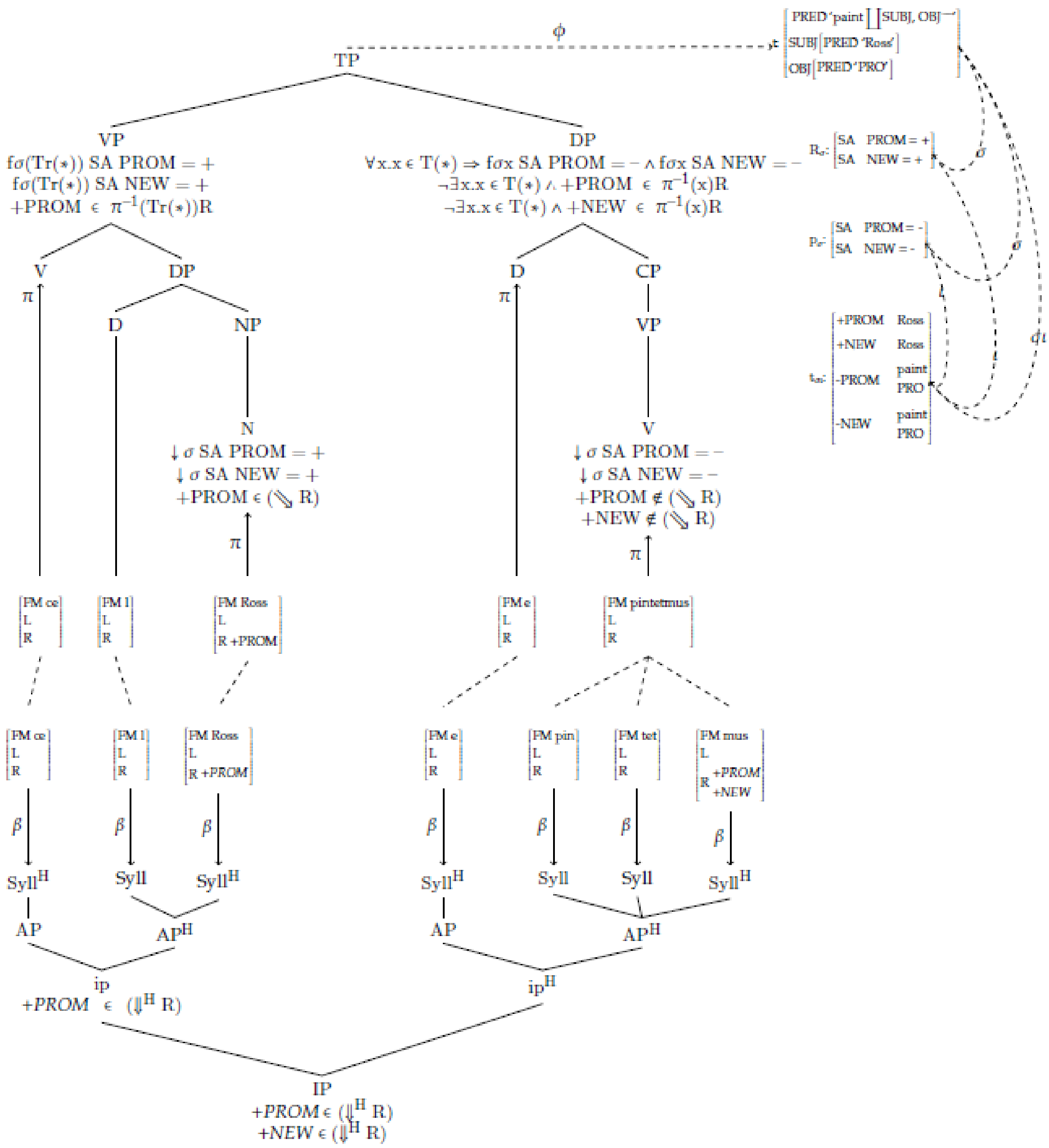


Figure 149: Effect of the annotations in [130] for Nłeʔkepmxcin

In this final section I have shown that the prominence-based annotations proposed in *6.2.1* to model the interaction between prosody and information structure in Georgian can be successfully extended to other languages, in which they fare better than an alignment-based approach. For English, I presented some modified p-structural annotations to model postnuclear prominent topic and emphatic constructions, and a modified version of p-structure to represent an additional level of prosodic organisation reflecting prominence distribution constraints in cases of non-alignment between words and prosodic phrases. For French, I proposed some modified p-structure annotations to account for the obligatory headedness of ip phrases. Finally for Nłeʔkepmxcin, I presented an annotated syntactic phrase structure rule to model the overriding effect of special nominal predicate and cleft constructions on some of the discourse features otherwise associated with the heads of prosodic phrases.

6.3 Summary and Conclusions

In this chapter I have presented a first model of the relationship between syntax, prosody and information structure in Georgian in the Lexical-Functional Grammar framework. The model presented reflects the analysis of Georgian proposed in the previous chapter in the form of a set of Optimality-Theoretic constraints. As one of the main questions that I have been concerned with in this thesis is that of how discourse relations are expressed in sentence form, the parallel architecture of LFG, which permits an explicit articulation of how levels of sentence structure interact in a given language, makes it an especially appropriate framework for a further elaborated model of this relationship.

I began in *6.1* by introducing the LFG architecture's levels c(onstituent)-structure and f(unctional)-structure, together with an illustration from O'Connor (2006) of how LFG is able to capture cross-linguistic variation in the formal expression of grammatical relations. I then showed how the LFG models of Georgian proposed by Meurer (2007, 2009), who models the morphological marking of grammatical functions by alternative means, and by Wier (2014), can be similarly elaborated. I then introduced the levels s(emantic)-structure and i-(nformation)-structure, together with the proposals of Dalrymple and Nikolaeva (2011) as to how these are linked with c-structure and f-structure. I applied these proposals to Meurer's and Wier's models of Georgian to illustrate more explicitly mappings from c-structure to i-structure consistent with their respective proposals. I then contrasted their proposals as reflected in these more elaborated models with my own analysis of the relationship between syntax and information structure in Georgian. On the basis of this contrast, I presented arguments in support of a flat phrase structure for Georgian of the kind assumed by Wier (2014). After applying to this the same annotations for grammatical function marking proposed previously with reference to the other models, I presented novel annotations to model the relationship between syntax and information structure. The first set of annotations presented capture the inviolable syntactic constraints ***XP$_{FOC}$V***, ***DITINIT*** and ****DAPINIT*** proposed in the previous chapter, and the second set the violable constraints ***CONSTINT***, ***PROMSEP***, ****DNPRSINIT***, ***FMARK***, ***SJINIT*** and ***GINIT***. For this I used the OT LFG proposed by Frank *et al.* (1998). The syntactic annotations presented reflect the limited role of syntax in expressing the discourse relations with which items are associated.

In *6.2* I turned to modelling the relationship between information structure and prosody, which in my analysis fulfils the key role of expressing discourse features in sentence form. I began in *6.2.1* by introducing LFG p(rosodic)-structure, discussing in particular recent major modifications to the LFG architecture proposed by Dalrymple and Mycock (2011) and Mycock and Lowe (2013). Adopting the architecture proposed by Mycock and Lowe, I pointed out that their alignment-based annotations capturing the prosodic expression of discourse features face similar problems to the alignment-based theories of focus prosody discussed in chapters 2 and 5, and presented modifications which permit annotations to all levels of prosodic phrasing by making reference to the headedness of prosodic phrases. I then proposed prosodic structure rules for Georgian using head annotations for focus to main prominence, prom to secondary prominences, capturing my strong constraints from the previous chapter. Following the principle of interface harmony proposed by Dalrymple and Mycock, I then proposed syntactic rules to provide matching labels for these, and to work with background constituents, and to spread focus in a more limited sense in line with my approach to focus projection in this thesis. After capturing violable constraint ***NOPHRASE***, I completed my model of Georgian by presenting an additional set of annotations to capture prosodic features associated with the heads and boundaries of prosodic structure, including an account of how the difference between statements and yes-no questions is marked.

Finally in section *6.2.2*, I showed that the prominence-based annotations proposed in *6.2.1* for Georgian are likewise preferable to an alignment-based approach, both when applied to another 'stress language' like English, and to 'alignment languages' like French and Nłeʔkepmxcin (Thompson River Salish). For English, I presented some modified p-structural annotations to model postnuclear prominent topic and emphatic constructions, and a modified version of p-structure to represent an additional level of prosodic organisation reflecting prominence distribution constraints in cases of non-alignment between words and prosodic phrases. For French, I proposed some modified p-structure annotations to account for the obligatory headedness of ip phrases. Finally for Nłeʔkepmxcin, I presented an annotated syntactic phrase structure rule to model the overriding effect of special nominal predicate and cleft constructions on some of the discourse features otherwise associated with the heads of prosodic phrases. The development of the prominence-based model proposed in this chapter, together with adaptations to it proposed for other languages, in particular the inclusion of a sub-syllabic level of p-structure representation in the case of English, have provided several avenues for future research.

7. Conclusions and Further Research

In this thesis I have investigated the formal expression of information-structural relations in Georgian and proposed novel accounts of their syntactic and prosodic realisation. On the basis of my findings I have proposed a first detailed formal model of the relationships between syntax, prosody and information structure in Georgian in the Optimality-Theoretic and Lexical-Functional Grammar frameworks. These proposals are situated within a novel account of the relationship between information structure and sentence form, according to which information-structural features cross-linguistically are reflected most closely in the alignment of items bearing them with the heads of prosodic phrases, permissible configurations of which are in addition articulated in terms of novel prominence structural constraints. In addition to Georgian, I showed that this approach is compatible with data, both from other 'stress' languages like English, and from 'alignment' languages such as French.

Following an introduction in chapter 1, I began in chapter 2 by introducing a set of information-structural categories proposed by Lambrecht (1994); in particular, the pragmatic roles focus and topic, and the pragmatic states discourse-active and discourse-inactive. I then considered the question of what aspect of sentence form most closely reflects the association of these categories with propositional entities. I first argued that horizontal projection of focus from accented to unaccented words within larger syntactic phrases, as proposed by Lambrecht (1994), Selkirk (1995), Rochemont (2013) and others, can be replaced with an extension of the notion of pragmatic accommodation to all words which are unaccented without explicit previous mention, permitting all unaccented words to be characterised as discourse-active. I then argued that the notion of vertical focus projection from words to larger syntactic phrases is better replaced with a non-syntactic version projecting information-structural features within propositional components. Moving on to discuss theories of sentence accentuation which assume a richer prosodic structure, I showed that the above arguments can be combined with Calhoun's (2007) finding that thematic and rhematic accents can be differentiated in terms of prominence structure. This yielded an approach according to which, cross-linguistically, the information-structural features associated with a word are, with some exceptions, most closely reflected in its alignment with the heads of prosodic phrases: the 'nuclear' heads of IP phrases are associated with focus, the 'secondary' heads of ip phrases with discourse-inactiveness, and the 'unaccented' heads of PW phrases with discourse-activeness. Finally, I showed that the proposed approach is preferable to an alternative 'focus-as-alignment' approach proposed by Féry (2013), both for 'stress' languages like English and German, and for 'alignment' languages like French. I also showed that data from both language types are consistent with novel constraints on the configuration of prosodic phrase heads with respect to left and right boundaries.

In the following two chapters I considered data and proposals from the literature concerning the relationship between information structure and sentence form in Georgian. Chapter 3 was devoted to the relationship between information structure and syntax. First considering grammatical and dominant constituent linearisations, I showed that relative configurational freedom in Georgian and its lack of a verb phrase, together with its ability to drop multiple arguments and the existence of discontinuous constituency constructions, further support the arguments made in the previous chapter against the necessity of reference to syntactic focus domains above the word level. I then briefly introduced several recently presented models of the information structure-syntax interaction in Georgian, in the Minimalist, Optimality Theoretic and Lexical-Functional Grammar frameworks, and showed that models vary in their predictions and are in some cases inconsistent with the available data. I identified three areas in particular where this is the case: the linearisation of preverbal and postverbal foci, the linearisation of given and topical arguments and the discourse features of verb-initial constructions. In each case, I identified several influences on word order supported by evidence from the literature. I concluded that discourse features are disambiguated by syntax only in certain cases, indicating that an important role is played in this respect by prosody, which can also be attributed an indirect role in some of the syntactic phenomena identified in terms of the markedness of prominence structure.

In chapter 4 I discussed the relationship in Georgian between information structure and prosody, again considering several recent analyses. These indicate that prosody plays the key role in identifying information-structural features in sentence form, and also that Georgian has properties of a stress language like English or German; like these, Georgian has pitch accents, with lexical stress also marked by non-tonal prosodic features. As in the previous chapter, however, the analyses discussed reach differing conclusions as to how information-structural features are realised: whilst some attribute the prosodic realisation of focus and discourse-inactive topics to specific pitch accent types, others attribute it to alignment of the focus or topic with the boundary of a prosodic phrase, although both left and right boundaries are attributed this role. In both cases I pointed out that the analyses proposed are problematic with respect to the accounts of focus-as-alignment and prominence-as-alignment from the previous literature discussed in chapter 2. Comparing the assumptions about information structure informing the methodologies of these studies with my own, I identified some areas in which more data were desirable, both in order to establish the facts of the information structure-prosody relationship in Georgian and to test for the compatibility of this relationship with the prominence-based approach proposed in chapter 2.

The syntactic and prosodic evidence discussed in chapters 3 and 4 was tested in chapter 5 against data from my own production experiments designed on the basis of these discussions. In *5.1* I presented new syntactic data from a production experiment conducted in Tbilisi in 2011, which provided additional support for several of the constraints on word order identified there. In *5.2* I presented the results of a production experiment conducted in Stuttgart in 2014. This was designed to test three sets of hypotheses, concerning the prosodic realisation of narrow focused constituents and of additional foci and prominent topics, and the permissibility of postnuclear prominences, and whether these are compatible with the proposed prominence-based approach. The data supported each of the first two sets of hypotheses: the prosodic realisation of focus constituents was found to be consistent with their realisation at the right boundary of an ip phrase, as was the realisation of discourse-inactive topics and additional prenuclear foci. In support of the proposed prominence-based approach, an additional feature of intensity was identified on clause-final foci, which can be posited to distinguish focus structures analysed as otherwise having identical prosodic phrasings. The data did not support the third set of hypotheses, indicating that Georgian does not permit postnuclear topics; this was argued to be consistent with Georgian's configurational freedom, which, similarly to German, permits discourse-inactive topics to be linearised in prenuclear positions. In addition, I presented data on the tonal realisation of yes/no questions which provide additional support for the right-alignment of discourse-inactive items. Finally, I showed that the data did not support an association of the difference between rising and non-rising f0 contours with the distinction between contrastive and non-contrastive foci and topics. After presenting the results and analysis for each experiment, I proposed novel sets of inviolable and violable constraints in the Optimality-Theoretic framework which articulate the relationships between information structure, syntax and prosody in Georgian identified in the literature and in my own data within the prominence-based approach to the realisation of discourse relations proposed in chapter 2. I also showed how the same prosodic constraints, with some additions, can be successfully applied to the data discussed in chapter 3, both from stress and from alignment languages.

Finally in chapter 6, I presented a model of the relationships between information structure, syntax and prosody in Georgian within the Lexical-Functional Grammar framework, the parallel architecture of which permits an explicit articulation of the role played by each aspect of sentence structure in the expression of discourse features. I first introduced the 'core' LFG levels of c-structure and f-structure, together with c-structural annotations to the LFG phrase structures for Georgian proposed by Meurer (2007, 2009) and by Wier (2014) to capture the morphological expression of grammatical relations as modelled by Meurer in a more computational version of LFG. I then turned to modelling the interaction between information structure and syntax. I began by discussing proposals for the representation of i(information)-structure, in particular those of Dalrymple and Nikolaeva (2011) Mycock and Lowe (2013) and Butt and King (2000), on the basis of which I proposed my own representation of i-structure compatible with the set of discourse features adopted from Lambrecht (1994) and their assumed applicability to discourse items as set out in chapter 2. After showing how the relationships between information structure and syntax proposed by Meurer (2007, 2009) and by Wier (2014) can be elaborated in a comparable way with annotations to their proposed phrase structures based on the proposals of Dalrymple and Nikolaeva (2011), I contrasted these with annotations to a flat Georgian phrase structure based on Wier's articulating my own analysis of this relationship as modelled in the Optimality-Theoretic framework in chapter 5. The set of violable constraints from this chapter were articulated using annotations to o-structure as proposed by Frank *et al.* (1998).

In *6.2* I presented a first LFG model of the relationship in Georgian between information structure and prosody. I began by discussing proposals for the representation of p(rosodic)-structure in LFG, in particular those of Dalrymple and Mycock (2011) and Mycock and Lowe (2013), which reflect evidence for a lack of isomorphism between the units of c-structure and p-structure. I then proposed modifications to Mycock and Lowe's alignment-based approach to focus prosody annotations to reflect my own proposals made in this thesis, according to which the relationship between information structure and prosody is better captured in terms of the alignment of discourse items with the heads of prosodic phrases than with their boundaries. I then presented a set of annotations to this modified p-structure capturing the prosodic constraints for Georgian proposed in chapter 5, which include an articulation of the prosodic realisation of foci, prominent topics and non-prominent material, together with annotations capturing how these are expressed in terms of tonal and other prosodic features. Finally, I showed how the same annotations can, with some modifications, be used to model this relationship in some of the other languages discussed in chapters 2 and 5, including both 'stress' and 'alignment' languages, to which I had demonstrated that the prominence-based approach could likewise be applied.

In the course of the thesis, I identified a number of areas for future research. In chapter 2 I pointed out that more cross-linguistic data are required on the prosodic realisation of a wider range of discourse structures in order to establish whether the proposed prominence-based approach is applicable beyond the available data for the languages discussed. Having discussed available evidence on the syntactic realisation of discourse features in Georgian in chapter 3, I pointed out that more research is required on the influence of discourse structure above and below the level of the clause, including the discourse characteristics of discontinuous-constituency constructions. In terms of the relationship in Georgian between information structure and prosody discussed in chapters 4 and 5, I concluded that more research is needed to establish whether there is a difference in prosodic realisation between contrastive and non-contrastive foci and topics, and what distinction, if any, is signalled by the difference between rising and non-rising f0 contours on constituents. Finally, in chapter 6, with respect to the LFG model proposed for Georgian I identified modelling the interaction between information structure, prodrop and verbal affixes as an area for future research.

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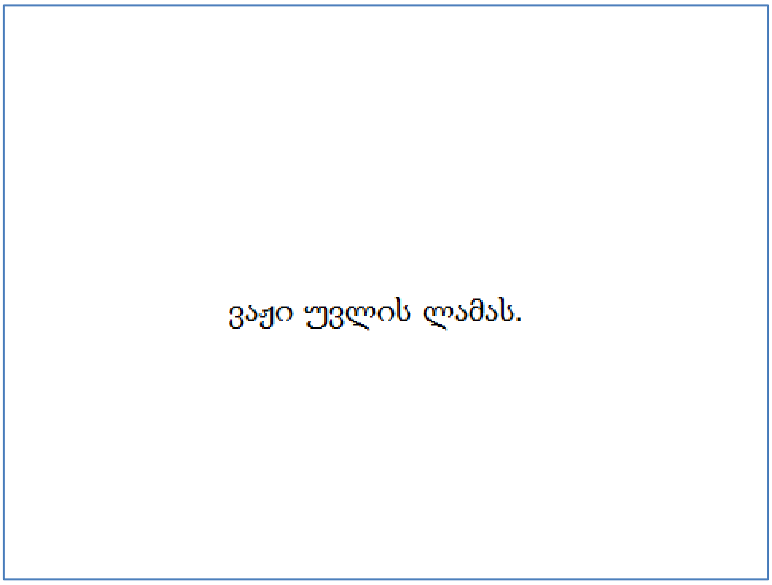
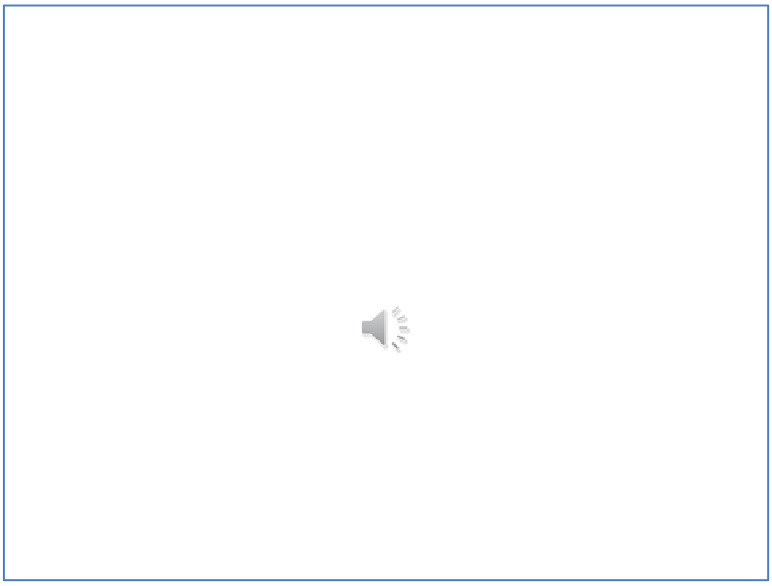
Appendix

1. Example slide pair from the prosodic production experiment: slide with target sentence followed by sound file with question.



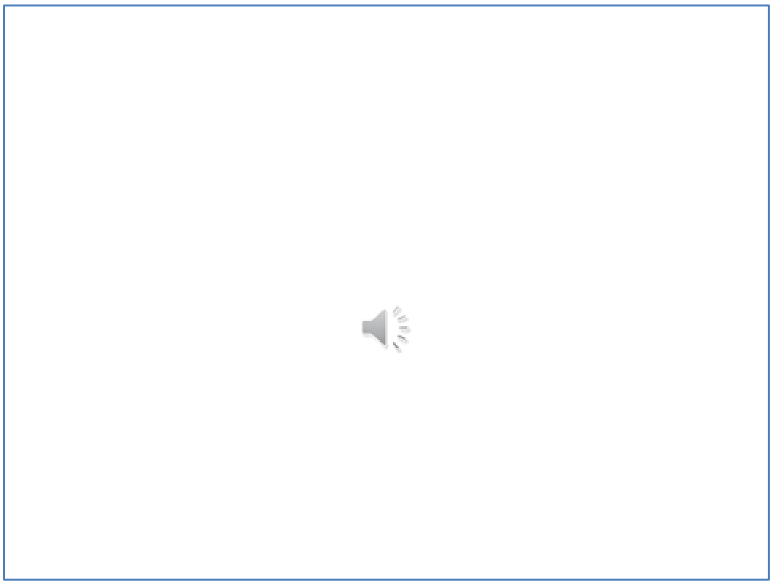
First slide: SVO sentence – here, *važi uvlis lamas* 'a/the boy is looking after a/the llama.' Participants were asked to remember the sentence before clicking to proceed to the second slide.



Second slide: Participants listen to and then respond to a recorded question using the remembered sentence, for example, *ras uvlis važi?* 'What is the boy looking after?' Participants respond using the remembered sentence before clicking to proceed to the next pair.

2. Example slide pair from the syntactic production experiment: slide with image followed by sound file with question.

First slide: Image of transitive action: here, man drying penguin. Participants view image before clicking to proceed to the second slide.



Second slide: Participants listen to and then respond to a recorded question pertaining to the image, for example *ras amšralebs ķaci?* ‘What is the man drying?’ Participants respond with a simple transitive sentence before clicking to proceed to the next pair.