

Handbook of Lexical Functional Grammar

Edited by

Mary Dalrymple

Empirically Oriented Theoretical
Morphology and Syntax

Empirically Oriented Theoretical Morphology and Syntax

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Mary Dalrymple (ed.). 2021. *Handbook of Lexical Functional Grammar* (Empirically Oriented Theoretical Morphology and Syntax). Berlin: Language Science Press.

This title can be downloaded at:

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ISBN: no digital ISBN

no print ISBNs!

ISSN: 2366-3529

no DOI

ID not assigned!

Cover and concept of design: Ulrike Harbort

Fonts: Libertinus, Arimo, DejaVu Sans Mono, Source Han Serif ZH, Source Han Serif JA

Typesetting software: Xe_{La}TeX

Language Science Press

xHain

Grünberger Str. 16

10243 Berlin, Germany

langsci-press.org

Storage and cataloguing done by FU Berlin

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Part I

History and overview

Part II

Grammatical phenomena

Chapter 1

Agreement

Dag Haug

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This chapter surveys the treatment of agreement in LFG. We show how theories of agreement can be classified by how they use symmetry and feature sharing in their treatments and how LFG usually opts for a symmetric but not feature sharing account. Other topics include the INDEX/CONCORD distinction, how non-f-structure such as linear order and information structure impacts on agreement, long-distance agreement and Wechsler's Agreement marking principle.

1 Introduction

Agreement is the linguistic phenomenon whereby a set of features is realized morphologically on two different syntactic tokens, as we see for example in (1).

- (1) The boy loves the girl.

Both the word *boy* and the word *loves* realize a singular number feature.¹ However, this feature is only meaningful on *boy*, where it indicates that the noun phrase refers to a single boy; *loves* merely agrees, in this case with its subject. Agreement is therefore a directed phenomenon: the *controller* has a set of meaningful features and the *target* agrees with these.

“Meaningful” must be taken with a grain of salt. We can also have agreement in purely syntactic features such as CASE or in features that are inherent in the controller but do not carry any obvious meaning, such as GENDER. But even in such cases, we observe directionality. Consider (2) from Latin.

¹We are relying here on an inferential, realizational view of morphology whereby *boy* is morphologically singular even if there is no singular morpheme.

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- (2) Latin *rosa* *spinosa* *floruit*
 rose:NOM;F;SG *thorny:NOM;F;SG* *bloomed:PST;3SG*
 ‘The thorny rose bloomed.’

The nominative case feature that is realized on *rosa* and *spinosa* is only meaningful on *rosa* because it indicates the grammatical function (subject) of the noun phrase. By contrast the grammatical function (adjunct) of *spinosa* is given by the fact that its case agrees with that of its head, rather than by a specific case feature: if the NP was in object position instead, the case of *rosa* would change because the grammatical function of the noun phrase would change; and the case of the adjective *spinosa* would also change, despite its grammatical function as adjunct remaining the same. Finally, the feminine gender feature in (2) is an inherent, purely formal property of the controller: it does not provide any information about the syntactic function or the meaning of the noun phrase headed by *rosa*, but is a non-variable feature of *rosa* which is part of the information conveyed by the lexeme. By contrast, the adjective *spinosa* inflects for this feature and can assume other gender features, depending on the inherent gender of its controller.

There are three main areas where languages display agreement phenomena. First, there is agreement in predicate-argument structures, where one or more arguments typically act as controllers and the predicate is the target. Second, we observe agreement inside NPs, where typically the head noun controls agreement on targets like determiners, quantifiers, adjectives and other modifiers. Third, we have ‘anaphoric agreement’ between anaphors and antecedents. The latter type of agreement has attracted little attention in LFG work and will consequently largely be ignored here, except that it is relevant as a diachronic source of predicate-argument agreement.

In §2, we show how theories of agreement can be classified by how they use symmetry and feature sharing in their treatments. In §3 we discuss the INDEX/CONCORD distinction that is drawn in much LFG work on agreement. While agreement is generally treated at f-structure in LFG, §4 discusses how linear order and information structure impacts on agreement. §5 discusses the diachrony of agreement markers. §6 discusses long-distance agreement, a phenomenon which suggests there may be a role for feature sharing in agreement to preserve syntactic locality. Finally, §7 discusses Wechsler’s Agreement Marking principle, which is a challenge to symmetric accounts of agreement.

2 Agreement in unification grammars

The basic treatment of agreement in unification-based grammars is very straightforward as we simply need to make sure that the relevant features of the controller and the target unify. This is usually done by specifying functional descriptions that put the features in the same position in the functional structure, namely that of the controller. The specifications of (2) are shown in (3) and yield the f-structure in (4). Only relevant features are shown.

- (3) *rosa* (\uparrow PRED) = 'ROSE'
 (\uparrow NUM) = SG
 (\uparrow CASE) = NOM
 (\uparrow GEND) = FEM
 floruit (\uparrow PRED) = 'BLOOM<SUBJ>'
 (\uparrow SUBJ NUM) = SG
 (\uparrow SUBJ CASE) = NOM
 (\uparrow SUBJ PERS) = 3
 spinosa (\uparrow PRED) = 'THORNY'
 ((ADJ \in \uparrow) NUM) = SG
 ((ADJ \in \uparrow) CASE) = NOM
 ((ADJ \in \uparrow) GEND) = FEM

- (4)
$$\left[\begin{array}{c} \text{PRED} \text{ 'BLOOM<SUBJ>'} \\ \text{SUBJ} \left[\begin{array}{c} \text{PRED} \text{ 'ROSE'} \\ \text{NUM} \text{ SG} \\ \text{CASE} \text{ NOM} \\ \text{GEND} \text{ FEM} \\ \text{PERS} \text{ 3} \\ \text{ADJ} \left\{ \left[\text{PRED} \text{ 'THORNY'} \right] \right\} \end{array} \right] \end{array} \right]$$

In this approach to agreement, there is *symmetry* between the controller and target features in that it does not matter whether a feature value originates from a functional description associated with the controller or the target or both. However, agreement features are *not* shared (in the technical sense of structure sharing in f-structures), but only represented in a single position in the f-structure, that of the controller, reflecting the directedness of agreement. It is this symmetric, yet not feature-sharing approach to agreement that gives the standard LFG analysis its specific flavor, different from analyses that are often found in the derivational tradition and in HPSG.

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In current derivational approaches, controller features are interpretable and target features are uninterpretable. The Agree mechanism matches uninterpretable features to their interpretable counterparts and deletes them. If uninterpretable features remain, the derivation crashes. Hence all target features must be available on the controller. But in Latin, which is a prodrop language, this forces us to postulate several null subjects differing only in their interpretable *PERS* and *NUM* values, merely to check off the matching uninterpretable features on the verb. The same point is made by Barlow (1988) and Pollard & Sag (1994: 64). Pollard and Sag give the Polish examples in (5), where the verb would be assumed to agree with a null subject.

(5) Polish

kochałem	kochałeś	kochał
I.M loved	you.M loved	he loved
kochałam	kochałaś	kochała
I.F loved	you.F loved	she loved

To maintain an asymmetric view of agreement, we are essentially forced to assume that the examples in (5) involve a multiplicity of phonetically null pronominals, one for each distinct form of the verb.

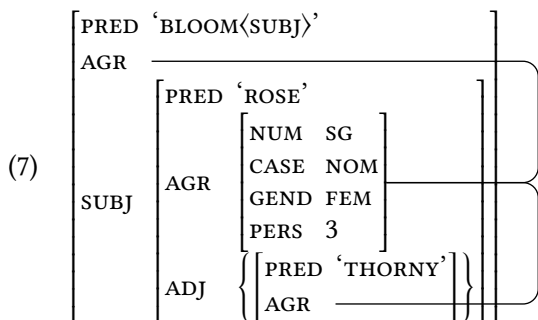
By contrast, on the standard LFG analysis, target features can themselves provide information. Going back to the Latin example from (2), we would get the *f*-structure in (6) if the subject is prodropped to give the simple sentence *floruit* ‘It blooms’.

$$(6) \left[\begin{array}{c} \text{PRED} \text{ 'BLOOM<SUBJ>'} \\ \text{SUBJ} \left[\begin{array}{c} \text{PRED 'PRO'} \\ \text{NUM SG} \\ \text{CASE NOM} \\ \text{PERS 3} \end{array} \right] \end{array} \right]$$

This *f*-structure arises directly from the *f*-descriptions of *floruit* in (3) plus an optional description ($\uparrow \text{SUBJ PRED}$) = ‘PRO’ associated with the verb. The *NUM*, *CASE* and *PERS* features are specified by the target (the verb) directly, with no need for matching features on the null subject, so that we do not need to multiply covert elements. Few LFG practitioners have therefore adopted an asymmetric mechanism for matching target and controller features, although the LFG framework offers such a mechanism in the form of constraining equations. Nevertheless, we will see in §3 that some theories of feature indeterminacy and coordination actually require the use of constraining equations, at least to deal with feature

resolution. More substantially, Wechsler (2011) has argued that absence of controller features has grammatical effects. This requires a deeper commitment to asymmetry. We discuss his proposal in §7.

While it contrasts with Minimalism in that target and controller features are taken to be symmetric, the standard LFG treatment also differs from an approach that is often seen in HPSG based on structure sharing of the agreement features between the target and the controller. In an LFG-setting, we could get such an analysis e.g. by embedding agreement features in a feature AGR to be structure shared between the target and the controller. This would yield the f-structure in (7) instead of (4), if we assume that both predicate-argument agreement and NP-internal agreement involve structure sharing.



Within the HPSG tradition, Kathol (1999) argues for such an approach. His main argument is that in many cases, target and controller morphology is arguably “the same” (such as the *-a* ending in *ros-a* and *spinos-a*). This is particularly common in noun phrase internal agreement, but occasionally happens also in predicate-argument agreement, cf. (8)–(9) (= Kathol 1999: ex. 14, originally from Welmers 1973: 171) from Swahili.

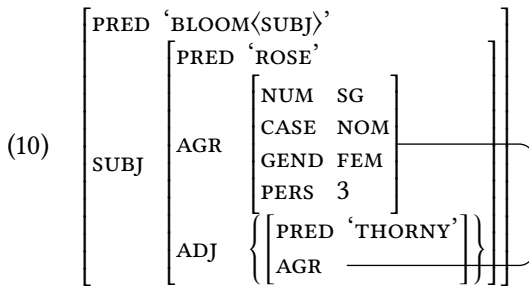
- (8) Swahili
Kikapu kikubwa kimoja kilianguka.
 basket large one fell
 ‘One large basket fell.’

- (9) Swahili
Vikapu vikubwa vitatu vilianguka.
 baskets large three fell
 ‘Three large baskets fell.’

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In such cases, although the morphology is the same, it has to contribute different functional descriptions in the various positions, because the agreement construction is built into the equations. By contrast, if we assume structure sharing, the mapping from morphology to functional descriptions becomes uniform: *-a* in Latin and *ki-* in Swahili always contribute their features to the AGR feature structure of the item where they are realized, and agreement will be captured by requiring structure sharing of AGR structure in the appropriate configurations.

We can assume that all agreement works in this way, but since morphological identity of target and controller features is much more common in noun phrase-internal agreement, it is possible to assume feature sharing only here and not in predicate-argument agreement. This is illustrated in (10).



The AGR feature bundle is structure shared inside the NP but not between the verb and the NP. This is the option taken in much HPSG work, e.g. Pollard & Sag (1994) and Wechsler & Zlatić (2003). It is natural to connect this difference to the INDEX/CONCORD distinction that we discuss in §3: on that view, the AGR feature of (10) will be split in two feature bundles, CONCORD (typically relevant for NP-internal agreement) and INDEX (typically between predicates and arguments) and we can assume that only CONCORD agreement involves structure sharing.²

Kathol’s argument is essentially an architectural argument about how to best capture the morphology-syntax interface. It has not been picked up in the LFG tradition. The most explicit work on the topic, Dalrymple et al. (2019: chapter 12) assumes the traditional LFG approach and consequently postulates complex so-called m-features (morphological features that are to be mapped to functional descriptions). That is, a first person plural form of the verb is associated with the m-feature in (11).

²Note that Wechsler & Zlatić (2003: 145) say that “subject-verb agreement...is modeled in terms of structure-sharing”, although it is clear from Wechsler & Zlatić (2003: 21) that they do not assume the verb bears its own person and number features. I assume that “structure sharing” is used loosely here in the sense of cospecification of features.

- (11) M-AGR:⟨AGR(SU):{PERS:1, NUM:PL}⟩

The form, then, carries information not just about the features it contributes (first person and plural number) but also *where* it contributes those features (in this case, to the subject). Therefore, there cannot be a uniform representation of *-a* in *ros-a* and *spinos-a* (or *ki-* and *vi-* in (8)–(9)), since they contribute the same feature to *different* locations. In a structure sharing account we *can* have a uniform representation (of the relevant morphemes or paradigmatic inferences, depending on your view of morphology), where e.g. *-a* is simply associated with nominative, singular, feminine features and the feature sharing that forces agreement stems from the relevant agreement construction. But as (11) shows, we do not *need* structure sharing: we can capture the same facts without it, but at the cost of a (slight) complication of the morphology-syntax interface.

In addition to the architectural issue, the structure sharing approach also makes different empirical predictions in some cases, because the same syntactic position can be simultaneously target and controller for two different agreement processes involving the same feature and hence give rise to so-called long distance agreement. We return to this in §6.

To sum up, the standard LFG treatment is symmetric but not feature-sharing: it is based on features contributed by defining equations from (potentially) several sources (the controller and one or more targets) to a single syntactic position. While there has been little pressure to change this except for special constructions, the complexities of agreement phenomena cross-linguistically has led to expansions in many different directions.

3 INDEX, CONCORD and coordination

It is possible for nominal controllers to trigger different values for the same feature on different targets, as in the Serbo-Croatian example (12) from Wechsler & Zlatić (2003: p. 5).

- (12) Serbo-Croatian
 Ta dobra deca su došla.
 that:F;SG good:F;SG children:(F;SG) AUX;3PL come:PRF;PTCP;N;PL
 ‘Those good children came.’

Here the noun *deca* ‘children’ triggers feminine singular agreement on the determiner and the adjective, but neuter plural agreement on the predicate.³ Such

³Note, though, that the feminine singular and the neuter plural are syncretic in Serbo-Croatian. See Alsina & Arsenijević (2012b,a) and Wechsler & Zlatić (2012) for discussion.

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examples require that we postulate two different bundles of agreement features, generally called INDEX and CONCORD (Pollard & Sag 1994; Kathol 1999; Wechsler & Zlatić 2003). Both INDEX and CONCORD are syntactic features, modelled at f-structure in LFG, but the intuition is that INDEX features are more closely related to semantics and are the ones that are related to the reference of a noun phrase, typically GENDER, PERSON and NUMBER (but not CASE). By contrast, CONCORD features are more closely related to morphological class and typically include GENDER, NUMBER and CASE (but not PERSON). According to Wechsler (2011) this division reflects the historical origin of the morphology on the agreement targets, which typically comes from incorporated pronouns in the case of INDEX agreement, but from nominal classifiers (and other sources) in the case of CONCORD agreement. CONCORD and INDEX are also different in that CONCORD agreement is generally found inside NPs whereas INDEX features are typically relevant to predicate-argument agreement.

Since GENDER and NUMBER are present both in INDEX and CONCORD, they may take different values in those contexts and that is what happens in (12). The f-structure for *ta dobra deca* in this example is shown in (13).

$$(13) \left[\begin{array}{l} \text{CONCORD} \\ \text{INDEX} \end{array} \left[\begin{array}{l} \left[\begin{array}{ll} \text{GEND} & \text{FEM} \\ \text{NUM} & \text{SG} \\ \text{CASE} & \text{NOM} \end{array} \right] \\ \left[\begin{array}{ll} \text{GEND} & \text{NEUT} \\ \text{NUM} & \text{PL} \\ \text{PERS} & 3 \end{array} \right] \end{array} \right] \right]$$

It is worth pointing out that although INDEX is in some sense ‘closer’ to the semantics than CONCORD, both are syntactic features, represented at f-structure. In addition to these two kinds of agreement it is necessary to postulate a third, semantic/pragmatic kind of agreement. This is particularly common in pronoun-antecedent agreement. For example, the Serbian/Croatian diminutive noun *devojčice* ‘girl’ may be referred to with a neuter pronoun (reflecting its INDEX GEND feature), or with a feminine pronoun, reflecting the meaning of its antecedent.

Much work in LFG uses representations like (4) as a simplification when the INDEX/CONCORD distinction is not relevant, but actual work on agreement has generally assumed the distinction. However, Alsina & Arsenijević (2012b,a) argued against having two sets of syntactic agreement features. For counterarguments defending the INDEX/CONCORD distinction, see Wechsler & Zlatić (2012) and Hristov (2013).

While some words like *deca* appear to be lexically specified with different INDEX and CONCORD features, another important motivation for the distinction

comes from different behaviour in coordinate structures. Consider (14) from Belyaev et al. (2015: p. 36)

(14) This/*These man and woman are/*is eating sushi.

The coordinate noun phrase in (14) consists of two singular nouns. The determiner must agree in singular number with each of these nouns, whereas the predicate must agree in plural number with the coordination as a whole. This indicates that CONCORD NUM, relevant for NP-internal agreement, is singular, but INDEX NUM, relevant for predicate agreement, is plural.

To derive this CONCORD/INDEX distinction in number, King & Dalrymple (2004) proposed that INDEX features are nondistributive, i.e. they are features not just of the individual conjuncts but also of the conjunction as a whole, based on rules of feature resolution; whereas CONCORD features are distributive, i.e. properties of the individual conjuncts but not of the conjunction as a whole. That is, a conjunction of two singular NPs such as *man and woman* cannot trigger a plural determiner (**These man and woman*) because the determiner agrees in CONCORD; but it does trigger plural number agreement on the verb (if it is the subject) because the conjunction as a whole has a NUM PL feature in the INDEX, different from the singular feature of the two conjuncts, as shown in (15).

$$(15) \left[\begin{array}{c} \text{INDEX} \quad [\text{NUM PL}] \\ \left\{ \left[\begin{array}{cc} \text{PRED} & \text{'WOMAN'} \\ \text{CONCORD} & [\text{NUM SG}] \\ \text{INDEX} & [\text{NUM SG}] \end{array} \right] \left[\begin{array}{cc} \text{PRED} & \text{'WOMAN'} \\ \text{CONCORD} & [\text{NUM SG}] \\ \text{INDEX} & [\text{NUM SG}] \end{array} \right] \right\} \end{array} \right]$$

This raises the question of how the features of a coordination are related to those of the conjuncts. The distinction between distributive and nondistributive features was originally introduced by Dalrymple & Kaplan (2000) who used set-valued features to model both indeterminacy and feature resolution in coordination. For example, the PERSON feature is treated in terms of sets over the atomic markers *S* (for “speaker”) and *H* (for “hearer”). In a language like English or Spanish, with no exclusive/inclusive distinction in the first person plural, sets over these atoms are interpreted as in (16).⁴

(16) $\{S, H\}$ first person
 $\{H\}$ second person
 $\{\}$ third person

⁴The system of Dalrymple & Kaplan (2000) can also capture the first person exclusive as $\{S\}$ in languages where this is needed.

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On this interpretation, feature resolution corresponds to set union and can be encoded in the phrase structure rule for coordination as in (17).

$$(17) \quad \text{NP} \longrightarrow \begin{array}{ccc} \text{NP} & \text{CONJ} & \text{NP} \\ \uparrow=\downarrow & & \uparrow=\downarrow \\ (\downarrow \text{PERSON}) \subseteq (\uparrow \text{PERSON}) & & (\downarrow \text{PERSON}) \subseteq (\uparrow \text{PERSON}) \end{array}$$

Because the values in (16) are ordered by set inclusion we get a hierarchy effect in resolution, where second and third person resolves to second person, and first and second/third person resolves to first person.

It is worth pointing out that this requires the target features to be stated with a constraining equation as in the sample first person entry in (18).

$$(18) \quad (\uparrow \text{PERSON}) =_c \{S, H\}$$

If the target features were stated constructively, as in the standard approach, a first person verb would be compatible with the coordination of two second person forms, because the first person from would set the `PERSON` feature to $\{S, H\}$ and each conjunct would simply check that $\{H\}$ is a subset of that. In other words, the set-based approach requires us to give up the symmetric approach to agreement and would therefore run into similar problems with e.g. prodrop as other asymmetric approaches to agreement, as discussed above.

Alternative accounts of feature resolution that are based on ordinary feature structures rather than sets seem at first sight not to require constraining equations. In particular, [Dalrymple et al. \(2009\)](#) suggests using ordinary LFG features to encode what would be set membership in the analysis of [Dalrymple & Kaplan \(2000\)](#) and to deal with feature indeterminacy that way. [Sadler \(2011\)](#) extends that approach to coordination. For example, in a language like Icelandic, where any coordination of nouns with different genders resolve to neuter gender, the set-based approach would assume values as in (19).

$$(19) \quad \begin{array}{ll} \{M, F\} & \text{neuter gender} \\ \{M\} & \text{masculine gender} \\ \{F\} & \text{feminine gender} \end{array}$$

This can be translated into standard feature structures by decomposing gender into two features, `M` and `F`, as follows.

$$(20) \quad \begin{array}{ll} \text{a. neuter gender:} & \begin{bmatrix} M & - \\ F & - \end{bmatrix} \\ \text{b. masculine gender:} & \begin{bmatrix} M & + \\ F & - \end{bmatrix} \end{array}$$

$$\text{c. feminine gender: } \begin{bmatrix} M & - \\ F & + \end{bmatrix}$$

The resolution rule will then specify that for each gender feature, if all the conjuncts are +, the set is also assigned +; otherwise the set is assigned -. However, as it turns out, stating this resolution rule explicitly requires the use of constraining equations, namely an implicational constraint.⁵ Still, the situation is different from the set-based solution in that the equations on both the target and on the controller conjuncts are constructive. It is only the resolution rule that makes use of constraining equations, suggesting that even in a declarative theory like LFG, feature resolution requires a procedural approach:⁶ first, we construct the conjuncts and then we can compute the features of the coordination. On the other hand, the agreement mechanism itself does not require constraining equations, and since the target features are still specified constructively we do not run into problems with prodrop.

4 Factors outside the f-structure

While agreement is generally determined in terms of f-structure relations, it is widely acknowledged that other factors are also relevant, in particular linear order/c-structure and information structure.

4.1 Linear order

That linear order can be relevant for agreement is shown by so-called single conjunct agreement. (21)–(22) show some examples from [Kuhn & Sadler \(2007\)](#).

(21) Czech

Na rohožce seděla kočka a pes.
 on mat was.sitting:F;SG cat:F;SG and dog:M;SG
 ‘The cat and the dog were sitting on the mat.’

(22) Portuguese

os [mitos e lendas] brasileiras
 the:M;PL myth:M;PL and legend:F;PL Brazilian:F;PL
 ‘The Brazilian myths and legends.’

⁵See [Dalrymple et al. \(2019: 640\)](#) for a formalisation of the required resolution rule.

⁶The use of constraining equations in LFG in general has been taken to be a “dynamic residue that resists a purely declarative analysis” ([Blackburn & Gardent 1995: 44](#)).

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In (21), from Czech, the predicate *seděla* agrees only with the closest subject conjunct, *kočka*. In (22), from Portuguese, the determiner agrees with its closest conjunct, the first one, whereas the postposed adjective agrees with the second conjunct, which again is the closest one. Examples such as (22) show that we cannot simply pick out a single distinguished conjunct and make that available for agreement: what is relevant is the distance between the target and the controller.

Kuhn & Sadler (2007) discuss earlier approaches to single conjunct agreement and propose a solution based on dividing features into not only the standard distributive/nondistributive classification, but also to distinguish left-peripheral, right-peripheral and proximity-based features. Dalrymple & Hristov (2010) dispense with the need for dividing features this way and instead provide definitions of new f-structure path descriptions. For example, $f_{(L)}$ is defined as in (23).

$$(23) \quad f_{(L)} \equiv f \quad \in^* \quad \neg[(\leftarrow \in) <_f \rightarrow]$$

Here, \in^* picks out an arbitrarily embedded member of the set (to account for nested coordination); the Kleene star also allows zero levels of embedding, which would make $f_{(L)}$ refer simply to f . However, in case we pick a set member, it must be the leftmost member of f . This is accomplished by the off-path constraint $\neg[(\leftarrow \in) <_f \rightarrow]$, which says that at any point in the path of (potentially nested) coordinations, there must not be other conjuncts $(\leftarrow \in)$ that f-precede ($<_f$) the one we pick (\rightarrow). Hence, if f is not a set, $f_{(L)}$ equals f , but if f is a set, $f_{(L)}$ can be either the whole set f or its leftmost member. This allows modelling of optional left conjunct agreement. We can also capture obligatory left conjunct agreement by defining f_L just like $f_{(L)}$ except it can never refer to a set. (So f_L always picks the leftmost member of f .) Similarly we can define f_R and $f_{(R)}$ by reversing the f-precedence relation and finally f_C (closest conjunct) as f_L if \downarrow f-precedes f_L and f_R if f_R f-precedes \downarrow . This solution makes it possible to describe (optional or obligatory) single conjunct agreement irrespective of whether the relevant agreement feature(s) are distributive or not; and it does so without altering the LFG formalism.

Consider the f-structure for (22).

$$(24) \quad \left[\left\{ \left[\begin{array}{cc} \text{PRED} & \text{'MYTH'} \\ \text{CONCORD} & \begin{bmatrix} \text{NUM} & \text{PL} \\ \text{GEND} & \text{M} \end{bmatrix} \end{array} \right] \left[\begin{array}{cc} \text{PRED} & \text{'LEGEND'} \\ \text{CONCORD} & \begin{bmatrix} \text{NUM} & \text{PL} \\ \text{GEND} & \text{F} \end{bmatrix} \end{array} \right] \right\} \right]$$

This f-structure satisfies the following functional description of *brasileiras*.

$$(25) \quad ((\text{ADJ } \uparrow)_C \text{ CONCORD NUM}) = \text{PL} \\ ((\text{ADJ } \uparrow)_C \text{ CONCORD GEND}) = \text{F}$$

$(\text{ADJ } \uparrow)$ refers in the normal way to the f-structure of the head, and the subscript C then makes sure we select the closest conjunct; if $(\text{ADJ } \uparrow)$ was not a set, the subscript c would simply have no effect.

4.2 Information structure

Besides c-structure/linear order, information structure is also relevant for agreement processes in many languages, as discussed by Dalrymple & Nikolaeva (2011). In their architecture, discourse functions are modelled as features at s-structure and can be accessed from the f-structure through the σ -projection. Dalrymple & Nikolaeva (2011: 123) provide the specification in (26) of the third person singular topical oblique agreement marker in Itelmen.

$$(26) \quad (\uparrow \text{ OBL PERS}) = 3 \\ (\uparrow \text{ OBL NUM}) = \text{SG} \\ ((\uparrow \text{ OBL})_\sigma \text{ DF}) = \text{TOPIC}$$

More complicated patterns are also possible. Object agreement in Itelmen is only optionally an indicator of the topicality of the object, but it does indicate that there is no oblique topic. This is captured by the description in (27) of the first person singular object agreement marker.

$$(27) \quad (\uparrow \text{ OBJ PERS}) = 1 \\ (\uparrow \text{ OBJ NUM}) = \text{SG} \\ \neg [((\uparrow \text{ OBL})_\sigma \text{ DF}) = \text{TOPIC}] \\ (((\uparrow \text{ OBJ})_\sigma \text{ DF}) = \text{TOPIC})$$

In addition to precedence and information structure role, LFG analyses have shown that agreement can be sensitive to other factors such as adjacency (direct precedence) and various prominence hierarchies based on person and grammatical functions. Broadwell et al. (2011) and Belyaev (2013) analyse such patterns in Kaqchikel and Dargwa respectively and show how they be captured with LFG augmented with Optimality Theory.

5 Diachrony: grammatical and anaphoric agreement

It is a long-standing observation from comparative linguistics (Bopp 1933 [1857]) that agreement markers in predicate-argument structures (i.e. INDEX agreement)

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arise from incorporated pronouns. That is, we have an evolution from anaphoric agreement with a dislocated noun phrase (“The man, he came”) to grammatical agreement (“The man he-came”). As pointed out by [Bresnan & Mchombo \(1987\)](#), LFG is well placed to capture this development because (unlike what happens in many other formal frameworks), pronouns and agreement markers are very similar, yet also distinct in a way which generates clear predictions about differences between anaphoric and grammatical agreement. In particular, incorporated pronouns always introduce a semantic form (PRED ‘PRO’), while agreement markers do not introduce a semantic form or do so only optionally (if the language allows prodrop). Otherwise, both agreement markers and incorporated pronouns introduce the relevant agreement features. [Bresnan & Mchombo \(1987\)](#) argue that in Chichewa, subject agreement is grammatical and obligatory whereas object agreement is anaphoric and optional. They represent subject markers (SM) and object markers (OM) with the lexical entries in (28).⁷

$$\begin{array}{lcl}
 (28) & \text{SM-} & \begin{array}{l} (\uparrow \text{SUBJ}) = \downarrow \\ (\downarrow \text{INDEX}) = \alpha \\ ((\downarrow \text{PRED}) = \text{'pro'}) \end{array} \\
 & & \hline
 & \text{OM-} & \begin{array}{l} (\uparrow \text{OBJ}) = \downarrow \\ (\downarrow \text{INDEX}) = \alpha \\ (\downarrow \text{PRED}) = \text{'pro'} \end{array}
 \end{array}$$

From a diachronic point of view, the subject marker and the object marker reflect different points on a grammaticalization path from pronouns to agreement morphology: the object marker has lost its c-structure independence, but is still in all respects a pronoun at f-structure, contributing its own PRED value. The subject marker has evolved one step further in that the PRED value contribution has become optional. There is a clear connection between the formal representations at the two stages, and the relation between them fits well with the intuitive notion of ‘bleaching’ or ‘loss of content’ in grammaticalization processes.

At the same time, the subtle difference between the two representations, along with some other independent properties of Chichewa, suffice to predict a number of differences between subject and object agreement. First, because the Chichewa sentence structure consists of a subject NP, a head-initial VP and a topic NP (in any order), the NP object must appear directly after the verb (i.e. inside the VP) whenever there is no object marker. When there is an object marker, however,

⁷We adopt the convention of treating sublexical units such as the subject and object marker as if they were nodes in a syntactic tree, with \downarrow designating their own f-structure and \uparrow that of the lexical item they attach to, as is done also in the presentation in [Bresnan et al. \(2016\)](#).

that marker is the actual object, whereas the apparent NP object is an anaphorically linked topic, which can therefore appear anywhere in the clause.

Second, because the object marker is a light (i.e. incorporated) anaphoric pronoun, it blocks the use of the independent pronoun in this function, with the effect that the independent object pronoun is reserved for cases of focus and contrastive topics.⁸ No such effect is found with the subject marker. Third, objects can be questioned in situ but only when there is no object marker. All these predictions are borne out in Chichewa.

In sum, the LFG framework makes it possible to understand fundamental differences between grammatical agreement with governed functions and anaphoric agreement with discourse functions, while at the same time providing a plausible diachronic pathway from the latter to the former, in line with what we observe in language change. Notice that the analysis relies crucially on treating the subject marker as ambiguous between a true pronoun (with a PRED ‘PRO’ feature) and an agreement marker (without it). This holds for LFG analyses of prodrop generally. [Toivonen \(2000\)](#) provides motivation for this kind of ‘lexical split’ analysis by pointing to the case of Finnish possessives, where the agreement marker and the suffixal pronoun differ in other features as well. For more on the LFG analysis of prodrop, see Chapter ??.

6 A role for feature sharing? – Agreement domains

In line with the general philosophy of LFG, the formalism itself does not in any way constrain how agreement domains are defined. We could easily write constraints that would enforce purely linear agreement (e.g. agree with closest NP irrespective of grammatical function) or agreement across unbounded domains (e.g. agree with COMP* SUBJ). An advantage of this is that LFG has no problems capturing surprising agreement relations such as those found in Archi, where agreement targets include a mixed bag of a number of first person forms, some adverbial elements, an emphatic particle and one postposition, which all agree with the absolutive element in their clause. (29) shows how the lexical entry for the first person dative pronoun looks according to [Sadler \(2016\)](#), assuming the absolutive argument bears the grammatical function PIV.

⁸Though as a reviewer remarks, this blocking effect is not formalized in [Bresnan & Mchombo \(1987\)](#).

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- (29) *d-ez* $(\uparrow \text{ PRED}) = \text{'PRO'}$
 $(\uparrow \text{ NUM}) = \text{SG}$
 $(\uparrow \text{ PERS}) = 1$
 $(\uparrow \text{ CASE}) = \text{DAT}$
 $((\text{PATHOUT } \uparrow) \text{ PIV GEND}) = \text{II}$
 $((\text{PATHOUT } \uparrow) \text{ PIV NUM}) = \text{SG}$

That is, the first person dative pronoun agrees with a PIV argument that is found by first going up PATHOUT, which is defined as {SUBJ|OBJ|OBL|OBL OBJ}. (30) shows an example where a first person pronoun embedded in PP (OBL OBJ) agrees with the absolutive.

- (30) Archi
 d-ez χ ir *d-e<r>q`a-r-ši* *d-i*
 II.SG-1SG.DAT behind II.SG-<IPFV>go-CVB II.SG-be.PRES
 ‘She goes after me.’

The first person dative pronoun bears the noun class II (essentially human feminine) marker *d-* because it agrees with the absolutive argument *she* (only expressed through agreement on the verb), irrespective of the gender of the speaker. The equation $((\text{OBL OBJ } \uparrow) \text{ PIV GEND}) = \text{II}$ captures that. But the use of inside-out functional uncertainties may be problematic in cases where it does not refer uniquely because of structure sharing. More work is needed on this kind of complex agreement paths.

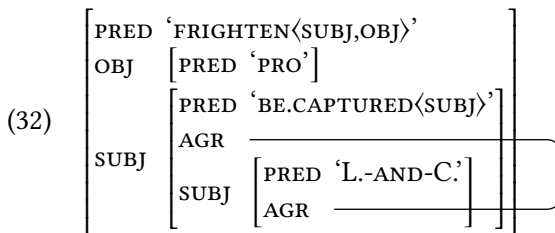
The approach of Sadler (2016) can in principle be extended with paths that cross clausal boundaries (so-called long distance agreement). However, the fact that we *can* write such equations does not mean that we *should*. Locality of grammatical processes remains an important theoretical concern in LFG even if it is not hardwired into the formalism. Haug & Nikitina (2015) argue that several cases of so-called long distance agreement can be given a local treatment if the agreement process is assumed to be structure-sharing. Their main example concerns the so-called “dominant participle” construction in Latin,⁹ where a noun and a participle form a non-finite clause which is headed by the participle but bears the agreement features of the noun.

- (31) Latin

⁹Haug & Nikitina (2015) also argue that the same analysis may work for long distance agreement in Tsez, Passamaquoddy and Innu-Aimûn, which has been widely discussed in the generative literature (Branigan & Mackenzie 2002; Bruening 2001; Polinsky & Potsdam 2001).

ne eum Lentulus et Cethegus ... deprehensi
lest him:ACC L.:NOM;M and C.:NOM;M captured:NOM;M;PL
terrere
frighten:IMPF;SUBJ;3PL
‘lest the capture of Lentulus and Cethegus should frighten him.’ (Sall., Cat
48.4)

According to the analysis in [Haug & Nikitina \(2015\)](#), *Lentulus et Cethegus...deprehensi* (‘that Lentulus and Cethegus were captured’) is a clause which acts as the subject of the matrix verb *terrere*. Yet unlike other clausal subjects in Latin, it does not trigger default third person singular agreement on the predicate. Instead, the matrix verb is plural, meaning that it either agrees with the embedded subject *Lentulus et Cethegus*, or the plural feature of the embedded subject has somehow been transferred to the predicate *deprehensi*. *deprehensi* does bear morphological plural marking, but on the standard, non-feature sharing approach to agreement this feature would only be active in the subject (controller) position. If instead we suppose that features in this kind of agreement are active in both the target and the controller, the target may in turn serve as the controller for another agreement process with the matrix verb as the target. This yields the f-structure in (32).



Structure sharing agreement between *Lentulus et Cethegus* and *deprehensi* makes the agreement features available in the f-structure which is SUBJ AGR relative to the matrix verb, so that there can be normal predicate–subject agreement in the matrix clause. In principle, that agreement could also be structure sharing, but as the apparent long-distance agreement can only be positively demonstrated in participial clauses, [Haug & Nikitina \(2015\)](#) remain agnostic on the matter. However, a similar feature-sharing account of agreement was extended to finite verb agreement by [Alsina & Vigo \(2014; 2017\)](#). Interestingly, their arguments for adopting structure sharing are different: in some cases, such as copular inversion in Catalan and raising constructions in Icelandic, the controller cannot be specified lexically, but is determined by OT constraints over the global f-structure. This,

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they hold, argues for a view that targets and controllers lexically specify features of their own AGR and then OT constraints decide which AGR structures should be linked to each other. Finally, a feature sharing approach to agreement is also adopted by Sadler (2019) to account for an adjectival construction in Modern Standard Arabic where the target adjective agrees with two distinct controllers.

7 A challenge to symmetry: The Agreement Marking principle

Wechsler (2011) proposes the principle in (33), called the *Agreement Marking principle*.

- (33) Agreement is driven by a syntactic feature of the controller, if the controller has such a feature. If the controller lacks such a feature, then the target agreement inflection is semantically interpreted as characterizing the controller denotation.

With this principle, Wechsler seeks to explain so-called mixed agreement, i.e. cases where a polite plural pronoun triggers plural agreement on the verb, but singular agreement on some other target, e.g. a predicative adjective as in (34) from French.

- (34) French
 Vous êtes loyal.
 you.PL are.2.PL loyal.M.SG
 ‘You (singular, formal, male) are loyal’

This pattern follows from the Agreement Marking principle on the assumption that *vous* bears an INDEX NUM PL feature that is able to control INDEX agreement on the verb, but *no* CONCORD NUM feature, which leaves the predicative adjective without an agreement controller, thereby licensing semantic agreement. Moreover, the Agreement Marking principle gives us an *explanation* of the so-called ‘polite plural generalization’, that there are no languages¹⁰ with the opposite pattern, i.e. where the polite plural pronoun triggers plural agreement on the adjective but allows singular agreement on the verb, or more generally, following Wechsler, on any target that has the PERSON feature. This polite plural generalization follows because pronouns by necessity have INDEX features and any PERSON target must be an INDEX target.

¹⁰See Wechsler (2011: Section 2.1) for the typological data.

Formalizing the Agreement Marking principle requires use of constraining equations. Wechsler's analysis of the French feminine definite article *la* is given in (35), where **female**(\uparrow_σ) is a simplified representation for the relevant semantic resource that will ensure that the referent is interpreted as female.

$$(35) \quad la \quad (\uparrow \text{ GEND}) =_c F \vee [\mathbf{female}(\uparrow_\sigma) \wedge \neg (\uparrow \text{ GEND})]$$

The idea is that when *la* combines with a noun that is lexically specified as feminine gender, such as *sentinelle* 'sentry', the feminine feature is *not* semantically interpreted; but when it combines with a noun that does not have a gender feature, such as *professeur*, it *will* be interpreted semantically. However, this entails a move away from the traditional symmetric approach to agreement in LFG to the asymmetric approach associated with derivational syntax.

As pointed out by Wechsler, the Agreement Marking principle is not in itself a descriptive generalization, since the presence versus absence of a given agreement feature on the controller NP is not always directly observable, but rather depends upon the grammatical analysis of the NP. However, the radically symmetric nature of the standard LFG analysis allows for cases where there is *no controller* NP at all. This is what we saw in the standard analysis of *floruit* in (6). The lexical entry of the verb on the standard analysis will be as in (36).

$$(36) \quad \textit{floruit} \quad \begin{aligned} (\uparrow \text{ PRED}) &= \text{'BLOOM<SUBJ>'} \\ (\uparrow \text{ SUBJ CASE}) &= \text{NOM} \\ (\uparrow \text{ SUBJ NUM}) &= \text{SG} \\ (\uparrow \text{ SUBJ PERS}) &= 3 \\ ((\uparrow \text{ SUBJ PRED})) &= \text{'PRO'} \end{aligned}$$

On the traditional LFG analysis, which also underlies the diachronic analysis of anaphoric agreement discussed in §5, there simply *is* no controller: it is constructed by the target. If we change (36) to interpret the number and person agreement along the lines of the Agreement Marking principle, we get (37), where **NON-PARTICIPANT**(\uparrow_σ) is shorthand for some semantic resource that ensures the subject referent is distinct from the discourse participants (speaker or hearer).

$$(37) \quad \textit{floruit} \quad \begin{aligned} (\uparrow \text{ PRED}) &= \text{'BLOOM<SUBJ>'} \\ (\uparrow \text{ SUBJ CASE}) &= \text{NOM} \\ (\uparrow \text{ SUBJ PERS}) &=_c 3 \vee [\mathbf{NON-PARTICIPANT}(\uparrow_\sigma) \wedge \neg (\uparrow \text{ SUBJ PERS})] \\ (\uparrow \text{ SUBJ NUM}) &=_c \text{SG} \vee [\mathbf{NON-PARTICIPANT}(\uparrow_\sigma) \wedge \neg (\uparrow \text{ SUBJ NUM})] \\ ((\uparrow \text{ SUBJ PRED})) &= \text{'PRO'} \end{aligned}$$

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If we want to maintain the Agreement Marking principle there are a number of ways we can go. First, we can take (37) at face value and assume that since there is no controller, the agreement features are interpreted semantically. This would yield the prediction that in prodrop structures, agreement features are always semantically interpreted, which is a strong and quite probably false assumption.¹¹ Second, we can exploit the fact that the LFG formalism cannot faithfully express the Agreement Marking principle as formulated in (33). (33) says that agreement in some feature is syntactic, “if the controller has such a feature”. However, the LFG formalism offers no way of checking where a feature originates. Constraining equations check whether some feature is present in the minimal solution to the f-description, irrespective of where they originate. Therefore, we can add the constructive equations $(\uparrow \text{SUBJ PERSON}) = 3$ and $(\uparrow \text{SUBJ NUM}) = \text{SG}$ to the optional part of (37). This preserves the formalization of the Agreement Marking principle, but arguably not its spirit, since the same lexical item provides both target and controller features. Finally, we could envisage a c-structure controller (with the appropriate features) in prodrop structures, although this seems at odds with all standard assumptions of LFG.

In sum, it is not clear how to best integrate the Agreement Marking principle in LFG. More generally, symmetry between target and controller features does important work in LFG’s traditional theory of agreement and it requires substantial work to alter this fundamental setup.

8 Agreement and semantics

A general question which has not received much attention in the LFG literature concerns how f-structure agreement features relate to the semantic content that they (sometimes) encode. In the standard LFG architecture, levels of linguistic description as found in the projection architecture are related by codescription, where linguistic items simultaneously describe different structures, including syntax and semantics. For example, the lexical entry for a singular noun might look like (38), where $1(x)$ is a cardinality test on the referent.

¹¹In fact, a reviewer offers a counterexample from Spanish, where second person plural forms can be used for very elevated addressees in a very formal register and crucially the interpretation does not change whether the subject is expressed by means of the pronoun *vos* or is null:

- (i) Spanish
 (Vos) sois muy bondadoso.
 you.PL are.2.PL very kind.M.SG
 ‘You (singular, formal, male) are very kind’

- (38) *horse* $(\uparrow \text{ PRED}) = \text{'HORSE'}$
 $(\uparrow \text{ INDEX NUM}) = \text{SG}$
 $(\uparrow \text{ CONCORD NUM}) = \text{SG}$
 $\lambda x. \text{HORSE}^*(x) \wedge 1(x) : v \multimap r$

This lexical entry simultaneously specifies syntactic singular number (in the form of f-structure features) and semantic singular number (simplified as a cardinality check on x). On the alternative, so-called ‘description-by-analysis’ approach (Halvorsen 1983), semantics is not cospecified together with syntax, but is instead read off the constructed f-structure.

Although codescription is the standard, Andrews (2008) points to two problems for this approach, both having to do with agreement. The first and most obvious problem is that in lexical entries like (38), there is no necessary connection between the syntactic and semantic singular number features: yet outside the limited class of *pluralia tantum* these are closely connected in a way we would predict more clearly if we simply had semantics read the f-structure features. There is to my knowledge no theory of how this connection would work in a codescription approach, but it seems conceivable that the morphology-syntax interface developed in Dalrymple et al. (2019: chapter 12) could also take care of the interface with semantics and restrict the mappings in a principled way.

The second problem for codescription, according to Andrews (2008), is that it creates the need to decide which of the various lexical entries introducing a given feature-value occurrence is the one that is introducing the semantic constructor. This again relates to the question of symmetry or not between target and controller features. Andrews considers an Italian example with possible pro-drop (39).

- (39) Italian
 (le ragazze) vengono
 the.FEM.PL girls.FEM.PL come.3.PL
 ‘The girls/they are coming.’

If the subject is present, we presumably want the noun to introduce the plural meaning constructor and the verb not to, but if the subject is omitted, then the verb presumably provides the constructor. However, we already need to make sure that the PRED feature of the subject is instantiated only once, so it is not clear that this is a deep problem, although as Andrews points out, it does open the door to some stipulation.

NP-internal agreement raises more tricky problems. As discussed by Belyaev et al. (2015), there are languages where a plural head noun can take two coordinated singular adjectives as modifiers, as in (40) from Russian.

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- (40) Russian
 krasnyj i belyj flagi
 red.SG and white.SG flag.PL
 ‘(the) red and (the) white flags [2 flags total: one red, one white]’

Belyaev et al. (2015) call this pattern ‘resolving agreement’. On their analysis, it has the f-structure in (41).¹² Notice that this treats CONCORD as non-distributive; according to Belyaev et al. (2015) the distributivity of CONCORD is subject to variation across languages, and even across different constructions within particular languages.

$$(41) \left[\begin{array}{l} \text{CONCORD} \left[\text{NUM PL} \right] \\ \text{INDEX} \left[\text{NUM PL} \right] \\ \text{CONJ AND} \\ \left\{ \left[\begin{array}{l} \text{PRED 'FLAG'} \\ \text{CONCORD} \left[\text{NUM SG} \right] \\ \text{ADJ} \left\{ \left[\text{PRED 'WHITE'} \right] \right\} \end{array} \right] \left[\begin{array}{l} \text{PRED 'FLAG'} \\ \text{CONCORD} \left[\text{NUM SG} \right] \\ \text{ADJ} \left\{ \left[\text{PRED 'RED'} \right] \right\} \end{array} \right] \right\} \end{array} \right]$$

Belyaev et al. (2015) do not offer an explicit semantics in their account, but it is clear that we will have to interpret agreement features from the target (the adjectives) one way or another. Notice that the analysis does not provide an INDEX NUM SG feature on the conjuncts and it would not be trivial to get that. So on a description by analysis approach, we need to interpret the CONCORD NUM SG features of the conjuncts, although CONCORD features are normally understood as meaningless. The (INDEX) NUM PL feature of the whole noun phrase would be superfluous but not harmful, just like in other cases of group formation from two singular nouns.

On a codescription approach, we cannot directly exploit the fact that there are two singular flags in the f-structure in (41). Instead it seems likely that the lexical entry of the singular adjectives themselves will introduce singular number constraints. The special phrase structure rule for resolving agreement might also play a role in constraining when adjectives’ number feature is interpreted, to avoid problems of interpreting adjective number features when they agree with e.g. a *plurale tantum*.

We cannot address this issue in further detail here, but we can conclude that in one way or another, the morphological singular feature that occurs on the

¹²See Belyaev et al. (2015) for the details of how this f-structure arises. In short, the relevant rule for adjective coordination creates two incomplete (PRED-less) NPs, to which each adjective contributes their CONCORD features, including singular number. The PRED feature originating in the noun is distributive and gets copied into each conjunct.

adjectives in (40) will have to be interpreted. Although details remain unclear, this supports the general symmetric approach to agreement in LFG.

9 Summary

We have seen that the standard treatment of agreement in LFG relies heavily on unification: the controller and the target co-specify a piece of functional structure. There is therefore symmetry between controller and target features, as both contribute grammatical information on an equal footing. On the other hand, the piece of functional structure that is co-specified is usually found only in the syntactic position of the controller (except when feature sharing is assumed), accounting for the directed nature of agreement. To account for certain phenomena in coordination and with special lexical items, it has proven necessary to operate with two such positions (f-structure features), INDEX and CONCORD. While the phenomenon of agreement is thus handled at f-structure, the projection architecture makes it possible to model interactions with other aspects of grammatical structure, notably c-structure and information structure, as has proven necessary for several phenomena.

The symmetric but not feature sharing theory of agreement has proven successful for example in accounting for the diachrony of agreement marking. Nevertheless, there are some constructions that seem to suggest modifications of the basic framework: long distance agreement across clause boundaries can be analyzed as local agreement if we allow structure sharing at least for (some) instances of CONCORD agreement, whereas Wechsler's Agreement Marking principle suggests that target and controller features are not symmetric. On the other hand, the semantic contribution that target features sometimes make seem to support the traditional, symmetric analysis.

Acknowledgements

I thank the three reviewers for very helpful feedback on the first version of this chapter.

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Chapter 2

Complex predicates

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This chapter surveys LFG work on a somewhat diverse collection of constructions often called complex predicate constructions, which can be broadly characterized by saying that the number of superficially apparent predicates is arguably different from that of actual predicates, either because two apparent predicates can be argued to have combined into one, or one apparent predicate with an affix is actually two predicates. Some of these constructions are also called Reanalysis, Restructuring, Clause Union or Light Verb Constructions, others are often called Serial Verb Constructions. Here we discuss the main analyses of these that have appeared in LFG, giving an overview of the sorts of criteria and analyses that have appeared in the LFG literature.

1 Introduction

The term ‘complex predicate’ has been widely and rather loosely applied to a variety of constructions where for some reason it appears that two predicates that might be regarded as independent are behaving as one. This happens in multiple ways, with the result that the term has been applied to constructions which are perhaps not very closely related. The major cases appear to be:

- (1) a. Two apparent predicates which appear to be syntactically and morphologically autonomous, but are nonetheless closely integrated semantically. Such constructions were called ‘composite predicates’ in the non-LFG analysis of Cattell (1984), but ‘complex predicates’ in the LFG analyses of Ishikawa (1985) and Matsumoto (1996). One component, the syntactically higher one, is a verb, often called a ‘Light Verb’, the other can be of various categories; Cattell studied

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those with nouns in English, Ishikawa a few with verbs in Japanese, and Matsumoto more with both verbs and nouns in Japanese.

- b. Two or more apparent predicates that are integrated semantically, and syntactically to a greater degree than in (a) or (c) below, but still morphologically distinct, in particular, the light verb is still a distinct stem rather than an affix. Examples include Noun+Verb combinations in Hindi (Mohanan 1994), and combinations of noun and other hard-to-categorize items with verbs in Jaminjung (Schultze-Berndt 2000).
- c. Items that appear to be distinct morphological and syntactic words, but show deeper signs of integration, such as sharing a single ‘argument structure’. This is often called Restructuring, Reanalysis, or Clause Union, and is exemplified by a variety of constructions including especially causatives in Romance (Alsina 1996; 1997, Andrews & Manning 1999, Andrews 2018b, Manning 1992, Manning 1996b), and also Urdu (Butt 1995; 1997, Lowe 2015).
- d. Two or more items that are integrated morphologically (for example one is a stem, the other like an affix), but have a considerable degree of semantic and syntactic autonomy (causatives in Japanese (Ishikawa 1985) and Bantu (Alsina 1997)).
- e. Serial Verb Constructions (SVCS), where two or more Vs or VPs occur together with some kind of sharing or combination of argument structure (Tariana as described by Aikhenvald 2003 and analysed in LFG by Andrews & Manning 1999, Dagaare and Akan as described and analysed by Bodomo 1996; 1997, and Barayin as described and analysed by Lovestrand 2018).

These divisions cross-classify extensively with the semantic/conceptual categories expressed by the constructions:

- (2) a. Desiderative, modal, potential and other concepts, shading in an unclear manner into ‘auxiliaries’ expressing tense, aspect and mood (in the LFG literature, discussed in connection with Restructuring and SVCs).
- b. Causative, applicative and other valence change (restructuring, SVCs and morphology).
- c. Associated motion (restructuring, SVCs, and morphology).¹

¹A category that might be unfamiliar to some readers, designating patterns of motion associated with an activity, first identified and named by Koch (1984).

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- d. Alternatives to a mono-lexical predicate (SVCs and light verb constructions).

In the following sections, I will consider in turn the construction types of (1), with some discussion of the semantic categories they express, and especially the criteria that have been applied to distinguish the supposed complex predicate constructions from similar ones, such as control constructions.

2 Composite predicates

This term was used in the non-LFG analysis of Cattell (1984) to refer to combinations such as *take a walk* or *have a look*, which appear to involve both a main verb and an apparent full NP object, these semantically interpreted together as at least roughly equivalent to a single lexical verb, in many cases. I am not aware of any attempt to reanalyse Catell's English data in LFG, but similar expressions in Japanese were treated at length (Matsumoto 1996), who however called them 'complex predicates'. He also looked at a variety of verb+verb constructions, such as benefactive *morau*, which had been early called 'complex predicates' by Ishikawa (1985).

Ishikawa and Matsumoto developed similar analyses, the latter considerably more extensive and detailed. In both cases, the constructions were treated as xCOMP constructions, with functional control of a SUBJ, motivated by the possibilities for reflexivization for *zibun*, along with a mechanism for allowing arguments to be expressed either in the higher or the lower structure. Ishikawa (1985: 99-100) proposed a principle of 'Object Function Sharing' whereby the equation $(\uparrow \text{OBJ}) = (\uparrow \text{xCOMP OBJ})$ can be added to lexical entries under various circumstances. Matsumoto observed that the apparent possibility of expressing arguments at either level applied to adjuncts as well as arguments, and was also found with a wide range of xCOMP structures, indeed, all of those in Japanese, and so proposed that the nonconfigurational c-structure rule for S could introduce GF's preceded by any number of xCOMPS, constituting a use of functional uncertainty (Matsumoto 1996: 87):

$$(3) \quad S \quad \longrightarrow \quad \begin{array}{cc} \text{NP}^* & \{V, A\} \\ (\uparrow \text{xCOMP GF}) = \downarrow & \uparrow = \downarrow \end{array}$$

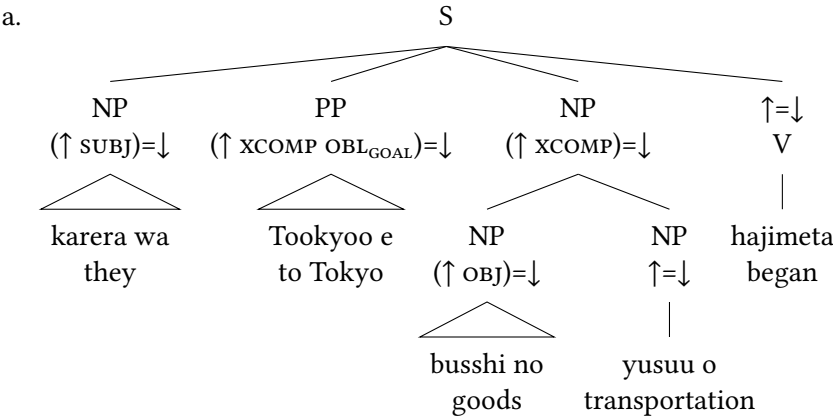
The predicates of these xCOMPS could be verbs, adjectives or verbal nouns, but are all analysed as having verb-like PRED-features taking sentential grammatical relations. But Matsumoto used the resources of LFG to assure that when an

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argument was expressed in an NP, it was marked with the nominal dependent marker *no* rather than the sentential object marker *o*.

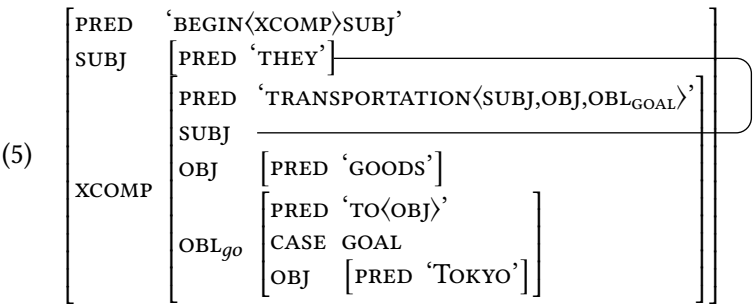
For example, a sample structure is (Matsumoto 1996: 88):

(4) Japanese



- b. kare wa Tookyoo e busshi no yusuu o hajimeta
they TOP Tokyo to goods GEN transportation ACC begin.PST
'They began the transportation of goods to Tokyo.'

The subject is shared between the main clause and the xcomp by means of functional control, while the directional argument is attributed to the complement clause by means of the functional uncertainty expression, and the object is expressed in the complement clause (with different case-marking conventions in both places, as formalized in LFG by Matsumoto). So the resulting f-structure is:



Variants of this work for a wide range of structures, including the constructions with NP+*suru* (in which the nominal is marked with the accusative marker *o*; there are also incorporational structures without *o*, to be discussed later), in

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which the *xCOMP*-value presumably supplies the meaning, with *suru* being semantically empty, merely transmitting it up to the top sentence level (Matsumoto 1996: 74):

- (6) Japanese
karera wa soko e sono busshi no yusoo o suru
they TOP there GOAL the goods GEN transport ACC do
‘They will transport the goods there.’

On this analysis, these structures do not involve any special combination of predicates, so I think it is reasonable to call them ‘composite predicates’ on the basis of the resemblance that some of them have to the structures investigated by Cattell. But they do have one feature that relates them to the clearer cases of ‘complex predicates’, which is the sharing of nonsubject arguments. The word-order characteristics of Japanese (verb final, variable ordering of arguments and adjuncts) allow a reasonably clean treatment of this with the phrase-structure stipulation of (3), which is also very similar to LFG proposals for the intricacies of West Germanic infinitival complements (Zaenen & Kaplan 1995, Kaplan & Zaenen 2003), which are often treated as a kind of complex predicate in the Minimalist literature (e.g. Wurmbrand 2017, where complex/restructuring predicates are analysed in terms of certain verbal projections being absent), but not in LFG, where sharing of grammatical attributes is normally required for the term ‘complex predicate’ to be used.

3 Light verb + coverb structures

The next structures we consider resemble composite predicates in a number of ways, but the apparent complement of the light verb shows signs of syntactic or morphological reduction. Most of the work in LFG has been on Hindi, starting with Mohanan (1994), followed by Mohanan (1997) and occasional later discussions, such as Andrews & Manning (1999: 34-37) considering Wagiman rather than Hindi.

Mohanan considered examples such as:

- (7) Hindi
Mohan ko kahaanii yaad aayii
Mohan DAT story.NOM memory.NOM come.PRF
‘Mohan remembered the story.’

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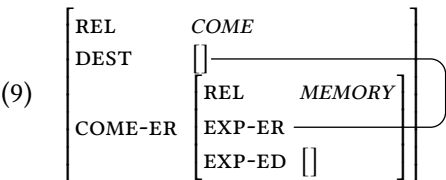
Here the combination *yaad aayii* functions equivalently to the English inflected verb ‘remembered’. She established a number of facts about these constructions which distinguish them from the composite predicates:

- (8) a. The nominal component (here *yaad*) is not head of an NP (cannot be modified by adjectives or coordinated), but an N component of a structure along the lines of $[N \bar{V}]_{\bar{V}}$ (the structures are recursive, and contain various other things beyond the V and the N).
- b. The V component has some mobility (Topicalization but not Scrambling); the N does not.
- c. The nominal and the verb are jointly responsible for licensing the arguments.
- d. Nevertheless, in the most prevalent subtype, the verb can agree with the nominal, so it would appear to bear a grammatical function in f-structure, under traditional assumptions (proposals for a ‘morphological structure’ might change this).
- e. The verbs also have independent verbal functions.

Concomitant with (a), there is no reason to believe that there is any expression of arguments by any nominal strategy: the arguments are all expressed as if they were arguments of a simple lexical verb.

Mohanan reconciles these somewhat contradictory phenomena by making use of the fact that LFG deploys multiple levels of representation, including originally c-structure and f-structure, but later extended to include some kind of ‘argument structure’ (ARG STR) and ‘semantic structure’ (SEM STR) (the details of what is proposed for these and other additional levels are subject to considerable variation in the literature). In her analysis, ARG STR intervenes between f-structure and SEM STR, and permits a semantically complex combination to function in certain respects as a single-level, ‘monoclausal’ structure.

The SEM STRs of the two verbs fit together in a standard predicate-argument combination, where for example in the following example meaning ‘remember’, the upper predicate is a motion verb interpreted metaphorically, while the lower means ‘memory’, the Destination of the upper predicate being identified with the Experiencer of the lower one, which also has an ‘Experienced’ argument:



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Mohanan argues from reflexivization phenomena that these form a ‘monoclausal’ pool (Mohanana 1994: 281, 1997: 443–444), but there is a problem with this.

She shows that the complex predicates divide in two types. In the majority type, the light verb agrees in gender with the nominal if the subject is ergative, exactly as would happen if the nominal was an ordinary direct object. Furthermore, a sole argument of this nominal must be in an oblique case, never nominative (lacking any overt case marking) or accusative. In the other type, the verb cannot agree with the nominal, and any sole argument of the nominal is nominative/accusative like an ordinary direct object (Mohanana 1997: pp. 457–469). This indicates that in the first type, there are two levels of f-structure, and the lower level has an effect on the marking of the arguments and perhaps even their grammatical function. It is not clear to me how to integrate the agreement phenomena with the theme of monoclausality (but it is not incompatible with various forms of argument-sharing).

In summary, the first type is similar to the composite predicates as analysed by Matsumoto, but with an apparent difference in reflexivization behavior, while the second seems more like the ones investigated by not so much by LFG workers, but more by typologically oriented ones such as Schultze-Berndt (2000) and many others, where there does not appear to be evidence that the non-verbal component (often called a ‘coverb’) bears any grammatical function. Neither of these types appear to have attracted much attention in the LFG literature subsequent to the 1990s, a situation that should perhaps be remedied.

4 “Restructuring” complex predicates

These are the constructions that seem to have attracted the most discussion since the 1990s, but without the emergence of a full consensus on how they should be treated. Their basic characteristic from an LFG perspective is to have the general appearance of control structures, with a subordinate structure that has more apparent syntactic autonomy than the previous type, but also to show evidence of the two being compacted into a single f-structure (monoclausality), with some kind of evidence against an xCOMP analysis. Studies of these structures appear to have begun in the late eighties and early nineties, early full publications being Butt (1993; 1995) investigating Urdu, and Alsina (1996) investigating Catalan.² These closely related approaches were then presented in shorter form in Butt (1997) and Alsina (1997). Also, Manning (1992) developed arguments about the constituent structures of Spanish, while Andrews & Manning (1993; 1999) made

²This was a reworking of the Romance language portion of Alsina (1993).

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proposals about how to handle these constructions in a substantially modified versions of LFG. Somewhat later, people began working on similar constructions in Mainland Scandinavian languages; a recent summary is provided by Lødrup (2014a), citing especially earlier LFG work by Niño (1997) and Sells (2004). This work raises a considerable number of interesting questions at the descriptive level, which however don't seem to have attracted a large amount of theoretical attention.

The work on these constructions is distinguished from the earlier work of Ishikawa and Matsumoto on Japanese by the existence of evidence for monoclausality, indicating that in spite of having the superficial appearance of xCOMP structures, they have a single level of f-structure, constituting the LFG version of the 'Clause Union' of Aissen & Perlmutter (1983) or the 'Restructuring' of Rizzi (1978). This however creates a tension with the evidence for hierarchical semantic interpretations matching the c-structure, for which various solutions have been proposed. The Urdu-Hindi³ and Romance streams contribute somewhat different elements to the picture; we begin with Urdu-Hindi, then look at Romance, and finally make some briefer observations about Mainland Scandinavian. We conclude the section with some theoretical discussion.

4.1 Urdu-Hindi

Butt (1993; 1995; 1997) considered two kinds of complex predicate structures, the 'permissive', which contrasts in interesting ways with an 'instructive' construction that appears to be an ordinary xCOMP structure, and 'aspectual' complex predicates. The former have assumed a prominent position in subsequent discussion, whereas the latter so far appear to have been of more limited interest.

4.1.1 Permissives

Butt's treatment of permissive constructions has made fundamental contributions to the subsequent discussion in at least two ways. First, she showed that the distinction between 'complex predicates' (the permissive) and 'complement structures' (the instructive) each appear with the same two different constituent structures, one where the subordinate verb is head of its own VP, another where it forms a complex verb with a light verb. Since both kinds of structures have been argued for in Romance, it is very significant that they can both be found in a single language. Second, she applied a number of tests originally developed

³Urdu put first in this combination, since the actual work is largely directed at Urdu, but with high applicability and close relationship to work on Hindi.

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by Mohanan (1994) to show that the permissives were monoclausal. These tests involved phenomena of agreement (with objects), control, and anaphora.

The tests involving anaphora are especially important because they refute the possibility of analysing the permissive as an xCOMP in the manner of Ishikawa or Matsumoto. There are two relevant phenomena, bound anaphora with *apnaa*, and obviation with *uskaa*, as illustrated by this selection of examples from Andrews & Manning (1999):

(10) Urdu

- a. Anjum_i ne Saddaf_j ko apnaa_{i/*j} xat lik^h-ne
 Anjum_i ERG Saddaf_j DAT self's_{i/*j} letter.M.NOM write-INF
 di-yaa
 give-PRF.M.SG
 'Anjum_i let Saddaf_j write her_{i/*j} letter.'
- b. Anjum_i ne Saddaf_j ko us-kaa_{*i/j} xat lik^h-ne
 Anjum_i ERG Saddaf_j DAT her_{*i/j} letter.M.NOM write-INF
 di-yaa
 give-PRF.M.SG
 'Anjum_i let Saddaf_j write her_{*i/j} letter.'
- c. Anjum_i ne Saddaf_j ko apnaa_{i/j} xat lik^h-ne ko
 Anjum_i ERG Saddaf_j DAT self's_{i/j} letter.M.NOM write-INF ACC
 kah-aa
 say-PRF.M.SG
 'Anjum_i told Saddaf_j to write her_{i/j} letter.'
- d. Anjum_i ne Saddaf_j ko us-kaa_{i/*j} xat lik^h-ne ko
 Anjum_i ERG Saddaf_j DAT her_{i/*j} letter.M.NOM write-INF ACC
 kah-aa
 say-PRF.M.SG
 'Anjum_i told Saddaf_j to write her_{i/*j} letter.'

(a) and (b) are permissives, and we see in (a) that the bound pronominal *apnaa* can be anteceded by the overt syntactic subject *Anjum* but not the overt object functioning as the so-called 'causee agent'⁴ *Saddaf*. But the facts are reversed in (b) with the free pronominal *uskaa*. Here, coreference with the causee agent is good, with the overt subject bad. In both cases, the facts are as they would be

⁴The agent of the embedded verb in a causative/permissive construction.

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in a simple clause. See Butt (2014) for an updated version of this and other arguments for monoclausality, which includes a discussion of the observation by Davison (2013) that (a) is an oversimplification of the facts: some speakers do accept coreference with either the overt subject or the causee agent. Butt explains this as a consequence of the fact that cross-linguistically, it is often possible for bound pronouns to accept a ‘logical subject’ (highest-ranked argument of a predicate) as their antecedent, regardless of whether or not this is a syntactic subject. Intra-speaker variation with respect to examples like (a) is therefore not a critical problem.

Another important property of the permissive is that it seems to have the same c-structure configurations as the instructive. Either the embedded verb and its complements can appear as a VP, which can scramble as a unit to the front of the sentence, but not be interrupted, or, both verbs can appear as a complex verb with the nominal complements able to be scrambled, in which case the two verbs only move as a unit (Butt 1995: 43–47, 1997: 113–115). A selection of examples illustrating VP scrambling and non-interruptibility is (Andrews & Manning 1999: 23) (11–12) below:

(11) Urdu Instructive (Biclausal):

- a. Anjum ne [ciṭṭʰii likʰ-ne] ko Saddam ko kah-aa
Anjum ERG letter(NOM) write-INF ACC Saddam DAT say-PRF.M.SG
‘Anjum told Saddam to write a letter.’
- b. Anjum ne kah-aa Saddam ko [ciṭṭʰii likʰ-ne] ko
Anjum ERG say-PRF.M.SG Saddam DAT letter.NOM write-INF ACC
‘Anjum told Saddam to write a letter.’
- c. *Anjum ne kah-aa ciṭṭʰii ii Saddam ko likʰ-ne ko

(12) Urdu Permissive (Monoclausal):

- a. Anjum ne [ciṭṭʰii likʰ-ne] Saddam ko d-ii
Anjum ERG letter(NOM) write-INF Saddam DAT give-PRF.F.SG
‘Anjum let Saddam write a letter.’
- b. Anjum ne d-ii Saddam ko [ciṭṭʰii likʰ-ne]
Anjum ERG give-PRF.F.SG Saddam DAT letter(NOM) write-INF
‘Anjum let Saddam write a letter.’
- c. *Anjum ne d-ii ciṭṭʰii ii Saddam ko likʰ-ne

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The (b) examples are somewhat degraded for pragmatic reasons,⁵ while (c) are ungrammatical.

But there are apparent exceptions to non-interruptibility, which arise exactly when the two Vs are adjacent, motivating a surface complex verb construction, similar to the the N+V structures investigated by Mohanan:

(13) Urdu

- a. Anjum ne Saddam ko **lik^h-ne ko kah-aa** ciṭṭ^h ii.
- b. Anjum ne **lik^h-ne ko kah-aa** Saddam ko ciṭṭ^h ii.

(14) Urdu

- a. Anjum ne Saddam ko **lik^h-ne d-ii** ciṭṭ^h ii.
- b. Anjum ne **lik^h-ne d-ii** Saddam ko ciṭṭ^h ii.

This is significant for at least two reasons. First, as emphasized by Butt, it corroborates the thesis of LFG that there are (at least) two distinct levels, c-structure and f-structure, with a substantial degree of independence, since each of the two c-structures can occur with both of the f-structures. Second, both of these c-structures have been proposed for the complex predicates of Romance, with for example Manning (1992) arguing for a VP complement of complex predicates in Spanish, similarly to Alsina (1996) for Chicheŵa, while Kayne (1975) and subsequent work arguing for a complex verb treatment of causatives in French. Note that the examples of (13) require that it be possible to annotate an NP in the matrix with xCOMP OBJ (ex (19a), Butt 1997: 117), as also required for the analyses of Japanese by Ishikawa and Matsumoto.

4.1.2 Aspectuals

The permissive complex predicates appear to have the same semantic structure as many complement structures, for example *let* or *allow* in English, with different c- and f-structural packaging, but the semantics of the aspectual complex predicates is harder to explain. They focus on properties of an action such as completion, initiation and volitionality, without giving an impression of taking the main verb as an argument (as is usually the case with the Romance complex predicates considered below). Rather, Butt uses the general framework of Jackendoff (1990) to endow them with a kind of enriched argument structure that combines with that of the main verb.

Some examples are:

⁵p.c. from Miriam Butt to Christopher Manning, 1997.

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(15) Urdu

- a. Anjum ne citṭi lik^h l-ii
Anjum ERG note.F.NOM write take-PRF.F.SG
'Anjum wrote a note.' (completely) (Butt 1995: 93)
- b. vo ro paṛ-aa
he.NOM cry fall-PRF.M.SG
'He fell to weeping.' (involuntarily) (Butt 1995: 109)
- c. us ne ro ḍaal-aa
he ERG cry put-PRF.M.SG
'He wept heavily.' (on purpose) (Butt 1995: 109)

Butt shows that these pass the tests for monoclausality, but the only one that is really significant is the obligatory agreement with the object as illustrated in (a),⁶ since, if they were xCOMPS, the complement and matrix subjects would be the same, so the anaphora and control tests would give the same outcomes. She also shows that the c-structures are somewhat different, the VP structure being unavailable, only the one with a complex verb.

These constructions seem rather different from the intransitive complex predicates in Romance, which from a semantic point of view appear to be syntactic alternatives to ordinary xCOMPS. Perhaps for this reason, there seems to have been relatively little further work on them, but see Butt (2010).

4.2 Romance

LFG treatments of complex predicates in Romance languages were developed at about the same time and in close communication with the work on Hindi and Urdu, largely by Alex Alsina and Christopher Manning, as presented in Alsina (1993; 1996; 1997), Manning (1992; 1996b), and Andrews & Manning (1993; 1999), building on earlier work mostly in the frameworks of Relational Grammar and Government-Binding Theory.

Although there are many similarities between the Urdu-Hindi Permissive complex predicates and the complex predicates of Romance languages, there are significant differences in some of the more empirically striking phenomena. In the Urdu-Hindi permissives, there is clear evidence for two different constituent structures, one a complex verb, the other a VP complement, both also used by the instructive, which is clearly a control structure, bearing the xCOMP GF in

⁶ Although the agent is semantically feminine, it is also ergative, so the verb cannot be agreeing with it.

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f-structure. In Romance, however, although there are also xCOMPs that are morphologically similar to the complex predicates, they have different word-order properties, suggesting a different c-structure. Many verbs can furthermore appear in either construction, with different verbs having different preferences.

The word-order correlations of xCOMP vs complex predicate constructions in Romance do not seem to have been much discussed in the LFG literature, but are considered in Sheehan (2016: 982), who illustrates both constructions being possible for perception verbs in French, where the xCOMP structure, ECM in the Minimalist Framework, is preferred:

(16) French

- a. Jean voir Marie manger le gâteau
Jean sees Marie eat.INF the cake
'Jean sees Marie eating the cake.' (ex 8b, p982; ECM/xCOMP)
- b. Jean voit manger le gâteau à Marie
Jean sees eat the cake to Mary
'John sees Mary eating the cake.' (ex 15a, p983; Restructuring/complex predicate)

The literature agrees that none of the evidences for being a complex predicate construction can appear with the ECM/control structure word order.

Superficially, for the complex predicates, a complex verb structure similar to that of Hindi seems plausible, but, as we will discuss, the LFG literature provides a number of arguments against this. Another difference is that Romance languages have extensive evidence for different orderings of the light verbs producing different interpretations, as well as a considerably richer system of morphological marking of the semantically subordinate verbs by the light verbs. These phenomena create difficulties for a proposal where the f-structure is flat.

The constructions furthermore have a more diverse semantic range that those in Urdu-Hindi, comprising

- (17) a. Causatives, including extensions including permission, ordering and persuasion
- b. 'Modal' (ability, possibility, desire)
- c. Aspectual (starting and finishing, as well as Perfect and Progressive)
- d. Associated Motion

Another difference is that while in Urdu-Hindi the list of light verbs appears to be limited and closed, in some of the Romance languages it seems to be larger and

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hazier; for example Solà (2002: 226-228) lists 31 predicates in Catalan excluding the traditional aspectual auxiliaries, which have clitic climbing for arguments, and he indicates that there are more.⁷

The most widely used argument for clause union is the phenomenon of ‘clitic climbing’, whereby a preverbal clitic appears in front of the light verb rather than next to the verb it is an argument of:

- (18) Spanish
 lo quiero ver
 it want.1.SG see.INF
 ‘I want to see it.’

In principle, this argument can be circumvented by allowing the clitics to carry annotations such as ‘(↑ XCOMP OBJ *) = ↓’, but there are some issues with this, such as the fact noted originally by Rizzi (1978: 120) that in Italian, the capacity for clitics to climb disappears when the putative XCOMP is preposed by *Wh*-Movement (and in various other situations):

- (19) Italian
- a. questi argomenti, dei quali ti verrò a parlare
 These arguments of.the which you.DAT come.FUT.1SG to talk.INF
 al più presto, ...
 as soon as possible
 ‘these arguments, about which I will begin to talk as soon as possible,
 ...’
 - b. *questi argomenti, a parlare dei quali ti verrò
 these arguments, to talk.INF of.the which you.DAT come.FUT.1SG
 a più presto ...
 as soon as possible
 these arguments, about which I will begin to talk as soon as possible,
 ...

In LFG, this would minimally indicate that there were two possible annotations for these apparent VPs, one allowing (pied-piped) *Wh*-movement, the other not. An important characteristic of clitic climbing, discussed by Sheehan (2016) and also by Andrews & Manning (1993) is that it is not in general obligatory, but

⁷Note also the relevant observation of García (2009: 185), working in a strongly functionalist approach, that constructions that normally reject indications of being a complex predicate, such as clitic climbing (see below) may accept it under certain pragmatic conditions.

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optional, subject to complex preferences and conditions, discussed extensively from a functional perspective by [García \(2009\)](#).

Various further arguments from the literature are reviewed from an LFG perspective in [Andrews & Manning \(1999: 47–59\)](#) of which we will specifically mention one for Catalan from [Alsina \(1996: 217\)](#), which shows that that apparent complement in a restructuring construction doesn't have a subject, unlike an xCOMP. The argument is that causee agents can't host bare floated quantifiers, although nonovert equi-infinitive subjects can:

(20) Catalan

- a. els metges_i ens_j deixin beure una cervesa cadascun_{i/*j}
the doctors us let drink a beer each
'Each of the doctors let us drink a beer.'
*'The doctors let each of us drink a beer.'
- b. els metges_i ens_j han convençut beure una cervesa cadascun_{i/*j}
the doctors us have convinced drink a beer each
'Each of the doctors has convinced us to drink a beer.'
*'The doctors have convinced each of us to drink a beer.' (Alsina (p.c.))

This is the same kind of argument for clause union as the ones from anaphora for Hindi and Urdu by Mohanan and Butt.

The arguments for clause-union similar to those from Urdu-Hindi, but the situation with c-structure is somewhat less clear, in that there is nothing comparable to Butt's argument that both a VP and a complex V structure are available. Rather, both have been argued for, complex Vs mostly in HPSG ([Abeillé & Gourdard 1994; 1996](#)) and VP complements in LFG. [Manning \(1992; 1996b\)](#) presenting arguments drawing heavily on previous work by Kayne and others on French, observes that clitics can climb out of coordinated VPs each with their own causee agent in Spanish as well as French:

(21) a. French

Marie le ferait lire à Jean et déchirer à Paul
Marie it will.make read.INF to Jean and tear up.INF to Paul
'Marie will make Jean read it and Paul tear it up.'

b. Spanish

Carlos me estaba tratando de topar y de empujar contra
Carlos me was trying of bump.INF and of push.INF against
María
María
'Carlos was trying to bump into me and push me against Maria.'

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He counters proposals to use coordination reduction to explain this away.

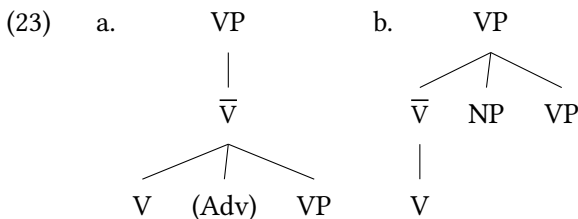
Alsina (1997: 226) gives an argument from coordination and provides additional ones from nominalization and from the fact that various elements, such as sentence adverbials set off by comma-pauses, can be inserted between the main and light verbs:

(22) Catalan

- a. la Maria ha fet de debó riure el nen
the Mary has made truly laugh.INF the boy
'Mary has truly made the boy laugh.'
- b. la Maria ha fet, em penso, riure el nen
the Mary has made I think laugh.INF the boy
'Mary has made the boy laugh, I think.'

Although it is often possible for certain kinds of particles to be inserted into complex verb structures,⁸ this seems more than is generally allowed, vindicating the argument.

Although the LFG literature does not have much to say about the c-structure of the complex predicates, I suggest that it is reasonable to propose that they are expansions of an 'inner VP', or \bar{V} , to V and VP, as in (a) whereas the xCOMP/control/ECM constructions are expansions of VP, as in (b):



The nature of the c-structure difference remains to be fully elucidated.

Although the nature of the constituent structure of Romance complex predicates is not entirely clear, something that is clear is the effect of the c-structure on semantic interpretation. **Alsina (1997: 238)** provides examples that show the same light verbs appearing in different arrangements in Catalan clause union constructions, and **Solà (2002: 239)** provides a few more:

(24) Catalan

⁸As discussed for Tariana by **Aikhenvald (2003)** and Jaminjung by **Schultze-Berndt (2000)**.

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- a. li acabo de fer llegir la carta
 him.DAT finish.1SG of make.INF read.INF the letter
 ‘I finish making him read the letter.’ (Alsina)
- b. li faig acabar de llegir la carta
 him.DAT make.1SG finish.INF of read.INF the letter
 ‘I make him finish reading the letter.’ (Alsina)
- c. les pot aver vistes
 them.F.PL can.SG have.INF seen.PST.PTCP.F.PL
 ‘He/She can have seen them.’ (Solà)
- d. les ha pogudes veure
 them.F.PL have.3SG been able.PST.PTCP.F.PL see.INF
 ‘He/she has been able to see them.’ (Solà)

In Urdu, on the other hand, multiple light verbs occur in an order consistent with semantic interpretation, assuming head-final ordering, but no cases of multiple possible orderings have been produced. The issue of how to control the semantic interpretation in Romance languages is therefore more acute, and there is disagreement about how to do it, as we discuss below.

A final characteristic of Romance is a substantially greater variety of subordinate verb forms. There are three inflectional categories, infinitive, active (present) participle, and passive (past) participle, the latter occurring in both agreeing and non-agreeing forms, with the further problem of specifying the verb-markers as such *a* ‘to/at’, *de* ‘of’ and others, mostly historically prepositions. This means that the question of how the marking of the subordinate verb is to be accomplished is more acute. However, the theoretical treatment is not as troublesome as the semantics, as we shall see.

4.3 Mainland Scandinavian

The most striking feature of the Scandinavian constructions is that their most obvious evidence for monoclausality is apparent verbal feature agreement between the light verb and its semantic complement, as illustrated in these examples from Norwegian (Lødrup 2014a: 4):

- (25) Norwegian
- a. forsøk å les
 try.IMP to read.IMP
 ‘Try to read!’

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- b. det har jeg glemt å fortalt
that have.PRS I forget.PTCP to tell.PTCP
'I forgot to say that.'
- c. jeg prøvde å leste det lure smilet hennes
I try.PST to read.PST the sly grin.DEF her
'I tried to read her sly grin.'

The inflectional agreement in the above examples is optional, commonest with imperative forms (a), less common with participles (b), and possible for only some speakers with the finite past (c).

The most-discussed evidence for reanalysis is 'long passives', which are arguably produced by morphological features associated with passive voice being shared across the two levels, as analysed by [Lødrup \(2014b\)](#). An example is:

- (26) Norwegian
at vaskemaskin-en må huskes å slås på
that washing machine-the must remember.INF.PASS 'to' turn.INF.PASS on
'that you must remember to turn on the washing machine' ([Lødrup 2014b](#): 388)

While the tense-mood features of (25) appear to percolate down from the upper to the lower verb, the voice feature of (26) percolates in the opposite direction, in a manner somewhat reminiscent of the analysis of auxiliary selection in Italian in [Andrews & Manning \(1999: 56-50\)](#).⁹ This suggests that this is a complex predicate structure where both verbs are associated with the same f-structure. Lødrup discusses further verbal constructions similar to these that do not appear to be complex predicate constructions; space precludes discussing them here. Similar phenomena appear to be found in Swedish and Danish, but have not been reported for Icelandic.

4.4 Theoretical approaches

A central conclusion from the data of these languages is that the apparent multiple levels of c-structure correspond to one level of f-structure. For example, according to both Butt's and Alsina's analyses, the f-structure of (24a) would be:

⁹Due to Manning, according to my recollections.

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$$(27) \left[\begin{array}{l} \text{SUBJ} \left[\begin{array}{l} \text{PRED 'PRO'} \\ \text{PERS 1} \\ \text{NUM SG} \end{array} \right] \\ \text{PRED 'FINISH-MAKE-READ'} \\ \text{OBJ} \left[\begin{array}{l} \text{SPEC DEF} \\ \text{GEND FEM} \\ \text{NUM SG} \\ \text{PRED 'LETTER'} \end{array} \right] \\ \text{OBJ}_\theta \left[\begin{array}{l} \text{CASE DAT} \\ \text{NUM SG} \\ \text{PERS 3} \end{array} \right] \end{array} \right]$$

There are three problems that arise:

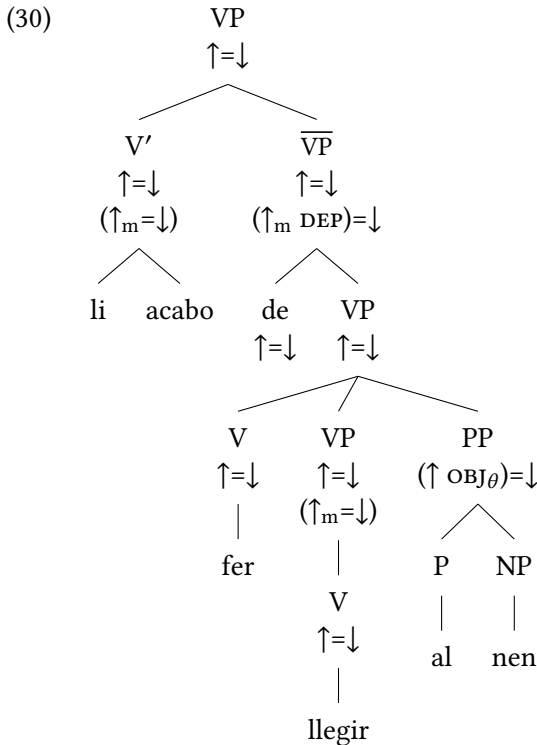
- (28) a. The morphological marking
 b. The combination of multiple PRED-values into one
 c. The effect of arrangement on semantic interpretation

(a) is the easiest to deal with, because, as discussed in Butt et al. (1999) it can be managed by proposing a morphological projection (m-structure), that comes directly off c-structure, where the relevant featural information can be stored. The m-structure attributes normally proposed are VMARK with values DE, A, etc, for the apparently prepositional marking, and VFORM for the inflectional categories, with values FIN, INF, PRS.PTCP and PST.PTCP. The relevant parts of the lexical entries for the light verbs in (24) will then be:

- (29) a. *acabo*: (\uparrow_m DEP VMARK)= DE, (\uparrow_m DEP VFORM)=INF, (\uparrow_m VFORM)=FIN
 b. *fer*: $\neg(\uparrow_m$ DEP VMARK), (\uparrow_m DEP VFORM)=INF, (\uparrow_m VFORM)=INF

The c-structure will annotate all of the VPs with $\uparrow=\downarrow$ for f-structure, but will assign to them a DEP-value in m-structure:

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The forms can then be managed, and this solution will clearly also work for Hindi.

There is however a potential problem, which is that it was later argued by [Frank & Zaenen \(2004\)](#) that m-structure ought to come off f-structure rather than c-structure directly. With this change, form-determination becomes more complicated. Their solution, which involves rather complex stipulation, works for French auxiliaries, but as discussed by [Andrews \(2018b\)](#), it does not seem very plausible for the richer system of light verbs found in some of the other Romance languages such as Catalan. But we will not pursue this further here, and consider instead the next problem.

This is that if both the main verbs and the light verbs are construed as having PRED-features, the f-structure annotations will produce a PRED-value clash. Within mainstream LFG there have been three proposed solutions. The first was proposed in an earlier form by [Alsina \(1996: 189\)](#), and then in a later, more formal form by [Alsina \(1997: 235–237\)](#). Although it was criticized extensively by [Andrews & Manning \(1999: 28–34\)](#), I think it can be further revised to reduce the force of some of their criticisms.

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The core of Alsina's proposal is the idea that light verbs have an empty argument position into which the PRED-value of their semantic complement is substituted. A schematic illustration is:

$$(31) \quad \text{'CAUSE}\langle[\text{P-A}] \underbrace{[\text{P-P}] \text{P}^*\langle\ldots[\]\ldots\rangle}\rangle\text{'}$$

'[P-A]' and '[P-P]' represent the proto-agent and proto-patient roles of Dowty (1991), 'P*' the unspecified predicate that is to be plugged in, and the underbar the fact that in the 'direct causative' construction, the patient of the causative verb is to be identified with some argument of the caused verb. Given (32a) as the subordinate verb to be plugged in, a possible result is (32b):

$$(32) \quad \begin{array}{ll} \text{a. 'READ}\langle[\text{P-A}] [\text{P-P}]\rangle\text{'} \\ \text{b. 'CAUSE}\langle[\text{P-A}] [\text{P-P}] \underbrace{\text{READ}\langle[\text{P-A}] [\text{P-P}]\rangle}\rangle\text{'} \end{array}$$

Alsina does not present this in an attribute-value notation where the usual methods for unification in LFG apply, but this is clearly a triviality. In what follows, it will be useful to assume that the empty predicate slot in the light verb is the value of an attribute such as PARG, in order to formalize the construction of a complex predicate such as (b) above in a more conventional notation.

The next component is the idea that the ' $\uparrow=\downarrow$ ' annotation on the VP complement of a light verb is either interpreted in a special way (Alsina 1996) or replaced by something a bit different (Alsina 1997). We take the second approach. Here, these VPs are annotated with the novel annotation $\uparrow_H=\downarrow$, which is interpreted as follows. The two most important provisions are that the PRED-values are not shared between the levels, which can be accomplished with the LFG device of 'restriction', and second, the PRED-value of the VP is plugged into to PARG-value of the light verb's PRED. This can be formalized as follows:

$$(33) \quad \begin{array}{l} \uparrow_H=\downarrow = \uparrow_{\backslash\text{PRED}} = \downarrow_{\backslash\text{PRED}} \\ (\uparrow \text{ PRED PARG}) = (\downarrow \text{ PRED}) \end{array}$$

This treatment is close to that proposed later for Urdu by Butt & King (2006), the difference being that they also propose a different approach to argument structure and linking.

\uparrow_H to both the light V and its semantic complement VP, which isn't necessary, as noticed implicitly by Butt & King (2006: 241). Manipulating argument-structure in c-structure rules might seem somewhat odd, but these constructions are difficult and seem to resist fully conventional treatments.

The final ingredient is a linking theory. Alsina's and Butt's analyses both require a linking theory that will apply to assembled syntactic structures rather

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than individual lexical entries. This is a substantial change from the original conception of Lexical Mapping Theory, which was supposed to apply to items listed in the lexicon. Alsina's and Butt's approaches differ in detail, but the basic idea is that the argument structure positions are assigned grammatical relations in accordance with prominence hierarchies, so that the most prominent will be expressed as SUBJ unless the verb is passive, in which case it is expressed as an oblique. The linking theories for complex predicates, including that of [Andrews & Manning \(1999\)](#) furthermore remained somewhat informal until recently, with the proposals of [Lowe \(2015\)](#) to use glue semantics, and [Andrews \(2018b\)](#) to use the 'Kibort-Findlay Mapping Theory' as developed in [Asudeh et al. \(2014\)](#) and [Findlay \(2016\)](#). We will however not pursue linking theory here, but rather review some followup proposals to the original analyses.

[Andrews & Manning \(1999\)](#) proposed to reanalyze the material in a way that was in some respects not so different from the original analyses, but set within a rather substantial reorganization of LFG. Rather than there being the two central levels of c-structure and f-structure, it was proposed that all attributes are in the first instance assigned to c-structure, nodes, and then differentially shared by annotations stated in terms of classes of attributes that share in different ways, some more aggressively than others. The bar-features of \bar{N} theory, for example, would be shared between mother and daughter in only certain coordinate structure and modificational configurations. category features more widely (between $N (=N^0)$ and $NP (=N^2)$, for example). Clause union complex predicates would then have sharing of the grammatical functions SUBJ, OBJ and OBJ_θ and others (which were called the ρ -projection) between the upper and lower VPs, while xCOMPS would not. The morphological features would however not be shared, effectively including in the analysis a kind of morphological projection, of the original kind, off of c-structure, rather than f-structure.

This approach reflects a difference in philosophy from Alsina's: he proposes that light verbs and the predicates of their semantic complements combine in a fundamentally different way from ordinary complementation, producing a genuine 'complex predicate', from which follow the peculiarities of linking and the evidence for clause union. Andrews and Manning did not share this intuition. In their account, the light verb constructions appear in very similar configurations to those of the complement structures, the main difference being that the former share grammatical relations while the latter don't,¹⁰ but have their semantic com-

¹⁰The VP complements of the light verbs are introduced as values of an attribute ARG, which might in principle be the same as xCOMP, as long as the latter is not in the ρ projection. This issue is not discussed in the text. In the earlier version of this approach presented in [Andrews & Manning \(1993\)](#), ARG had to be a different attribute than xCOMP.

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plements introduced by a different attribute, ARG, that is on a different projection than the f-structural attribute xCOMP, but the mode of semantic composition is fundamentally the same.

This could be defended on the basis that there do not appear to be major semantic differences between the structures where ARG is motivated versus the ones without clitic climbing that call for xCOMP. By contrast, many of the complex predicates investigated by Butt and Mohanan really do seem to involve closer combination between the light verb and the heavy verb, as indicated by Butt's introduction of aspects of Jackendoff's conceptual structures. This leads to a further issue, the treatment of auxiliaries. Butt (2010) argues strongly that auxiliaries are not light verbs, on the basis of having different general behavior and historical trajectories. But in Romance languages, they tend to show the typical behavior of the light verbs, including clitic climbing, and the capacity to condition the form of their apparent complements, and the non-auxiliary light verbs seem to have the semantics of ordinary complement structures in other languages. Catalan *voler*, for example, with restructuring, seems to have essentially the same meaning as English *want*, which does not show clear evidence of restructuring from the perspective of LFG.¹¹ By contrast, the Urdu light verb contrast between *par* 'fall' and *daal* 'put' signifies contrast between accidental and volitional action, respectively Butt (1995: 108-109), in a way that is not well captured by the usual kind of semantic composition proposed for complements.

There are three further analyses to consider, Butt and King's 2006 analysis of Urdu, Lowe's (2015) rather different analysis of the same language, and Andrews' (2018b) analysis of Romance. Butt and King's treatment is very similar to the modified version of Alsina's analysis proposed here, but differs in one important respect: it doesn't use linking theory, but rather uses restriction to prevent the SUBJ and OBJ_{GOAL} (grammatical function of the causee agent) from being shared between the two levels, but uses an equation to identify their value (ex (8) on pg. 241). This might generalize to Romance, but faces a problem in both Romance and Hindi (also, presumably, Urdu), which is that it doesn't explain the evidence (from anaphora in Urdu, and subject-oriented adverbs in Catalan) that the causee agent is not a subject. In a sentence such as (10a), for example, the subject-bound anaphor *apnaa* is sitting in a clause nucleus whose SUBJ-value is *Saddaf ko*, so it is not clear why it cannot be bound by it, even though the f-structure in which

¹¹However Grano (2015) argues within Minimalism that English *want* does have restructuring (and similarly for even more superficially biclausal constructions in Modern Greek). But his arguments are based mainly on the inability of various modifiers to appear, as can be explained by the absence of certain functional projections (or perhaps semantic operators), rather than shared f-structures, which is the basis for clause-union in LFG.

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this happens is not actually part of the f-structure of the matrix S, due to the operation of restriction.

The 1999 analysis of Andrews and Manning and the 2006 analysis of Butt and King lack a feature that is relatively typical for LFG, which is that the f-structure of a c-structure constituent contains the f-structures of all of that constituent's subconstituents. We might call this property 'monotonicity of f-structure (with respect to c-structure)'. When this property is discarded, analyses involving functional uncertainty can fail in ways that are difficult to predict, which might provide a reason for preferring other kinds of analyses if they are available. A further, related point is that 'forgetting' much of the abstract structure of subconstituents is an essential characteristic of HPSG with its head-feature constraint. It is plausibly a good idea to develop LFG in ways that are clearly distinct from HPSG. The next two analyses retain f-structure monotonicity.

The second one is that of [Lowe \(2015\)](#) of Urdu, which neither uses restriction nor proposes any changes to the LFG framework, but makes use of two different ideas. The first is to treat the light verbs as not having PRED-features, but introducing grammatical features such as [PERMISSIVE +]. This is workable for Urdu-Hindi, because the inventory of light verbs is clearly closed, and they are semantically bleached, but less plausible for Romance, because the inventory is larger, and, as we have previously discussed, not so sharply delimited, and many of the verbs have considerable lexical content, as discussed in the previously mentioned [Solà \(2002\)](#). On the other hand, given glue semantics, it is not clear exactly what the PRED-features are accomplishing, so this might not really be a problem. Given that there is no problem of conflicting PRED-features, a rather clever glue semantics trick is used to get the right interpretation, which cannot be explained properly in the limited space available here. Given the use of a morphological projection or similar device, the analysis solves all problems except for the dependence on the c-structure for scopal interpretation in Romance. In particular, since the causee agent NP is in no way at any level a value of SUBJ, there is no problem with either the phenomena of anaphora in Urdu-Hindi or the floating quantifiers in Catalan. [Lowe \(2015\)](#) also provides an extremely thorough discussion and critique of all previous analyses of complex predicates in LFG.

The final analysis, that of [Andrews \(2018b\)](#), solves the problem of hierarchical interpretation without using a distinct morphological projection, but also obeys f-structure monotonicity. It has significant similarities to the analyses of both [Andrews & Manning \(1999\)](#) and [Butt & King \(2006\)](#). It requires some modification to the LFG framework, although a considerably less extensive one than Andrews and Manning's approach. The basic idea is to apply the concept of 'distributive attribute' and 'hybrid object' from [Dalrymple & Kaplan \(2000\)](#) to sets with a

single member, so that a complex predicate structure is taken to be a hybrid object with the semantic complement as a set-member:

$$(34) \left[\begin{array}{c} \text{PRED 'LET'} \\ \dots \\ \left\{ \left[\begin{array}{c} \text{PRED 'WRITE'} \\ \dots \end{array} \right] \right\} \end{array} \right]$$

This provides appropriate places to locate the morphologically required features, without requiring a new projection, and also a structure to determine the semantic interpretation, at the cost of requiring a certain amount of stipulation to distinguish the features that need to be shared versus those that cannot be. The Kibort-Findlay Mapping Theory is used to get appropriate interpretation of the arguments of the verb without having to treat the causee agent as a SUBJ-value.

5 Morphologically integrated complex predicates

These are constructions which might be analysed as derivational morphology, but for various reasons have invited analysis as morphologically compacted versions of the previous constructions. The two main examples are [Ishikawa \(1985\)](#) for Japanese, and [Alsina \(1997\)](#) for Chicheŵa, extending their analyses for the previously discussed complex predicate constructions (in the authors' terminology) to the current ones.

5.1 Ishikawa and Matsumoto on Japanese

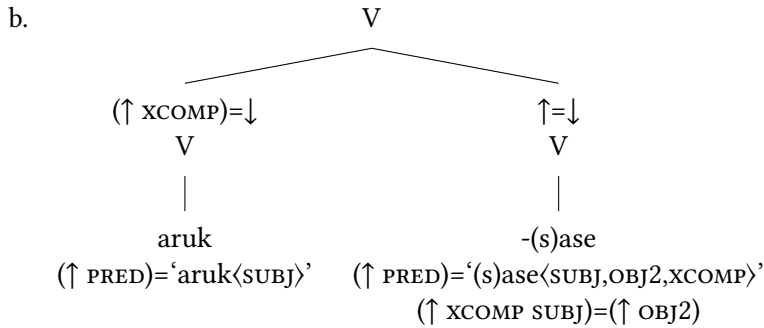
To analyse Japanese *-(s)ase-* causatives,¹² Ishikawa uses the technique from earlier LFG work such as [Simpson \(1983\)](#) of allowing word-level phrase-structure rules to introduce stems or affixes with a grammatical function. For example the verb stem *aruk-ase* in example (a) below is given the tree structure (b):

(35) Japanese

- a. John ga Mari ni/o aruk-ase-ta
 John NOM Mary DAT/ACC walk-cause-PST
 'John caused Mary to walk.' ([Ishikawa 1985: 98](#))

¹²The initial *s* appears after stems ending in a vowel, but is absent after a consonant.

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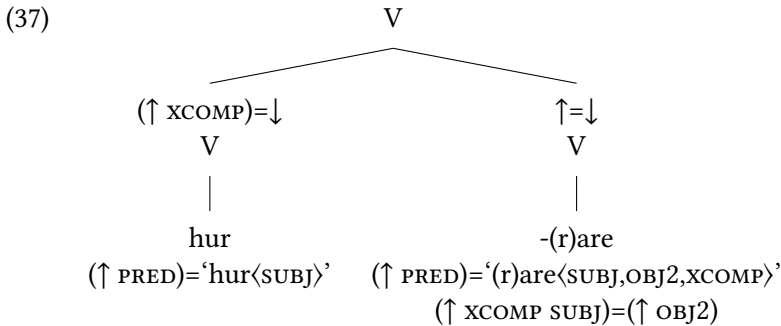


The difference between dative and accusative on the causee agent is semantically significant, treated as whether the grammatical function is IOBJ2 (currently designated as OBJ_θ) for the dative or OBJ for the accusative.

Ishikawa extends this analysis to the 'indirect' or 'adversative' passive, in which the subject is characterized as suffering the effect of the action (Kuno 1973: 303):

- (36) Japanese
 John ga ame ni hur-are-ta
 John NOM rain DAT fall-PASS-DAT
 'John suffered from rain falling.' (Ishikawa 1985: 106)

The annotated c-structure for this is:



There has been a dispute as to whether the adversative passive must always add a new argument, or can be similar in appearance to the regular passive, but expressing adversity to the overt (promoted) subject. Kuno says no, while Ishikawa (1985: 114-124) says yes, although the arguments are complex, and depend on too many details of Japanese for further discussion here.

Matsumoto (1996) provides a similar analysis, but implemented somewhat differently, for causatives, and also certain desideratives. For the latter, he argues

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that desideratives which take the desired event object as an accusative have a bi-clausal structure, while the ones where this object is nominative are monoclausal (Matsumoto (1996: 103):

(38) Japanese

- a. boku wa hon o yomi-tai
I TOP book ACC read-want
'I want to read the book.'
- b. boku wa hon ga yomi-tai
I TOP book NOM read-want
'I want to read the book.'

The argument that Matsumoto makes is complex, and depends on the possibilities for passivization. One point is that the desiderative forms an adjective rather than a verb, and adjectives as such cannot be passivized. However there is a way out: adjectives of subjective state can be verbalized by adding the suffix *-gar*, meaning 'to show signs of being in the state'. These derived verbs are natural with non-first person subjects, which the original adjectives are not. Although these derived verbs take accusative objects, there is a difference in passivization: the ones whose base forms reject *ga*-marked objects are also the ones that are acceptable in the passive. These are the ones where the subject in some sense wants to 'have' the object (Matsumoto 1996: 107):

(39) Japanese

- a. boku wa sono hon o/ga yomi-tai
I TOP the book ACC/NOM read-want
'I want to read the book.'
- b. boku wa kare o/*ga machi-tai
I TOP him ACC/NOM wait-want
'I want to wait for him.'

It is the verbal forms derived from the desideratives that accept *ga* on their patients that can be passivized:

(40) Japanese

- a. sono hon wa minna ni yomi-ta-gar-arete-iru
the book TOP all DAT read-want-VBLZ-PASS-ASP
'The book is in such a state that everybody wants to read it.'

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- b. *kare wa minna ni machi-ta-gar-arete-iru
 He TOP all DAT wait-want-VBLZ-PASS-ASP
 ‘He is in such a state that everybody wants to wait for him.’

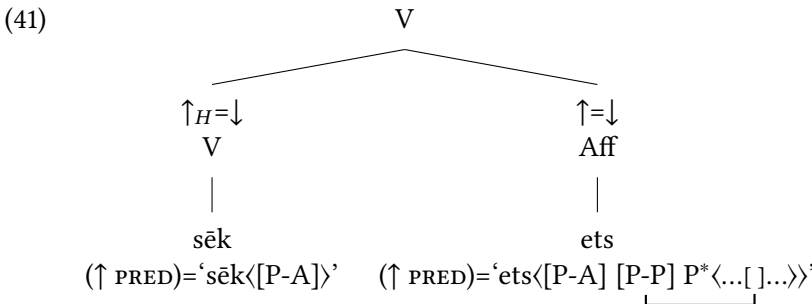
‘Long passives’ are possible in some but not all of the languages with the complex predicate constructions discussed in the previous section (present in Italian and Catalan, but not in Spanish), but the contrast between these examples does indicate that there are two different constructions. Matsumoto also discusses differences in adjunct interpretation and verbal anaphora to justify the proposed distinction between biclausal and monoclausal.

Unfortunately, there does not appear to have been much followup to compare Ishikawa’s and Matsumoto’s analyses with the later ones of Bantu and Hindi-Urdu, to which we turn next.

5.2 Alsina on Bantu, and similar constructions

Alsina (1997) presents an analysis of causatives in Chicheŵa, based on the same account of argument structure and predicate-composition as presented in Alsina (1996). The difference from the treatment of Catalan is in the c-structure: in both cases, the c-structures are monoclausal, but in Chicheŵa, the causative element is treated as an affix to the Caused verb stem, rather than an independent morphological stem, as in Catalan. Alsina provides convincing evidence for this difference.

The c-structures are identical to those proposed by Ishikawa and Matsumoto for Japanese, but the annotations are different: they are the same as they would be for Catalan (assuming my claim that we only need the special annotation for the semantic complement, not the head, and adjusting the lexical entries to fit Alsina’s linking theory):



The analysis actually works a bit better for this construction than the Romance one, because we don’t have to worry about conditioning the subordinate verb

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form, and the problem of different orderings having different semantic interpretations does not arise.

This form of analysis has been extended more widely to other ‘valence change’ constructions, including reciprocals in Chicheŵa (Alsina 1997), passives and antipassives in a variety of languages (Manning 1994; 1996a), and causatives and applicatives in Australian languages (Austin 2005). Complex-predicate-based analyses of morphologically based valence change do not however appear to have been much pursued in recent years. The most recent LFG analysis of passives is for example within the Kibort-Findlay Mapping Theory (Findlay 2016), and does not use a complex predicate analysis.

Typology seems to provide some warrant for questioning these analyses. Passive constructions (or, more precisely, constructions in various languages that are often called ‘passive’) do often involve auxiliary verbs in what might plausibly be complex predicate constructions, but those normally called antipassives are to the best of my knowledge always morphological, and apparent complement structures that are actually complex predicates seem likewise to be nonexistent for reflexives and reciprocals. Another intriguing asymmetry arises with causatives and applicatives. As discussed by Austin (2005), it is not unusual for morphological causatives and applicatives to use the same formative.

Austin analyses these in various Australian languages as having the applicative/causative morpheme introduce a light verb AFFECT, with the difference between causative and applicative senses being based on different patterns of argument identification. Sample causative and applicative combinations are (Austin 2005: 32-33):

(42) a. Causative:

AFFECT	< Ext Arg	Int Arg	PRED	< Arg >>
	+vol	-vol		-vol

e.g. ‘The man turned the child.’

b. Applicative:

AFFECT	< Ext Arg	Int Arg	PRED	< Ext Arg	Goal/Loc >>
	+vol	-vol		+vol	-vol

e.g. ‘The man laughed at the child.’

In the causative, the agentive argument of the AFFECT predicate is identified with the unaccusative argument of the embedded predicate, while in the applicative, the agentive arguments of the two predicates are identified, and also the second argument of AFFECT and a locative/directional argument of the embedded verb.

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This captures the idea that applicatives of such verbs often express a meaning to the effect that the locative/directional is affected by the action.

There is however perhaps a typological issue with the analysis: the causative is often expressed by constructions that look like and often seem to actually be complement constructions, but this is not the case for applicatives, whose sense is however sometimes expressed by serial verb constructions, as we consider in the next section. This typological difference suggests a fundamental structural one, but there is also evidence for a relationship, in that the same formative is sometimes used for both. What I suggest is that the AFFECT concept is common to both, with argument sharing as proposed by Austin, but that the structural relations are different. We can partially express them using the ‘Natural Semantic Metalanguage’ (NSM) approach of Anna Wierzbicka and her colleagues, which can be regarded as being a technique for expressing meanings in simple terms that are found to be highly translatable.¹³ In the case of causatives, the sense is:¹⁴

- (43) X does something to Y
Because of this, <Caused Event>

In the case of applicatives, there does not seem to be any caused event distinct from what X does to Y, rather what X does *constitutes* X doing something to Y. For this I suggest the following:

- (44) <Applied event, performed by X involving Y>
This is X doing something to Y.

This is not of course anywhere near a full explanation of the differences between the constructions, but it is perhaps a start. In particular, it seems plausible that the identity relationship expressed in (44) is not something that is normally expressed by complement structures.

Neither these contemporary analyses of morphological causatives and valence change operations, nor the earlier ones by Ishikawa and Matsumoto, in which they are morphologically expressed xCOMP structures, have received much discussion in recent years.

¹³ Andrews (2016) is an attempt to express the basic ideas of NSM in a form that might make some sense to people trained in formal semantics.

¹⁴ NSM accounts (called ‘explications’) of the causative tend to include ‘after this’ after ‘because of this’, but I suggest that this is better treated as an inference licensed by a law that effects come after their causes (at least in the local timeline of an individual, ignoring scenarios from science fiction).

6 Serial Verb Constructions

Our last type is Serial Verb Constructions (SVCs). Perhaps the first issue that arises with these is the rather controversial one of defining them. I will here roughly follow [Aikhenvald \(2006b\)](#) in defining them as structures where:

- (45) a. There is some evidence of at least partial clause union.
- b. There is no explicit marking of subordination or coordination.

(a) is an indication that SVCs are complex predicates or at least control structures, while (b) has no clear status in a formal syntactic analysis of these constructions, but is plausibly very important for their functional characteristics and tendencies in diachronic development, since they do not provide much in the way of overt cues as to what their syntactic structure is.

SVCs have not received much attention in the LFG literature, the main exceptions being the treatment of Tariana in [Andrews & Manning \(1999\)](#),¹⁵ the treatment of Dagaare and Akan (with observations about other languages) in [Bodomo \(1997\)](#), and the recent analysis of Barayin in [Lovestrand \(2018\)](#). In this section, I will consider these three languages, and then take a brief look at Misumalpan causatives, treated as complex predicates by [Andrews & Manning \(1999\)](#), but argued to be something different in [Andrews \(2018a\)](#).

6.1 Tariana

Tariana SVCs¹⁶ consist of a sequence of verbs inflected identically for person, with some further grammatical markers appearing once, in a number of positions. A fundamental division in these constructions is between the ‘symmetric’ SVCs, which look and act like coordinated verbs (but without any overt coordinator), and the ‘asymmetric’ ones, which are diverse, but many of them are semantically similar to Romance complex predicate structures, and have some capacity to occur embedded in each other. [Andrews & Manning \(1999\)](#) took this as a basis for analysing the two with similar feature-structures, but differing in the c-structures. A particularly striking piece of evidence for the monoclausality of these constructions is the phenomenon of ‘concordant dependent inflection’, whereby the caused verb shows subject agreement with the causer, presumably on the basis that this is the subject of the entire construction, rather than the causee agent, its own agent. This is illustrated in the following example:

¹⁵With an update to the framework of [Andrews \(2018b\)](#) in [Andrews \(2018a\)](#).

¹⁶For a descriptive account see [Aikhenvald \(2003\)](#) and [Aikhenvald \(2006a\)](#).

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(46) Tariana

nu-na=tha nu-ra nu-sata dineiru

1SG-want=FRUSTR 1SG-order 1SG-ask money

‘I want to order (him) to ask for money.’

(Modal on causative; elicited, Aikhenvald p.c.)

In the Andrews and Manning analysis, the light verb shares both the f-projection and the a-projection (roughly equivalent to f-structure and argument structure) with the c-structure mother, while its semantic complement shares only the f-structure, and is introduced into the a-structure as the value of an attribute ARG. In the later version of [Andrews \(2018a\)](#), the light verb has $\uparrow=\downarrow$, while the main verb is introduced as a set member.

The various other kinds of analyses we considered would work for Tariana as well as they do for their original subject material, and there would be no need to involve a morphological projection to control the government of the forms of the semantic complement verbs by the light verbs.

6.2 Dagaare and Akan

Most Tariana SVCs can be treated as either syntactically coordinate structures (symmetric SVCs) or as an expression of Romance-type restructuring predicates (asymmetric SVCs), with a different technique of morphological expression. But Dagaare and Akan, two major languages of Ghana discussed by [Bodomo \(1996; 1997\)](#), have additional SVC constructions that do not submit to such analyses, and require something different. These are also considerably more similar than Tariana SVCs to the constructions commonly called SVCs in many other languages.

[Bodomo \(1997: 80-84\)](#) discusses a number of types. One of their characteristics is that in some of the cases, such as action-causation, no plausible suspect for being the ‘light verb’ can be identified:¹⁷

(47) Dagaare

a. Benefactive:

o da tong la toma ko ma

3SG PST work(v) FACT work(M) give me

‘S/he worked for me.’

b. Action-Causation (‘Causative’):

o da daa ma la lɔɔ

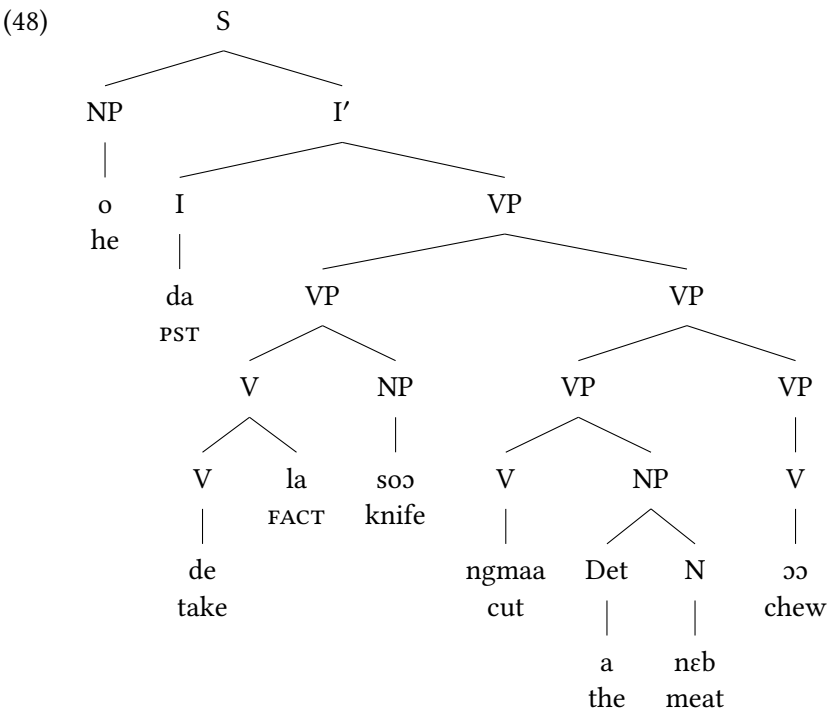
3SG PST push me FACT cause-fall

‘S/he pushed me down.’

¹⁷*la* is the ‘Factive’ particle in Dagaare, marking positive affirmations ([Bodomo 1997: 65-69](#)).

- c. Inceptive *take* serialization:
 o de la gan ko ma
 3SG take FACT book give me
 ‘S/he gave me a book.’
- d. Instrumental *take* serialization:
 o da de la soɔ ngmaa a nɛb ɔɔ
 3SG PST take FACT knife cut DEF meat chew
 ‘S/he cut the meat with a knife and ate it.’
- e. Deictic (Directional/Associated Motion)
 o da zo wa-ɛ la
 3SG PST run come.PRF FACT
 ‘S/he ran here/S/he came by running.’

At the level of c-structure, Bodomo proposes flat binary VP structures without specifying what would happen in examples such as (d) above that might involve nesting, as I suggest below:



My proposed account is that the upper pair of VP's constitute instrumental se-rialization, while the pair embedded under the rightmost member of the upper

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are a collocation (and type not listed in (47) meaning ‘eat’). Bodomo is however not clear about this, and a flat structure of three VPs sitting under one would be consistent with the text.

For the f-structure analysis, he follows Alsina, with the modification that since it is frequently impossible to regard one of the verbs as light and another as heavy, the two PRED-values are integrated into a ‘PREDCHAIN’ value in a manner that can be formalized in various ways (no specific one is chosen).

The semantics is treated with a ‘cell theory’ that is part of the ‘Sign Model’ of [Hellan & Dimitrova-Vulchanova \(1996\)](#), which does not appear to have ever been published, but seems broadly compatible with many recent ideas about the aspectual constitution of verb meanings. Events have a variety of properties, including an obligatory Core component, and optional Initiation and Termination components. Although there is no published account of the entire theory, the approach seems broadly consistent with that taken by Butt, and could plausibly be implemented by unification, or in the Davidsonian Event semantics used in the Kibort-Findlay Mapping theory.¹⁸

In the causation-action construction, for example the first verb specifies a ‘action’ component (what is done), the second a ‘causation’ component (what happens because of what is done). If we take the general approach to complex predicates proposed in [Andrews \(2018b\)](#), we could have a VP expanding to two VPs, each producing an element of a set, with a ‘syncategoremantic’ meaning constructor (one introduced by the c-structure rules) setting these up as the action and causation subevents of the main event:

$$\begin{array}{lcl}
 (49) \quad VP & \longrightarrow & \begin{array}{cc} VP & VP \\ \downarrow \in \uparrow & \downarrow \in \uparrow \\ \downarrow = \%F & \downarrow = \%G \end{array} \\
 & & \lambda e. \exists e_1 (Action(e, e_1)) \wedge \exists e_2 (Result(e, e_2)) : \\
 & & ((\%F_{\sigma} EV) \multimap \%F_{\sigma}) \multimap ((\%G_{\sigma} EV) \multimap \%G_{\sigma}) \multimap (\uparrow_{\sigma} EV) \multimap \uparrow_{\sigma}
 \end{array}$$

This takes two predicates over events, and creates a single predicate that is true of an event if it contains action and result subevents. This is only an initial suggestion of how a worked out analysis might proceed, but I think it demonstrates that Bodomo’s work provides an excellent basis to start out from.

6.3 Barayin

Barayin SVCs are analysed in considerable detail by [Lovestrand \(2018\)](#), using a combination of a very carefully worked out major revision of the LFG version

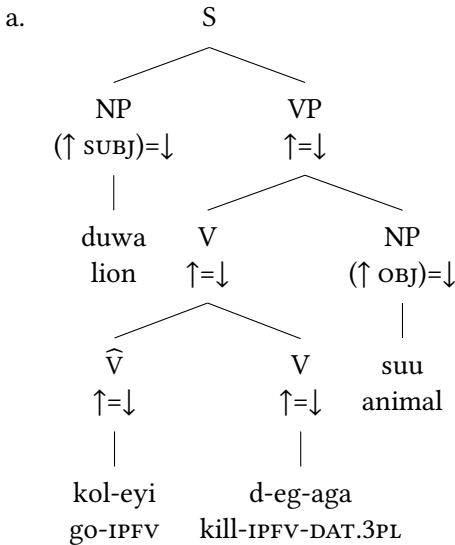
¹⁸[Asudeh et al. \(2014\)](#) and [Findlay \(2016\)](#).

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of X-bar theory from [Bresnan et al. \(2016\)](#), and a development of the ‘connected s-structure’ (semantic structures) pioneered in [Asudeh et al. \(2014\)](#) and [Findlay \(2016\)](#). The latter allows serial verbs to make various contributions to meaning, sufficient for the range of these structures in Barayin, without needing to build apparent complement structures as appears to happen in Romance, and, to a lesser extent, Tariana.

The apparent syntactic form of the constructions is argued to be a ‘nonprojecting word’ ([Toivonen 2001](#)) left-adjoined to the V, a typical example being:

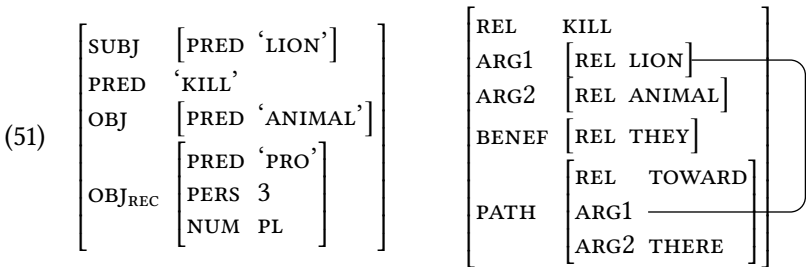
(50) Barayin



- b. duwa kol-eyi d-eg-aga suu
 lion go-IPFV kill-IPFV-DAT.3PL animal
 ‘The lion went and killed an animal for them.’

The f- and s-structures of this example would be (not explicitly provided by Lovestrland, but evident from other examples and the annotations for SV *kol-o* ([Lovestrland 2018: 221](#)):

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In the semantics of the SV (first member of the SVC construction), there is also a not-fully-formalized provision that the motion along the path can either be simultaneous with or previous to the action of the main verb.

The potential problem of PRED-clash is averted by the proposal that the SVs have no PRED-feature, which is workable because there are only a limited number of SVs, producing the following kinds of constructions, each discussed by Lovstrand:

- (52)
- a. Deictic (Associated Motion with deictic motion verbs such as *kol-o* ‘go’ as in the examples above).
 - b. Manner (*gor-o* ‘run’ or another manner of motion verb).
 - c. Stand (*juk-o* ‘stand’, inchoative or indicating change in the narrative).
 - d. Take (*pid-o* ‘take’, indicating the agent grasping the patient).

Even if the inventory of possible SVs turned out to be at least somewhat open, that fact that there does not appear to be any recursion in the construction means that the extra PRED could be managed somehow, perhaps by a variant of the ‘EP’ proposal of Lovstrand (2020). A further unique and interesting feature of this analysis is that it has been fully implemented in the XLE system. The use of the connected s-structures has significant resemblances to both Butt’s use of Jackendoff’s Lexical-Conceptual Structures, and Bodomo’s use of the unfinished Cell Theory. This is clearly a promising area for future work.

6.4 Misumalpan

The last case I will consider is some so-called serial verb constructions in the Misumalpan languages Miskitu and Sumu, presented as a kind of complex predicate in Andrews & Manning (1999). The constructions at issue have the form of ‘consecutive’ clauses, expressing a chain of events, but they are interpreted in a range of ways similar to more standard SVC structures with no marking of the verbs (Salamanca 1988). This range of interpretations can be said to justify

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considering them as SVC constructions regardless of whether we consider their marking pattern to be in accord with (45) or not.

A fairly typical example is:

- (53) Misumalpan
 witin ai pruk-an kahw-ras
 he me hit-OBV.ACTUAL.3 fall-NEG
 ‘He hit me and I did not fall down.’ (Consecutive Reading)
 ‘He didn’t knock me down.’ (Causative SVC reading)
 (Hale 1991: 26, Andrews & Manning 1999: 93)

The suffix *-an* above is the ‘obviative actual’, obviative indicating that the subject of the clause whose verb has the marking is different from that of the next, ‘actual’ being a tense. In the consecutive reading, the clauses indicate different events that apply in sequence, and the negative affix applies to the second event. In the causative SVC reading, the first clause is the event that causes the second to happen, and the negative affix applies to the entire, complex event.

Andrews & Manning (1999) analyse these constructions as involving a rather unusual pattern of attribute sharing, while Andrews (2018a) argues that no unusual syntactic structures are required, and that the interpretations can be obtained by the use of glue semantics.

7 Conclusion

LFG analyses of complex predicates have been concerned primarily with the symmetrical sharing of attributes between different levels, and with the issues of combining the argument structures of multiple verbs into a single one that is associated with one set of grammatical relations. A remaining challenge is a theme that is more dominant in Minimalist analyses, which is the involvement of ‘reduced projections’, where some of the verbs do not appear to have all of the functional projections that an independent main verb would have (Grano 2015, Wurmbrand 2017). Negation for example is frequently impossible for the lower component of a complex predicate (as in Romance), but this is not the case in Urdu (Butt 1995: 49). There is clearly more to be done in this area, perhaps by an elaboration of functional projections in c-structure, of types in glue semantics, or a combination of both.

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Acknowledgements

I would like to acknowledge the three reviewers for many very helpful comments and suggested references.

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Chapter 3

Noun phrases in LFG

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In this chapter we consider the analysis of noun phrases in LFG. As a preliminary, in §1 we go through a number of criteria that can be used to distinguish noun phrases from other phrase types. Degree of configurationality at clause level and its consequences for c-structure is a well-studied phenomenon in the LFG literature, and in §2 we evaluate how the conclusions drawn for clausal structure can be applied to noun phrases. In §3 we review the different approaches that have been taken to the functional structure and argument structure of noun phrases. In §4 we explore briefly how discourse functions may be expressed within the noun phrase.

1 Defining noun phrases

Before discussing the syntax of noun phrases, it is helpful to consider briefly the definition or delimitation of the category: how do we know what is and is not a noun phrase, and what are the essential properties of the class of noun phrases? In regard to most relevant phenomena in most languages, there is little difficulty in distinguishing a particular class of words which we label as ‘nouns’, in distinction from verbs and other categories such as adjectives, adverbs, adpositions etc. We informally utilize different criteria in making these distinctions: the core meaning and basic function of the words, their morphology and the structure of the phrases they head. Some words, and some phrases, may be more problematic, however, aligning with our basic category of nouns in some respects, but not in others. Moreover, if we want to talk about the properties and analysis of

noun phrases crosslinguistically, we need to be clear about the criteria used for categorization, and to ensure that our criteria for categorization are applicable crosslinguistically.

According to Kornfilt & Whitman (2011: 1297–1298), approaches to categorizing phrases and words can be broadly divided into two types: ‘distributionalist’ approaches define categories with exclusive reference to syntactic criteria, while ‘essentialist’ approaches make use of nonsyntactic criteria, such as lexical semantics. Some approaches to categorization make use of both types of criteria; this is true, for example, of Baker’s (2003) theory of syntactic categories.

Given the separation of syntax and semantics in the LFG architecture, ‘essentialist’ criteria have relatively little weight in the definition of categories in LFG. As discussed by Lowe (2020), there are three types of ‘distributionalist’ criteria commonly used for defining categories in LFG, by authors such as Spencer (2015) and Bresnan et al. (2016); we discuss each of these in turn.

The first type of criteria is the internal syntax of the phrase in question; that is, what sorts of words and phrases may appear together with the head inside the phrase in question. For example, we might say that noun phrases typically may contain determiners (in those languages that have them) and adjectives, while other types of phrase cannot contain these. There may also be differences in the configurational possibilities of different phrase types. For example, under some approaches to the phrase structure of English, noun phrases are the only lexical phrase type which contain a specifier (e.g. Dalrymple 2001); for others (e.g. Falk 2001b) no lexical phrases may contain specifiers, while functional phrases can. We discuss the phrasal structure of noun phrases in detail in §2.

Furthermore, there may be differences between phrases of different categories in terms of the grammatical functions which can appear with them, i.e. in terms of which grammatical functions a head of a particular category may or may not subcategorize for. Given the LFG architecture and the concept of structure-function mapping principles (Bresnan et al. 2016: 105, 117, see also §3), these issues are related to configurational differences between phrase types, but are not fully defined by them. For example, a grammatical function POSS for the possessor in a noun phrase is often assumed, and sometimes contrasted with SUBJ, such that POSS may be a grammatical function exclusively associated with noun phrases, and SUBJ a grammatical function exclusively associated with verb phrases. Similarly, it is widely assumed that nouns and adjectives do not, at least usually, subcategorize for OBJ (though see Mittendorf & Sadler 2008, Al Sharifi & Sadler 2009, and Vincent & Börjars 2010 for OBJ with adjectives and Lowe 2017 for further discussion). We discuss grammatical functions within the noun phrase in detail in §3, and discourse functions within the noun phrase in §4.

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The second type of criteria used for defining categories within LFG is the external syntax of the phrase in question (labelled ‘distribution’ by [Lowe 2020](#)). So, there are a certain set of positions within other phrase types where noun phrases may appear, and others where they may not. For example, in English, noun phrases may appear in the specifier of IP, in the complement position of VP and PP, but not in the complement position of AdjP or NP (though see references to OBJ with adjectives above).

The third type of criterion used for defining categories in LFG is the morphosyntax of the head of a phrase (or of the phrase itself): typically languages show differences between the morphosyntactic properties of, say, nouns, adjectives, and verbs. In many Indo-European languages, for example, nouns inflect for case and number, while verbs inflect for tense/aspect, person and number; adjectives inflect for case and number, but also inflect for gender, which is an inherent property of nouns.

The use of all three types of criteria is widespread in LFG approaches to categorization. Although each of the criteria can be problematic to apply in individual cases, in most cases the three types of criteria align unproblematically, such that it is relatively easy to distinguish broad categories of noun phrases, adjective phrases, verb phrases, etc. For example, while there are differences in the internal syntactic possibilities of noun phrases and verb phrases, there is also a degree of overlap: some noun phrases may be indistinguishable from verb phrases, purely in terms of their internal syntax. In such cases, however, external syntax and morphosyntactic criteria may help to distinguish noun phrases from verb phrases.

In rare cases there are serious mismatches between the criteria for categorization. This is perhaps most common in the case of noun-verb mixed categories: phrases which show properties of both noun and verb categorization. We avoid discussions of such mixed categories in this paper (for discussion see [Lowe 2020](#)), restricting ourselves to phrases which can (fairly) unambiguously be defined as purely noun phrases based on the sorts of criteria discussed above.

2 *Configurationality and noun phrases*

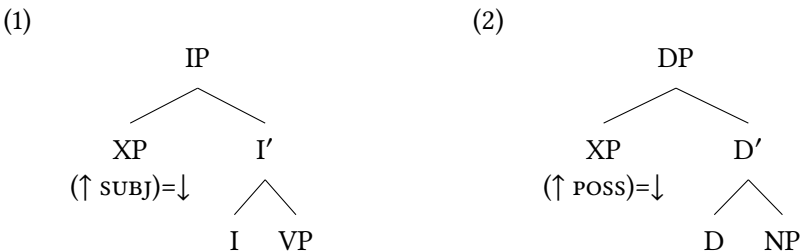
In this section we investigate the analysis of the surface configurational structure, the c-structure, of noun phrases in LFG. We consider how generalizations developed for degrees of configurationality at clausal level can be applied to noun constituents and how these can be represented at c-structure (Chapter ??).

[Abney \(1987\)](#) changed the way in which noun phrases are analysed within mainstream generative approaches to syntax. Projecting functional categories

at clausal level had been introduced in the work that led to the publication of Chomsky (1986), and Abney’s work was intended as “a defense of the hypothesis that the noun phrase is headed by a *functional element* (...) D, identified with the determiner. In this way, the structure of the noun phrase parallels that of the sentence, which is headed by Infl(ection)” (1987: 3).

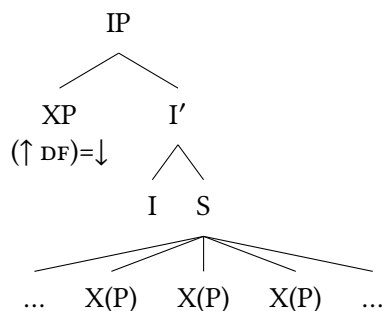
In this chapter, we will make comparisons between clausal and nominal constituents, but not with the aim of emphasizing parallels. Within LFG, the approaches to c-, f- and a-structure have been developed more on the basis of clausal structures than anything else, and we will explore the extent to which the resulting assumptions can be applied also to noun constituents. Our aim here is not to provide full analyses of any language, but to illustrate how a particular interpretation of a data set might be analysed in LFG.

Three levels of configurationality are generally distinguished within LFG at clausal level: configurational, illustrated in (1), part-configurational (3) and non-configurational (5), with S being an exocentric clause-level category (Chapter ??). If we assume a corresponding exocentric category NOM for noun phrases, then we can set up the parallel noun phrase structures in (2), (4) and (6). Different combinations of these options may be motivated for different languages; for discussion see Nordlinger (1998) and Bresnan et al. (2016: 118–9). Specifiers of functional projections are assumed to be either syntactically prominent, illustrated here with SUBJ and POSS, or information-structurally prominent functions, here we have used DF for discourse function (see Snijders 2015, Bresnan et al. 2016: 104–11 and Dalrymple et al. 2019: 121–6). As we will see in §3, functions such as SUBJ and POSS may be seen to have a dual role in this respect. We will return to what DF may mean for noun phrases in §4. In (1) – (4), we have only annotated the specifier node, for information about annotations and how they work, see Chapter ??.

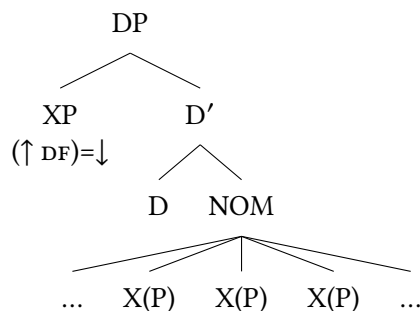


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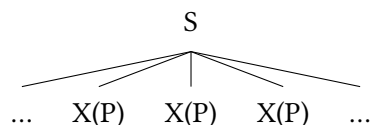
(3)



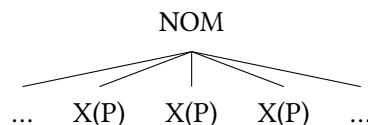
(4)



(5)



(6)



2.1 Degrees of configurationality

Criteria commonly applied to strings to establish degrees of configurationality are (i) word order, (ii) capacity for discontinuity, and (iii) structural vs. non-structural determination of grammatical functions (for an excellent summary of arguments, see Nordlinger 1998).¹

English is a language in which noun phrases display strict word order and relatively little discontinuity. Examples of discontinuity such as (7) are generally not taken to indicate non-configurationality, but are assumed to be due to a more general principle of extraposition due to weight. Noun phrase internal grammatical functions such as possessor are generally marked by structural position in English (though see §3 for more detailed discussion).

(7) A book was published last year on a new theory.

¹The concept of null anaphora is also called upon quite widely to justify a configurational analysis of languages like Warlpiri that are characterized by freedom of word order (see for instance Jelinek 1984; Hale 1993). This approach has been criticized by Austin & Bresnan (1996) for lacking empirical support when a broader set of languages is considered, and we will not consider this further here.

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English noun phrases can therefore be assumed to be thoroughly configurational and best represented by a tree such as (2), though we will return to the issue of functional categories in §2.2.

Turning now to the other end of the configurationality spectrum, for a number of languages which may at first sight appear to have non-configurational noun phrases, it has been argued that they do not in fact have noun phrases at all (see for instance [Blake 1983](#)). A string of elements that refer to the same referent – we will use the term **NOMINAL STRING** for these – whether continuous or not, may in some languages be best analysed as a number of independent nominal elements in apposition. In order to find a language with non-configurational noun phrases we must therefore first make sure that there is reason to assume that there are noun phrases in the language. [Louagie & Verstraete \(2016\)](#), in an evaluation of claims about non-configurationality in noun phrases in Australian languages, propose five criteria for establishing whether nominal strings form noun phrases: (i) contiguity, (ii) word order, (iii) diagnostic slots, (iv) phrasal case marking and (v) intonation.

Contiguity (i) is a necessary but not sufficient criterion; where the elements do occur together, they could still be assumed to occur in apposition, just as in the discontinuous examples. For our purposes, (relative) freedom of word order (ii) within a string for which there is other evidence of it forming a constituent will be taken as evidence of a flat structure. Some of the languages we will consider have an identifiable position (iii) at clausal level in which only a single constituent can occur, hence if a nominal string can occur in this position it can be assumed to form a structural unit. In a similar vein, if case is marked only once in a nominal string (iv), this string can be assumed to form a constituent. If a nominal string has a single intonation contour (v), it can be assumed to form a noun phrase (see also [Schultze-Berndt & Simard 2012](#)). The conclusion [Louagie & Verstraete](#) draw is that statements about the lack of noun phrase constituents in Australian languages have been overstated, but this is to some extent dependent on how they apply the criteria. For instance, whereas discontinuity has been taken as evidence against constituency, they say that “the existence of discontinuous constructions is not invariably an argument against NP constituency” (2016: 28).

With respect to Warrongo (Pama-Nyungan), [Louagie & Verstraete](#) conclude: “This is really the only type of language where flexibility provides evidence against constituency.” (2016: 35). This is based on the description by [Tsunoda](#), who argues on the basis of evidence such as (8) that “the relative order of NP constituents is not fixed and it is difficult to generalize about it” (2011: 347).²

²We use the Leipzig glossing rules also when these have not been used in the source of the

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(8) Warrongo

- a. yarro-Ø gajarra-Ø ngali-ngo
this-ACC possum-ACC 1DU-GEN
'this possum of ours' (Tsunoda 2011: 348)
- b. yarro-Ø ngaygo gajarra-Ø
this-ACC 1SG.GEN possum-ACC
'this possum of mine' (Tsunoda 2011: 348)
- c. yino gornggal-Ø ngona-Ø nyon.gol-Ø jarribarra-Ø
2SG.GEN husband-ACC that-ACC one-ACC good-ACC
'that one good husband of yours' (Tsunoda 2011: 347)
- d. ngaygo yarro-Ø jarribara-Ø wobirri-Ø
1SG.GEN this-ACC good-ACC English.bee-ACC
'this nice English bee of mine' (Tsunoda 2011: 347)

Though nominal strings in Warrongo are generally contiguous, there are examples of discontinuity, as exemplified in (9).

(9) Warrongo

- a. yinda gagal-Ø wajo-ya bori-Ø.
2SG.ERG big-ACC burn-IMP fire-ACC
'Make a big fire.' (Tsunoda 2011: 349)
- b. gajarra-Ø nyola ganyji-n goman-Ø.
possum-ACC 3SG.ERG carry-NFUT another-ACC
'She carried [i.e. brought] another possum.' (Tsunoda 2011: 349)

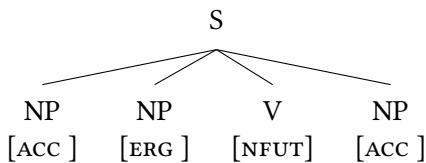
The examples in (8) and (9) show that each element of the nominal string is separately case marked, apart from the genitive possessor, regardless of whether the string is contiguous or not. Furthermore, with the exception of the genitive, the parts can each form an independent noun phrase. There is no diagnostic slot at clause level in Warrongo, and we do not have enough information about prosody to use that as evidence. Hence, based on the evidence available, we can assume that Warrongo is best analysed as a language where each part of a nominal string forms an independent nominal phrase, even when there is no discontinuity, so

example. For a number of glosses used in our sources, there is no equivalent in the Leipzig glossing rules, and we have maintained the original. This applies to the following: AN action nominal, DUB dubitative, EMPH emphatic, MIN minimal, POT potential, ONLY restrictive and SEQ sequential.

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that in both (8) and (9), the individual words occur as daughters of a flat clausal structure. Though it is not our aim to provide a detailed analysis of Warrongo clause structure, our conclusions can be illustrated schematically as in (10) for (9b), where the case feature on the initial and final elements would ensure that they both become associated with OBJ in the associated f-structure (compare the analysis of Kalkatungu in Blake 1983).

(10)



We turn now to Bilinarra (Pama-Nyungan), as described by Meakins & Nordlinger (2014). Discontinuous noun phrases are possible in Bilinarra, as illustrated in (11), and for these cases Meakins & Nordlinger (2014: 107–8) assume an analysis where each part forms a structurally independent constituent, in line with the conclusions drawn about Warrongo above.

(11) Bilinarra

Ngurra-nggurra=rna=rla ga-nggu, **ngayiny-jirri**, warrba=ma.

house-ALL=1MIN.S=3OBL take-POT 1MIN.DAT-ALL clothes=TOP

‘I’m going to take them to **the house**, to **my** (house), the clothes I mean.’

(Meakins & Nordlinger 2014: 108)

However, there is also evidence in Bilinarra that contiguous nominal strings do form constituents and hence can be NPs. Pronominal clitics, such as *yi* in (12), can occur in different positions in the clause, but most commonly occur in second position. When they do, they can be preceded by a word or a phrase. When a nominal string occurs in this pre-clitic position, as in (12a) it can be assumed to form a constituent. It should be added here that the clitic can also be preceded by just one word of a nominal string as illustrated in (12b), and in such cases Meakins & Nordlinger analyse all elements of the string as separate noun phrases in apposition.

(12) Bilinarra

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- a. Ngayiny-ju=ma ngamayi-lu=ma=yi wanyja-rni
 1MIN.DAT-ERG=TOP mother-ERG=TOP=1MIN.OBJ leave-PST
 yabagaru=rni.
 small=ONLY
 ‘My mother left me as a child.’ (Meakins & Nordlinger 2014: 102)
- b. Yalu-lu=yi ngumbid-du ba-ni, garndi-lu.
 that-ERG=1MIN.OBJ man-ERG hit-PST stick-ERG
 ‘That one, the man hit me with a stick.’ (Meakins & Nordlinger 2014: 102)

Prosodic criteria are also used by Meakins & Nordlinger to identify a difference between strings that form noun phrases and strings that involve separate constituent parts in apposition. In (13a), the comma between *nyanuny-jirri* and *munuwu-yirri* indicates an intonational break and the possessor and the noun are assumed to form two phrases in apposition. In (13b), on the other hand, the two form part of the same prosodic unit and can be assumed to form a noun phrase constituent like they do in (12a). The resulting difference in meaning is captured by the idiomatic translations.

(13) Bilinarra

- a. Jardila=ma ya-n.gu=nga na, lurrbu na, **nyanuny-jirri**,
 tomorrow=TOP go-POT=DUB SEQ return SEQ 3MIN.DAT-ALL
munuwu-yirri.
 home-ALL
 ‘Tomorrow she might go home to hers, to home.’ (Meakins & Nordlinger 2014: 103)
- b. Jardila=ma ya-n.gu=nga na, lurrbu na, **nyanuny-jirri**
 tomorrow=TOP go-POT=DUB SEQ return SEQ 3MIN.DAT-ALL
munuwu-yirri.
 home-ALL
 ‘Tomorrow she might go home to her home.’ (Meakins & Nordlinger 2014: 103)

We can then follow Meakins & Nordlinger and assume that nominal strings may form noun phrases in Bilinarra; when the string is contiguous, not interrupted by a pronominal clitic and forms one prosodic unit. On the assumption that there is no evidence in favour of a functional projection in Bilinarra (see §2.2), we can assume that a tree like that in (6) is appropriate for these noun

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phrases. For examples of other languages that warrant (partially) flat analyses of noun phrases, see for instance [Simpson \(1991\)](#) on Warlpiri, [Raza & Ahmed \(2011\)](#) on Urdu, [Lowe \(2015\)](#) on Old English, [Börjars et al. \(2016\)](#) on Old Icelandic and for constraints on discontinuity of Latin noun phrases see [Snijders \(2012\)](#).

2.2 Headedness of noun phrases

There were early suggestions in the literature that noun phrases may in fact be headed by determiners (see for instance [Lyons \(1977\)](#) and [Hudson \(1984\)](#)) and a debate between [Zwicky \(1985\)](#) and [Hudson \(1987\)](#) attempted to establish criteria on the basis of which the issue could be settled. However, these criteria do not lead to an unambiguous empirical conclusion, but theoretical assumptions determine the choice. Generally, after [Abney \(1987\)](#) all noun phrases were assumed to be (at least) DPs within Chomskyan approaches, but more recently the suggestion has been made within this architecture that a DP may not be motivated for all noun phrases ([Bošković 2008; 2012](#)). LFG generally takes a more restrictive approach to functional categories; they are assumed when a functional feature is associated with a particular structural position ([Kroeger 1993: 6](#), [Börjars et al. 1999](#), [Sadler 2000: 92, 108](#)). LFG's universal principles of endocentric structure-function association also state that the specifier of a functional category hosts a DF ([Bresnan et al. 2016: 105, 117](#), see also §3), so that if a DF can be found to be associated with a particular structural position, this can be used to argue in favour of a functional category (see §4 for further discussion). Only one functional category is generally assumed within noun phrases, though there are some language-specific exceptions, for instance as in the analysis of Welsh by [Mittendorf & Sadler \(2005\)](#) and Chinese by [Börjars et al. \(2018\)](#), for further examples, see [Dalrymple et al. \(2019: 102–3\)](#).³

There has not been much discussion in the LFG literature of the headedness of noun phrases. [Bresnan et al. \(2016\)](#) assume that English noun phrases are DPs, but without much motivation. [Dalrymple \(2001\)](#) analyses them as NPs, with determiners located in specifier of NP, and this is maintained in [Dalrymple et al. “for simplicity” \(2019: 101\)](#). NP analyses for English can also be found in [Chisarik & Payne \(2003\)](#), [Arnold & Sadler \(2014\)](#), [Lowe \(2015\)](#).⁴ [Börjars et al. \(2019\)](#) include a brief discussion of the issue and conclude that there is no unambiguous evidence either way in the case of English noun phrases, but analyse them as DPs on the basis of the definiteness feature being associated with the left edge.

³[Mittendorf & Sadler \(2005\)](#) say explicitly “Determining the precise c-structure is not our main concern here.”

⁴However, in [Lowe \(2015\)](#) an NP-internal possessor is a DP, and the 's is structure shared.

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Sadler (2000: 92) argues explicitly for an NP analysis of Welsh on the basis of lack of evidence for a DP. POSS, which shares some properties with SUBJ and hence is a DF, occurs in the specifier position of NP in this analysis. However, Sadler points out in a footnote that “the discourse-oriented functions are canonically associated with specifier of functional categories” (2000: 97) and suggests an alternative DP analysis in which POSS is found in the specifier of DP position. Charters (2014: 211) also uses the role of the specifier of a functional category in determining the headedness of noun phrases: “These days a DP analysis is more generally assumed, is a ‘universal default’ under the EMPs [Endocentric Mapping Principles] ...”. We will return to Sadler’s analysis in §3.4.

There are languages for which the marking of definiteness can be argued to provide clearer evidence of headedness. Consider the Amharic data in (14), from Kramer (2010: 197–9).

- (14) Amharic
- a. bet=**u**
house=DEF
‘the house’ (Kramer 2010: 197)
 - b. tilli=**u** bet
big=DEF house
‘the big house’ (Kramer 2010: 198)
 - c. bätam tilli=**u** bet
very big=DEF house
‘the very big house’ (Kramer 2010: 198)
 - d. idɣɣig bätam tilli=**u** bet
really very big=DEF house
‘the really very big house’ (Kramer 2010: 198)
 - e. lä-mist-u tammaññ=**u** gäs’ä bahriy
to-wife-his faithful=DEF character
‘the faithful-to-his-wife character’ (Kramer 2010: 199)
 - f. ibab yä-gäddäl-ä=**w** liɣ
snake COMP-kill.PFV-3M.SG=DEF boy
‘the boy who killed a snake’ (Kramer 2010: 199)

Here we see that the definiteness marker attaches to the first constituent. The

status of the definiteness marker is problematic.⁵ The marker attaches to whatever word ends the first constituent, including nouns (14a), adjectives (14b–e) and finite verbs (14f). Following the arguments of Lowe (2016: 161), this freedom of attachment to in principle any word class suggests a clitic, an analysis also followed by Lyons (1999), and hence we have used = in the glossing. In that case, the definiteness marker is most naturally interpreted as a D head, with a specifier position preceding it. By the structure-function association principles, the specifier position would be expected to be able to house a DF, and this can indeed be argued to be the case in Amharic. In Amharic, possessors, which can be argued to have discourse-functional properties (see §3.2 for discussion), take the shape of a PP with the preposition *yä* as in (15), and are found in the pre-definiteness position.⁶ The annotated tree is provided in (16).

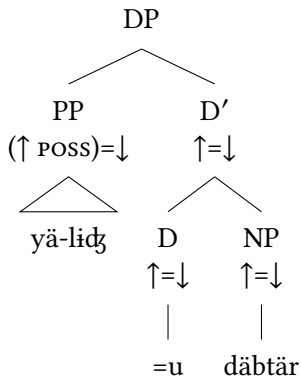
- (15) Amharic
 *yä=liḍ=***u** *däbtär*
 of=boy=DEF notebook
 ‘the boy’s notebook’ (Kramer 2010: 202)

If we apply the argument based on the relation between free word order and a flat structure conversely, and assume that lack of flexibility of word order indicates a hierarchical structure, then the tree in (16) would be appropriate for Amharic. This is a version of the skeletal tree in (2). However, as we shall see in §4, word order may be fixed even in languages for which there is evidence in favour of a flat structure; this is unproblematic to analyse within LFG.

⁵Kramer formulates her analysis within Distributed Morphology, where the distinction between affix and clitic is not directly relevant. In her analysis the element is found under D, with an indication that it is bound, but this is the case regardless of the nature of its prosodic and morphological dependency.

⁶As noted, the status of the definiteness marker is problematic, and besides the evidence for clitic status there is also evidence for affixal status, including the possibility for multiple definiteness marking: in noun phrases with more than one modifier, the first one is obligatorily marked, and any following modifiers are optionally marked (Kramer 2010: 202). Beermann & Ephrem (2007) assume affixal status within their HPSG analysis. Even if the definiteness marker is taken to be an affix, it still unambiguously marks the right edge of a constituent which can host a DF function, and thus represents a specifier position. Similar distribution of DEF can be found in Balkan languages and there are a range of analyses, in part dependent on the view of the morpho-syntactic status of DEF (e.g. Sadock 1991: 117–20, Halpern 1995: 153–7, Dimitrova-Vulchanova & Tomić 2009, Bermúdez-Otero & Payne 2011, Franks 2015). We will return to elements that display properties of both affix and clitic in §3.4.

(16)



A DP analysis of noun phrases has been proposed also for Catalan (Alsinà 2010)⁷, Faroese (Börjars et al. 2016), German (Dipper 2005)⁸, Hungarian (Laczkó 2007; 2017)⁹, Low Saxon (Strunk 2005), Old English (Allen 2007) and Welsh (Mittendorf & Sadler 2005) (compare deP for Mandarin in Charters 2004). NP analyses have been proposed for Arabic (Al Sharifi & Sadler 2009), Chimane (Ritchie 2016), Hebrew (Falk 2001a; 2007; Spector 2009)¹⁰, Hindi (Lee 2003), Hungarian (Chisarik & Payne 2001; 2003), Russian (King 1995), Swedish (Sells 2001), Tagalog (Kroeger 1993), Tz’utujil (Duncan 2003), Urdu (Bögel et al. 2008; Raza & Ahmed 2011), Vedic (and other Early Indo-Aryan varieties) (Lowe 2017), Welsh (Sadler 2003; Mittendorf & Sadler 2008), and widely for Australian languages (e.g. Simpson 1991; Austin & Bresnan 1996; Nordlinger 1998 and many more). In many of these publications, establishing the structure and category status of the noun phrases is not the main issue, so that there are varying degrees of commitment to the structure assumed.

Complements of nouns are generally assumed to be the sister of N in c-structure, though as we shall see in §3.3.3, some argue that it is not possible to draw a clear structural distinction between complements and adjuncts. We will return to the f-structure feature of complements of nouns in §3.3. Modifying elements like APs or modifying PPs have the function *ADJUNCT*, and can be assumed to adjoin either at phrasal or X’ level (see Bresnan et al. 2016: 127, Butt et al. 1999: 105–114). In a

⁷This is an analysis within a lexical sharing approach.

⁸Note that Dipper has a flat structure under D’.

⁹Laczkó (2017: 250) comments: “when there is no need for a DP projection from an LFG perspective, I use the NP maximal projection”.

¹⁰Though note that Falk (2001a) has a KP (case phrase) inside this NP.

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DP analysis, they may attach either within the D spine or the N spine. Their position is established empirically, and there may be arguments within a particular language for attaching different types of modifiers at different levels within the noun phrase.

3 Noun phrases, GFs and argument structure

In this section we review the different grammatical functions that have been used for noun phrases and the arguments for the different approaches. We also consider how the relevant aspects of the structure-function association principles apply within the noun phrase.

While there is in general a good understanding and broad agreement on how to identify and define the grammatical functions of arguments within verb phrases and clauses (Chapter ??), there are a variety of contrasting approaches to arguments within the noun phrase in LFG, and little sign of a developing consensus. We begin this discussion by considering the universal principles of endocentric structure-function association proposed by [Bresnan et al. \(2016: 105, 117\)](#):¹¹

1. c-structure heads are f-structure heads;
2. complements of functional categories are f-structure coheads;
3. specifiers of functional categories are the grammatical discourse functions;
4. complements of lexical categories are nondiscourse argument functions or f-structure co-heads;
5. constituents adjoined to phrasal constituents are optionally nonargument functions.

These principles are fundamentally developed on the basis of, and exemplified using, verb phrases and clauses, but as universal principles of endocentric

¹¹In [Dalrymple et al. \(2019\)](#), some of these principles are modified slightly. [Dalrymple et al.](#) note that according to [Laczko \(2014\)](#), Hungarian is an exception to Bresnan's claim that SUBJ cannot be the complement of a lexical category. [Dalrymple et al. \(2019: 121\)](#) further "propose that specifier positions are filled by phrases that are prominent either syntactically or in information-structural terms... Syntactically prominent phrases that can appear in specifier positions in the clause are those bearing either the function SUBJ or the overlay function DIS heading a long-distance dependency. Information-structurally prominent phrases can also appear in specifier position; if they are not syntactically prominent, they may bear any grammatical function within the local clause."

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structure-function mapping, there is an implicit assumption that these principles should hold also for noun phrases. One explicit acknowledgement of the applicability of these principles to noun phrases is by Sadler (2000: 94), who notes that her proposed annotated c-structure rules for Welsh NPs are “fully consistent with the structure-function mapping principles for configurational languages proposed in Bresnan 2000 [2001].”

Based on the current state of research, it seems that noun phrases crosslinguistically do in fact tend to conform to the structure-function association principles (but see also §4). However, this still leaves a significant degree of flexibility in how grammatical functions within the noun phrase may be analysed, as discussed in the rest of this section.

3.1 Types of nouns involving possessors (in the broadest sense)

We can distinguish at least three broad categories of noun: common nouns (e.g. *dog*, *book*), relational nouns (e.g. *sister*, *friend*), and nouns derived from verbs (e.g. *arrival*, *destruction*, *playing* etc.). Common nouns can unproblematically, and commonly do, occur without any dependent argument or possessor phrase, though they can, of course, have possessors. Relational nouns differ in that they seem to entail the existence of an entity to which the referent of the noun bears the relevant relation; and this entity is regularly expressed as a possessor phrase within the relational noun phrase. There are different types of nouns derived from verbs, and it is not always easy to distinguish the different types crosslinguistically (see amongst many others Comrie 1976; Grimshaw 1990; Koptjevskaja-Tamm 1993; 2002). But in different ways and to different degrees, all nouns derived from verbs necessarily bear a relation to a lexeme which has an argument structure (i.e. the verb), and thus can or do entail the existence of other participants corresponding to the arguments of the base verb, and may also inherit some of the selection properties of the base verb.

In the case of nouns derived from verbs, questions of nominal argument structure intersect with questions of verbal argument structure, and so it is here that the theoretical implications of the similarities and/or differences between nominal and verbal argument structure are most significant (for verbal argument structure and its mapping to f-structure, see Chapter ??). Within LFG, this was first explored by Rappaport (1983). In event nominalizations, for instance, noun phrases may contain two phrases that bear a grammatical relation in a way that closely parallels that of a corresponding clause:

- (17) a. The sea water constantly hit the loose stones on the beach.

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- b. the sea water's constant hitting of the loose stones on the beach

But there are a wide variety of views on the necessary inheritance of verbal argument structure by derived nouns. At one extreme, Rappaport (1983: 127) assumes that “in the unmarked case, a derived nominal inherits the argument structure of its related verb”. At the other, Lowe (2017: 15) argues that a derived noun like *destruction* (in e.g. *the destruction of the city by the invaders*) has no syntactic or semantic arguments, the agent and patient relations of the prepositional dependents being “pragmatically inferrable”. In between these two positions, Butt et al. (1999: 46) treat phrases like *of the city* and *by the invaders* as adjuncts (like Lowe) but assume there is a dependency relation between the head noun and its modifiers at the level of semantics.

A key element of this debate is the greater optionality of the arguments found with derived nominals, compared with the obligatoriness of the arguments of corresponding verbs. But there is crosslinguistic variation here: Laczko (1995; 2000) shows that argument realization is obligatory for Hungarian complex event nominals, and he therefore naturally adopts an analysis involving full verbal argument structure inheritance by the derived nominals.

3.2 GFS used for primary arguments

Many languages have a special marking for what we will call the primary argument of a noun; this will often be a possessor, or may be a thematic argument in the case of nouns derived from verbs. Some languages have more than one means of marking the arguments of nouns, but if so there is usually one means of marking which is the more common and basic, and which is thus in a second sense the more primary means of marking arguments of nouns. In English, this primary marking is the so-called genitive or possessive 's marker. Much of the following discussion is based on the English possessive 's, but the principles apply more widely to primary markers of arguments of nouns in other languages.

There are three main approaches to the analysis of primary-marked possessors in noun phrases. The most common assumption is that such possessors fill the grammatical function POSS (e.g. Rappaport 1983; Sadler 2000; Falk 2001b; Bresnan 2001; Bresnan et al. 2016; Laczko 2000; 2007; 2017; Strunk 2005; Charters 2014; Lowe 2017; Dalrymple et al. 2019). A few authors, including Williford (1998), Butt et al. (1999), and Dalrymple (2001), treat these possessors rather as SPEC. However, the function SPEC is also widely used for the function of determiners and/or quantifiers, and as noted by Sadler (2000) and Falk (2002) this is problematic for languages in which determiners and possessors (e.g. Romanian) and/or quantifiers and possessors (e.g. English) can co-occur. On this basis Dalrymple et al.

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(2019: 83–84) argue that SPEC should be restricted to quantifiers; instead they use POSS for possessors and features such as DEF and DEIXIS for articles and demonstratives.¹²

Chisarik & Payne (2001; 2003) argue that primary possessors have the function SUBJ. The close relation between possessors and the SUBJ function is clear in the case of nouns derived from verbs (cf. 17), and is acknowledged also by some of those who treat possessors as POSS. For example, Sadler (2000: 106) defines POSS as a “SUBjective” function; similarly, Laczko (2007: 358) refers to the “subject-like nature of the possessor”. Like SUBJ, POSS includes discourse-functional properties, and may be associated with topicality (Rosenbach 2002); see further §4.

In some sense, POSS can be seen as the nominal equivalent of SUBJ, the most basic, most common, and semantically most variable verbal argument function. Yet there are important differences between the two. For example, expletives can fill SUBJ, but cannot be possessors in English:¹³

- (18) a. There appears to be a reindeer on the roof.
- b. * There’s appearing to be a reindeer on the roof is an illusion.

- (19) a. It appears that there’s a reindeer on the roof.
- b. ? Its appearing that there’s a reindeer on the roof is an illusion.

SUBJ is generally assumed to be associated with specifier of IP, or to be morphologically marked as a SUBJ (or both); POSS is assumed to be associated with a broad range of positions crosslinguistically.¹⁴ The semantic relation between

¹²It should be pointed out here that quantifiers have not been fully explored from a c-structure perspective. They are sometimes assumed to head a QP, but without detailed argumentation (e.g. Wescoat 2007, Bresnan et al. 2016: 211–212). A referee suggests that one reason form and function of quantifiers have not been so well-explored in LFG is that the distinction is either trivial or problematic for these elements. However, Dipper (2005) is an example of how the distinction can be made; she provides detailed argumentation that elements in German which function as quantifiers in fact belong to two different c-structure categories, some sharing properties with adjectives and some with determiners. Note that beyond LFG, Payne & Huddleston (2002) do distinguish between the category ‘determinative’, to which quantifiers belong, and the function ‘determiner’. The semantics of quantifiers has been well explored in LFG; see Dalrymple et al. (2019: 302–312).

¹³The examples are taken from Bresnan et al. (2016: 315). A referee points out that the noun phrase status of the constituent built around *appearing* in (18b) and (19b) is controversial, and suggests that using *tend* and *tendency* in examples (18) and (19) would be more convincing.

¹⁴Charters (2014: 209) sums up: “Possessors have been said to occur in Spec NP (Sadler 2000; Charters 2004; Laczko 2007; Lødrup 2011); Spec DP/FP (Charters 2004; Strunk 2005); adjoined to NP (Chisarik & Payne 2001); adjoined to N (Lødrup 2011), and in the complement of N (Chisarik & Payne 2001).”

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a POSS and its possessum is considerably more flexible than that between a SUBJ and its verbal head, and there does not appear to be a nominal equivalent of the Subject Condition (Chapter ??), for example.¹⁵ Thus there does seem to be some justification for distinguishing SUBJ from the grammatical function of possessors.

SUBJ is a governable grammatical function, and so must be subcategorized for. The status of POSS is arguable: some authors treat POSS as an argument function, others as a non-argument function, and others as both. For Sadler (2000: 97), POSS is a non-argument function for common nouns and an argument function for deverbal nouns, this is illustrated in (20).

(20) Welsh

- a. *llyfr* N 'LLYFR<>(↑POSS)' 'book' (common noun)
- b. *disgrifiad* N 'DISGRIFIAD<(↑POSS)>' 'description' (deverbal noun)

Bresnan et al. (2016: 315–319) assume a lexical predication template which converts nouns, including deverbal nouns, into predicates with an optional POSS argument:¹⁶

- (21) a. *horse* N (↑PRED) = 'HORSE<>'
'horse<>' ⇒ 'horse-of<(↑POSS)>'
- b. *singing* N (↑PRED) = 'SINGING<(↑OBL_{OF})>'
'singing<(↑OBL_{OF})>' ⇒ 'singing-of<(↑POSS) (↑OBL_{OF})>'

Laczko (2007) proposes a slightly different lexical redundancy rule which converts a noun without argument structure into a one-place “raising” predicate, and a relational noun to an “equi” predicate:¹⁷

(22) Hungarian

- a. *kalap₁* N 'HAT<>' ⇒
kalap₂ N 'HAT<(↑XCOMP)>(↑POSS)'
(↑POSS) = (↑XCOMP POSS)

¹⁵In fact, arguments of nouns are rarely obligatory, with only a few possible exceptions in English (like *behalf* and *sake*). To account for the obligatory realization of arguments with complex event nominals in Hungarian, Laczko (1995) proposes a nominal equivalent to the subject condition, namely the ‘poss condition’.

¹⁶Similarities and differences between POSS and SUBJ are referred to but POSS is not classified with respect to argument or discourse function. For verbal gerunds like *Mary’s frequently visiting Fred* POSS is equated to SUBJ.

¹⁷The templates used by both Bresnan and Laczko have the effect of adding an optional argument. For an alternative way of capturing the optionality of arguments of nouns, see Lowe (2017: 293–4) with reference to Asudeh & Giorgolo (2012); Giorgolo & Asudeh (2012); Asudeh et al. (2014).

- b. *húg*₁ N 'YOUNGER-SISTER-OF($\langle\theta\rangle$)' \Rightarrow
*húg*₂ N 'YOUNGER-SISTER-OF($\langle(\uparrow\text{POSS})(\uparrow\text{XCOMP})\rangle$)',
 ($\uparrow\text{POSS}$) = ($\uparrow\text{XCOMP POSS}$)

Payne et al. (2013: 804–5) argue that no clear distinction can be drawn between inherently relational and non-relational nouns, they propose to treat all nouns grammatically as nonrelational until combined with a dependent.

3.3 Secondary argument marking

In many languages the primary means of marking a possessor or other argument of a noun can only mark one such argument, and there is a secondary means of marking arguments which can be used alongside, or sometimes instead of, the primary marking. This is not the case in all languages, for example in Estonian the genitive case is the primary means of marking possession, but two arguments of a noun can be marked in the genitive:

- (23) Estonian
- a. Jaan-i Inglisma-a kaart
Jan-GEN.SG England-GEN.SG map.NOM.SG
'Jan's map of England' (Koptjevskaja-Tamm 2002: 732)
- b. Peetr-i maja-de ehita-mine
Peter-GEN.SG house-GEN.PL build-AN.NOM.SG
'Peter's building (of) houses' (Koptjevskaja-Tamm 2002: 732)

In contrast, in English, as illustrated by the translations above, any second argument of a noun must be expressed by means of a prepositional phrase, and this can also be the case for single arguments of a noun. This can include possessors, marked in English with *of*:

The grammatical function of such secondary argument phrases, such as English *of* possessors, is also a matter of debate. Such possessors are sometimes treated as ADJ, e.g. by Butt et al. (1999), Sadler (2000), and Lowe (2017), sometimes as an OBL_{OF}, e.g. by Rappaport (1983) and Bresnan et al. (2016).¹⁸ We consider the major grammatical functions associated with secondary argument marking in the following subsections.

¹⁸Laczko (1995) permits English *of* possessors to realize either OBL_θ or POSS.

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3.3.1 Secondary argument marking and OBJ

It is significant that while the close relation between POSS and SUBJ is widely recognized, and the two are sometimes conflated, a clear distinction is always maintained between secondarily marked possessor phrases and the OBJ function, despite, for example, the positional similarity between *of* possessors and objects (as seen in (17)). It is taken as a strong, if not definitional, generalization, that nouns cannot take OBJ (Bresnan & Kanerva 1989; Bresnan & Moshi 1990; Bresnan & Mugane 2006; Chisarik & Payne 2001; 2003; Lowe 2017; 2020). Lowe (2017; 2020) argues that noun phrases which appear to include object dependents are in fact mixed projections, incorporating a verbal projection which licenses the object.

Chisarik & Payne (2001; 2003) propose a specialized nominal argument function NCOMP/ADNOM, which is intended to capture the relevant similarities between the secondary possessor function and OBJ, while keeping them distinct. In argument structure terms, NCOMP is, like SUBJ and OBJ, an unrestricted function [−R]. Like SUBJ and unlike OBJ, however, NCOMP is also [−O] (for an explanation of these features, see Chapter ??).

As with POSS and SUBJ, secondarily marked possessors are considerably less semantically restricted than any corresponding verbal argument function (including OBJ). For example, secondarily marked possessors differ from clausal OBJ in that they can be mapped to Agent:

- (24) a. the love of a good woman
b. the poor performance of the team

Moreover, primary and secondary possessors are unrestricted to different degrees. Payne & Huddleston (2002: 473–8) argue that the set of semantic relationships that can be expressed by an *of*-phrase in English is a proper superset of those that can be expressed by an *'s* phrase. For example, genitive POSS has to be affected: **history's knowledge* vs. *knowledge of history*. The following examples, from Payne et al. (2013: 809), illustrate how widely the relation between a prepositional possessor and its head can (and must) be interpreted in English.

- (25) a. David Peace's Red Riding Quartet, which spins a fictional plot alongside **the murders of the Yorkshire Ripper**, is all the more potent for its true crime background.
b. One of two sisters who bombed the Old Bailey in the 1970s is in custody today being questioned about **the murders of two soldiers** in Northern Ireland in March.

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- c. Paul Temple is part of the era between **the upper class murders of Agatha Christie** and **the gritty murders of today**.
- d. The driving rhythms of London's fiercely competitive cat-walks may seem a thousand miles away from **the cosy cottage murders of Miss Marple**, but they provide a perfect environment for the more chilling edge of Agatha Christie's short stories.

3.3.2 Secondary argument marking and ADJ

Sadler (2000: 94) claims that "there are several reasons for believing that PP dependents of nouns do not map to complement functions". She analyses PP dependents of nouns in Welsh as ADJ because they show relatively free word order with respect to each other, but are fixed with respect to a possessor DP/NP (2000: 94–7). The argument to some extent works also for English; in the following examples, the *of*-possessor phrase follows an optional *by*-phrase, even when the latter is heavy, as in (26b).¹⁹

- (26) a. the description by the victims of their attacker
- b. the description by the surgeon, Sir Zachary Cope, author of a highly regarded monograph on the early diagnosis of the acute abdomen, of his own experience with cholecystitis

3.3.3 Secondary argument marking and OBL

Rather than ADJ, Rappaport (1983: 127) considers OBL_{θ} to be the best analysis of postnominal preposition phrases in English, on the grounds that postnominal noun phrases always "appear as the object of a preposition which reflects its thematic role." Possessive *of*-phrases are assumed to be OBL_{THEME} explaining the restriction on *of*-phrases with some deverbal nouns:

- (27) a. Randy instructed Deborah to meet him at two.
 - b. * Randy's instruction of Deborah to meet him at two
 - c. Randy's instructions to Deborah to meet him at two
-
- (28) a. John fled the city.
 - b. * John's flight of the city
 - c. John's flight from the city

¹⁹The example in (26b) is taken from Flegel (2002: 1379).

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- (29) *the destruction of the Romans (with *the Romans* as Agent)

Another argument in favour of OBL_{θ} over ADJ is the treatment of deverbal nouns from verbs like *put* which subcategorize for both OBJ and OBL_{θ} . If the verb *put* requires SUBJ, OBJ and OBL_{LOC} , does the gerund *putting* require POSS, OBL_{LOC} and ADJ? Given that the semantic restrictions on the locational phrase remain in the deverbal noun phrase, OBL_{LOC} seems reasonable; but then it seems odd to assume that the OBJ of the verb is demoted to ADJ, moving below the OBL_{LOC} argument on the grammatical function hierarchy (Chapter ??). It would mean that in examples such (30), the ADJ would naturally precede a subcategorized OBL .²⁰

- (30) a. All right, Republicans are denouncing President Donald Trump because of his apparent defense of Russian President Vladimir Putin and **his putting of the United States and Putin's Kremlin on moral equivalent grounds**.
 b. her constant placing of the Hills on a pedestal

On the other hand, [Payne et al. \(2013: 795\)](#) argue that “the empirical facts show the distinction between complements and modifiers of nouns to be unfounded. There is no rational way to motivate drawing the distinction between them... We assume no structural differentiation of the phrases formerly classified as either complements or adjuncts: all nouns are treated grammatically as nonrelational until they combine with a dependent.” [Payne et al.](#)’s analysis is not formalized within LFG, but correlates with recent LFG work by [Przepiórkowski \(2016; 2017\)](#), who argues against the argument vs. adjunct distinction. If this is accepted, the OBL_{θ} vs. ADJ question with respect to noun phrase dependents is moot.

In some languages, the distribution of primary and secondary argument marking differs from the patterns seen above in English. As shown by [Laczkó \(1995; 2000\)](#) (see also [Laczkó 2007; 2017](#)), event nominalizations in Hungarian require the theme argument to be expressed as either a dative or a nominative possessor, whereas the agent must be treated as an adjectivalized postpositional modifier. There is therefore no mapping in Hungarian equivalent to the mapping involved in the English *Edith's smashing of the vase*.

For [Laczkó \(2000\)](#), the Hungarian linking pattern for event nominals is essentially ergative: the SUBJ of an intransitive event nominal and the OBJ of a transitive event nominal are mapped to POSS, while the SUBJ of a transitive event nominal is mapped to a *by*-phrase.

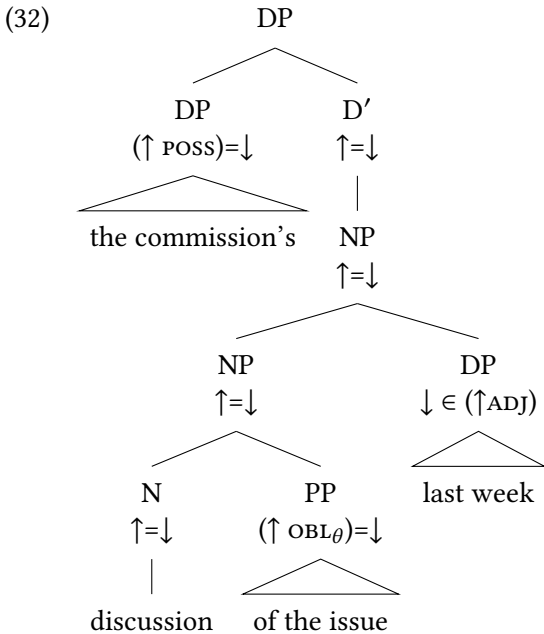
²⁰The examples in (30a) and (30b) are from <http://edition.cnn.com/TRANSCRIPTS/1702/06/nday.06.html> and <https://www.goodreads.com/review/show/1326602940>, respectively.

3.4 Sample analyses

It will have become clear from §3.2 and §3.3 that there are different views on what grammatical functions are available within the noun phrase and what their positions are within the c-structure. Here we will illustrate with two analyses of English noun phrases based on different assumptions, and one of Welsh, which shows interestingly different properties.

Based on some of the assumptions with respect to c-structure and noun-phrase internal grammatical functions, we would get the annotated tree in (32) for the noun phrase in (31), with the associated f-structure in (33), where we have simplified the PRED values for the OBL_{OF} and the ADJ.

(31) the commission's discussion of the issue last week



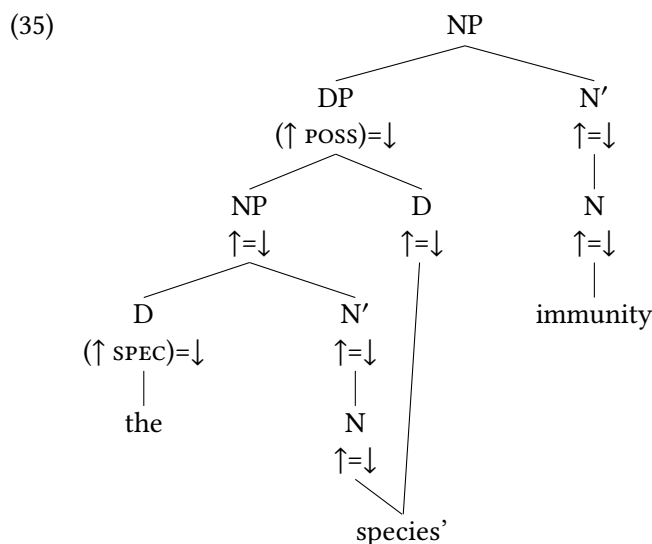
(33)

$$\left[\begin{array}{l} \text{PRED} \quad \text{'DISCUSSION'} \langle (\text{POSS}), \text{OBL}_{\text{OF}} \rangle' \\ \text{OBL}_{\text{OF}} \quad \left[\text{PRED} \quad \text{'ISSUE'} \right] \\ \text{POSS} \quad \left[\text{PRED} \quad \text{'COMMISSION'} \right] \\ \quad \quad \text{DEF} \quad + \\ \text{ADJ} \quad \left\{ \left[\text{PRED} \quad \text{'LAST WEEK'} \right] \right\} \end{array} \right]$$

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In (32) and (33) we have opted to use the functions POSS and OBL_θ for the primary and secondary arguments, respectively, and assumed that these are optional arguments of *discussion*. With respect to c-structure, we have assumed that a distinction in attachment can be made between the complement of *the issue* and the adjunct *last week*, though we recognise that the arguments for this distinction are by no means unambiguous. There is no determiner element present in this analysis and hence the head of the DP is eliminated by what is generally referred to as the Principle of Economy of Expression (for different versions, see Bresnan et al. 2016: 90–2 and Toivonen 2003 and for a critical discussion see Dalrymple et al. (2015), Chapter ??). An alternative, if 's is analysed as a clitic, is to assume that it fills the D position (cf. similar assumptions for the Amharic definiteness marker in (16)), and this could then also account for the complementary distribution between the determiner and the POSS. However, Lowe (2016) provides arguments against this type of analysis and instead provides a lexical sharing analysis in which 's can be analysed as both an affix and a clitic. The lexical sharing analysis makes use of the dimension representing the string of words, the s-string, which is mapped to the hierarchical c-structure. Under certain circumstances, one element in the s-string can be associated with two nodes in the c-structure, and in this case 's is mapped both to the N and the D head of the possessor. In this analysis, though possessors are of category DP, non-possessor noun phrases are assumed to be of the category NP, where the specifier position can be filled either by a non-projecting D (represented as \hat{D} in LFG) (Chapter ??), or by a possessor DP, thereby accounting for the complementarity of possessors and determiners. The analysis is best demonstrated with an example where there is evidence of affix status, for instance where the 's is unexpressed because some property of the final word of the phrase it attaches to, as in (34), where *species* has the irregular “possessive” form *species'*. The annotated tree capturing the lexical sharing analysis is found in (35).

(34) the species' immunity



Sadler (2000) provides an LFG analysis of Welsh noun phrases that she contrasts with the head movement analysis proposed by Rouveret (1994). Sadler assumes an NP structure, with the function *poss* found in the specifier of NP position.²¹ This analysis captures the complementarity of a possessor and the definite determiner, which is a property also of Welsh, and it accounts for the definiteness of the noun phrase as a whole. The definiteness of a noun phrase containing a possessor is determined by the presence of the definite article *y(r)* within the possessor, and if there are nested possessors, within the most deeply embedded possessor. The complementarity is assumed to be a property of the definite article. The first equation in the lexical entry in (36) captures the complementarity and the second the definiteness feature.

- (36) $y(r)$ 'the' $\neg (\uparrow \text{POSS})$
 $(\uparrow \text{DEF}) = +$

Consider the noun phrase in (37), where we have three layered possessors (note that ‘bank’ in ‘bank manager’ is realized as a possessor in Welsh).

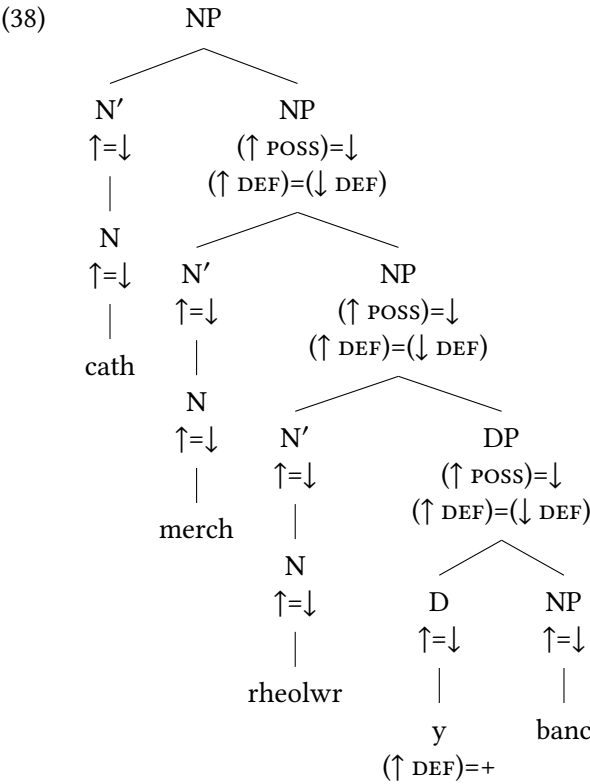
- (37) Welsh

²¹Note that [Sadler \(2000: 97, fn 17\)](#) points out that if one accepts the claim that discourse-oriented functions such as *poss* are found in the specifier of a functional category, then a DP analysis of Welsh noun phrases would be appropriate, but states that the analysis developed in the paper can be recast in a DP structure.

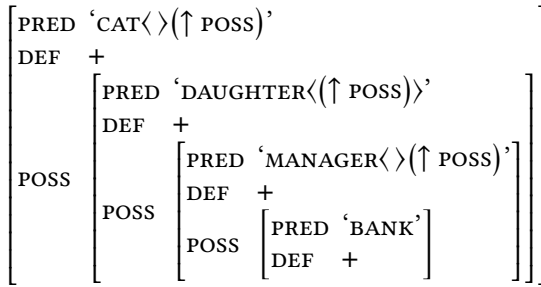
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cath merch rheolwr y banc
cat daughter manager the bank
'the bank manager's daughter's cat'

The annotated c-structure tree assumed by Sadler (2000: 101) and the associated f-structure can be found in (38) and (39). Here we see how a possessor is annotated as sharing its DEF feature with its daughter, ensuring that the definiteness of the most deeply embedded possessor determines the definiteness of the noun phrase as a whole. In (39), we also see illustrated the difference in argument status of poss between common (*cat* and *manager*) and relational (*daughter*) nouns illustrated for common and deverbal nouns in (20).



(39)



4 Noun phrases and “discourse functions”

In §3, we referred to the principle of structure-function association, which states that the specifier of functional categories houses discourse functions. This does not, of course mean that this is the only position where DFs can occur (see for instance [Laczko 2014](#), who provides evidence for a DF in the specifier of VP for Hungarian). Though noun phrases are unlikely to allow the same range of grammatical discourse functions as clausal constituents, languages may have positions reserved for emphasis or contrastive focus within the noun phrase, and in what follows we will use DF in its broadest sense as any information-structurally marked position (Chapter ??).

Babungo (Grassfields, Benue-Congo) has radically head-initial noun phrases. The examples in (40) illustrate this for a range of elements.²²

- (40) Babungo
- a. ká wî
money that
'that money' ([Schaub 1985: 73](#))
 - b. yílwan̄ tēe
hammers five
'five hammers' ([Schaub 1985: 74](#))
textacu
 - c. ŋgá kwàlò
antelope big
'a big antelope' ([Schaub 1985: 72](#))
 - d. tásaw tǎ
pipes your
'your pipes' ([Schaub 1985: 72](#))

²²PST2 and PST4 refer to different past tense markers.

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- e. ghí 'wée
loaf child
'the loaf of the child' (Schaub 1985: 76)
- f. wěembwā fǎŋ tǐi wi sí sǎŋ (ŋwǎ)
child who father his PST2 beat.PFV him
'a child whom his father had beaten' (Schaub 1985: 34)
- g. shúu ɲi wúumbǎ wī
mouth house friend his
'the door of his friend's house' (Schaub 1985: 76)

Babungo has a number of elements indicating emphasis. The elements *ɲkèè* and *shè'*, which can be associated with noun phrases as in (41), are described as emphasis adverbials. However, since these can also modify PPs, A(P)s and Adv(P)s, we can assume they are external to the noun phrase.

- (41) Babungo
 - a. ɲkèè ɲkáw kǎŋ
very chair my
'my own chair' (Schaub 1985: 74)
 - b. shè' ɲkáw kǎbwǎ
only chair bad
'only a bad chair' (Schaub 1985: 74)

More relevant to our exploration of DFS within the noun phrase are the emphatic forms of possessors and demonstratives, which precede the noun, as illustrated in (42).²³

- (42) Babungo
 - a. yínkíi tǐ
that.EMPH tree
'that particular tree' (Schaub 1985: 73)
 - b. ntǐi tǎsǎw
your.EMPH pipes
'your own pipes' (Schaub 1985: 73)

There is also a negation focus element *tǔu*, which may precede the head noun as in (43).

²³Emphatic demonstratives may also follow the noun (Schaub 1985: 73).

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(43) Babungo

- a. *tũu wə̀ mù' (nè kée lùu shó mē)*
 even person one PST4 NEG be there NEG
 ‘Not even one person was there.’ (Schaub 1985: 75)
- b. *(ŋwə̀ nè kée kò) tũu fá (shée mē)*
 he PST4 NEG give.PFV even thing to.me NEG
 ‘He didn’t give me anything at all.’ (Schaub 1985: 75)

As shown in (44), the emphasis adverbials, which we hypothesize occur outside the noun phrase, can co-occur with emphatic possessors and demonstratives.

(44) Babungo

- a. *shè' yínkíi ŋkáv*
 only that.EMPH chair
 ‘only that particular chair’ (Schaub 1985: 77)
- b. *shè' ŋkǎŋ ŋkáv kî*
 only my.EMPH chair that
 ‘only that chair which is mine’ (Schaub 1985: 77)

An unfocused demonstrative and an unfocused possessor can co-occur (45a), as can an focused possessive and an unfocused demonstrative (45b).

(45) Babungo

- a. *ŋkáv kǎŋ kî*
 chair my that
 ‘that chair of mine’ (Schaub 1985: 77)
- b. *ŋkǎŋ ŋkáv kî*
 my.EMPH chair that
 ‘that chair which is mine’ (Schaub 1985: 77)

However, an emphatic demonstrative and an emphatic possessive cannot co-occur.²⁴ Similarly, the emphatic negative *tũu* cannot co-occur with either the emphatic demonstrative or the emphatic possessive. The examples in (44) indicate that there is no general restriction on two emphatic elements being associated with the same noun phrase, so we can assume that the constraint that rules

²⁴Emphatic demonstratives cannot co-occur with any possessor.

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out the co-occurrence of the emphatic demonstrative and the emphatic possessive or *tǔu* is a noun phrase internal structural constraint. In other words, there appears to be one unique dedicated information-structurally privileged position within the noun phrase. By structure-function mapping, we might expect this to be the specifier of a functional projection, and hence for the tree in (2) or (4) to be appropriate. However, there is no other obvious evidence of a functional projection. There is no article in Babungu; there is what is described as an “anaphoric demonstrative adjective” (Schaub 1985: 97), but its position would not be taken as evidence of it being a projecting D. Babungu has a strict ordering within the noun phrase: Head noun > A > Poss > Nom > Dem > Q > PP > RelC (Schaub 1985: 77), but no evidence of a hierarchical structure.²⁵ Since freedom of word order is generally taken as one piece of evidence in favour of a flat structure, in §2.2 we referred to the possibility of using the criterion conversely, to assume that strict word may indicate a hierarchical structure. However, the interpretation of the Babungu data that we have argued for here indicates that word order can be strict even when there is no other evidence of hierarchical structure. Such non-hierarchical ordering restrictions can be accounted for within LFG by means of LINEAR PRECEDENCE RULES (Dalrymple et al. 2019: 144–145). However, this is not something that has been extensively explored in the LFG literature. Interestingly, in contrast to Babungu, which is head-initial and can be argued to have an initial information-structurally privileged position, Ingush (Northeast Caucasian) has consistently head-final noun phrases and has an information-structurally privileged post-nominal position (Nichols 2011), so in a sense provides a mirror image of Babungu.

We see evidence, then, that noun phrases in different languages may include positions specifically associated with discourse-function marking. However, such positions need not be specifiers of functional projections, but may instead be specifiers of lexical projections (parallel to Laczkó’s DF specifier of VP in Hungarian). Relatively little work has been done on discourse-function marking within the noun phrase, however, and more work is needed to establish the patterns and constraints on this cross-linguistically.²⁶

²⁵The only exceptions involve obligatory possession (inalienable and kinship), which occur between the head noun and the A.

²⁶Authors who do consider the dimension of discourse structure within the noun phrase include Charters (2014) and Chisarik & Payne (2001; 2003).

5 Conclusion

In this chapter, we have explored aspects of the analysis of noun phrases in LFG. Relatively little work has been done within LFG on the c-structure of noun phrases, though there are some notable exceptions, to which we have referred in this chapter. Degrees of configurationality at clause level and how to analyse them has, however, been a focus of much LFG work. Therefore, in §2, we considered how these analyses could be transferred to noun phrases. We argued that examples can be found of strictly configurational, partly configurational and non-configurational noun phrases, so that the c-structure analyses of the three global levels of configurationality developed at clause level can be carried over to noun phrases. In §2.2 we also considered the use of functional categories in the noun phrase in light of the restricted approach generally taken to such categories within LFG.

The role of argument structure and grammatical functions within noun phrases is, on the other hand, well-studied within LFG. However, there is no consensus on which GFs are relevant within noun phrases, or how the arguments of nouns relate to those of verbs. In §3, we reviewed and evaluated a number of proposals from the literature. We also considered how principles of endocentric structure-function association (Bresnan et al. 2016: 105, 117) apply to the relation between grammatical functions and structure in noun phrases.

Though noun phrases are unlikely to involve the same range of information structural notions as clauses do, basic notions such as emphasis and contrast do apply. In §4, we argued that there are languages that have a position for a basic grammaticalized discourse function within the noun phrase. In the languages we considered, this is a position at the edge of the noun phrase, preceding the head in a head-initial language (Babungu) and following the head in a head-final language (Ingush). However, our consideration has been relatively superficial and the noun phrases of these languages deserve further consideration.

Acknowledgements

Some of this paper formed part of a presentation at LFG 2019 at ANU in Canberra, and KEB is grateful for comments received there. We are grateful to the three referees whose comments have helped clarify a number of things.

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Part III

Grammatical modules and interfaces

Part IV

Linguistic disciplines

Part V

Formal and computational issues and applications

Part VI

Language families and regions

Chapter 4

LFG and African languages

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Lexical Functional Grammar (LFG) as a formal, constraint-based grammatical theory has been used to analyze various languages around the world since the 1970s. These analyses comprise grammatical descriptions, grammatical formalizations, and computational implementations of the grammars developed using LFG. Africa is home to over 2000 languages and while not even half of these have established writing systems let alone descriptive grammars in any linguistic framework, quite a substantial number of these languages, especially many Bantu languages, have been analyzed using LFG. The list includes languages such as Swahili, Chicheŵa, Chishona, Kichaga, Dagaare, Akan, Tigrinya, Wolof, Soso, Wan, Setswana, Yag Dii, Malagasy, and Ndebele. In this chapter we first outline the major, salient linguistic features of African languages and then indicate how LFG has been used to analyze these salient features, covering topics such as the lexical integrity principle, applicative constructions, object asymmetries, agreement, reciprocal marking, locative inversion, serial verb construction, and focus marking phenomena. In the process of doing all this, the analyses in the chapter point to the major contributions of African languages to the development of LFG and, in turn, to the major contributions of LFG to the understanding of African language phenomena.

1 Introduction

Since the second half of the 20th Century, African language data have been applied to the development of many descriptive and formal frameworks within modern linguistics – from phonology through morphosyntax to semantics and

pragmatics. Descriptive frameworks such as Greenbergian universals, Hallidayan systemic functional grammar, Chomskyan generative grammar, and Goldsmithian autosegmental phonology, among others, have been used to analyse African languages. One of these major frameworks is the Lexical Functional Grammar (LFG) framework as developed by Ronald Kaplan and Joan Bresnan (1982).

In this chapter we focus on the symbiotic relationship between African languages and LFG, showing how African languages have provided useful data for developing and testing LFG and how LFG has been used to analyze some intricate grammatical structures and processes in African languages like Swahili, Chicheŵa, Dagaare, Akan, Tigrinya, Wolof, and Setswana.

The chapter is organized as follows. This introductory part provides a brief outline of the language situation in Africa, showing that Africa is a highly multilingual society and its people are very polyglottic. We also provide a snapshot of the major features of African languages. §2 is the main and longest part of the chapter. We provide concise illustrations of how LFG has been used to analyze various grammatical structures and phenomena including the lexical integrity principle, applicative constructions, object symmetries and asymmetries, agreement, reciprocal marking, locative inversion, serial verb constructions, and discourse function analyses. In §3, we briefly summarize the contribution of LFG to the analyses of African language phenomena, and conclude the chapter in §4 by tying together the various strands in all the sections of the chapter.

1.1 The language situation in Africa

Africa is not only a mineral resource rich continent; it is also a linguistic resource rich continent. Not only are there so many languages on the African continent, Africans also exhibit a rich polyglottic repertoire in multilingual societies with many individual Africans, particularly in urban centres, speaking an average of four to five languages per person. Indeed, Africa has the second largest number of languages among the continents. According to the *Ethnologue: Languages of the World* (Eberhard et al. 2020), there are at least 7,102 living languages in the world and 2,138 of them are in Africa.¹ African languages belong to a diverse set of language families, mainly including the Niger–Congo language family (divided in Niger–Congo A and Niger–Congo B which comprises of the Bantu lan-

¹We use the term *African languages* (or the *Languages of Africa*) broadly to refer to languages indigenous to the African continent. This term is to be distinguished from the term *Languages in Africa* which would comprise the indigenous languages and non-indigenous languages including former colonial languages like English, French, and Portuguese, which continue to be used as “official” languages in many African countries.

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guages), the Afro-Asiatic language family, the Nilo-Saharan language family, and the Khoisan language family (see Figure 4.1).

(Map courtesy of Wolff (2016), Cambridge University Press)

Figure 4.1: Language Families of Africa²

The great amount of language diversity on the African continent and elsewhere is of interest to linguists and other scholars who believe in the need for linguistic and cultural diversity, and therefore the need to document and preserve these languages and their associated cultures. This diversity itself is a double-edged sword (Bodomo 2017). On the one hand, each of these 2,138 languages in Africa is the basis of a rich culture as languages are the main media through which we express and convey our cultural values. On the other hand, the fact that we have many languages within each of the 55 polities in Africa means that we face serious challenges and problems for language policy formulation and language planning. With this brief mention of the language situation, we now sketch some salient features of African languages in §1.2.

1.2 Salient linguistic features of African languages

African languages have contributed a lot in informing descriptive and theoretical frameworks for analyzing the world's languages:

In brief, whether the search for universals is pursued along the lines of cross-linguistic generalizations, as recommended by Comrie, building on the work of Greenberg and others, or it is conceived of in terms of the biologically specified abstract principles that determine the form of human grammars and characterize the content of the language responsible cognitive structures, it is clear that African languages will definitely continue to make valuable contributions to progress in generative grammar. (Mchombo 1997: 202)

Thirty years ago, in her plenary address *African Languages and Syntactic Theories* on the occasion of the 20th Annual Conference on African Linguistics, Joan Bresnan recognized the impact of African languages on syntactic theories in

²As suggested by one reviewer, Austronesian languages, especially on the islands to the East of Africa, like Madagascar, ought to also be included in Figure 4.1; see Chapter ?? for more on Austronesian languages. In addition, we should also acknowledge that not many people believe in the genetic unity of “Khoisan” language family anymore.

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these aspects: logophoricity, topic/subjecthood, agreement, argument asymmetries, and the syntax of verbs. But the impact was thought to be fairly mild compared to advances in phonology (Bresnan 1990). As time went by, Henderson (2011: 15) asserts that the significant development in this area “has been the exponential increase in syntax researchers who are interested in African languages, along with the sheer volume of work they have produced”.

The complex morphology of many African languages has been of great interest among linguists, lending support to the study of morphosyntax largely dominated by Bantu languages (Bresnan & Mchombo 1995, Mchombo 1980; 1997; 2002; 2003; 2004, Moshi 1995, Morimoto 2002, Matambirofa & Mabugu 2014). The syntactic derivation of the verb stem in Bantu languages typifies the highly agglutinative nature of these languages, including various suffixes (sometimes called extensions) and prefixes associated with negation, tense/aspect, modality, markers of agreement with the subject and the object, as shown in (1).

- (1) Swahili (Petzell 2004: 152-153)
- a. si-ku-mw-on-a
NEG.SM-NEG.T-OM-see-FV
‘I didn’t see him/her.’
 - b. Erik a-li-pig-i-w-a simu na mwalimu.
Eric SM-PST-ring-AP-PASS-FV phone by teacher
‘Eric was rung by the teacher.’

Example (1a) involves the phenomenon of negation spread in which *si* is both a negative marker and a subject marker. In this case, the morpheme *si* can be called a *portmanteau morph*, i.e., a single morpheme expressing two meanings. Portmanteau morphs and feature spreading such as the negation spread are said to be frequent phenomena in Bantu and other non-Bantu languages such as Mande. In (1b), it is demonstrated that these affixal materials follow a strict order and certain combinatorial restrictions. For example, the applicative comes before the passive in Swahili.

In general, Creissels & Good (2018) provide a good context to the discussion of African languages with a list of generalizations regarding the state of the art of the morphosyntactic typology of the languages of the continent. Many of these features are listed in (2) below (Creissels & Good 2018: 709-710):

- (2) a. The ergative type of core syntactic role coding is exceptional among African languages.

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- b. Case-marked subjects or objects are less common among African languages than at world level.
- c. The so-called “marked-nominative” type of case contrast between subjects and objects is exceptional in other parts of the world but very common among African languages that have a case contrast between subjects and objects.
- d. Obligatory agreement of transitive verbs with their object does not seem to be attested among African languages.
- e. Second-position clitics are relatively common in the languages of the world, but exceptional among African languages.
- f. In a relatively high proportion of African languages, the construction of verbs with an argument frame of the type giver–given–recipient tends to assimilate the recipient (rather than the thing given) to the patient of prototypical transitive verbs, and double object constructions are particularly frequent.
- g. Focus strategies implying morphosyntactic alternations, and in particular focus marking by means of verbal inflection, are particularly common in Africa.
- h. The use of special verb forms in sequential constructions is particularly widespread among African languages.
- i. Applicatives are particularly common in Africa, and a relatively high proportion of African languages make a wide use of obligatory applicatives and of various types of non-canonical applicatives.
- j. Classifier systems are exceptional among African languages.
- k. Relatively few African languages are devoid of a morphological plural or have a morphological plural restricted to a subset of nouns occupying a high position in the animacy hierarchy.
- l. African languages that do not use the same morpheme as a noun phrase coordinator and as a comitative adposition are relatively rare.
- m. The proportion of languages with a syntactically flexible constituent order is much lower among African languages than at world level.
- n. The constituent order SOVX, relatively rare at world level, is relatively frequent among African languages.
- o. Clause-final negative particles occur among African languages much more frequently than in other parts of the world.

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- p. Changes in the constituent order triggered by negation are particularly common among African languages.
- q. True relative pronouns are particularly rare in African languages, and the use of dependent verb forms in postnominal relatives, relatively rare in the languages of the world, is common among African languages.
- r. Logophoricity is particularly widespread among African languages.
- s. Systems of coding of spatial relations in which the distinction location at/ movement towards/movement from manifests itself exclusively on verbs are more frequent in Africa than in most other parts of the world.

Admittedly, when it comes to the analyses of African languages in LFG, it is hard not to be “Bantu-centric”, given the pioneering work done by Sam Mchombo and Joan Bresnan. In more recent times, however, much more work is being produced in non-Bantu languages, and we have tried to include the analyses on these non-Bantu languages as much as possible. These mainly include Wolof, Tigrinya, Soso, Wan, Yag Dii, Malagasy, Dagaare, and Akan. In §2, we illustrate the analyses of many of these features listed in this section.

2 Major African language grammatical phenomena analysed in LFG

In this section, the longest in the chapter, we do a concise analysis of major constructions and grammatical phenomena in African languages from an LFG perspective. We begin with the lexical integrity principle, showing how data from African languages have been used to illustrate one of the best known principles in the LFG theoretical framework. We then move on to discuss argument structure and morphology, agreement, reciprocal marking, locative inversion, serial verbs, and discourse functions.

2.1 Lexical integrity principle

This subsection begins with a constraint on the architecture of grammar inspired by African language structure. When we encounter a sequence of morphemes in African languages, a natural question to ask is: what is indeed a word? In the framework of Lexical Functional Grammar, the lexical integrity principle has

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been of great importance with respect to c(ategorial)-structure and f(unctional)-structure in clarifying that the morphemic structure of words differs from the c-structure of phrases both in constituents and principles of combination. In their seminal paper, [Bresnan & Mchombo \(1995\)](#) elicit a great deal of evidence from Bantu noun class markers in support of the lexical integrity principle. They argued that “the Bantu noun class markers are a particularly fruitful domain for investigations of lexical integrity because they straddle the borderlines between syntax and morphology and between inflection and derivation” ([Bresnan & Mchombo 1995:183](#)).

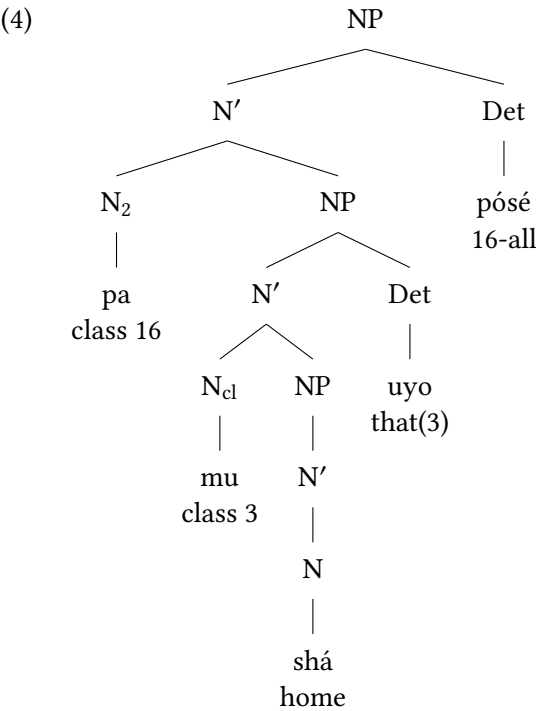
Bantu noun class markers have a mixed inflectional and derivational nature when they mark nominals for number and gender, specifying the agreement forms of determiners, modifiers and predicates. The number classes, on one hand, trigger the syntactic agreement as an inflectional process, and on the other hand, the gender classes change the semantic class of the stem since they are associated with semantic properties such as animacy, configuration, location, size, plurality or quality and the process is seen as derivational. The standard morphological analysis was strongly advocated by [Doke \(1929; 1935\)](#), in which the class markers are analyzed as morphologically bound morphemes. However, this position has been challenged alternatively by the syntactic analyses (e.g. [Myers 1987](#)) or the head-movement theories of word derivation (e.g. [Kinyalolo 1991](#) and [Carstens 1991](#)). Throwing themselves into this debate, [Bresnan & Mchombo \(1995\)](#) draw the evidence that supports the lexical integrity principle from the morphology and syntax of Bantu noun class prefixes by applying a couple of effective tests of lexical integrity to the class markers of nouns in Chichewa and other Bantu languages. Four main tests go to build up the argument.

2.1.1 **Test 1: phrasal recursivity**

The central idea of phrasal recursivity is that the arbitrarily deep embedding of syntactic phrasal modifiers is not allowed in word-internal constituents. For Bresnan and Mchombo, there are mixed results on this front due to the so-called alternative concord when modifiers simultaneously show concord with any of several class markers on the same noun ([Bresnan & Mchombo 1995:195](#)), as shown in example (3).

- (3) Chishona ([Myers 1987: 104](#))
 pa-mu-shá uyo p-ósé p-a-káchén-a
 16-3-home that(3) 16-all 16-white
 ‘at that whole white house’

The noun ‘home’ is preceded by two noun class markers from classes 16 and 3. Interestingly, the first following modifier agrees with the inner class 3 marker and the final two agree with the outer class 16 marker. Myers (1987) provides the following syntactic representation:



This representational analysis also correctly accounts for the fact that the inner concord modifiers must precede the outer ones as indicated by the ungrammaticality in (5).

- (5) Chishona
 *pa-mu-shá apo w-ósé p-a-káchén-a
 16-3-home that(16) 3-all 16-white

The same holds true for Chicheŵa, shown below in (6a)-(6d).

- (6) Chicheŵa
 a. pa mu-dzi p-áthú p-ônse
 16 3-village 16-our 16-all
 ‘at all of our village’

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- b. pa mu-dzi w-áthú p-ônse
16 3-village 3-our 16-all
'at all of our village'
- c. pa mu-dzi w-áthú w-ônse
16 3-village 3-our 3-all
'at all of our village'
- d. *pa mu-dzi p-áthú w-ônse
16 3-village 16-our 3-all

But the syntactic analysis of Myers does not necessarily apply to all class markers. As a matter of fact, it turns out that the class marker 16 in these examples belongs to the locative classes comprising of 16, 17 and 18, and an alternative concord is only possible with these locative classes. For the nonlocative class markers, they are prefixed to the nouns and noun stems without the recursive structure of syntactic NPs, where alternative concord is impossible. For example,

(7) Chicheŵa

- a. ka-mu-ndá k-ánga
12-3-field 12-my
'my small field'
- b. *ka-mu-ndá w-ánga
12-3-field 3-my

2.1.2 Test 2: inbound anaphoric islands

The inbound anaphoric islands test can also tell a true syntactic phrase from a derived word. According to this test, anaphoric and deictic uses of pronouns should occur within the phrasal NP complement to a class marker. Again it is true with the locative class markers but not with the other class markers as shown in (8) and (9).

(8) Chicheŵa

- a. mu iyi
18 9-this
'in this (e.g. house)'
- b. pa icho
16 7-that
'on that (e.g. hat)'

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- a. *Mu-na-chéz-á ndí m- [phunzitsi kapéná
 II.PL/HON.SBJ-REC.PST-converse-IND with 1- teacher or
 sangalatsi]?
 entertainer
 ‘Did you converse with the teacher or entertainer?’
- b. *A-na-b-á ka- [m-pando kapéná m-tõndo]?
 1SBJ-REC.PST-steal-IND 12 3-chair or 3-mortar
 ‘Did he steal a little chair or a little mortar?’

2.1.4 Test 4: gapping

Under this test, it is possible to gap the noun following the locative class marker. In contrast, none of the other class markers allow this gapping as shown in (12a-b).

(12) Chicheŵa

- a. A-nyamäta a-na-vín-á njerero pa bwaló
 2-boy 2SBJ-REC.PST-dance-IND 9name.of.dance 16 5courtyard
 lá mfúmú Kapanga ndí pá (bwaló) lá mfúmú Kapatuka.
 5ASC 9chief K. and 16 (5courtyard) 5ASC 9chief K.
 ‘The boys danced the njerero dance on Chief Kapanga’s courtyard
 and on Chief Kapatuka’s (courtyard).’
- b. *Kodí áná awa a-ku-fún-á m-pira w-á mphira kapéná
 Q 2child 2this 2SBJ-PROG-want-IND 3-ball 3-ASC 9rubber or
 m-*(pira) w-á nsanza?
 3-(ball) 3-ASC 10rag
 ‘Do these children want a rubber ball or a rag ball?’

All these tests show that the locative class markers are syntactically independent and all the others are morphological prefixes. Bresnan and Mchombo provided an explanation with regard to the split between the syntactic and morphological class markers. As hypothesized by [Greenberg \(1977; 1978\)](#), the class markers in Niger-Congo have evolved historically from syntactic elements of NPs into being morphologically bound as prefixes or suffixes. Along this line, it is possible that this process of historical change has been completed for most of the class markers of proto-Bantu that became prefixes, but a few like locatives retained their syntactic behavior as nominal constituents.

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According to [Bresnan & Mchombo \(1995\)](#), the fact that agreement is marked both syntactically and morphologically does not violate the lexical integrity principle:

By factoring apart the syntactic levels of f-structure and c-structure, we can distinguish naturally between structure-dependent syntactic principles (e.g., constituent order), which respect lexical integrity, and function-dependent syntactic principles (e.g., agreement), which do not. ([Bresnan & Mchombo 1995:213](#))

In LFG framework, the correspondence is in general imperfect between structural form and syntactic function. Take Bantu noun class markers, for example. Here changes in form can occur partly independent of changes in function. As a result, this lends strong support to the lexical integrity principle. With this illustration of the lexical integrity principle, we now go on to discuss argument structure in §2.2.

2.2 Argument structure and morphosyntax

In this subsection we discuss two main constructions, applicatives and objective asymmetries mainly in Bantu languages, before outlining some recent works in mainly non-Bantu languages.

2.2.1 Applicative constructions

The discussion of grammatical functions came to the fore in the 1980s and early 1990s ([Marantz 1984](#), [Baker 1988a](#), [Alsina 1992](#), [Alsina & Mchombo 1990; 1993](#), [Bresnan & Moshi 1990](#)). Valency-changing operations like the passive, applicative, causative and similar alternations had raised the question whether grammatical functions (GF) should be seen to be primitives or derivatives. Bantu languages contributed a lot to this discussion since these languages are characterized by applicative, causative and passive morphemes (see [\(1b\)](#) for example).

This section centers on a critique made by [Alsina & Mchombo \(1990\)](#) on [Baker \(1988b\)](#) over applicatives in Chicheŵa. [Baker \(1988b\)](#) proposes an asymmetry in the assignment of the beneficiary and instrumental theta-roles. For Baker, instrumentals are assigned their theta-roles as NP sisters of the verb, while beneficiaries are theta-marked in a PP complement to the verb. In other words, beneficiaries get their theta-role indirectly from the verb through the PP but instrumentals are theta-marked directly by the verb. According to Alsina and Mchombo, Baker's theory is particularly successful in two aspects ([Alsina & Mchombo 1990:495](#)):

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- (13) a. Word order: while the beneficiary NP must precede a theme/patient NP in the verb phrase, the instrumental NP may either precede or follow it.
- b. Object markers: while only the applied object in a beneficiary applicative may be expressed by means of an object marker, either the applied or the patient/theme object in an instrumental applicative may be so expressed.

At the same time, they also adduced three types of evidence against Baker's theta theoretic asymmetry.

2.2.1.1 Extraction facts

As observed by Baker (1988b), a patient or a theme can be extracted both in beneficiary (14a) and in instrumental applicatives (15a), but in contrast, it is not possible to extract a beneficiary object (14b) as an instrumental (15b).

(14) Chicheŵa

- a. Īyi ndi mphátso iméné chítsíru chí-ná-gúl-ír-a atsíkāna.
 9-this be 9-gift 9-REL 7-fool 7SBJ-PST-buy-AP-FV 2-girls
 'This is the gift that the fool bought for the girls.'
- b. *Āwa ndi atsíkāna améné chítsíru chí-ná-gúl-ír-a mphátso.
 2-these be 2-girls 2-REL 7-fool 7SBJ-PST-buy-AP-FV 9-gift
 'These are the girls that the fool bought the gift for.'

(15) Chicheŵa

- a. Īli ndi dengū liméné ányǎni á-kú-phwány-ír-a mwāla.
 5-this be 5-basket 5-REL 2-baboons 2SBJ-PROG-break-AP-FV 3-stone
 'This is the basket that the baboons are breaking with a stone.'
- b. Ūwu ndi mwalá úméné ányǎni á-kú-phwány-ír-a dēngu.
 3-this be 3-stone 3-REL 2-baboons 2SBJ-PROG-break-AP-FV 5-basket
 'This is the stone that the baboons are breaking the basket with.'

Baker (1988b) explains these differences on the basis of the *nonoblique-trace filter*. Unfortunately, the whole analysis collapses given the fact that there are grammatical instances of extractions of beneficiaries or goals in a Chicheŵa passive sentence (Alsina & Mchombo 1990: 498):

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- (16) Chicheŵa
 Āwa ndi atsíkána améné á-ná-gúl-ír-ídw-á mphâtso.
 2-these be 2-girls 2-REL 2SBJ-PST-buy-AP-PASS-FV 9-gift
 ‘These are the girls that were bought a gift.’

2.2.1.2 Transitivity effects

Baker’s proposed D-structure distinction between beneficiaries and instrumentals predicates that beneficiary applicatives cannot be formed from intransitive verbs. However, [Alsina & Mchombo \(1990\)](#) prove it to be incorrect again as in (17).

- (17) Chicheŵa
 Yêsu a-ná-wá-f-er-a (anthu).
 1-Jesus 1SBJ-PST-2OBJ-die-AP-FV 2-people
 ‘Jesus died for them (the people).’

2.2.1.3 Locative applicatives

According to [Alsina & Mchombo \(1990: 503\)](#), “locative applicatives constitute a crucial source of evidence for evaluating [Baker’s](#) (1988b) theory”. In Baker’s theory, beneficiaries and locatives are conceptually similar because they are both theta-marked by the verb via a preposition. In contrast, the facts show that locatives behave like instrumentals and not like beneficiaries considering things like word order, object marking, and relativization.

Consequently, a classical transformational approach appears to be quite problematic when dealing with applicatives in Chicheŵa given its complex morphosyntax.

2.2.2 Object symmetries/asymmetries

So far, we have briefly discussed one asymmetrical object type: applicatives. This subsection will look deeper into this construction in parallel to the symmetrical type. The distinction between the two types is associated with *primary object* syntactic properties of passivizability, object agreement, adjacency to the verb, and the like. The asymmetrical object type language means that only one of the postverbal NPs exhibits *primary object* syntactic properties, while in the symmet-

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rical object type language there are more than one NPs that can do so.³ **Bresnan & Moshi (1990: 149-157)** identify the typological differences based on their observation on Kichaga (symmetrical) and Chicheŵa (asymmetrical). For example,⁴

(18) Kichaga

- a. N-ǎ-ĩ-lyì-í-à m-kà k-élyà. V NP_{ben} NP_{pt}
 FOC-1SBJ-PROG-eat-AP-FV 1-wife 7-food
 ‘He is eating food for/on his wife.’
- b. M-kà n-ǎ-ĩ-lyì-í-ò k-élyâ. NP_{ben} V_{pas} NP_{pt}
 1-wife 1SBJ-PROG-eat-AP-PASS 7-food
 ‘The wife is being benefited/adversely affected by someone eating the food.’
- c. K-èlyá k-ĩ-lyì-í-ò m-kà. NP_{pt} V_{pas} NP_{ben}
 7-food 7SBJ-PROG-eat-AP-PASS 1-wife
 ‘The food is being eaten for/on the wife.’

Kichaga examples (18b)-(18c) show that any object in the symmetrical type can be passivized, but in Chicheŵa, examples like (18c) are ungrammatical (**Baker 1988b**).

Another difference is related to object markers, illustrated in (19).

(19) Kichaga

- a. N-ǎ-ĩ-m-lyì-í-à k-èlyâ. OM_{ben}-V_{stem} NP_{pt}
 FOC-1SBJ-PROG-1OBJ-eat-AP-FV 7-food
 ‘He/She is eating food for/on him/her.’
- b. N-ǎ-ĩ-kì-lyì-í-à m-kà. OM_{pt}-V_{stem} NP_{ben}
 FOC-1SBJ-PROG-7OBJ-eat-AP-FV 1-wife
 ‘He/She is eating it for/on the wife.’
- c. N-ǎ-ĩ-kì-m-lyì-í-à. OM_{pt}-OM_{ben}-V_{stem}
 FOC-1SBJ-PROG-7OBJ-1OBJ-eat-AP-FV
 ‘He/She is eating it for/on him/her.’

³The asymmetrical type includes languages such as Kiswahili, Chimwi:ni, Hibena and Chicheŵa, while the symmetrical type includes languages such as Kinyarwanda, Kihaya, Kimeru, Mashi, and Luyia (or Luhya).

⁴The examples in this chapter are selected from various papers covering a wide range of African languages. We cannot guarantee their consistency in orthography. All we can do is transcribe them as originally as possible. In terms of tones, the symbol “ˊ” represents a superhigh tone, “ˋ” a high tone, “ˊˊ” a rising tone, “ˋˋ” a falling tone, “ˊˋ” a low tone, and “ˊˊˊ” a superlow tone.

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In Kichaga, the object marker can be put on the verb from any or all of the multiple objects. Again, cases such as (19b) and (19c) are not allowed in Chicheŵa.

Bresnan and Moshi also compared the two types in terms of unspecified object deletion, reciprocalization and interactions of object properties. They went on to discuss the problems posed by the data for previous theories (Gary & Keenan 1977, Perlmutter & Postal 1983, Marantz 1984, Baker 1988b, and Kiparsky 1988). Along the lines of Bresnan & Kanerva (1989), Alsina & Mchombo (1988) and Alsina (1999), Bresnan & Moshi (1990) show that the LFG treatment is capable of providing a single parameter of variation for the symmetrical and asymmetrical object types from which all the typological differences follow, instead of postulating multiple unrelated differences in the grammar of the two types of languages. In doing so, they decomposed syntactic functions by two crucial properties: $[-r]$ and $[+o]$, schematized in (20).

$$(20) \quad \begin{array}{cc} \left[\begin{array}{c} -r \\ -o \end{array} \right] & \text{SUBJ} \quad \left[\begin{array}{c} +r \\ -o \end{array} \right] & \text{OBL}_{\theta} \\ \\ \left[\begin{array}{c} -r \\ +o \end{array} \right] & \text{OBJ} \quad \left[\begin{array}{c} +r \\ +o \end{array} \right] & \text{OBJ}_{\theta} \end{array}$$

However, there is a peculiarity in applicative and dative constructions. Following Alsina & Mchombo (1988), Bresnan and Moshi acknowledged that there is a limitation concerning the applied beneficiary and recipient roles, i.e., they universally lack the $[+o]$ classification and receive the $[-r]$ classification. An asymmetrical object parameter was therefore proposed:

(21) Asymmetrical Object Parameter (AOP)

$$\begin{array}{cccc} * & \theta & \dots & \theta \\ | & & & | \\ [-r] & & & [-r] \end{array}$$

For ditransitive constructions in Chicheŵa (Mchombo & Firmino 1999), the applied NP must be adjacent to the verb if it is a beneficiary or recipient; otherwise, either the patient NP or the applied NP may be adjacent to the verb (Bresnan & Moshi 1990:172). Serving as the parameter of variation, it states that only one role can be intrinsically classified as unrestricted. The idea is illustrated in (22).

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(22)	‘eat-for<	<i>ag</i>	<i>ben_{ap}</i>	<i>pt</i>	>
AOP:		[−o]	[−r]	[+o]	
defaults:		[−r]		[+r]	
		SUBJ	SUBJ/OBJ	OBJ _θ	
well-formedness:		SUBJ	OBJ	OBJ _θ	

Based on Alsina & Mchombo’s (1988) extended version of intrinsic classifications to account for applicative and dative constructions, the applied beneficiary or recipient role (traditionally called *indirect objects*) can only be [−r], whereas the patient can be either [−r] or [+o]. Similarly in Kichaga, the applied beneficiary role will always be [−r], however, since the AOP does not apply to the symmetrical type, the patient can be either [−r] or [+o] as shown in (23) and (24). The only problem with (23) is that two unrestricted roles will lead to a violation of the final well-formedness condition of Function-Argument Biuniqueness which states that each expressed lexical role must be associated with a unique function, and conversely. So the patient role can only take the [+o] option in the active as shown in (24).

(23)	‘eat-for<	<i>ag</i>	<i>ben_{ap}</i>	<i>pt</i>	>
		[−o]	[−r]	[+o]	
defaults:		[−r]			
		SUBJ	SUBJ/OBJ	SUBJ/OBJ	
well-formedness:		SUBJ	OBJ	*	

(24)	‘eat-for<	<i>ag</i>	<i>ben_{ap}</i>	<i>pt</i>	>
		[−o]	[−r]	[−o]	
defaults:		[−r]		[+r]	
		SUBJ	SUBJ/OBJ	OBJ _θ	
well-formedness:		SUBJ	OBJ	OBJ _θ	

The analysis also explains adequately why in Chicheŵa only the object that is adjacent to the verb in the active can become the subject in the passive, as seen in (25), while in Kichaga, either object can be passivized, because when one of the two [−r] roles is realized as the subject in the passive construction, the other may be the unrestricted object, as shown in (26).

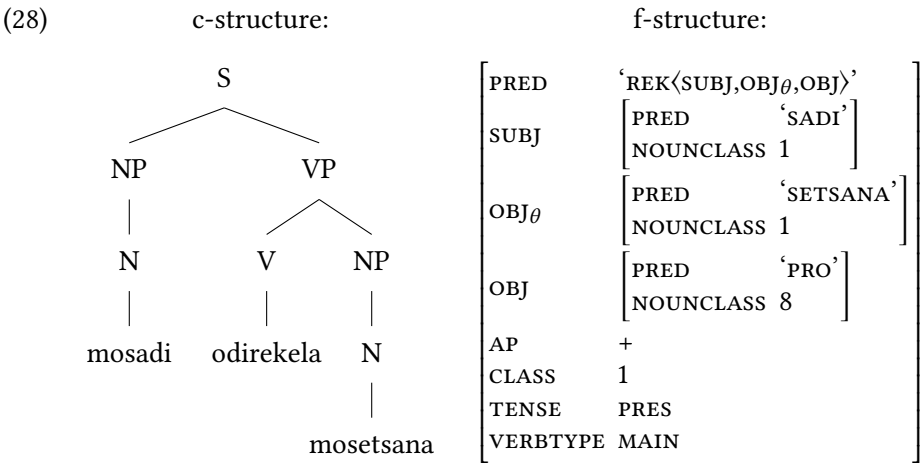
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(25)	‘eat-for⟨	<i>ag</i>	<i>ben_{ap}</i>	<i>pt</i>	⟩
AOP:		[−o]	[−r]	[+o]	
Passive :		∅			
defaults:				[+r]	
		SUBJ/OBJ		OBJ _θ	
well-formedness:		SUBJ		OBJ _θ	
(26)	‘eat-for⟨	<i>ag</i>	<i>ben_{ap}</i>	<i>pt</i>	⟩
		[−o]	[−r]	[−r]	
Passive :		∅			
defaults:					
		SUBJ/OBJ		SUBJ/OBJ	
well-formedness:		SUBJ		OBJ	or
				SUBJ	

The single parameter of variation under LFG provides good explanations for other typological differences equally well, namely object deletion, reciprocalization and interactions of object properties, which have been observed between the symmetrical and asymmetrical object types.

In the LFG literature, two recent works on Setswana are from [Berg et al. \(2013\)](#) and [Pretorius & Berg \(2019\)](#). The latter proposes an LFG-based analysis of the tense and aspect features of Setswana auxiliary verbs. In Setswana, auxiliary verbs indicating tense, aspect and time may appear juxtaposed inside a VP, following a specific order determined by the semantic values associated with the auxiliaries. Here we focus on [Berg et al. \(2013\)](#) which analyses Setswana constructions with double objects and double object agreement morphemes.

- (27) Setswana
Mosadi o-direk-el-a mosetsana.
1-woman 1-8-buy-AP-FV 1-girl
‘The woman buys the girl it’.



In the end, these works also provide a computational model of these phenomena using the XLE grammar development platform.⁵ Other LFG work on argument structure and grammatical functions can be seen in [Zaenen \(1984\)](#), [Mchombo \(1980; 1999a; 2002; 2003; 2004\)](#), [Harford \(1993\)](#), and [Kioko \(1995\)](#). For recent papers on this topic within Bantu languages, one may refer to [Matambirofa \(2010\)](#) and [Matambirofa & Mabugu \(2014\)](#).

2.2.3 Recent work in argument structure on non-Bantu languages

As is well known, at least among LFG practitioners, LFG research on African languages has been pioneered and dominated by analyses of Bantu languages, as shown in the previous analyses. In this subsection, we bring to light a few recent studies involving four languages outside the Bantu group: Tigrinya, Wolof, Soso, and Wan, the latter two of which belong to the Mande language family.⁶ Particularly, the discussion of object properties is found in all four languages.

2.2.3.1 Work on Tigrinya

In previous discussions, we have seen that the correlation of properties such as pronominal marking and passive typology has been used in object asymmetries as a proof for primary objecthood ([Bresnan & Moshi 1990](#), [Alsina & Mchombo](#)

⁵For those who are interested in XLE implementations, they can see them both in [Dione \(2013b\)](#) and [Berg et al. \(2013\)](#).

⁶Our special thanks go to one of the reviewers who summarized for us some parts of works included in this section.

1993, Alsina 1996a). Kifle's (2007) analysis reveals that Tigrinya exhibits symmetric properties of objects in its ditransitive constructions, and asymmetric properties in its applicative constructions.

(29) Tigrinya

- a. ʔit-omi tāmāharo n-ät-i māšihafi-ti
 DEF-3M.PL student.PL OBJ-DEF-3M.SG book.PL
 tä-wahib-om-wo.
 PASS-PRF.give-SM.3M.PL-OM₁.3M.SG
 'The students are given books.'
- b. ʔit-i māšihafi-ti ni-tāmāharo
 DEF-3M.SG book.PL OBL-student.PL
 tä-wahib-u-womi.
 PASS-PRF.give-SM.3M.SG-OM₁.3M.PL
 'The books are given to students.'

The recipient (29a) and the theme (29b) display primary object properties in the sense that both of them function as subjects in passivization. However, it is observed that only the theme role can function as a subject in passivization when it comes to applicative constructions, as shown in (30). The type of asymmetry found in Tigrinya seems to be the reverse version of the asymmetry found in Bantu languages like Chicheŵa.

(30) Tigrinya

- a. ʔit-i māšihafi n-saba tä-gäzi-u-la.
 DEF-3M.SG book.SG OBL-Saba.F PASS-PRF.buy-SM.3M.SG-OM₂.3F.SG
 'The book was bought (for) Saba.'
- b. *saba māšihafi tä-gäzi-ʔa
 Saba.F book.SG PASS-PRF.buy-SM.3F.SG

Therefore, in Tigrinya ditransitive clauses, the symmetric objects possess the [-r] features classified as OBJ_S, while the applied object in an applicative construction functions as OBJ_θ with the [+r] feature and the verbal object is OBJ with the [-r] feature. Given these facts, the Tigrinya data pose a particular challenge to the claim made about the correlation between the passive typology and the restrictions on pronominal marking. When applied on Tigrinya (Kifle 2011), the grammatical tests commonly used to distinguish between symmetrical and asymmetrical objects do not converge into a single primary object property. In Tigrinya, the applied object often displays the opposite properties to what is predicted by the lexical mapping theory (LMT).

2.2.3.2 Work on Wolof

In relatively recent research, diverse phenomena in the morphosyntax of Wolof have been analyzed in LFG, including its cleft constructions and their relations to copular constructions (Dione 2012), the interaction between Wolof clitics and different grammar components (Dione 2013a), and pro-drop and control constructions (Dione 2019). In addition, there are several recent works on Wolof that take a computational approach to handle various aspects of the language within the LFG framework (Dione 2014a,b; 2017; 2020).

Among his extensive work on Wolof, Dione (2013b) proposes an LFG-based analysis to deal with applicative-causative polysemy in Wolof using a predicate composition approach of complex predicate formation. He postulated an a-structure for each derivation (applicative and causative) by analyzing polysemous suffixes as carrying their own PRED(ICATE) argument structure which they share with other suffixes of the same derivation type. The focus of his work is on Wolof applicative and causative suffixes.

(31) Wolof

- a. Móodu la Faatu wax-al.
 Móodu FOC.3SG Faatu talk-AP
 ‘Faatu talked to MÓODU.’
- b.
- | | | |
|-----------------|--------------|--------------|
| | <i>Faatu</i> | <i>Móodu</i> |
| -al comitative: | SUBJ | OBJ |
| | | |
| | ‘ap<‘wax< | _>’, ARG >’ |
| | agt | com |

(32) Wolof

- a. Faatu daw-al woto bi.
 Faatu run-CAUS car the
 ‘Faatu made the car run.’
- b.
- | | | |
|----------------|-------------------|-------------|
| | <i>Faatu</i> | <i>woto</i> |
| -al causative: | SUBJ | OBJ |
| | | |
| | ‘caus< ARG, ‘daw< | _>’>’ |
| | causer | causee |

Dione proposed a special argument ARG as the matrix argument for each derivation type. In the applicative clause (31b), he assumed that ARG bears the matrix’s

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second argument and is underspecified for a comitative, while in the causative clause (32b), ARG occupies the subject position and bears the matrix first argument.

2.2.3.3 Work on Mande

Nikitina (2011a; 2019) examine a highly unusual basic word order pattern in Mande languages: the rigid S-O-V-X word order, meaning subjects and objects precede the verb, while all oblique arguments and adjuncts follow the verb. For example,

- (33) Soso, Central Mande
- | | | | | |
|-----|--------|----------|-----|----|
| S | O | V | [PP |] |
| ń | nìngéé | fíi-mà | í | má |
| 1SG | cow | give-FUT | 2SG | to |
- ‘I will give you a cow.’

Mande languages are not regarded as “real” verb-final languages in the sense that arguments of a verb are not realized within the same verb phrase: object noun phrases must be placed next to their verb, but postpositional arguments appear in the position outside the verb phrase.

- (34) Wan, Southeastern Mande
- è [kúnà]_{VP} ságlā [yré é gó]_{PP}
 3SG climb started tree DEF in
 ‘She began to climb onto the tree.’
 - *è kúnà [yré é gó]_{PP} ságlā
 3SG climb tree DEF in started
 - *è [yré é gó]_{PP} kúnà ságlā
 3SG tree DEF in climb started

Because the oblique argument *yré é gó* does not form a syntactic constituent with the verb *kúnà* that selects for it, it cannot appear next to that verb as shown in (34b) and (34c), and only (34a) is grammatical in which the verb *kúnà* is embedded in the non-finite complement of the finite verb *ságlā*. Nikitina (2019) explains this unexpected placement of postpositional arguments in terms of a surface-oriented account of high attachment of PPs.

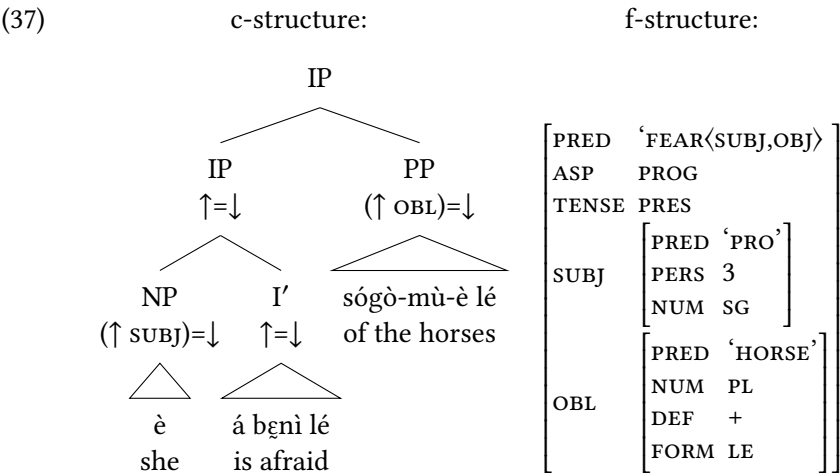
- (35) Wan, Southeastern Mande

è á bɛ̀ni lé sógò-mù-è lé
3SG PROG fear PROG horse-PL-DEF at
'She fears horses.'

The phrase structure rule in (36) allows for PPs to adjoin to the clause (Nikitina 2008; 2011b):

(36) $IP \longrightarrow IP \quad PP$
 $\uparrow=\downarrow \quad (\uparrow \text{ GF } * \text{ OBL})=\downarrow$

The Kleene star indicates that the PP can contribute information regarding an oblique argument at any level of embedding, but the ambiguity at the c-structure can be solved at the f-structure where the PP is associated with the main verb to satisfy the well-formedness conditions on f-structure. The resulting structures of (35) is thus represented below:

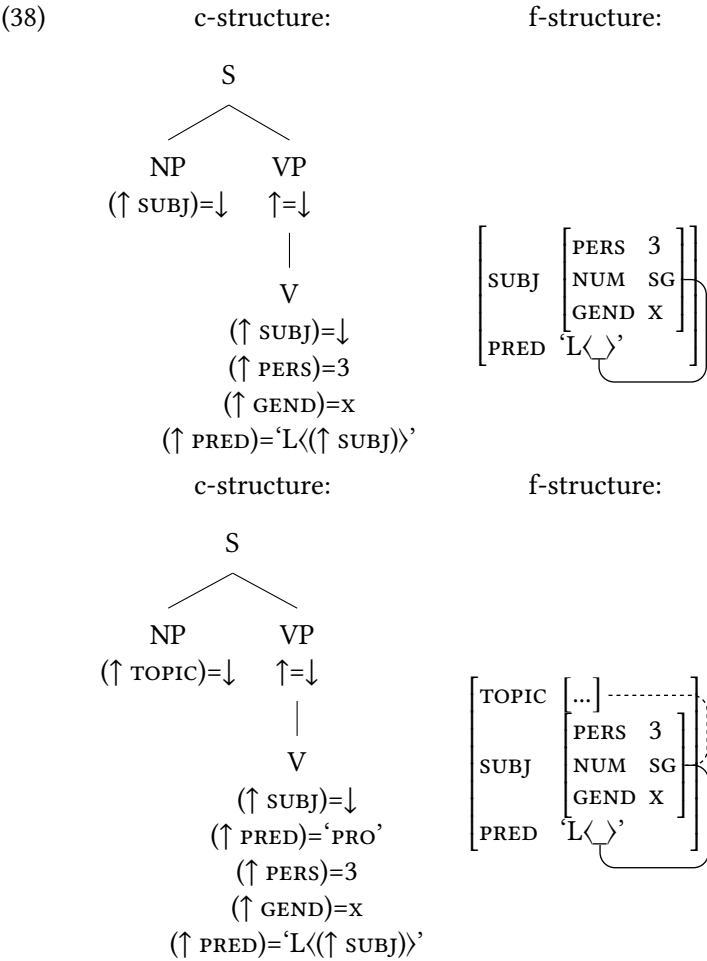


2.3 Agreement

African languages exhibit an interesting nature of agreement (Bresnan & Mchombo 1987, Culy 1996, Mchombo 2004, Nsoh 2011). This section will focus on pronouns in particular. Two particular papers under LFG dealing with pronouns and agreement are from Bresnan & Mchombo (1987) *Topic, Pronoun, and Agreement in Chicheŵa* and Dalrymple (2015) *Obligatory Nonlocal Binding: An Exclusively Long Distance Anaphor in Yag Dii*.

Like other Bantu languages, the subject marker (SM) and object marker (OM) in Chicheŵa indicate agreement in their verbal morphology. For Bresnan and

Mchombo, the OM is always an incorporated pronoun but the subject NP has two possibilities: a true subject grammatically agreeing with the verb or a topic NP anaphorically agreeing with the subject pronominal in the verb, as shown in (38).



In a recent paper, Dalrymple (2015) carries out a thorough investigation on the complicated pronominal system in Yag Dii. According to her, Yag Dii provides counter-evidence to the general assumption that languages do not have grammatical dependencies that are exclusively nonlocal. The following observations are made regarding the distribution of four types of Yag Dii pronouns (Dalrymple 2015: 1113):

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- (39) a. MÍ: can bear any grammatical function, except for subject of $\dot{A}\dot{N}$ clause; antilogophoric in BI domain
 b. $\dot{A}\dot{N}$: must appear as subject of $\dot{A}\dot{N}$ clause; antilogophoric in BI domain
 c. BI: appears only in BI domain; can bear any grammatical function (except for some subordinate subject positions within BI domain); coreferent with logophoric antecedent
 d. \dot{I} : appears only as subordinate subject within logophoric domain; coreferent with logophoric antecedent

Take the BI pronouns for example (Bohnhoff 1986: 118):

- (40) Yag Dii
 Nà'á Ø 'qd bà'á [Múúsà bà Ø 'q [bà biñ híí
 Mother_i (she_i) tells Father Moses_j that (he_j) says that he.BI_{j,*i} wants
 lààli kaali]].
 to.go town.to
 'Mother_i tells Father that Moses_j says that *she_i/he_j wants to go to town.'
- (41) Yag Dii
 *Nà'á Ø 'qd bà'á [bà mí 'q [bà biñ híí lààli kaali]].
 Mother_i (she_i) tells Father that I say that she.BI_i wants to go town.to
 'Mother_i tells Father that I say that she_i wants to go to town.'

The analysis is built on LFG's binding theory, which is schematized in (42) (Dalrymple 2015: 1114).

$$(42) \quad (\uparrow_{\sigma} \text{ ANT}) = ((\quad \text{GF}^* \quad \text{GF}_{\text{PRO}} \quad \uparrow) \quad \text{GF}_{\text{ANT}} \quad)_{\sigma}$$

DELIMITS	GRAMMATICAL	GRAMMATICAL
BINDING	FUNCTION OF	FUNCTION OF
DOMAIN	PRONOUN	ANTECEDENT

f-structure: $\left[\begin{array}{c} \text{GF}_{\text{ANT}} \\ \dots \text{GF}^* \dots \text{GF}_{\text{PRO}} \end{array} \left[\begin{array}{c} \text{ANTECEDENT} \\ \text{PRONOUN} \end{array} \right] \right]$

The equation dictates that the antecedent must be found within the binding domain ($\text{GF}^* \text{GF}_{\text{PRO}} \uparrow$). In order to constrain the distribution of the four types of pronouns, Dalrymple (2015) adds the LOG feature to the inventory of features that are universally available in the binding domain, inspired by Bresnan (2001), Strahan (2009; 2011), Asudeh (2009) and Adesola (2006).

The binding constraints for BI was proposed by Dalrymple as follows:

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$$(43) \quad (\uparrow_{\sigma} \text{ANTECEDENT}) = ((\quad \text{GF}_{\text{LOG}} \quad \text{GF}^* \quad \uparrow) \text{SUBJ})_{\sigma} \\ \quad \quad \quad (\rightarrow \text{LOG}) \quad \neg(\rightarrow \text{LOG}) \\ \quad \quad \quad 1 \quad \quad \quad 2 \quad \quad \quad 3$$

The logophoric pronoun must appear within the logophoric domain which is the f-structure value of the GF_{LOG} feature. The numbers occur under each element of binding equation where constraints are imposed. For example, the number 2 states that the BI pronoun may be embedded at an arbitrary depth within the logophoric domain, but it must be bound by the closest logophoric binder: examples (40)-(41) show the evidence that the smallest BI domain must be chosen (see Dalrymple 2015: 1116 for more details).

2.4 Reciprocal marking

African languages have also provided rich linguistic data for the analysis of reciprocity under the LFG framework (Mchombo & Ngunga 1994, Dalrymple et al. 1998, Mchombo 1999b). A PhD dissertation that has been specifically dedicated to the topic is from Peter Hurst's (2012) *Reciprocation strategies and the syntax of reciprocal constructions*, in which he examined the reciprocal in Icelandic (Germanic), Malagasy (Austronesian) and Swahili (Bantu), based on the previous work, Hurst (2006) and Hurst (2010).

According to Hurst (2006), the Malagasy reciprocal construction is formed by way of a prefix *-if-* or *-ifamp-* to the verb, as shown in (44).

- (44) Malagasy
 N-ifamp-i-laza ho namboly vary Rasoa sy Ravelo.
 PST-RECP-act-say COMP PST.cultivate rice Rasoa and Ravelo
 'Rasoa and Ravelo said of each other that s/he cultivated rice.'

Hurst (2006) proposes that the verb's valency remains unchanged at the level of f-structure and the reciprocal morpheme creates a reciprocal pronoun selected by the verb as an internal argument. The lexical entries for (44) are thus given below:

- (45) *n-ifamp-i-laza* V $(\uparrow \text{PRED}) = \text{'SAY} \langle (\uparrow \text{SUBJ}) (\uparrow \text{XCOMP}) \rangle (\uparrow \text{OBJ})'$
 $(\uparrow \text{XCOMP SUBJ}) = (\uparrow \text{OBJ})$
 $(\uparrow \text{OBJ PRED}) = \text{'PRO}_{\text{REC}}'$ (from *-ifamp-*)
 $(\uparrow \text{VOICE}) = \text{ACTIVE}$
 $(\uparrow \text{TENSE}) = \text{PAST}$

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<i>namboly</i>	V	(↑ PRED) = ‘CULTIVATE<(↑ SUBJ) (↑ OBJ)>’ (↑ VOICE) = ACTIVE (↑ TENSE) = PAST
<i>vary</i>	N	(↑ PRED) = ‘RICE’

Furthermore, [Hurst \(2010\)](#) examines two reciprocal constructions in Swahili: the monadic construction that incorporates the participants into the subject NP while losing an object NP and the dyadic construction that has two participants in the subject NP and in a comitative phrase respectively. According to his LFG analyses, the syntactic and semantic (to a lesser extent) behaviour of reciprocal constructions results from more fundamental reciprocation strategies by which asymmetric predicates are made to describe symmetric situations, rather than from structural features, i.e., the formation process that may involve clitics and affixes. [Khumalo \(2014\)](#) also touches upon similar constructions (monadic and dyadic) in Ndebele using the Lexical Mapping Theory (LMT). Like in most Bantu languages, the Ndebele reciprocal is marked by the verbal suffix *-an-*, as shown in (46).

- (46) Ndebele
 Aba-ntwana ba-ya-thand-an-a.
 2-children 2SM-PRS-love-RECP-FV
 ‘The children love each other.’

The monadic construction seems to violate the mapping principle in the LMT since each semantic role is assigned to a grammatical function and vice versa. According to the semantic interpretation of the reciprocal, the only participant in (46), *abantwana*, acts both as an agent and a beneficiary, as illustrated in (47).⁷

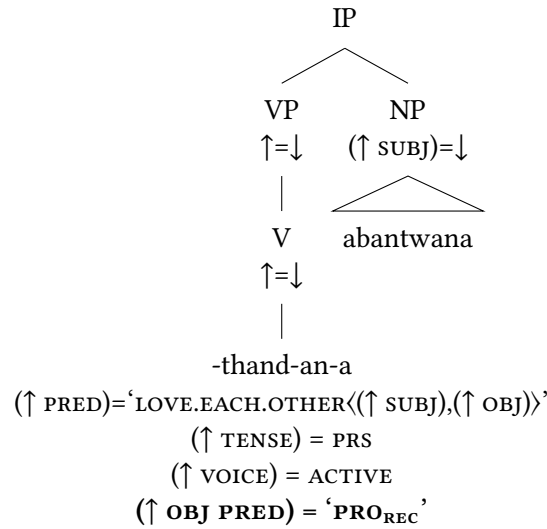
- (47) A-structure: *thanda* ⟨AGENT, BENEFICIARY⟩
 F-structure: *thandana* ⟨SUBJ⟩

Following [Hurst \(2006; 2010\)](#), [Khumalo \(2014\)](#) attempts to solve the puzzle by proposing the following analysis:

- (48) c-structure:

⁷See [Alsina \(1996b: 260-263\)](#) for a similar analysis of the formation of reciprocal expressions in Catalan.

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f-structure:

SUBJ	["ABANTWANA"]
OBJ	[PRED 'PRO _{REC} ']
PRED	'-THANDANA<(↑ SUBJ), (↑ OBJ)>'
VOICE	ACTIVE
TENSE	PRS

In this analysis, the reciprocal pronoun is licensed by the reciprocal morpheme through the definition, -an-: (↑ **OBJ PRED**) = 'PRO_{REC}'. As for the dyadic construction, Hurst (2010) proposes that the comitative NP should be treated as an argument-adjunct which cannot receive a theta role but is crucially licensed in the a-structure.

2.5 Locative inversion

The discussion of locatives in African languages has also attracted considerable attention (Bresnan & Kanerva 1989, Bresnan 1991, 1994, Moshi 1995, Morapedi 2010). Interestingly, unlike the PP locative in English, locatives have the structure of NP and occur freely in the subject and object positions. The locative phrase is a subject in (49a) and an object in (49b). Example (49c) is the passivized version of (49a) in which the locative is the object of the preposition "by". Obligatory subject-verb agreement can also be seen with locative subjects as shown in (49).

(49) Chicheŵa (Bresnan 1991: 58)

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- a. Ku San José kú-ma-ndi-sangalâts-a.
 17 San Jose 17-SBJ-PRS.HAB-I.SG.OBJ-please-IND
 ‘It pleases me in San Jose, (Being in) San Jose pleases me.’
- b. Ndí-ma-kónd-á ku San Josê.
 I.SG.SBJ-PRS.HAB-love-IND 17 San Jose
 ‘I like it in San Jose.’
- c. Ndí-ma-sangalats-ídw-á ndí ku San Josê.
 I.SG.SBJ-PRS.HAB-please-PASS-IND by 17 San Jose
 ‘I am pleased by (being in) San Jose.’

Another salient feature of locatives is exhibited by locative inversion construction.

(50) Chicheŵa (Bresnan 1991: 60)

- a. A-lendô-wo a-na-bwér-á ku-mu-dzi.
 2-visitor-2those 2SBJ-REC.PST-come-IND 17-3-village
 ‘Those visitors came to the village.’
- b. Ku-mu-dzi ku-na-bwér-á a-lendô-wo.
 17-3-village 17SBJ-REC.PST-come-IND 2-visitor-2those
 ‘To the village came those visitors.’

The locative *ku-mu-dzi* is the oblique complement of the intransitive verb (or passive verbs) and undergoes locative inversion as illustrated in (50b). According to Bresnan and Karneva’s analysis, “the inverted subject is the thematic subject, the syntactic object, and the presentational focus in discourse” (1989: 38), which can be accounted for by generalizing the special subject default to the focus subject default:⁸

- (51) $[f]$ *loc* / *expl*
 |
 $[-r]$

There is a constraint regarding the distribution of the focus feature $[f]$ in Chicheŵa: only the theme argument can bear an $[f]$ feature, and only when it is the highest expressed role.⁹

⁸The feature $[f]$ refers to the presentational focus attribute(s), and *expl* represents an expletive subject that may appear as an alternative to the *loc* classification.

⁹Bresnan & Karneva (1989) is another long and complex paper. For reason of conciseness, we cannot include all details here, but we encourage those who are interested in the analysis to read the whole paper.

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Morapedi (2010) argues that the preverbal locative NP in Setswana is not the subject but the topic setting the scene for the focused NP in the sense that the preverbal locative NP does not pass the subjecthood test, while the post-verbal NP shows features atypical of objects.

2.6 Serial verbs and complex predicates

Complex predicates can be defined as predicates which are composed of more than one grammatical element (either morphemes or words), each of which contributes a non-trivial part of the information of the complex predicate (Alsina et al. 1997). Within the framework of LFG, the pioneer work has been done by Butt (1995; 1998), Alsina (1993; 1994), Frank (1996), Bodomo (1996; 1997), and Mohanan (1997).

Bodomo (1996) provides a series of syntactic and semantic tests on two types (causative and benefactive) of SVCs in Dagaare and Akan, arguing that the various verbs do indeed behave as a unit in the form of a complex predicate.

(52) Dagaare

- a. Báyúó dà ngmε-ø lá Áyúó lɔɔ-ø.
Bayuo PST beat-PRF FOC Ayuo CAUS+fall-PRF
'Bayuo knocked Ayuo down.'
- b. Ò dà dé lá à bié zèglè bàrè.
he PST take FOC DEF child seat leave
'He seated away the child.'

(53) Akan

- Kofi fa-a ntoma ma-a me.
Kofi take-PRF cloth give-PRF me
'Kofi took a cloth for me.'

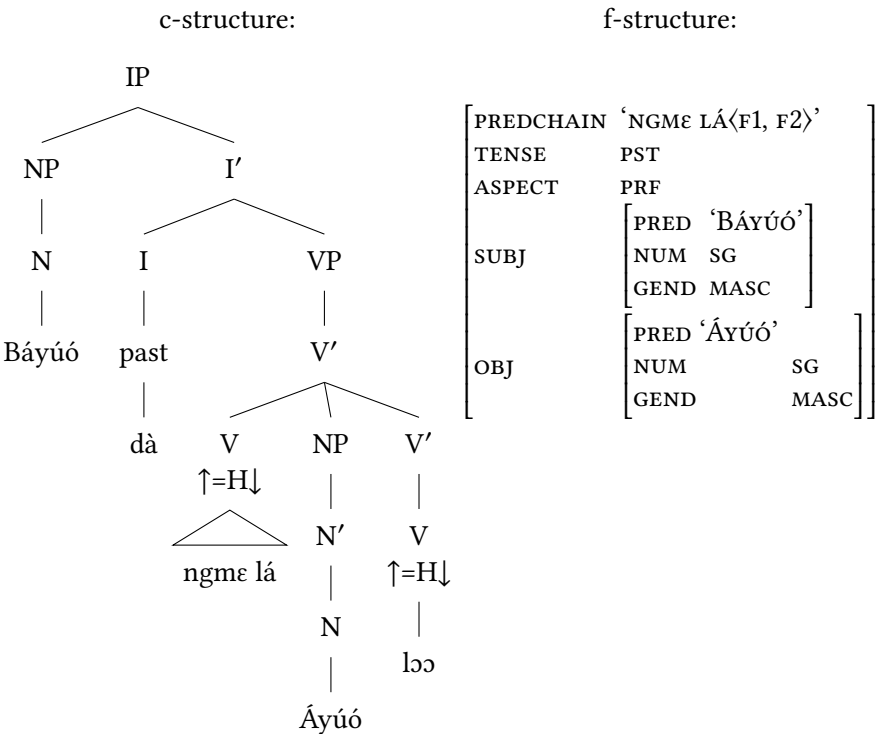
Bodomo adopted and extended Alsina's (1994) idea of predicate composition to license the idea of composing the PRED features of SVCs into a single predicate-chain feature, labeled PREDCHAIN. Since in standard LFG unification is not possible with PRED values, Alsina replaces the annotation, $\uparrow=\downarrow$, found on heads with the annotation, $\uparrow=H\downarrow$, which will then allow the PRED values to be composed and not unified, represented below:

$$(54) \quad \uparrow=H\downarrow \equiv_{\text{def}} \uparrow \backslash_{\text{PRED}} = \downarrow \backslash_{\text{PRED}} \\ (\uparrow \text{ PRED}) = F((\downarrow \text{ PRED}), (\rightarrow H \text{ PRED}))$$

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What the definition says is that if a c-structure node has the head equation, its features are identical to the features of its mother node M except for PRED, and its PRED feature composes with that of its head sister node to yield the PRED feature of M. According to Bodomo, Alsina built his extension of the classical LFG notation on the assumption that one of the PREDs which compose must be incomplete. However, it is difficult to consider any of the verbs in the SVC data of Dagaare and Akan as any less complete than the other. A solution would be to consider, as does Baker (1989), a distinction of the notion of head into secondary and primary heads. Some of the predicates in the SVC would then be secondary to others in terms of headedness. It is these “secondary predicates” which count as the equivalents of the incomplete predicates in the sense Alsina used them. In this way predicate composition is possible with SVCs and thus licenses the existence of PREDCHAIN, as shown in (55).

(55)



More recent work on LFG analyses of serial verb constructions in African languages can be seen in Nyampong (2015) and Lovestrland (2018).

2.7 Discourse functions

Discourse functions have constituted another topical issue in African linguistics. The major work under LFG includes Kanerva (1990), Bresnan (1995), Mchombo (2003), Mchombo & Morimoto (2009), Marfo & Bodomo (2005) and Abubakari (2018). Among them, Marfo & Bodomo (2005) stand out for attempting a constraint-based analysis, Optimality-Theoretic LFG (OT-LFG), when addressing *wh*-question fronting and focus constructions in Akan. It is shown that both *wh*-question fronting and focus constructions essentially share common representations in the c-structure and the f-structure but a variance is drawn between them in the information (i-) structure. Q-word fronting in Akan refers to the dislocation of the Q-word to the left-periphery of an extra-sentential position by using a clitic morpheme, *na*, referred to as a focus marker (FOCUS), at the right-edge of the fronted Q-word, as shown in (56).

(56) Akan

- a. [IP Pàpá rè-sèré hwáí]
 Father PROG-laugh who
 ‘Father is laughing at who?’
- b. Hwáí_i nà [IP Pàpá ré-séré nó_i]
 who FOC father PROG-laugh 3SG
 ‘Whom is father laughing at?’

Both (56a) and (56b) are legitimate question forms in Akan. On the other hand, in a focus construction in Akan, contrastive information (of certainty) is intentionally employed for the purpose of emphasis as in (57). Both Q-word fronting and focus constructions essentially share a common marked categorial configuration, i.e., [FOCP XP *na* [IP ...]].

(57) Akan

- [FOCP emóó_i nà [IP ɔbáá nó [VP nóá [NP Ø_i]]]]
 rice FOC lady DEF cook.HAB *e*
 ‘It is rice (that) the lady cooks.’

Following Boadi (1990), Marfo & Bodomo (2005) argue that the Q-word fronting lacks semantic contrast given the fact that Q-words are actually inherently focus-marked. As a result, there is a difference in their i-structures regarding the focus type (F-TYPE):

(58) a. Q-word fronting:

FOCUS	$\left[\begin{array}{l} \text{F-TYPE NEUTRAL} \\ \text{I-PRED 'HWAI'} \end{array} \right]$
BCK	$\left[\begin{array}{l} \text{PÀPÁ} \\ \text{RÉSÉRÉ NÓ} \end{array} \right]$

b. Focus:

FOCUS	$\left[\begin{array}{l} \text{F-TYPE CONTRASTIVE} \\ \text{I-PRED 'EMÓÓ'} \end{array} \right]$
BCK	$\left[\begin{array}{l} \text{ᏍBÁÁ NÓ} \\ \text{NÓÁ} \end{array} \right]$

This semantic distinction between the two constructions is further shown in the OT-LFG framework by ranking the following i-/c-structure correspondence/alignment constraints (Choi 2001):

- (59) a. NEW-L: [+NEW] aligns left in the construction of occurrence.
b. PROM-L: [+PROM] aligns left in the construction of occurrence.
c. NEUT-L: [+NEUT] aligns left in the construction of occurrence.
d. CONST-L: [+CONST] aligns left in the construction of occurrence.

(60) NEW-L » PROM-L » CONST-L » NEUT-L

		NEW-L	PROM-L	CONST-L	NEUT-L
	$[\text{FOCP NP}_i \text{ na } [\text{IP Pro}_i [\text{VP V NP}]]]$ ¹⁰				
a.	$[\text{FOCP } \text{emóó}_{[+CONST, +NEW, +PROM]} \text{ nà } [\text{IP Pro}_i [\text{VP V NP}]]]$				*
b.	$[\text{FOCP } \text{Hwái}_{[+NEUT, +NEW, +PROM]} \text{ nà } [\text{IP na } [\text{IP Pro}_i [\text{VP V NP}]]]$			*!	

The table in (60) signals a few things. First, since both Q-word and constituent in focus are noted as “[+PROM] [+NEW]” at the i-structure and each of them sits at Spec-FOCP, it is obvious the i-/c-structure correspondence constraints in (59a-b) will be satisfied in both constructions. However, Q-word fronting and

¹⁰This optimal candidate emerges as $[\text{FOCP NP}_i \text{ na } [\text{IP Pro}_i [\text{VP V NP}]]]$ via OT for both Q-word fronting and focus constructions in an earlier section of the paper. We encourage those who are interested to read the whole paper.

focus constructions have been set apart in the semantics as “discourse-neutral” and “discourse-contrast” respectively through the projected *i*-structure (see (58)). These separate semantic orientations of *Q*-word fronting and focus are expressed in constraint terms (59c-d). Second, CONST-L must crucially outrank NEUT-L where there is a need to establish *i*-*c*-structure harmonic alignment in a focus construction (i.e., a correspondence between a constituent in focus and the Spec-FOCP position, as against harmonic alignment between a fronted *Q*-word and the Spec-FOCP position). Third, the ranking between CONST-L and NEW-L/PROM-L is hardly crucial because both fronted *Q*-word and focus constituent sit at Spec-FOCP and specify for [+NEW]/[+PROM]. Fourth, the fact that the focus construction outperforms the fronted *Q*-word construction does not mean that the *Q*-word fronting construction is ungrammatical since CONST-L and NEUT-L are only necessary constraints motivated on individual semantic content to draw attention to the semantic distinction between *Q*-word fronting and focus constructions. It only explains that, unlike in a focus construction, no semantic contrast is realized in a *Q*-word fronting construction.

This main section of the chapter has documented a diverse set of features of African languages and shown how they have been analyzed in the LFG framework. In §3, we summarise the important role that LFG has played in analyzing African languages.

3 Contributions of LFG to the understanding of African language phenomena

In general, many African languages are characterized by rich morphosyntactic properties, stacked inflectional morphemes and mixed derivational and inflectional uses of the same morphemes, which have posed serious challenges to syntactic movement approaches (Mchombo 1980, Mchombo & Mtenje 1983, Bresnan 1994). The appearance of LFG in the 1970s has provided an important alternative under these circumstances. Petzell (2004) makes a comparison between LFG and transformational theories when dealing with certain phenomena in Bantu languages and concludes that LFG is more suitable for a surface-oriented, lexical analysis of syntactic and morphological issues in Bantu languages. Indeed, the Africanist research done under a constraint-based theory of grammar like LFG shows that multitiered, parallel structure analyses help understand a phenomenon at different levels of the grammar by means of unification, as we have already shown in §2. Bresnan & Kanerva (1989) put it accurately:

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The architecture of generative grammar has been predominantly based on the representation of independent levels of grammatical organization by configurations of the same kind of syntactic sentence structure; yet the need to constrain derivational relations among syntactic representations conflicts with the actual divergence of what is being represented. Although it is possible to superimpose thematic, structural, and functional relations onto the same syntactic representation, only the natural factorization of grammar will enable us to discover the deeper principles of language. (Bresnan & Kanerva 1989:38)

There is no doubt that African languages and LFG are valuable to each other. For one thing, African languages provide a particularly rich empirical domain for testing the adequacy of the LFG framework. And for another, LFG provides a resourceful theoretical tool to look into the nature of these languages (Kroeger 2007).

4 Conclusion

In this chapter, we began with a brief outline of the language situation in Africa as well as a snapshot of the major features of African languages in §1. In §2 we then indicated how LFG has been used to analyze some of these salient features, covering topics such as the lexical integrity principle, applicative constructions, object asymmetries, agreement, reciprocal marking, locative inversion, serial verbs and complex predicates, and discourse functions. In the process of doing all this, the analyses in the chapter point to the major contributions of African languages to the development of LFG and, in turn, the major contributions of LFG to the understanding of African language phenomena, as shown in §3.

But, of course, there are other topics that we have unfortunately not been able to fully address here so as to keep this chapter concise enough. These include causatives (Alsina 1992), dative and passive (Mchombo 1980), comparatives (Beer-mann et al. 2005), negation (Bond 2016), mismatches/mixed categories (Bresnan 1995, Bresnan & Mugane 2006, Morimoto 2002), among others. It seems that most of the work has been done within the Bantu languages,¹¹ although there is now an increasing availability of works in other languages in recent years. We could

¹¹ As pointed out by one of our reviewers, a lot of the key LFG papers in Bantu are from the 1990s while more recently there has been comparatively less work. At the same time, there has been a bit of a Bantu boom beyond LFG, in particular in GB/MP and in comparative studies of variation, including locative inversion, applicatives, agreement, etc. However, these current trends in African linguistics have not yet been addressed fully in the LFG community. On the other

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not agree more with [Henderson \(2011\)](#) that future research on African languages needs more comparative work. Such work will impact not only LFG but also syntactic theory on the whole in a more profound way.

Acknowledgments

We would like to thank a number of people for their help in writing this chapter. First, we thank the editor, Mary Dalrymple, for assigning us this important task of doing an overview of LFG works on African languages. We thank Tatiana Nikitina and four anonymous reviewers for critical and insightful comments that led to what we believe is an improved chapter. We would like to dedicate this chapter to the pioneers of LFG analyses of African languages. Professor Sam Mchombo deserves particular mention in this respect given the sheer number and quality of his contributions in collaboration with prominent LFGists such as Joan Bresnan and Alex Alsina.

Abbreviations

Besides the abbreviations from the Leipzig Glossing Conventions, this chapter uses the following abbreviations.

9-, 3-, etc.	(nominal) class 9, class 3, etc.	AP	applicative
ASC	associative	FV	final vowel
HAB	habitual	HON	honorific
OM	object marker	PL	plural (also used for honorification of an individual)
REC.PST	recent past	SM	subject marker
T	tense		

hand, recent trends in LFG have not yet been linked specifically with African languages. This includes partial agreement ([Sadler 2016](#)) and information structure effects. More discussion of these African language phenomena can be found in [Downing & Marten \(2019\)](#) and [Agwuele & Bodomo \(2018\)](#).

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Chapter 5

LFG and Scandinavian languages

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This chapter gives an overview of some of the LFG literature on the Scandinavian languages: Danish, Swedish, Norwegian, Icelandic and Faroese. LFG has been used to investigate these languages ever since the framework was launched in the eighties. Important work has been done by researchers both inside and outside Scandinavia.

1 Introduction to the Scandinavian languages

The North Germanic languages are referred to in English as the Scandinavian languages. The modern languages are usually divided into Mainland Scandinavian: Danish, Swedish¹ and Norwegian, and Insular Scandinavian: Icelandic and Faroese. The literature on Faroese is limited, and Icelandic will usually have to represent Insular Scandinavian in this chapter.

In Danish, Swedish and Norwegian, the term *skandinavisk* is often used in a different way, to denote only Danish, Swedish and Norwegian. The English use will be applied in this chapter.

Danish, Swedish and Norwegian are by and large mutually intelligible. When Danes, Swedes and Norwegians talk to each other, they can come a long way using their own language. Danish, Swedish and Norwegian may appear to behave alike, but there are often differences that can be more or less subtle.

Mainland Scandinavian and Insular Scandinavian are not mutually intelligible. There are a number of grammatical differences. For example, morphological case

¹The variety spoken in Älvdalen in Sweden, known as *älvdalska* in Swedish, and Elfdalian or Övdalian in English, is often considered a separate language (Garbacz 2009). It has hardly been mentioned in the LFG literature, and it is not discussed in this chapter.

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on nouns and agreement on finite verbs can be found in Insular Scandinavian, but not in Mainland Scandinavian (except for relics in archaic dialects).

Older forms of the Scandinavian languages will be mentioned occasionally. In medieval times, the most important dividing line was between Eastern Scandinavian: Old Danish and Old Swedish, and Western Scandinavian: Old Norwegian and Old Icelandic. The latter two are sometimes referred to together as Old Norse.

There is an interesting LFG literature on various topics in the Scandinavian languages. For more general overviews of their syntax (independently of LFG), the following can be recommended: [Faarlund \(2004\)](#) on Old Norse, [Thráinsson et al. \(2004\)](#) on Faroese, [Thráinsson \(2007\)](#) on Icelandic, and [Faarlund \(2019\)](#) on Mainland Scandinavian.

2 C-structure phenomena

2.1 Basic sentence structure: V2

The architecture of LFG gives an excellent point of departure for studying c-structure. With parallel levels of representation, insights about c-structure can be obtained without necessarily involving the analysis of phenomena that could be argued to belong to other levels.

The Scandinavian languages have a relatively rigid word order, with the well known V2 requirement: the finite (auxiliary or main) verb must be in second position in main clauses.² This is a classical topic within various approaches to syntax.

Examples of V2 are (1) and (2).³ Example (1) has the subject in the initial position, while example (2) has an adverb in the initial position, and the subject following the finite verb.

- (1) Swedish ([Sells 2001](#): 34)

Anna läste bok-en.

Anna read book-DEF

‘Anna read the book.’

- (2) Swedish ([Sells 2001](#): 34, modified)

²The concept of finiteness is discussed and refined in [Sells \(2007\)](#) and [Heinat \(2012\)](#).

³The source of example sentences is indicated when available. Examples that do not indicate a source have been provided by the author.

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Igår läste hon bok-en.
 Yesterday read she book-DEF
 ‘Yesterday she read the book.’

In Mainland Scandinavian, there is no V2 requirement in subordinate clauses. An example is (3).

- (3) Swedish
 Om Anna inte läser bok-en ...
 if Anna not reads book-DEF
 ‘If Anna doesn’t read the book ...’

Icelandic usually has V2 in subordinate clauses (Thráinsson 2007: 58–64), while Faroese subordinate clauses are in the process of changing from V2 to non-V2 (Heycock et al. 2012).

V2 was an important motivation for the field grammar that Paul Diderichsen proposed for Danish (Diderichsen 1946). His approach was later taken up by Ahrenberg (1992), who proposed an LFG-like system in which the c-structure is given in the format of a field grammar.

Functional categories were used in LFG from the nineties. They were inspired by work in the Principles and Parameters framework, but the architecture of LFG made a more restricted use possible. A common Principles and Parameters assumption was that all main clauses in Scandinavian have a CP - IP - VP structure, with C as the designated V2 position.

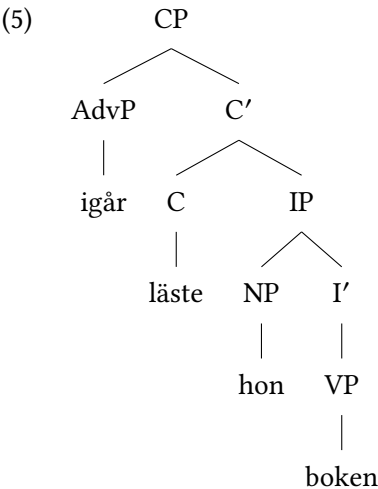
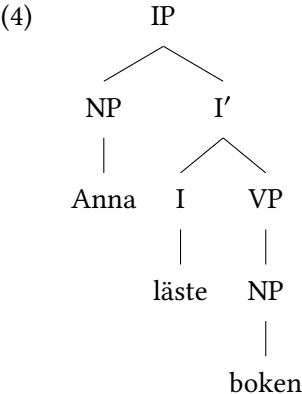
Sells (2001) is an important work on Swedish c-structure in LFG.⁴ The account proposed by Sells is based on the general principles that a subject is typically in SpecIP, and a constituent associated with a discourse function typically in SpecCP. He assumes that subject initial sentences are IPs (when the subject does not have a discourse function), while other sentences are CPs. This means that there is no designated V2 position – the finite verb is either in I or in C in main clauses.

This analysis might seem to allow sentences with more than one main verb. This is not the case, however. CP and IP are functional projections, which correspond to the same f-structure as VP, and this f-structure can only have one PRED.

⁴Sells (2001) includes a component with restrictions stated in Optimality Theory, like some of the work that proposes alternatives to his analysis (Börjars et al. 2003; Andréasson 2007; 2010). For simplicity, these aspects of the analyses are put aside here.

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The c-structure trees for examples (1)–(2) are from Sells (2001: 34). Note that the tree for (1) is an IP with the finite verb in I, while the tree for (2) is a CP with the finite verb in C.



2.2 Object shift

Another c-structure phenomenon that has often been discussed is object shift in Mainland Scandinavian. Examples are (6)–(7).

- (6) Swedish (Sells 2001: 54)
 Anna såg den inte.
 Anna saw it not
 ‘Anna didn’t see it.’

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- (7) Swedish (Sells 2001: 54)

Såg Anna den inte?

saw Anna it not

‘Didn’t Anna see it?’

Object shift means that a weak pronominal object is not realized in the regular object position within the VP, but in a position closer to a finite main verb.⁵ It can then precede a sentence adverb, as in (6)–(7). Object shift requires that the main verb is not in the VP, but in a higher functional projection. This is often called “Holmberg’s generalization” (Holmberg 1999). When the non-finite main verb is in VP, as in (8), then object shift cannot apply.

- (8) Swedish

Anna har inte sett den.

Anna has not seen it

‘Anna has not seen it.’

Sells (2001: 54–56) assumes that a weak pronoun does not project in syntax. He assumes that a shifted pronoun adjoins to the I node. The adjunction is syntactic, and not morphological or phonological incorporation.

Below are the c-structure trees for (6)–(7), from Sells (2001: 62). The finite verb is in I, as in (9), or in the higher C position, as in (10). When the verb is in C, the pronoun is still under I, following the post-verbal subject.⁶ Negation and other sentence adverbs are under I’.⁷

⁵Icelandic also allows object shift with full nominal phrases (Thráinsson 2007: 31–37). This will not be discussed further here.

⁶The reader might find it strange that the pronoun is the only element under I when the verb is in C, as in (10). This follows from the adjunction rule $X \rightarrow X Y$, combined with the optionality of phrase structure nodes and an economy principle which requires “tree pruning”

⁷Negation is always expressed outside the VP. An interesting effect of this is that an argument with a negative quantifier cannot be inside VP, cf. the contrast (i)–(ii). This is discussed in Sells (2000) and Sells (2001: 93–101).

- (i) Swedish (Sells 2001: 93)

Jag såg ingen.

I saw nobody

‘I saw nobody.’

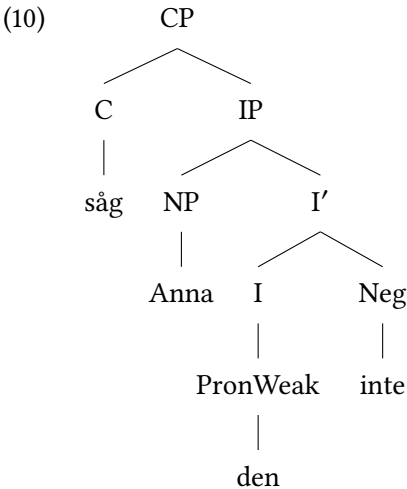
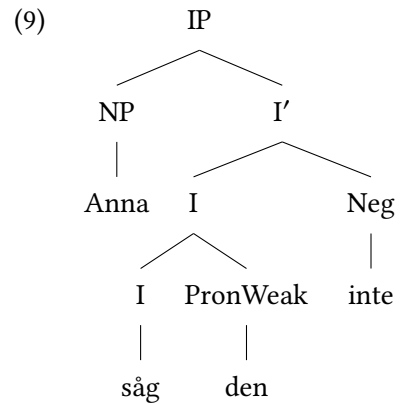
- (ii) Swedish (Sells 2001: 93)

*Jag har sett ingen.

I have seen nobody

‘I have seen nobody.’ [intended]

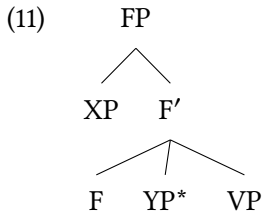
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Restrictions on object shift have been discussed several times, see e.g. [Andréasson \(2008; 2010\)](#), [Ørnes \(2013\)](#), and [Engdahl & Zaenen \(2020\)](#).

2.3 How much hierarchy?

Some researchers have argued that the c-structure proposed by Sells is more hierarchical than necessary, and inconsistent with the principle of Economy of expression (see [Bresnan et al. 2016: 90](#) for this principle). They propose a basic sentence structure with one functional category above VP. The head position of this functional category is then the V2 position. The category is called IP in [Dyvik \(2000\)](#) (on Norwegian), and FP – Finiteness Phrase – in [Börjars et al. \(2003\)](#) and [Andréasson \(2007; 2010\)](#) (on Swedish). The structure they propose is as in (11).



F is the position of the finite verb. An initial subject has the same position as an initial non-subject, namely SpecFP. In the middle field between F and the VP there can be a subject (when not in SpecFP), one or more sentence adverbs, and pronominal objects.

One motivation for this kind of structure is the relative flexibility of the constituent order in the middle field. Sentence adverbs can precede or follow the subject, conditioned by scope and information structure. Examples are (12), with the subject scoping over the sentence adverb, and (13), with the sentence adverb scoping over the subject.

- (12) Swedish (Börjars et al. 2003: 54)

Då skulle alla grod-or-na antagligen dö.
 then should all frog-PL-DEF probably die
 ‘All the frogs should probably die then.’

- (13) Swedish (Börjars et al. 2003: 54)

Då skulle antagligen alla grod-or-na dö.
 then should probably all frog-PL-DEF die
 ‘All the frogs should probably die then.’

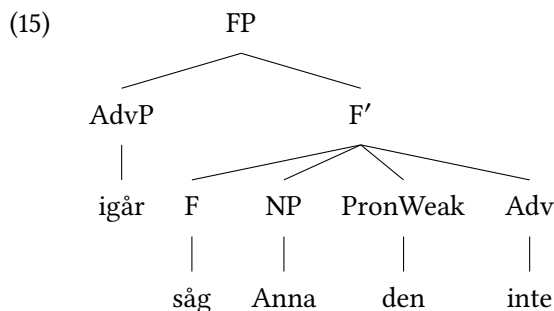
Example (12), with the subject preceding the adverb, requires that frogs have been mentioned in the discourse. There is no such requirement in example (13), with the adverb preceding the subject.

With the FP analysis, a sentence with object shift such as (14) would have the c-structure tree (15).

- (14) Swedish (Sells 2001: 54)

Igår såg Anna den inte.
 yesterday saw Anna it not
 ‘Yesterday, Anna didn’t see it.’

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2.4 Is Icelandic different?

While the clausal hierarchy of Mainland Scandinavian has been discussed within LFG, there has been no parallel discussion of Insular Scandinavian. All newer LFG work on Icelandic seems to assume a c-structure that has one functional category above VP, e.g. Sells (2001: 190–92, 2003; 2005), Booth et al. (2017), Booth (2018). This analysis is also given for Old Norse in Kristoffersen (1996: 69). Icelandic then has the same basic structure that is assumed for Mainland Scandinavian in the work discussed in §2.3 above (the name of the functional projection aside).

Only Sells (2001: 190–92, 2003; 2005) assumes that Icelandic is different from Mainland Scandinavian concerning its basic sentence structure. His motivation seems to be that Icelandic differs from Mainland Scandinavian in being a “symmetric” V2 language with embedded V2. Sells here follows ideas from Diesing (1990) which cannot be discussed further in this context.

2.5 Expletives

The Scandinavian languages have several constructions that involve expletives. However, Icelandic expletives are very different from those of Mainland Scandinavian. Expletives in Mainland Scandinavian have the c-structure properties of subjects, preceding or following the finite verb in main clauses. Examples (16)–(17) show expletives preceding and following the finite verb.

- (16) Norwegian
 Det ble danset til midnatt.
 EXPL became danced to midnight
 ‘People danced until midnight.’

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- (17) Norwegian
 Ble det danset til midnatt?
 became EXPL danced to midnight
 ‘Did people dance until midnight?’

Some Mainland Scandinavian varieties distinguish between expletive *det* ‘it’ and *der* ‘there’ in a way comparable to expletive *it* and *there* in English (Larsson 2014). This is the case in Danish and in some dialects of Swedish and Norwegian. Other varieties use only *det* ‘it’.

Icelandic also has one expletive only, namely *það* ‘it’ (see Booth 2018 for an LFG account of Icelandic expletives). This expletive can occur in the first position of the clause, but it cannot follow the finite verb. Examples are (18)–(19).

- (18) Icelandic (Thráinsson 2007: 310)
 Það var dansað til miðnætis.
 EXPL was danced to midnight
 ‘People danced until midnight.’
- (19) Icelandic (Thráinsson 2007: 312)
 Var (*það) dansað til miðnætis?
 was (*EXPL) danced to midnight
 ‘Did people dance until midnight?’

The position following the finite verb should be considered the basic subject position in Scandinavian main clauses, in the sense that only this position is reserved for subjects. The fact that the Icelandic expletive cannot occur there motivates the common view – inside and outside LFG – that it is not a subject.

Sells (2005) gives a different analysis in which the expletive is treated as a subject. He shows that the Icelandic expletive is not limited to the first position of a main clause. It can occur in the first position in an embedded clause. Some speakers also allow it as a raised subject in the subject-to-object raising construction, as in (20).

- (20) Icelandic (Thráinsson 1979: 481–2)
 Jón telur (það) vera mýs í baðker-inu.
 Jón believes EXPL be mice in bathtub-DEF
 ‘Jón believes there to be mice in the bathtub.’

In Sells’ analysis, the expletive is a subject without a PRED. There can be another subject in the sentence, as in (21).

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- (21) Icelandic (Thráinsson 2007: 327)
 Það höfðu einhverjir stúdentar stolið smjör-inu.
 EXPL had some students stolen butter-DEF
 ‘Some students had stolen the butter.’

Both the expletive and the logical subject then map to subject in f-structure, where the expletive is only reflected by a feature such as [EXPL +] (see also §3.4).

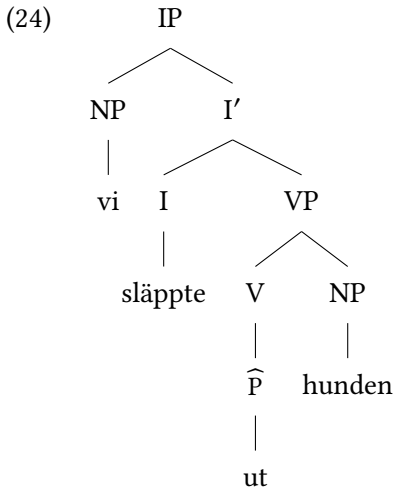
2.6 Verbal particles

The Scandinavian languages differ as to the placement of verbal particles (Lundquist 2014d). Particles precede the object in Swedish, while they follow the object in Danish. Norwegian and Icelandic allow both word orders. Swedish and Danish examples are (22) and (23).

- (22) Swedish (Toivonen 2003: 160)
 Vi släppte ut hund-en.
 we let out dog-DEF
 ‘We let the dog out.’

- (23) Danish (Toivonen 2003: 160)
 Vi slap hund-en ud.
 we let dog-DEF out
 ‘We let the dog out.’

Toivonen (2003) discusses Swedish verbal particles. They precede the object, as mentioned. To be more exact, they follow the verb, and precede all other VP-internal constituents. Toivonen argues that these particles are non-projecting words in c-structure. They are adjoined to V, which explains the word order. The c-structure for (22) is then as in (24), where the “hat” on P means that it is non-projecting (Toivonen 2003: 21–22). Note that the finite verb is in I in (24).



It was mentioned above that the other Scandinavian languages are different with respect to the position of the particle. Toivonen proposes that Danish differs from Swedish in that words such as ‘out’ have a different status in Danish. They are prepositions that project a PP, and PPs generally follow objects.

Norwegian and Icelandic would be more difficult to account for within Toivonen’s proposal, since they allow particles to either precede or follow the object. The Norwegian situation is analysed in [Dyvik et al. \(2019\)](#). They consider particles a c-structure category, and particles can precede or follow the object. Particle verbs have lexical entries in which the verb and the particle are represented as one PRED. For example, the particle verb *skrive opp* ‘write up’ has the PRED (25).

(25) PRED ‘skrive*opp <((↑SUBJ) (↑OBJ))>’

The presence of the relevant particle is secured by a requirement in the lexical entry of the particle verb. A constraining equation requires a feature contributed by the relevant particle. This equation is independent of the position of the particle in c-structure.

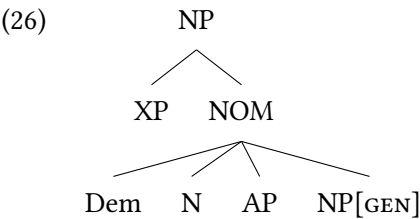
2.7 The structure of nominal phrases

Nominal phrases in modern Scandinavian have a rigid word order. Old Norse is very different, with free word order in nominal phrases.

[Börjars et al. \(2016\)](#) study the development of nominal phrases from Old Norse to Modern Faroese. They argue that the Old Norse nominal phrase is a non-configurational NP. There are no syntactic constraints on word order, but the

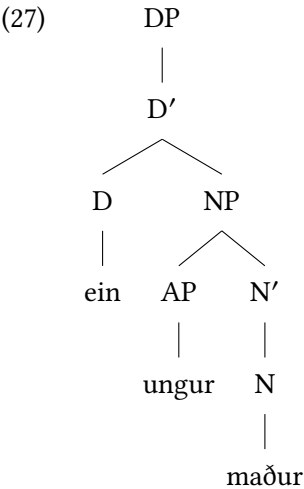
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first position is information structurally privileged. The rest of the phrase has a flat structure. They give the schematic c-structure tree (26) (Börjars et al. 2016: e17).



In Modern Faroese — as in the other modern Scandinavian languages — the word order is no longer free. The first position in a referential nominal phrase contains an element that marks the it as \pm DEFINITE, such as an indefinite or definite article, a demonstrative, or a noun with the bound definiteness marker.

Börjars et al. (2016) argue that what has happened between Old Norse and Modern Faroese is that a category D has developed, which heads a DP. The c-structure tree for Modern Faroese *ein ungur maður* ‘a young man’ is then as in (27) (Börjars et al. 2016: e25).



This is a change from a non-configurational to a configurational nominal phrase.

2.8 Non-projecting possessive pronouns

Standard Swedish and Danish have one position for possessive pronouns in the nominal phrase, preceding the noun and AP (if any). In other Scandinavian vari-

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eties, possessive pronouns in addition have the option of immediately following the noun. Examples are (28)–(29).

- (28) Norwegian
 min ny-e bil
 my new-DEF car
 ‘my new car’
- (29) Norwegian
 den ny-e bil-en min
 the new-DEF car-DEF my
 ‘my new car’

Lødrup (2011) gives a lexicalist analysis of postnominal possessive pronouns in Norwegian, where the main point is that they are non-projecting weak pronouns. They are adjoined to N in syntax, comparable to the weak object pronouns that are adjoined to I in Sells’ analysis (see §2.2). A noun preceding a possessive pronoun always has the definite form. The noun is either under N, as in (29), or in the higher head position D, as in (30) (following Hankamer & Mikkelsen 2002).

- (30) Norwegian
 bil-en min
 car-DEF my
 ‘my car’

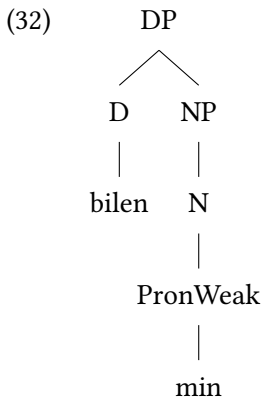
The c-structure trees for (29) and (30) are given in (31) and (32).

- (31)
-
- ```

graph TD
 DP --> D
 DP --> NP1[NP]
 D --> den
 NP1 --> AP
 NP1 --> NP2[NP]
 AP --> nye
 NP2 --> N1[N]
 N1 --> N2[N]
 N1 --> PronWeak
 N2 --> bilen
 PronWeak --> min

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- The diagram shows a c-structure tree for the Norwegian phrase 'den ny-e bil-en min'. The root node is DP, which branches into D and NP. D branches to the word 'den'. NP branches into AP and another NP. AP branches to the word 'nye'. The second NP branches to N. This N branches into another N and a PronWeak node. The final N branches to the word 'bilen', and the PronWeak node branches to the word 'min'.

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### 3 F-structure phenomena

#### 3.1 Oblique subjects in Icelandic

The relation between morphological case and syntactic function is complicated in some languages. The situation in Icelandic has been the object of interesting discussion within different grammatical frameworks. Especially the fact that a number of verbs take an oblique (i.e. non-nominative) subject has been the topic of much attention. Some examples are (33)–(36).

- (33) Icelandic (Andrews 1982: 461)  
 Bát-inn rak á land.  
 boat-DEF.ACC drifted to land.ACC  
 ‘The boat drifted to shore.’

- (34) Icelandic (Andrews 1982: 461)  
 Dreng-ina vantar mat.  
 boys-DEF.ACC lacks food.ACC  
 ‘The boys lack food.’

- (35) Icelandic (Andrews 1982: 462)  
 Barn-inu batnaði veik-in.  
 child-DEF.DAT recovered.from disease-DEF.NOM.  
 ‘The child recovered from the disease.’



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- (36) Icelandic (Zaenen et al. 1985: 100)  
 Henni hefur alltaf þótt Ólaf-ur leiðinleg-ur.  
 she.DAT has always thought Ólaf-NOM boring-NOM  
 ‘She has always found Ólaf boring.’

The verbs that take an oblique subject are all non-agentive. There are some tendencies concerning the correlation between verb meaning and subject case, but the option of an oblique subject must be seen as idiosyncratic. Important ground-work on oblique subjects was carried out within the framework of LFG. The very first mention of the phenomenon was in Andrews (1976); an LFG analysis was later proposed in Andrews (1982). His proposal is to treat an oblique subject in a way that resembles the treatment of a lexically selected preposition. There is an extra “layer” in their f-structure, in the sense that e.g. a dative subject is the value of the attribute DAT, and this f-structure is the value of SUBJ. Below is the simplified f-structure that Andrews (1982: 472) gives example (35).

$$(37) \left[ \begin{array}{l} \text{PRED} \text{ 'BATNA<SUBJ DAT,OBJ>'} \\ \text{SUBJ} \left[ \begin{array}{l} \text{DAT} \left[ \begin{array}{l} \text{PRED 'BARN'} \\ \text{CASE DAT} \\ \text{DEF +} \end{array} \right] \end{array} \right] \\ \text{OBJ} \left[ \begin{array}{l} \text{PRED 'VEIK'} \\ \text{DEF +} \end{array} \right] \end{array} \right]$$

One argument for this analysis is that an oblique subject doesn’t trigger agreement the way a nominative subject does. Regular agreement is blocked by the extra layer. In sentences without a nominative argument, such as (33)–(34) above, the verb occurs in the default third person singular. In sentences with a nominative object, the object can agree with the verb. An example is (38), with a singular oblique subject and a plural nominative object that triggers agreement.

- (38) Icelandic (Thráinsson 2007: 156)  
 Mér hafa alltaf leiðst þessir kjölturakk-ar.  
 me.DAT have.PL always bored these poodle-NOM.PL  
 ‘I have always found these poodles boring.’

Another classic article on non-nominative subjects is Zaenen et al. (1985), who discuss case-preservation in passive sentences. Consider (39)–(40).

- (39) Icelandic (Zaenen et al. 1985: 96)

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Ég hjálpaði honum.  
I helped him.DAT  
'I helped him.'

- (40) Icelandic (Zaenen et al. 1985: 98)  
Honum var hjálpað.  
him.DAT was helped  
'He was helped.'

Zaenen et al. (1985) show how various syntactic criteria for subjecthood give evidence for non-nominative subjects in passive sentences such as (40). They also compare Icelandic to German. German has superficially similar sentences, but Zaenen et al. (1985) show that the non-nominative arguments in question do not show subject properties.

Zaenen et al. (1985) assume that idiosyncratic case is assigned to arguments at the level of a-structure. One important reason for this assumption is that idiosyncratic case is preserved independently of the syntactic function that realizes the argument position. It is not affected by valency alternations such as passive or raising, as can be seen in (40).

The diachrony of oblique subjects in Icelandic is discussed in Schätzle et al. (2015) and Booth et al. (2017).

### 3.2 Control and complementation in Icelandic

Control and complementation have been important research topics in LFG since Bresnan (1982a). These topics are intertwined in some ways. LFG distinguishes between two main types of control. One is anaphoric control of a PRO subject (an f-structure subject with a pronominal PRED). The other is functional control, in which the subordinate subject is structure shared with the subject or the object of the governing verb. Functional control is restricted in several ways. It is limited to complements with the function xCOMP and adjuncts with the function xADJ. This means that if an infinitive can be shown to have a syntactic function other than xCOMP or xADJ, control must be anaphoric.

Andrews (1982) assumes that finite *that*- and *wh*-clauses in Icelandic have the external syntactic properties of nominal phrases, realizing nominal syntactic functions such as subject and object (following Thráinsson 1979). Andrews argues that this is also true of infinitival clauses with the infinitival marker *að*. This analysis gives a prediction about how the subject of these infinitival clauses

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is controlled. Because they are subjects or objects, there must be anaphoric control of a PRO subject.

An interesting question is what case a PRO subject can have. Icelandic verbs can take oblique subjects, as was discussed in §3.1. One should expect, then, that PRO can be oblique when required by the infinitival verb. This expectation is true, as can be seen from example (41).

(41) Icelandic (Andrews 1982: 474)

Ég vonast til að vanta ekki ein-an í tím-anum.  
 I.NOM hope toward to lack not alone-ACC in class-DEF  
 ‘I hope not to be the only one missing from class.’

The main verb *vonast* ‘hope’ takes a regular nominative subject, while the infinitive *vanta* ‘lack’ requires an accusative subject. In (41), the case of PRO can be seen from the case on *einan* ‘alone.ACC’, which is an XADJ that agrees with the subject. If control were functional in (41), the accusative subject of *vanta* would have to structure share with the nominative subject of *vonast* ‘hope’. This would be impossible, however, because structure sharing shares all grammatical properties, and the values for CASE would be incompatible.

### 3.3 Control and complementation in Mainland Scandinavian

The function and control of complement clauses have also been discussed for Mainland Scandinavian. Dalrymple & Lødrup (2000) proposed that a finite complement is an object if it shares external syntactic properties with nominal objects, and a COMP if it doesn’t. (See Alsina et al. 2005 for criticism.)

Icelandic is a language with finite complements that are objects (see §3.2). Examples of languages that have both types of finite complements are English and Swedish (Dalrymple & Lødrup 2000). Norwegian also shows this split, even if object complements represent the dominant option (Lødrup 2004). For example, Norwegian *bevise* ‘prove’ takes a complement that alternates with a nominal phrase, and corresponds to a subject in the passive. Its complement is then assumed to be an object. The verb *anse* ‘consider’, on the other hand, takes a complement that lacks these properties, and it is therefore assumed to be a COMP. Examples (42)–(45) show the differences.

(42) Norwegian (Lødrup 2004: 65)

Han har endelig bevist [at jord-en er rund] / dette  
 he has finally proved that earth-DEF is round / this  
 ‘He has finally proved that the earth is round / this.’

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- (43) Norwegian (Lødrup 2004: 65)  
 [At jord-en er rund] er endelig blitt bevist.  
 that earth-DEF is round is finally become proved  
 ‘That the earth is round has finally been proved.’
- (44) Norwegian  
 Komiteen anser [at fordel-ene oppveier  
 committee-DEF considers that advantage-PL.DEF compensate  
 ulemper-ene] / \*dette  
 disadvantage-PL.DEF / this  
 ‘The committee considers that the advantages compensate for the  
 disadvantages / this.’
- (45) Norwegian  
 \*[At fordel-ene oppveier ulemper-ene] blir  
 that advantage-PL.DEF compensate disadvantage-PL.DEF becomes  
 ansett.  
 considered

Lødrup (2004) shows that infinitival complements in Norwegian also show this split, with object complements as the dominant option. For example, the infinitival complement of *akseptere* ‘accept’ alternates with a nominal object, as shown in (46), and it corresponds to a subject in the passive, as shown in (47).

- (46) Norwegian (Lødrup 2004: 70), modified  
 De har akseptert [å betale høyere skatt] / dette  
 they have accepted to pay higher tax / this  
 ‘They have accepted to pay higher taxes / this.’
- (47) Norwegian (Lødrup 2004: 71)  
 [Å betale høyere skatt] er blitt akseptert.  
 to pay higher tax is become accepted  
 ‘To pay higher taxes has been accepted.’

As for Icelandic (see §3.2), the object analysis implies that the infinitival complements have a PRO subject, and not functional control with structure sharing. In the active (46), the controller of the infinitival subject is the subject of *akseptere* ‘accept’. In the passive (47), on the other hand, the infinitive has no controller.

This situation rules out functional control, because there is nothing that the subject of the infinitive can structure share with. PRO, on the other hand, can do without a controller, so the infinitive must be assumed to have a PRO subject. (A corresponding analysis of the Danish verb *forsøge* ‘try’ is given in Ørnes (2006).)

### 3.4 Subject vs object in presentational sentences

All the Scandinavian languages have what could be called a presentational construction, in which a verb takes an expletive and a so-called logical subject. Examples are (48) and (49).

(48) Norwegian

Det kom fire studenter på forelesning-en i går.  
EXPL came four students on class-DEF in yesterday  
‘Four students came to class yesterday.’

(49) Icelandic (Thráinsson 2007: 310)

Það komu fjór-ir nemend-ur í tím-ann í gær.  
EXPL came-3PLUR four-NOM students-NOM.PL in class-DEF in yesterday  
‘Four students came to class yesterday.’

The grammatical properties of the presentational construction are rather different in Mainland Scandinavian and Icelandic, and there is some discussion concerning its analysis.

For the Icelandic construction, there seems to be agreement that the logical subject is a grammatical subject. As mentioned in §2.5, Icelandic expletives are usually assumed not to be subjects. They can occur in first position, but not in the subject position following the finite verb, as shown in (50).

(50) Icelandic (Thráinsson 2007: 313)

Komu (\*Það) fjórir nemend-ur í tím-ann í gær?  
came-3PLUR (EXPL) four-NOM student-NOM.PL in class-DEF in yesterday  
‘Did four students come to class yesterday?’

However, Sells (2005) assumes that the expletive and the logical subject both map to subject in f-structure. The expletive has no PRED, and no other features that cannot unify with those of the logical subject. Its only reflex in f-structure is then a feature such as [EXPL +].

The Mainland Scandinavian presentational construction is rather different from the Icelandic one. The expletive can occur in all subject positions in c-structure, including the position following the finite verb, as shown in (51).

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(51) Norwegian

Kom det fire studenter på forelesning-en i går?  
 came EXPL four students on class-DEF in yesterday  
 ‘Did four students come to class yesterday?’

The logical subject has the same c-structure position as a regular object. The grammatical status of the logical subject has been discussed several times, both inside and outside LFG. Lødrup (1999b; 2020) argues that it is an object in f-structure, following Askedal (1982), Platzack (1983) and others. This view has been criticized by Börjars & Vincent (2005), Zaenen et al. (2017), and Hellan & Beermann (2020). Börjars & Vincent (2005) propose the same kind of analysis for Swedish that Sells (2005) gives for Icelandic: both the expletive and the logical subject correspond to the subject in f-structure. Zaenen et al. (2017) are more agnostic concerning the correct analysis.

Arguments have been given for both subject and object analyses of the logical subject. The presentational construction is not possible with a syntactically realized object role in Mainland Scandinavian, as shown in (52).

(52) Norwegian

Det spiser mange studenter (\*pølser) i denne kafe-en.  
 EXPL eats many students (sausages) in this cafeteria-DEF  
 ‘Many students eat (sausages) in this cafeteria.’

This gives an argument for the object analysis, which assumes that the direct object function (LFG’s OBJ) is taken by the logical subject. (Icelandic, on the other hand, allows transitive verbs, see example (21) above.)

Another argument for the object analysis is given by subject-to-object raising. Consider (53).

(53) Swedish (Zaenen et al. 2017: 268)

Johan anser det ha varit för många hästar på kyrkogård-en.  
 Johan considers EXPL have been too many horses in churchyard-DEF  
 ‘Johan considers there to have been too many horses in the churchyard.’

Subject-to-object raising leaves the logical subject in the embedded object position, as shown by (53). It is the expletive that raises. This gives an argument that the expletive must be the f-structure subject of ‘to have been’.

Reflexive binding has been used as argument that the logical subject is a grammatical subject. The logical subject not only allows, but seems to require a co-referring proform to be reflexive. An example is (54), in which the reflexive possessive *sin* is acceptable, while the non-reflexive *hans* is not.

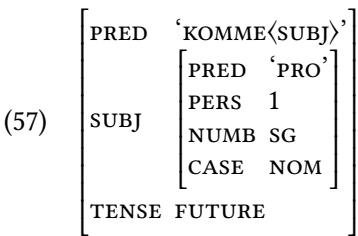
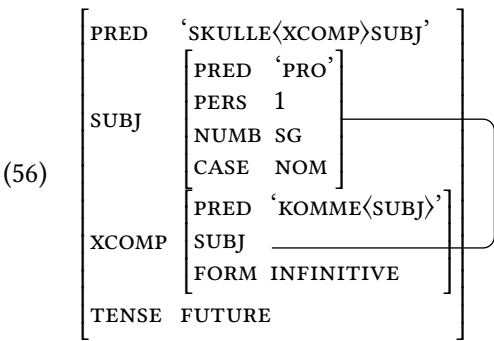
- (54) Swedish (Börjars & Vincent 2005)  
Det kom en man med sin / \*hans fru.  
EXPL came a man with REFL.POSS / his wife  
‘There came a man with his (own) wife.’

The arguments that have been given for the competing analyses of presentational sentences are discussed by Lødrup (2020) who concludes that there are no acceptable arguments for the subject analysis.

3.5 Auxiliaries – verbs or functional heads?

The analysis of auxiliary verbs has often been discussed, both outside and inside LFG. In early LFG, they were treated as raising verbs (Falk 1984). In newer LFG, the tendency has been to see them as functional heads without a PRED. With this analysis, they only contribute grammatical features (Butt et al. 2004; Frank & Zaenen 2004). The f-structures (56) and (57) show the different analyses of example (55), with an auxiliary that expresses future tense.

- (55) Norwegian  
Jeg skal komme. ‘I will come.’  
I shall come



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The analysis of auxiliaries raises several difficult questions, and it is not clear that all verbs that are traditionally called auxiliaries should get the same analysis (Falk 2008). Dyvik (1999) discusses Norwegian modals, and criticizes the functional head analysis. His point of departure is the status of *f*-structure as a grammatical level of representation. He rejects the idea that semantics gives an argument for parallel *f*-structure representations of morphological and periphrastic expression of e.g. the future.

If one accepts the functional head analysis, there are phenomena that must be accounted for in a different way than in traditional LFG. For example, an auxiliary restricts the form of its dependent verb. When the auxiliary selects an *xCOMP*, it can restrict the form of the verb heading the *xCOMP* with the equation ( $\uparrow$ *xCOMP* FORM) = INFINITIVE. To account for this kind of phenomena with the functional head analysis, Butt et al. (2004) propose a separate morphological projection, *m*-structure, (see also Frank & Zaenen 2004). However, Wedekind & Ørsnes (2003) argue that a simpler description is possible, using the so-called restriction operator. They also use the restriction operator in their account of VP-topicalization (Wedekind & Ørsnes 2004).

### 3.6 “*do*-support” in Scandinavian

The Scandinavian languages differ from English in not having *do*-support in interrogative and negative sentences. There is, however, a kind of *do*-support that is used in three contexts: When the main verb VP is topicalized, as in (58), elided, as in (59), or pronominalized as in (60). The support verb in these examples is the present form of (Danish) *gøre* ‘do’.

- (58) Danish (Ørsnes 2011: 410)

Venter gør han ikke.  
waits does he not  
‘He doesn’t wait.’

- (59) Danish (Ørsnes 2011: 410)

Han venter. Nej, han gør ej.  
he waits no he does not  
‘He’ll wait. No he won’t.’

- (60) Danish (Ørsnes 2011: 410)



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Han venter. Nej, det gør han ikke.  
 he waits no that does he not  
 ‘He is waiting. No he is not.’

A VP is pronominalized with the pronoun *det* ‘it/that’ (Lødrup 1994). This construction often corresponds to VP ellipsis in English, which is a rather restricted option in Scandinavian.

Ørsnes (2011) discusses the use of the non-finite form of the support verb. A non-finite support verb is optional when a VP or a VP anaphor is topicalized. An example of the former is (61).

- (61) Danish (Ørsnes 2011: 420)  
 Hørt efter har han aldrig (gjort).  
 listened PARTICLE has he never done  
 ‘Listen! he never did that.’

Ørsnes (2011) shows that the non-finite support verb in Danish can be obligatory with a post-verbal VP anaphor in some cases, as in (62) (see also Ørsnes 2013).

- (62) Danish (Ørsnes 2011: 419)  
 Peter plejer aldrig ??/\*(at gøre) det.  
 Peter used never to do that  
 ‘Peter never used to do that.’

The support verb is considered an auxiliary in Lødrup (1990; 1994). Ørsnes (2011) argues against auxiliary status. A difference from regular auxiliaries is that the support verb cannot take a verbal complement in its complement position. Another difference is that it does not impose restrictions on the shape of its complement. This can be seen in examples (58) and (61) above; a topicalized VP can have its head in the infinitive or in the same form as the support verb (with some variation within Scandinavia). Ørsnes (2011) sees the support verb as a main verb – a subject-to-subject-raising verb that takes an object complement.

### 3.7 Varieties of raising and control

Raising and control have been important research topics within LFG. They are related phenomena, and the border between them can be thin (see e.g. Lødrup 2008c). This section will illustrate how raising can be more constrained in Scandinavian as compared to English, and show how the analysis of raising and control have been applied to other constructions in Scandinavian. (Note that the discussion of passives in §3.8 also covers two constructions that have been given a raising analysis: pseudopassives and complex passives.)

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### 3.7.1 Raising to object with *believe* type verbs

Norwegian is traditionally assumed not to have raising to object with *believe* type verbs (sometimes called the ECM construction). Lødrup (2008b) shows that even if sentences such as (63) are possible, sentences such as (64) are not.

- (63) Norwegian (www)  
 Dette antar jeg å være en menneskelig forsvarsmekanisme.  
 this assume I to be a human defense.mechanism  
 ‘This I assume to be a human defense mechanism.’

- (64) Norwegian  
 \*Jeg antar dette å være en menneskelig forsvarsmekanisme.  
 I assume this to be a human defense.mechanism  
 ‘I assume this to be a human defense mechanism.’ [intended]

The relevant difference between (63) and (64) is that the raised object is in the canonical object position in (64), and in SpecCP in (63). Norwegian requires that the raised object be in a topic or focus position. This constraint was called the Derived Object Constraint in Postal (1974) (see also Kayne 1981). In Lødrup (2008b) the relevant verbs are equipped with a constraint in the lexicon which says that the raised object is realized as a discourse function.

Danish and Swedish are not exactly like Norwegian concerning raising to object with *believe* type verbs. In Danish, it seems to be rather marginal (Brandt 1995: 26). In Swedish, on the other hand, this kind of raising seems to be somewhat less restricted, at least in writing (Teleman et al. 1999: 576–78).

Passive raising sentences with *believe* type verbs, such as (65), are not affected by the Derived Object Constraint.

- (65) Swedish (Ramhøj 2016: 583)  
 Hon säg-s vara en utpräglad målskytt.  
 she says-PASS be a specialized goal-scorer  
 ‘She is said to be a specialized goal scorer.’

However, these passive sentences also raise some questions.

First, there is a restriction on the realization of the passive. Mainland Scandinavian has two ways of realizing the passive — with a suffix or with an auxiliary and a participle. Passive raising sentences with *believe* type verbs differ from other passives in being reluctant to take the periphrastic passive, cf. (66).

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- (66) Swedish (Ramhøj 2016: 583)

\*Hon blir sagd vara en utpräglad målskytt.  
 she becomes said be a specialized goal-scorer  
 ‘She is said to be a specialized goal scorer.’

Second, there are passive *believe* type raising sentences that do not correspond to actives, in the sense that there is no acceptable equivalent active with the passive subject as an object. An example is (65) above. These properties could be taken to indicate that the relevant sentences should not be seen as passives of raising sentences with *believe* type verbs. However, Ramhøj (2016) argues that they should.

## 3.7.2 Copy raising

Asudeh & Toivonen (2012) discuss so-called copy raising in Swedish and English. An example is (67).

- (67) Swedish (Asudeh & Toivonen 2012: 323)

Tina verkar som om hon har hittat choklad-en.  
 Tina seems as if she has found chocolate-DEF  
 ‘Tina seems as if she has found the chocolate.’

Copy-raising differs from regular subject to subject raising in that there is a finite complement clause with a pronominal representation of the raised subject. In the analysis of Asudeh & Toivonen (2012), the *som om* ‘as if’ complement is an xCOMP whose subject is raised. This raised subject anaphorically binds the copy pronoun in the complement.

## 3.7.3 Pseudocoordination as control

A favorite topic in both traditional and modern Scandinavian grammar is so-called pseudocoordination (see e.g. Lødrup 2019a and references there). An example is (68).

- (68) Norwegian

Da satt han og arbeidet.  
 then sat he and worked  
 ‘Then he sat working.’

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A pseudocoordination contains two verbs with the same inflectional form, and the conjunction *og* ‘and’ between them. The first verb is often a posture verb, as in (68), but some verbs of other types are also possible. A pseudocoordination has grammatical properties that distinguish it from a coordination of two verbs or verb phrases (Lødrup 2019a). Two important properties are the following:

The two verbs cannot occur together in the V2 position in a sentence such as (69).

- (69) Norwegian  
       \*Da satt og arbeidet han.  
       then sat and worked he  
       ‘Then he sat working.’ [intended]

The first verb in a pseudocoordination allows the presentational construction without involving the second verb, cf. (70).

- (70) Norwegian (Lødrup 2019a: 92, from the www)  
       Nå sitter det en mann her og skriver om en ny type maskin.  
       now sits EXPL a man here and writes about a new type machine  
       ‘A man is sitting here now, writing about a new type of machine.’

Lødrup (2002) discusses the analysis of pseudocoordination, and argues that most pseudocoordinations are complement constructions with functional control of the complement headed by the second verb. In Lødrup (2017) this analysis is revised, with anaphoric instead of functional control. When the second verb heads a verbal complement, the properties illustrated in (69) and (70) above follow. In true coordination two verbs can occur in the V2 position, but in pseudocoordination, the first verb cannot ‘bring with it’ the second verb since it is the head of its complement. In (70), the object *en mann* ‘a man’ can be understood as the subject of the second verb because it is the controller of its PRO subject.<sup>8</sup> With true coordination, a presentational construction involving the first verb only is not possible. The reason is that a preceding object cannot be understood as a subject of a second coordinated VP — only a preceding subject can.

### 3.7.4 The preposition *med* ‘with’ as a control predicate

The preposition *med* ‘with’ (and to some extent *uten* ‘without’) has interesting control properties. Lødrup (1999a) showed that it must be assumed to select a

<sup>8</sup>The observant reader will notice that the author here takes sides in the discussion of the analysis of the presentational construction, calling the controller an object (see §3.4).

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subject in one of its uses. His argument was based upon example (71), which requires a subject in the complement of *med* to bind the reflexive.

- (71) Norwegian (Lødrup 1999a: 376)  
 En dame med en hund foran seg kom løpende.  
 a lady with a dog in.front.of REFL came running  
 ‘A lady with a dog in front of her came running.’

*med* ‘with’ in (71) takes a subject, a non-thematic object and an xCOMP. Haug (2009) argues that *med* can take a subject also when there is no xCOMP. The argument is again based upon binding. Haug gives example (72), in which the object ‘car’ must be interpreted as the possessor of the prepositional object ‘tank’.

- (72) Norwegian (Haug 2009: 343)  
 Han leverte bil-en med full tank.  
 he returned car-DEF with full tank  
 ‘He returned the car with the tank full.’

In Norwegian, this kind of null possessor is generally bound in the same way as a simple reflexive (Lødrup 1999a; 2010, see also §3.11). This means that it cannot be bound by an object (Lødrup 2010: 95), so it is necessary to assume that *med* takes a subject.

The subject of *med* is always an anaphorically bound PRO. The controller is often an argument of the matrix verb, but other controllers are also possible – even a participant implied by a verbal noun, as in example (73).

- (73) Norwegian (Haug 2009: 340)  
 Fødsel-en foregår med ski på bein-a.  
 birth-DEF takes.place with skis on legs-DEF  
 ‘The birth takes place with (the mother or the baby) wearing skis.’

Haug (2009) gives a semantic account of *med* using Glue semantics.

### 3.7.5 “Backward” possessor raising

Lødrup (2009b; 2018) discusses Norwegian sentences such as (74), with a body part noun and a possessor with the preposition *på* ‘on’. This construction corresponds to the dative external possessor construction, which is found in e.g. French and German, cf. (75).

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- (74) Norwegian  
 Jeg brekker arm-en på ham.  
 I break arm-DEF on him  
 ‘I break his arm.’

- (75) French  
 Je lui casse le bras.  
 I him.DAT break DEF arm  
 ‘I break his arm.’

In the French and German dative external possessor construction, the external possessor is understood to be affected by the verbal action. The external possessor is not included in the verb’s basic valency, however. This means that the dative external possessor realizes an “extra” thematic role that must be added by a lexical rule.

The dative external possessor construction is often seen as possessor raising — the dative  $\text{OBJ}_\theta$  is structure shared with the possessor function in the body part noun phrase. (Alternatively, the relation between the possessor and the body part noun could be seen as binding, see e.g. Deal (2017).)

Old Norse had the dative external possessor construction. In Modern Norwegian, there is no dative case, and the possessor is expressed as a PP. This construction is rather similar to the dative external possessor construction, but there is one important difference: The PP can be a part of the body part noun phrase, due to reanalysis (Lødrup 2009b; 2018). Example (74) can have ‘the arm on him’ as one or two constituents.

The two constituent construction can be analyzed in the same way as the dative external possessor construction, when the PP is considered an  $\text{OBJ}_\theta$ . The one constituent construction is more challenging. Lødrup (2018) proposes that the noun phrase-internal possessor should be considered a so-called prominent internal possessor (see e.g. Ritchie 2017). The possessor is structure shared with the verb’s  $\text{OBJ}_\theta$  function. This could be considered a case of “backward” possessor raising. It could be compared to cases of raising and control in which a shared subject is realized in the lower subject position (Polinsky & Potsdam 2006), schematically as in (76).

- (76) tried [John to leave]

The structure sharing equation on the main verb accounts for both forward and backward raising. The lexical entry of the verb in example (74) is given in (77).

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- (77) ‘break  $\langle (\uparrow\text{SUBJ}) (\uparrow\text{OBJ}_{\text{affected}}) (\uparrow\text{OBJ}) \rangle$ ’  
 $(\uparrow\text{OBJ}_{\text{affected}}) = (\uparrow\text{GF POSS})$ , where GF is a local function

## 3.7.6 Possessor raising with unergatives

A different type of possessor raising with body part nouns can be found with transitive and unaccusative verbs in many languages. An example is (78).

- (78) Norwegian (Lødrup 2019b: 562)  
 Hun vasket baby-en i ansikt-et.  
 she washed baby-DEF in face-DEF  
 ‘She washed the baby’s face.’

The possessor is raised from the prepositional object, and realized as an OBJ with transitive verbs, or as a subject with unaccusatives. This kind of possessor raising can also be seen as structure sharing — the OBJ is structure shared with the possessor function in the prepositional object. (Again, the alternative is a binding analysis, see e.g. Deal 2017.)

Lødrup (2009c; 2019b) shows that sentences seemingly similar to (78) also occur with unergative verbs in Norwegian. An example is (79).

- (79) Norwegian (Lødrup 2019b: 563)  
 Hun spyttet ham i ansikt-et.  
 she spat him in face-DEF  
 ‘She spat in his face.’

This option is completely productive. The only restriction is the same for transitive and unergative verbs: they must denote some form of physical contact. Lødrup (2019b) sees the raised argument with unergatives as a thematic object. It realizes the same role as the PP with *på* ‘on’ in sentences such as (74) above. Example (79) can alternatively take this PP, cf. (80).

- (80) Norwegian (Lødrup 2019b: 563)  
 Hun spyttet i ansikt-et på ham.  
 she spat in face-DEF on him  
 ‘She spat in his face.’

However, the raised argument shows the syntactic properties of an OBJ, and not of an  $\text{OBJ}_\theta$  in sentences such as (79) (Lødrup 2019b). We see, then, that the affected role can be realized as either an  $\text{OBJ}_\theta$  PP or an OBJ DP/NP with unergatives. The

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OBJ option follows from the syntactic features assigned to arguments by Lexical Mapping Theory. The affected role will usually be treated as a secondary patient-like role by Lexical Mapping Theory. It then gets the syntactic feature [+o], and is realized as an OBJ<sub>θ</sub>. However, with an unergative verb, the affected role can alternatively be treated as a regular patientlike role. It then gets the syntactic feature [−r], and is realized as a direct object. This option does not exist with unaccusatives or transitives. The reason is that their subject is [−r], and a verb can only take one [−r] argument in Norwegian, as in many other languages (Bresnan & Moshi 1990).

### 3.8 Varieties of the passive

The passive has been a favorite topic in lexicalist frameworks. Scandinavian has a rich and interesting variety of passives. Mainland Scandinavian has two ways of realizing the passive: a periphrastic passive with an auxiliary and a participle, or a morphological passive with a suffix (see e.g. Engdahl 2006). Icelandic only has periphrastic passives (Thránsson 2007: 10–11). Icelandic passives with oblique subjects were mentioned in §3.1.

#### 3.8.1 Different passives of ditransitives

Norwegian, Swedish and to a lesser extent Danish allow both internal arguments of a ditransitive verb to be realized as the passive subject, as shown in (81)–(83).

- (81) Norwegian  
 De overrakte ham medalj-en.  
 they presented him medal-DEF  
 ‘They presented him with the medal.’

- (82) Norwegian  
 Han ble overrakt medalj-en.  
 he became presented medal-DEF  
 ‘He was presented with the medal.’

- (83) Norwegian  
 Medalj-en ble overrakt ham.  
 medal-DEF became presented him  
 ‘The medal was presented to him.’



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These data create problems for theories of the mapping of arguments in passives. It is generally assumed that only one of the internal arguments can correspond to a passive subject. Lexical Mapping Theory assumes that only one internal argument can be classified as an unrestricted function, and thus be realized as a passive subject. [Bresnan & Moshi \(1990\)](#) show that some Bantu languages are “symmetrical” in the sense that either object role can correspond to a passive subject. [Lødrup \(1995\)](#) argues that their analysis cannot be transferred to Mainland Scandinavian, because objects in ditransitives are not symmetrical outside the passive. However, no solution to the problem is presented.

Icelandic is both similar and different from Norwegian and Swedish concerning the passivization of ditransitives ([Zaenen et al. 1985](#)). The central group of ditransitives are those that take a dative object and an accusative object, such as *gefa* ‘give’. They allow both internal arguments to be realized as the passive subject, as shown in (84) and (85). When the dative is realized as a subject, as in (84), the object gets nominative case and can trigger agreement on the verb (compare example (38) above).

- (84) Icelandic ([Zaenen et al. 1985](#): 460)  
 Konung-inum voru gef-nar ambátt-ir.  
 king-DEF.DAT were given-PL female.slave-NOM.PL  
 ‘The king was given female slaves.’

- (85) Icelandic ([Zaenen et al. 1985](#): 460)  
 Ambátt-in var gef-in konung-inum.  
 female.slave-DEF.NOM.SG was given.SG king-DEF.DAT  
 ‘The female slave was given to the king.’

[Zaenen et al. \(1985\)](#) argue that both internal objects with these verbs can be either object or second object [i.e. OBJ or OBJ<sub>θ</sub>]. The option of being an object makes it possible for them to change to subject by the (then current) lexical rule of passive, which replaces OBJ by SUBJ in the linking of roles and functions in the verb’s lexical entry.

Ditransitives with other case frames only allow the linearly first internal argument to be realized as a subject.

## 3.8.2 Pseudopassives

The Mainland Scandinavian languages all have pseudopassives, i.e. passives in which the subject corresponds to the object of a preposition in the active. ([Eng-](#)

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dahl & Laanemets (2015) show that claims to the contrary are not correct.) An example is (86).

- (86) Norwegian (www)  
 Skildringer av norsk natur se-es ofte ned på.  
 depictions of Norwegian nature see-PASS often down on  
 ‘People often look down upon depictions of Norwegian nature.’

Bresnan (1982b) pointed out that pseudopassives create a potential problem for a lexical treatment of the passive. She proposed a rule which incorporates the verb and the preposition into one complex verb (Bresnan 1982b: 50–59). This analysis accounts for the fact that the verb and the preposition behave as a unit in English pseudopassives. The preposition must be adjacent to the verb, and it can be a part of a derived participle-based adjective. Examples are (87)–(88).

- (87) English (Bresnan 1982b: 54)  
 \*Everything was paid twice for.
- (88) English (Bresnan 1982b: 53)  
 Each unpaid for item will be returned.

Scandinavian pseudopassives are different from the English ones. The preposition does not have to be adjacent to the verb, as (86) shows, and derived adjectives with a preposition following the verb do not exist. Scandinavian grammarians have therefore been skeptical of preposition incorporation (see e.g. Christensen 1986).<sup>9</sup> Lødrup (1991) proposes a raising to subject analysis, in which the subject and the prepositional object are structure shared (see also Alsina 2009).

### 3.8.3 Complex passives

The so-called complex passive is exemplified in (89).

- (89) Danish (Ørsnes 2006)  
 Bil-en bed-es flyttet.  
 car-DEF ask-PASS moved  
 ‘You are asked to move your car.’

<sup>9</sup>These arguments rule out an analysis in which the verb and the preposition are one lexical item. However, given later developments within LFG, one could imagine a different analysis that makes the verb and the preposition one unit. They could be one PRED in f-structure in the same way as complex predicates consisting of two verbs (see the discussion following example (90) below).

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This construction has a passive verb followed by a passive or unaccusative participle. One of its interesting properties is that there is no directly corresponding active sentence. It is impossible to realize the theme argument *bilen* ‘car.DEF’ as the object of *bede* ‘ask’.

The complex passive is possible with a small number of first verbs in Danish and Norwegian. It is more marginal in Swedish. Ørsnes (2006) gives an LFG account in which the complex passive is a subject-to-subject raising construction.

## 3.8.4 Long passives

Another type of passive that involves two verbs is exemplified in (90).

- (90) Norwegian  
 Dette forsøk-es å gjør-e(-s).  
 this try-PASS to do-INF(-PASS)  
 ‘One tries to do this.’

This construction can be found in Norwegian, Swedish and Danish, even if speakers’ intuitions vary. It sounds best with a passive second verb (Lødrup 2014). The subject of (90) realizes the internal argument of the second verb. This is a passive of a complex predicate consisting of two verbs (Butt 1995; Alsina 1996; Sells 2004), a so-called long passive (Lødrup 2014).

There is independent evidence for the complex predicate analysis. Verbs that take the long passive also allow verbal feature agreement in the active, in the sense that a second verb takes on the form of the preceding verb, instead of the expected infinitive. Verbal feature agreement is a complex predicate phenomenon, for reasons discussed in Niño (1997) and Sells (2004). Mainland Scandinavian can (to varying degrees) have this kind of agreement with imperatives and participles, as in (91)–(92) (Havnelid 2015; Aagaard 2016).

- (91) Norwegian (www)  
 Forsøk å gjør ditt beste.  
 try.IMP to do.IMP your best  
 ‘Try to do your best.’
- (92) Norwegian (www)  
 Hadde forsøk-t å gjør-t samtal-en kort.  
 had try-PTCP to do-PTCP conversation-DEF short  
 ‘(I) would have tried to make the conversation short.’

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### 3.8.5 The new passive/impersonal construction

Icelandic has a construction that has been called the new passive construction or the new impersonal construction (see [Maling & Sigurjónsdóttir 2002](#)). An example is (93).

- (93) Icelandic ([Kibort & Maling 2015](#))  
 Loks var fund-ið stelp-una eftir mikla leit.  
 finally was found-N.SG girl.(F)-DEF.ACC after great search  
 ‘They finally found the girl after a long search.’

This construction seems to have passive morphology. There is no realized subject. (There can be an expletive in first position, but these are usually not considered subjects, see §2.5.) The external role cannot be realized as a subject, and there is no “promotion to subject” of an internal role.

The analysis of this construction has been discussed several times, but the only LFG discussion is in [Kibort & Maling \(2015\)](#). Some authors see it as a real passive (e.g. [Eythórsson 2008](#)). Maling and her co-authors argue that despite its morphology, the construction is not a passive. They see it as an impersonal active construction, comparable to the Irish autonomous form and the Polish *-no/to* construction. This means that the verbal morphology introduces a PRO subject with an unspecified, typically human interpretation. This PRO is argued to behave like other subjects syntactically. For example, it can control a subject-oriented adjunct, as shown in (94).

- (94) Icelandic ([Maling & Sigurjónsdóttir 2002](#): 125)  
 Það var kom-ið skellihlæjandi í tím-ann.  
 EXPL was come-N.SG laughing.out.loud into class-DEF  
 ‘People came into class laughing out loud.’

### 3.9 Directed motion – rules or constructions

[Toivonen \(2002\)](#) and [Asudeh et al. \(2013\)](#) discuss the Swedish directed motion construction, in which a verb takes a reflexive and a directional PP. An example is (95).

- (95) Swedish ([Asudeh et al. 2013](#): 13)  
 Sarah armbågade sig genom mängd-en.  
 Sarah elbowed REFL through crowd-DEF  
 ‘Sarah elbowed her way through the crowd.’

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Toivonen (2002) discusses how this kind of sentence should be described, with a construction or with a lexical rule. An argument for using a construction is that “it is difficult to pin its meaning to any one of its individual parts” (Toivonen 2002: 342). The relevant sentences denote traversal, but the verb does not need to be a motion verb. There is no special word or morpheme that is uniquely associated with the construction.

Asudeh et al. (2013) discuss this and similar expressions further. They point out that assuming a directed motion construction would violate the Lexical Integrity Principle:

“Morphologically complete words are leaves of the c-structure tree and each leaf corresponds to one and only one c-structure node.” (Bresnan et al. 2016: 92)

This principle entails that units smaller or bigger than words cannot be inserted in c-structure. Asudeh et al. (2013) propose templates to factor out grammatical information that can be invoked by words or construction-specific phrase structure rules. This makes it possible to capture the constructional effects, without giving up the Lexical Integrity Principle.

### 3.10 Definiteness and pronouns

#### 3.10.1 Double definiteness

So-called double definiteness can be found in Norwegian, Swedish and Faroese, but not in Danish and Icelandic. Examples are (96)–(97).

- (96) Norwegian  
       denne hest-en    / ??hest  
       this    horse-DEF / horse  
       ‘this horse ‘

- (97) Norwegian  
       den hvit-e        hest-en    / ??hest  
       the    white-DEF horse-DEF / horse  
       ‘the white horse ‘

Double definiteness means that the definiteness of the nominal phrase is expressed by two elements: both the determiner and the definite suffix on the

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noun.<sup>10</sup> In (97), the adjective makes the determiner *den* obligatory. When there is no adjective, a definite noun such as *hesten* ‘horse.DEF’ can be a nominal phrase on its own.

Double definiteness is usually obligatory in the colloquial language. There are, however, certain options for semantic differences with and without double definiteness, especially in literary style. Some researchers assume that the two definite elements give different semantic contributions to the phrase (e.g. Julien 2005: 35–44).

The LFG formalism makes it easy to account for double definiteness by letting both definite elements introduce [DEF +]. A problem is then how to avoid double definiteness in languages where it is ungrammatical, such as Danish. Cf. example (98).

- (98) Danish  
       den hvid-e      hest / \*hest-en  
       the white-DEF horse / horse-DEF  
       ‘the white horse’

One way of accounting for Danish is to use so-called instantiated values (Strahan 2008: 213–14). The Danish determiner *den* ‘the’ is then specified as [ $\uparrow$  DEF = +\_], where the underscore indicates that this specification cannot unify with anything else. The Danish definite noun *hesten* ‘horse.DEF’ also has this specification, so (98) is ruled out with a definite noun.

A different analysis of double definiteness can be found in Romero (2015). He assumes that the determiner is the only element that has definiteness as an inherent property, while the noun simply agrees with it. The definite form of the noun then carries a constraining equation [ $\uparrow$  DEF =<sub>c</sub> +]. This analysis gives rise to a problem with nominal phrases such as *hesten* ‘horse.DEF’, which can be used in all argument positions. Romero’s solution is that *hesten* is really *den hesten* ‘the horse.DEF’, where the elements undergo lexical sharing (in the sense of Wescoat 2002).

Börjars & Harries (2008) discuss the history of double definiteness, and make the following remark on its analysis:

All analyses of the difference between double and single definiteness appear to be somewhat stipulative [ . . . ] This may be because it is a relatively superficial phenomenon, not associated with deep semantic proper-

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<sup>10</sup>The definite (or “weak”) form of the adjective in (98) is conditioned by the definiteness of the nominal phrase. This will not be discussed further here.

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ties, and hence there may not be any fundamental principled explanation.  
 Börjars & Harries (2008: 341)

## 3.10.2 Pronominal demonstratives

Norwegian and Danish can use a pronoun as a demonstrative in sentences such as (99)–(100).

(99) Norwegian (Strahan 2008: 193)

Se på han mann-en!  
 look at he.NOM man-DEF  
 ‘Look at that man!’

(100) Danish (Strahan 2008: 193)

Se på ham mand-en!  
 look at he.ACC man-DEF  
 ‘Look at that man!’

Johannessen (2008) says that the use of the demonstrative is linked to what she calls psychological distance, and names it the pronominal psychological demonstrative. The form of the pronoun is invariable in each language, not depending upon the function of the nominal phrase. Norwegian always uses the nominative, while Danish uses the accusative. It is striking that Danish can have the definite form of the noun in this construction when double definiteness is not allowed otherwise.

A nominal phrase with a pronominal demonstrative always has specific reference (while the regular distal demonstrative *den* is neutral in this respect). Strahan (2008) sees the relation between the specificity of the pronominal demonstrative and the definiteness of the noun as a kind of agreement.

A difference between Norwegian and Danish is that Danish needs a determiner following the pronominal demonstrative when there is an adjective preceding the noun, as in (101). The noun is then indefinite. The Norwegian equivalent cannot have this determiner following the pronominal demonstrative, as shown in (102).

(101) Danish (Strahan 2008: 213)

Det er ham den store mand.  
 it is he.ACC the big-DEF man  
 ‘It is that big man.’

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- (102) Norwegian  
 Det er han (\*den) store mann-en.  
 it is he.NOM the big-DEF man-DEF  
 ‘It is that big man.’

This difference between Norwegian and Danish shows that the pronominal demonstrative must be at different levels in c-structure in the two languages. *Strahan (2008)* assumes that it is under NP in Norwegian, and under DP in Danish.

Varieties of Swedish are similar to Danish in allowing sentences parallel to (101). On the other hand, Swedish is like Norwegian in using the nominative form of the pronoun.

### 3.10.3 Nominative and accusative of Danish pronouns

Personal pronouns in Danish have, like English, the accusative form as the default form, while the nominative is reserved for subjects. *Ørsnes (2002)* discusses a special feature of Danish: The nominative is only used for local subjects, as in (103). A non-local subject is realized in the accusative form, as in (104).

- (103) Danish (*Ørsnes 2002*)  
 Peter tror han vinder.  
 Peter thinks he.NOM wins  
 ‘Peter thinks he is going to win.’
- (104) Danish (*Ørsnes 2002*)  
 Ham / \*han tror Peter vinder.  
 he.ACC / he.NOM thinks Peter wins  
 ‘Peter thinks he is going to win.’

*Ørsnes (2002)* gives the following conditions for nominative and accusative pronouns:

*Nominative* The DP is the subject of the immediately containing f-structure.

*Accusative* The DP is *not* the subject of the immediately containing f-structure (but possibly the subject of an embedded f-structure).

The constructive case formalism (*Nordlinger 1998*) makes it possible to state these conditions in a simple way. *Ørsnes (2002)* proposes that the accusative *ham* is equipped with the restriction (105), and the nominative *han* with (106).



- (105)

*ham*

$\{\neg (\text{SUBJ } \uparrow) \vee$   
 $((\text{COMP}^+ \text{ SUBJ } \uparrow) \text{ DF}) = \uparrow \}$
- (106)

*han*

$(\text{SUBJ } \uparrow)$   
 $((\text{COMP}^+ \text{ SUBJ } \uparrow) \text{ DF}) \neq \uparrow$

3.11 Reflexive binding

3.11.1 The classical LFG approach

The basic facts about binding of reflexives are rather similar in the Mainland Scandinavian languages (but see [Lundquist 2014a](#) for some nuances).

Norwegian data has played an important role in the development of binding theory in LFG. [Dalrymple \(1993\)](#) was influenced by the pioneer work of [Hellan \(1988\)](#) (see also [Hestvik 1991](#)). Her work is followed up in [Bresnan et al. \(2016: 227–85\)](#). Two general introductions to LFG also discuss binding in Norwegian and Swedish: [Falk \(2001: 173–91\)](#) and [Börjars et al. \(2019: 152–175\)](#).

Anaphoric elements in Norwegian give a nice illustration of different kinds of binding requirements. Their properties are shown in table 1 (from [Dalrymple 1993: 34](#)). A nucleus is a PRED and the functions that it selects. A complete nucleus is a nucleus that contains a SUBJ.

Table 5.1: Anaphoric elements in Norwegian

|                 | Bound to:                            | Disjoint from:                      |
|-----------------|--------------------------------------|-------------------------------------|
| <i>seg selv</i> | subject in coargument domain         |                                     |
| <i>ham selv</i> | argument in minimal complete nucleus | subject in minimal complete nucleus |
| <i>seg</i>      | subject in minimal finite domain     | subject in minimal complete nucleus |
| <i>sin</i>      | subject in minimal finite domain     |                                     |

Examples are (107)–(110).

- (107)

Norwegian ([Dalrymple 1993: 29](#), from [Hellan 1988: 67](#))

Jon fortalte meg om seg selv.

Jon told me about REFL SELF

‘Jon told me about himself.’

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- (108) Norwegian (Dalrymple 1993: 29, from Hellan 1988: 104)  
 Vi fortalte Jon om ham selv. ‘We told Jon about himself.’  
 We told Jon about him SELF
- (109) Norwegian (Dalrymple 1993: 31, from Hellan 1988: 73)  
 Jon hørte oss snakke om seg.  
 Jon heard us talk about REFL  
 ‘Jon heard us talk about him.’
- (110) Norwegian (Dalrymple 1993: 33, from Hellan 1988: 75)  
 Jon ble arrestert i sin kjøkkenhave.  
 Jon became arrested in REFL.POSS kitchen-garden  
 ‘Jon was arrested in his kitchen garden.’

Dalrymple shows how anaphoric elements can be equipped with binding requirements in their lexical entries. Binding is described as an inside-out phenomenon in f-structure. Intuitively, we start at the anaphoric element, and go outwards to find a possible binder to co-index with. The path outward is restricted in different ways for different elements. For example, *seg selv* is bound to the subject in its coargument domain, which means that the path cannot go through an f-structure that contains a subject. Possessive *sin* is bound to a subject in a minimal finite domain, which means that the path cannot go through an f-structure that contains TENSE.

The relation between the anaphoric element and the binder can be non-local, as shown by the long distance use of the simple reflexive *seg* (example (109)). This is a case of functional uncertainty.

### 3.11.2 Some questions of data and interpretation

The Norwegian binding data used by Dalrymple have been the basis of theoretical discussion within different frameworks. They are not without their problems, however. The Hellan/Dalrymple assumptions were criticized in Lødrup (1999a; 2007; 2008a). Three problems for the Hellan/Dalrymple assumptions will be mentioned here: object binders, the status of the simple reflexive *seg*, and binding into a finite clause.

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## 3.11.2.1 Object binders

Hellan and Dalrymple assume that only subjects are possible binders. This might be considered a somewhat brutal idealization of the data, because speakers accept object binders as well in some cases, such as (111) (Lødrup 2008a).

- (111) Norwegian (www)  
 Regl-ene er til for å beskytte dem mot seg selv.  
 rules-DEF are PARTICLE for to protect them against REFL SELF  
 ‘The rules exist to protect them against themselves.’

3.11.2.2 The status of the simple reflexive *seg*

Hellan and Dalrymple assume that the simple reflexive *seg* is not used in local binding, only in long distance binding as in example (109) above. A difficult question concerns the status of the simple reflexive when it is not long distance bound. It is uncontroversial that it can be a non-argument, e.g. with inherently reflexive verbs (such as *skynde seg* ‘hurry’). The problem concerns sentences such as (112), in which the simple reflexive seems to be locally bound.

- (112) Norwegian  
 Jon vasker seg.  
 Jon washes REFL  
 ‘Jon is washing himself.’

In the Hellan/Dalrymple approach, one has to say that this is not an argument reflexive, but a lexical reflexive that is used to detransitivize the verb. (Lødrup 1999a; 2007) argues that the simple reflexive is a thematic object in sentences such as (112). He claims that a locally bound simple reflexive is possible in what he calls a physical contexts (see also Bresnan et al. 2016: 279–282). This means that the reflexive is the object of a verb that denotes an action directed towards the body of the subject, or the object of a locational preposition.

Physical contexts are also the contexts that allow body part nouns and other nouns in the “personal domain” to occur in the definite form without a possessive pronoun, as in (113) (Lødrup 1999a; 2010). The subject is then understood as the possessor. This use of the definite form is independent of the regular conditions on definiteness, such as being previously known or mentioned.

- (113) Norwegian

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Jon vasker ansikt-et.  
Jon washes face-DEF  
'Jon is washing his face.'

Lødrup assumes that both simple reflexives and the relevant group of definite nouns can be bound in physical contexts. Outside physical contexts, the complex reflexive is required — and a body part noun needs a possessive pronoun (or a definite form that satisfies the regular conditions on definiteness). This is shown in (114)-(115).

(114) Norwegian  
Jon elsker seg \*(selv).  
Jon loves REFL (SELF)  
'Jon loves himself.'

(115) Norwegian  
Jon elsker ansikt-et \*(sitt).  
Jon loves face-DEF (REFL.POSS)  
'Jon loves his face.'

### 3.11.2.3 Binding into a finite clause

Mainland Scandinavian allows non-local binding into a non-finite clause, as in example (109) above. Varieties of Mainland Scandinavian also allow binding into a finite clause to some extent. Lødrup (2009a) shows that this can be acceptable when the subject of the embedded clause is low prominent: expletive, non-animate or non-specific. Examples are (116)-(117). Note that the complex reflexive is used in (117).

(116) Norwegian (Lødrup 2009b: 116, from the www)  
Alle kan føle det er en del av seg. . .  
all can feel it is a part of REFL  
'Everybody can feel that it is a part of them.'

(117) Norwegian (Lundquist 2014b)  
Folk leser vel bare de brev-ene som er til seg selv.  
people read presumably only the letters-DEF that are to REFL SELF  
'People presumably only read the letters which are for them.'

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The Norwegian (117) is accepted by a majority of informants, and the same is true of its Swedish equivalent (Lundquist 2014b).

The conditions on binding into a finite clause in Mainland Scandinavian seem to be complicated, and there has been some discussion about their nature (Strahan 2009; 2011; Lødrup 2009a; Lundquist 2014b,c; Julien 2020).

## 3.11.3 Long distance binding in Insular Scandinavian

Icelandic allows binding into a finite clause when the subordinate verb is subjunctive (Thráinsson 1976). Icelandic long distance reflexives are usually considered logophoric (see e.g. Maling 1984). An example is (118).

- (118) Icelandic (Thráinsson 1976)  
 Jón segir að María elsk-i sig.  
 Jón says that María loves-SBJV REFL  
 ‘Jón says that María loves him.’

Sentences corresponding to (118) are also possible in Faroese (Strahan 2011), even though this language does not have a subjunctive mood.

Strahan (2009; 2011) compares long distance binding in Mainland and Insular Scandinavian, and discusses the formalization of relevant binding conditions. An original idea is the use of outside-in (in addition to inside-out) functional uncertainty, to account for the role of the binder as a perspective-holder

## 3.12 Binding of distributive possessors

The Scandinavian languages can use prenominal distributive possessors to express distance distributivity. Examples are (119)-(120).

- (119) Swedish  
 Vi har ätit varsitt äpple.  
 we have eaten each.3.REFL.POSS.NEUT apple  
 ‘We have eaten one apple each.’
- (120) Eastern Norwegian  
 Vi har spist hver-t eple.  
 we have eaten each-NEUT 1.REFL.POSS-NEUT apple  
 ‘We have eaten one apple each.’

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These distributive elements are composed of a distributive quantifier and a reflexive possessor (at least from a historical point of view). Lødrup et al. (2019) compare the grammar of these expressions in Standard Swedish and Eastern Norwegian, and find a number of differences. Eastern Norwegian has agreement that is lacking in Standard Swedish: The distributive quantifier agrees with the following noun in number and gender, and the possessor agrees with the subject in person and number. Another difference is that the Eastern Norwegian expression follows standard binding requirements, while this is not always necessary in Swedish.

Lødrup et al. (2019) give an analysis which is based upon an idea from Vangsnes (2002): The Swedish *varsitt* ‘each.3.REFL.POSS.NEUT’ is a single lexical unit, while its Eastern Norwegian correspondent is syntactically complex. They also give a semantic analysis in which the distributive possessor has the semantics of a Skolemized Choice Function.

## 4 Computational work

Computational approaches to Scandinavian grammar are not covered in this chapter. It could be mentioned, however, that seminal work on Norwegian grammar within LFG has been conducted in several computational linguistics projects at the University of Bergen. NorGram is a broad-coverage LFG grammar for Norwegian implemented on the XLE platform (Dyvik 2000, see also Chapter ??). Extensive online documentation of NorGram covers inter alia basic clause structure, lexical categories, phrase structure categories, and f-structure features.<sup>11</sup> NorGram has been used in the construction of the LFG treebank NorGramBank (Dyvik et al. 2016, see also Chapter ??). For the treebank there is detailed documentation (in Norwegian) on how to search for various grammatical phenomena; it provides not only c- and f-structures, but also comments on the analyses.<sup>12</sup>

## 5 Conclusion

There is a rich LFG literature on various aspects of the Scandinavian languages, and it was impossible to do justice to it all in this chapter. Scandinavian data have played a role in the development of LFG, for example when it comes to binding conditions and functional categories. Chomskyan approaches have had

<sup>11</sup>[https://clarino.uib.no/iness/page?page-id=norgram\\_documentation](https://clarino.uib.no/iness/page?page-id=norgram_documentation)

<sup>12</sup><https://clarino.uib.no/iness/page?page-id=norgram-soek>

a dominating position in Scandinavian syntax, and research in LFG has given alternative perspectives. It has produced results that are important both for Scandinavian and international linguistics.

## Acknowledgments

For thorough and constructive comments I would like to thank the three anonymous reviewers, the editor, and Nigel Vincent. Thanks are also due to Victoria Rosén.

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# Chapter 6

## LFG and Slavic languages

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This chapter provides a survey of LFG work on Slavic languages. It briefly introduces some of the Slavic family's most salient grammatical properties, before outlining how they have been handled in the framework of LFG. The topics include lexical categories and their grammatical features, the morphology-syntax interface, agreement and government, clause structure and information packaging, passivisation, subjectless and impersonal constructions, copular clauses, clitics, negation, distance distributivity, anaphoric control, and coordination. LFG analyses are placed in a wider context, highlighting how they have enhanced our understanding of Slavic, as well as how Slavic has contributed to modifying the formalism of LFG.

To the memory of my grandfather, Metodi Alexandrov,  
named after one of the first teachers of the Slavs

### 1 Introduction and background

#### 1.1 The Slavic languages

Today, the Slavic (or Slavonic) languages are spoken in their heartland of central and eastern Europe, as well as in vast swathes of Asia and various immigrant communities around the world. They all evolved from a common ancestor, Proto-Slav(on)ic/Common Slav(on)ic, itself a variety descended from Proto-Indo-European which can be reconstructed based on the evidence from the attested daughter languages, as well as data obtained from wider comparison across Indo-European (see [Comrie & Corbett 1993](#), [Schenker 1993; 1995](#), [Sussex & Cubberley 2006](#), [Berger et al. 2009](#)). The Slavic languages are conventionally divided into

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three main branches according to the splits that occurred after the breakup of the original Slavic speech community in the first millennium AD:

*East:* Russian, B(y)elorussian (Belarusian), Ukrainian;

*West:* Czech, Slovak(ian), Polish, Kashubian (Cassubian), †Polabian, Upper and Lower Sorbian;

*South:* †Old Church Slavonic (Old Bulgarian), attested between the 9th and 11th centuries AD and in many respects close to the common Slavic progenitor, Bulgarian, Macedonian, Bosnian/Croatian/Serbian, formerly also known as Serbo-Croat(ian), Slovene (Slovenian).

In their authoritative description of the family, [Comrie & Corbett \(1993: 5\)](#) note that “in many ways the Slavonic languages form a homogeneous group within Indo-European. They are therefore an ideal area for comparative and typological work.” Most LFG work has been done on Russian, Polish, Bulgarian and Bosnian/Croatian/Serbian. Below, I first survey some of the salient grammatical properties of the members of the Slavic family, before exploring how they can be captured and elucidated in the framework of Lexical-Functional Grammar.

## 1.2 Salient grammatical properties of Slavic languages

Some of the major issues which are still at the forefront of contemporary Slavic linguistics, including LFG research, received a pioneering treatment in the foundational volumes on Slavic studies, most notably [Miklosich \(1862–1875\)](#) and [Vondrák \(1906–1908\)](#). Such topics include case, number and gender inflections and their usage, constituent order and information packaging, pro-drop, as well as clitic placement.

### 1.2.1 Case, number and gender inflections

Slavic languages have a very rich morphology, boasting an elaborate inflectional system, which makes them a conservative group within the larger Indo-European family. The morphosyntactic categories found in Slavic are those typically found in Indo-European. They are primarily encoded by fusional affixes, i.e. with one morpheme marking several grammatical categories, e.g. case, number and gender (see [Comrie & Corbett 1993: 6, 14–17](#), [Sussex & Cubberley 2006: Chapters 5 and 6](#), [Berger et al. 2009](#)). As is typical of Indo-European, verbs and nouns are grouped into conjugational and declensional classes.

The Common Slavonic case values inherited from Proto-Indo-European include: nominative (for subjects and predicative subject complements/PREDLINK), accusative (characteristically for direct objects, but also for objects of prepositions, temporal adjuncts, etc.), genitive (for possession and various other relations, also taking over the functions of the IE ablative), dative (typically for indirect objects), instrumental (for means or accompaniment, including with prepositions), locative (for location in space or time, now required by diverse prepositions), and vocative (for direct address). The majority of cases have been preserved more or less intact in the modern Slavic varieties, with the exception of Bulgarian and Macedonian, where case has been almost completely abandoned.<sup>1</sup>

The original three-number contrast between singular, dual, and plural has usually been reduced to a binary opposition between singular and plural, with vestiges of the dual found in all the Slavic languages, though only Slovene and Sorbian retain the dual as a distinct category. The standard Late Indo-European genders of masculine, feminine and neuter find continuation in Slavic, which additionally saw the development and spread of a (masculine) personal subgender, sometimes later extended as animate vs. inanimate (see Browne 1993: 319, 363–364, Rothstein 1993: 696–698, Schenker 1993: 108, Timberlake 1993: 836ff. Kibort 2006: Section 2, Berger et al. 2009). Since gender is a grammatical category, there can be disparities between the grammatical gender of a noun and its semantics – for instance, words denoting humans (e.g. ‘child’, ‘boy’ or ‘girl’) could be grammatically neuter, while face cards could be treated as animate.

The morphosyntactic categories listed above participate in extensive agreement, including subject-verb agreement (normally in person and number, except for some tenses consisting solely of historically participial forms which agree in gender and number, as in (8) below; cf. (24), with person, number and gender agreement in Polish; see further Sussex & Cubberley 2006: 279–280). There is agreement in number, gender, and case (in the languages that have it) between

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<sup>1</sup>Przepiórkowski & Patejuk (2011; 2012a,b; 2015), Patejuk (2015) and Patejuk & Przepiórkowski (2014a,b; 2018) offer explicitly formalised outlines of case in Polish, addressing various specificities, including the so-called instrumental of predication (cf. Dalrymple et al. 2004: 192 for instrumental predicative complements in Russian). For an LFG take on case in contemporary Russian, consult Neidle (1988), King (1995: Chapter 8), and Bresnan et al. (2016: 422–425). In addition to their main uses, individual cases can possess more idiosyncratic meanings/functions – for instance, direct objects in negated clauses can appear in the genitive rather than the accusative. The fact that essentially the same phenomenon may exist in more than one Slavic language does not guarantee that it operates in the same way across the board: the “genitive of negation” facts in Modern Russian, for example, differ considerably from those in Polish and even from those in earlier Russian, while this characteristic quirk of Slavic grammar is by now virtually extinct in Czech.

dependents inside the NP and the head noun. In an LFG setting, Dalrymple (2001: 146–148) and Dalrymple et al. (2019: 223–225) discuss agreement in gender and number between Russian relative pronouns and their antecedents, while Neidle (1982; 1988) and Bresnan et al. (2016: 402) examine the behaviour of so-called second predicates in Russian, alongside other agreement phenomena. The interaction of inflectional patterns and morphosyntactic features with syntax and semantics sometimes leads to feature clashes and complex resolution rules which have attracted a great deal of descriptive/typological and theoretical interest, including from scholars working within constraint-based frameworks such as LFG and HPSG (see §2.2–§2.3, as well as Corbett 1983, Huntley 1993: 134–136, Rothstein 1993: 732–734, Timberlake 1993: 865–866.)

### 1.2.2 Constituent order and information packaging

In Modern English, word order encodes syntactic functions like subject (which comes before the verb) or object (characteristically after the verb). Changing the order of constituents either changes the meaning (*Mary kissed John* ≠ *John kissed Mary*, both SVO), or results in ungrammaticality (*\*Mary John kissed*, SOV). By contrast, all the permutations of S, V and O are permissible in Slavic, even in a language which has lost noun case marking, like Bulgarian:<sup>2</sup>

- (1) Bulgarian (personal knowledge)
  - a. Marija celuna Ivan [SVO]  
 Marija kissed.3sg Ivan  
 ‘Marija kissed Ivan.’ (neutral)
  - b. Ivan (go) celuna Marija [OVS]  
 Ivan (him) kissed.3sg Marija  
 ‘(As for Ivan,) Ivan was kissed by Marija.’/‘It was Marija that kissed Ivan.’/‘It was Ivan that Marija kissed.’ (with the exact interpretation depending on context, stress/intonation and the presence/absence of the optional clitic pronoun *go* ‘him’)

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<sup>2</sup>See Rudin (1985: Chapter 2). “Freer” word order is typical of early Indo-European languages and can be attributed to PIE, which might have had SOV as its basic pattern, at the same time allowing various alternative arrangements. Sussex & Cubberley (2006: Chapter 7) and some of the chapters in Berger et al. (2009) provide an overview of Slavic sentence structure, including specific phenomena like passives. While Bulgarian word order is free, major constituents such as NPs have a stricter internal structure and cannot be broken up.

## 6 LFG and Slavic languages

- c. Marija Ivan celuna [SOV]  
 Marija Ivan kissed.3sg  
 ‘It was Ivan that Marija kissed (not somebody else).’ (one possible interpretation)
- d. Ivan Marija (go) celuna [OSV]  
 Ivan Marija (him) kissed.3sg  
 ‘It was Marija that kissed Ivan.’ (one possible interpretation)
- e. Celuna (go) Marija Ivan [VSO]  
 kissed.3sg (him) Marija Ivan  
 ‘Marija did kiss Ivan.’
- f. Celuna (go) Ivan Marija [VOS]  
 kissed.3sg (him) Ivan Marija  
 ‘Marija did kiss Ivan.’

Note that most of these will be ambiguous out of context without a reduplicated/resumptive object clitic pronoun and/or appropriate intonation. In the absence of evidence to the contrary, preference might be given to SVO interpretations as the most neutral. Case will serve to disambiguate the meaning in the languages that retain case inflections on nouns, such as Russian, Czech, Polish or Bosnian/Croatian/Serbian, barring syncretism in some declensions. While Bulgarian and Macedonian have lost the original Slavic case declensions for nouns, they preserve vestigial case distinctions on pronouns, not unlike English or Romance. Sometimes the ambiguity can be resolved by subject-verb agreement, for instance where the subject and object are not identical in number and/or person (or gender for some participial forms).

Crucially, the sentences in (1a)–(1f) do not differ in terms of the subject and agent (*Marija* in all of them) and the syntactic object/semantic patient (*Ivan*). Thus, unlike English, word order in Slavic does not encode grammatical relations. Instead, word order serves information-packaging purposes, namely the arrangement of given and new information or the topic and the focus of the message (Comrie & Corbett 1993: 7, 12–14, King 1995).<sup>3</sup> These insights became prominent due to work on Czech done by linguists from the Prague School, variously labelled functional sentence perspective, communicative dynamism or topic-comment/theme-rheme structure (see Mathesius 1939; 1947, Hajičová et al.

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<sup>3</sup>Compare Browne (1993: 343–344) for Bosnian/Croatian/Serbian, Huntley (1993: 164–165) for Old Church Slavonic, Rothstein (1993: 723, 726–727) for Polish, Scatton (1993: 222, 234–235), Timberlake (1993: 858–860), Bresnan et al. (2016: 199–207, with references) for Russian, Bulgarian and Macedonian.

1998, as well as other representatives of the Prague School listed in Dalrymple et al. 2019: 369–370). Given information which is shared by the speaker and the addressee tends to be placed towards the beginning of the sentence, while important new information, i.e. the focus, tends to be placed towards the end of the sentence; this is especially notable in (1b) in the presence of the object clitic, which assumes that *Ivan* is old and familiar information on which the rest of the message can be “pegged” (something like ‘As for Ivan, he was kissed by Marija’). Therefore, Comrie & Corbett (1993: 13) conclude that “in a sense the basic word order in most Slavonic languages can be said to be Topic-X-Focus, where X represents material other than the topic and focus (non-focus comment material).” The sentence-initial slot can alternatively be associated with a focused constituent, as in some of the examples/interpretations above, including (1b) in the sense ‘It was Ivan that Marija kissed’, this time without the object clitic and with stress on *Ivan* (see §2.4 for a more precise formalisation). It can thus be generalised that Topic-X-Focus order is the default for statements in written Slavonic, but in spoken varieties clause-initial stress may function as a marker of focus.

This means that it is hard to fit individual Slavic languages into types such as SVO, SOV, etc. SVO is the most frequent and therefore arguably the most basic default (surface) word order across the family, though King (1995) proposes that Russian, and perhaps the rest of Slavic, is underlyingly VSO.<sup>4</sup> The frequency of subject-initial clauses might have to do with the frequency of subjects acting as typical topics (cf. Jaeger & Gerassimova 2002: 210).

### 1.2.3 Passives and passive-like constructions

Related to organising the informational content of a message are passive constructions, which Slavic builds with a passive participle combined with the auxiliary ‘be’ (alongside alternative auxiliaries in some of the varieties). There also exist reflexive constructions with a reflexive marker (clitic or affix) derived from Proto-Slavic *\*sę* (<IE *\*s(w)e-*), which sometimes indicate “middle” or passive meanings, as in (2) (see §2.5 below; cf. Browne 1993: 333 for Bosnian/Croatian/Serbian, Rothstein 1993: 712–714 and Kibort 2006: Section 3, for Polish).

(2) Bulgarian (personal knowledge)

- a. Ivan otvori vrata
- Ivan opened the.door
- ‘Ivan opened the door.’

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<sup>4</sup>Suggestions that Bulgarian may have a flat/exocentric S structure, discussed in §2.4.2 and §3.3, or be a VSO language, can be found in King (1995: 120 fn. 21, 127); cf. Rudin (1985).

- b. Vratata se otvori  
 the.door REFL opened  
 ‘The door opened.’/‘The door was/got opened.’

Sussex & Cubberley (2006: 369) note that passives are less common in Slavic than in English: while one of the major roles of the passive in a syntactically more rigid language like English is to enable the rearrangement of old/new information in the clause, a natural way to achieve that in Slavic is to use OV(S) word order instead (cf. (1b) and its passive English translation).

#### 1.2.4 Pro-drop and impersonal clauses

Since finite verbs express the number and person of their subjects, unstressed and unemphatic subject pronouns are often omitted, although the individual languages vary in terms of the extent to which they favour so-called pro-drop or zero anaphora (Comrie & Corbett 1993: 7).<sup>5</sup> Subject pronouns may be inserted for special stress and emphasis.

Slavic additionally has genuinely subjectless/impersonal clauses which neutralise the categories of verbal person and number (as well as gender), utilising the default third person singular (neuter) in the absence of a subject (even an implied one), as in (3)–(4), with accusative or dative experiencers (see Scatton 1993: 222, 227, Schenker 1993: 107–108, King 1995: 134–135).

- (3) Russian (from King 1995: 18)

Ann-u tošnil-o.  
 Anna-ACC be.sick.PST-N.SG  
 ‘Anna was [feeling] sick.’

- (4) Russian (ibid.)

Mne budet xolodno.  
 me.DAT be.FUT.3SG cold  
 ‘I will be cold.’

In an LFG context, Dalrymple (2001: 19) adduces syntactic evidence that Russian, unlike English, has bona fide subjectless sentences. Further discussion, also highlighting unsettled matters and controversies, can be found in §2.6.

<sup>5</sup>Cf. Browne (1993: 365–366), Huntley (1993: 175), Rothstein (1993: 742), Scatton (1993: 234), Timberlake (1993: 871–872), King (1995: 17, 21–22, 69), Sussex & Cubberley (2006: 402).

### 1.2.5 Clitics

Three classes of clitics, inherently stressless words which are unable to stand on their own, can be distinguished in Slavic: proclitics, enclitics and variable clitics, which can be either pro- or enclitics depending on the environment. Proclitics are placed in front of their host (the word/phrase they need to “lean on”), while enclitics follow their host. The position of clitics with respect to other words is fixed and sometimes regulated by complex rules, which (unsurprisingly) differ across the individual members of the family, even when it comes to the distributional restrictions imposed on otherwise cognate items (see further §2.8).

Examples of clitics from the material above include the so-called “short” personal pronoun *go* ‘him’ (3SG.M.ACC) in (1b) (as opposed to the longer/full non-clitic *nego* ‘him’), or the reflexive *se* in (2b). Bulgarian *go*, for instance, belongs in the group of variable clitics: it acts as an enclitic on a stressed verb form when the verb form is sentence-initial, (1e); otherwise, *go* is a proclitic which precedes its verbal host, (1d). By contrast, clitics in the closely related Bosnian/Croatian/Serbian are consistently enclitic, forming an accentual unit with the word that precedes them (see Browne 1993: 345–346, Dimitrova-Vulchanova 1999, Bresnan et al. 2016: 427–429, Diesing & Zec 2016, Zec & Filipović Đurđević 2016, for more detail and refinement).

### 1.2.6 Other phenomena

Apart from the most salient grammatical phenomena of Slavic languages outlined above, the discussion below will feature some additional phenomena that have generated debate in the LFG literature. One such phenomenon is something approximating negative concord/agreement, as in (5), where the negative particle *ne* on the verb appears with other negative forms (see §2.9):

- (5) Bosnian/Croatian/Serbian (from Browne 1993: 362)

Ni(t)ko nigd(j)e ne vidi nikoga.  
nobody nowhere NEG sees nobody  
‘Nobody sees anybody anywhere.’

Another peculiarity, typical of Russian, is the regular omission of the copula ‘be’ in the present tense, which will receive more attention in §2.7 (see also Timberlake 1993: 861–864, 869, 874). Finally, very little work has been done in LFG on Slavic aspect, a conspicuous feature of verbs across the family. Slavic aspect for the most part has to do with semantics (e.g. completion/incompletion), morphology and syntax, all of which are self-contained modules in LFG, so existing analyses can be imported “wholesale”, as noted by an anonymous reviewer, though



spelling out the Glue details or the morphology-syntax interface would still be an intriguing and non-trivial task. This work would be unlike transformational work, where aspectual derivation is commonly done in the syntax.

Revisiting the main points from this introduction, §2 examines LFG treatments of the major grammatical phenomena in Slavic, beginning with the unit of the word, more specifically lexical categories/parts of speech (§2.1) and the morphosyntactic features associated with them (§2.2). §2.3 then zooms in on agreement and government processes, whereas §2.4 outlines how LFG models the structure of the clause. This is followed by brief accounts of specific constructions like passive (§2.5), subjectless, impersonal (§2.6), and copular (§2.7) clauses, clitics and clitic placement (§2.8), as well as negation and negative concord (§2.9). The final sub-sections are dedicated to distance distributivity (§2.10), coordination (§2.11), and anaphora (§2.12). §3 places the relevant LFG research in the context of other frameworks, while §4 sums up how LFG has contributed to our understanding and adequate description of the grammar of Slavic languages.

## 2 LFG analyses of major grammatical phenomena

### 2.1 Lexical categories and the morphology-syntax interface

This section gives a taste of the rich Slavic inflectional system outlined in the opening of the chapter, highlighting how relevant morphological information can be captured in LFG terms and interfaced with the syntax, especially in cases of discrepancy between them. Having assembled at least partial morphological entries of word forms in this and the following two sections, I then illustrate how they are plugged into the syntax, discussed at greater length in §2.4.

Building on typological work by Baerman et al. (2015) and Spencer (2013: 122–123), Dalrymple et al. (2019: 451–453) provide an LFG-based account of mixed lexical categories like Russian *stolovaja* ‘dining-room, canteen’, a lexeme which shares properties of adjectives and nouns. Historically, it derives from an adjective but synchronically it behaves like a noun with a set of adjectival inflections, as illustrated in Table 6.1, where the paradigm of the deadjectival noun *stolovaja* ‘dining-room’ is laid out side by side with those of the regular adjective *bol’soj* ‘big’ (with a feminine in *-aja*), and the regular feminine noun *lampa* ‘lamp’.

*Stolovaja* can be seen as a member of a special class of words which are morphologically adjectives but behave syntactically as nouns, labelled a “mixed lexical category”. In the notation of LFG, a regular adjectival form like *bol’saja* will be assigned to the M-CAT:ADJ, M-CLASS:REGULAR, with an M-CASE value NOM. These

Table 6.1: Nominal and adjectival declensions in Modern Russian (Spencer 2013: 123).

|                   | Noun<br>'dining-room' | Adjective<br>'big' | Noun<br>'lamp' |
|-------------------|-----------------------|--------------------|----------------|
| NOM               | stolov-aja            | bol's-aja          | lamp-a         |
| ACC               | stolov-uju            | bol's-uju          | lamp-u         |
| GEN               | stolov-oj             | bol's-oj           | lamp-i         |
| DAT               | stolov-oj             | bol's-oj           | lamp-e         |
| INS               | stolov-oj             | bol's-oj           | lamp-oj        |
| PREPOSITIONAL/LOC | stolov-oj             | bol's-oj           | lamp-e         |

are some of its important morphological properties. The feminine noun *lampa* will accordingly be of the M-CAT:NOUN, M-CLASS:REGULAR, with M-CASE:NOM. Crucially, the mixed lexical category *stolovaja* will have an entry to acknowledge its intermediate status between an adjective and a noun: M-CAT:ADJ (i.e. a word which patterns morphologically as an adjective), M-CLASS:MIXED-A-N (i.e. a mixed category with the syntactic behaviour of a noun), M-CASE:NOM. These so-called m(orphological)-entries are then fed into a mapping rule, which will assign the mixed-category word *stolovaja* with the m-feature M-CLASS:MIXED-A-N to the c(onstituent)-structure category of N(oun) – this is the word-class membership relevant to the syntax. The mapping rule will essentially map the M-CAT:ADJ to the c-structure category N in the presence of the m-feature M-CLASS:MIXED-A-N, or to the c-structure category of A(djective) if the m-feature is specified as M-CLASS:REGULAR. Depending on the mapping, the word forms thus interfaced can in turn be plugged as N or A terminal nodes in c-structure trees discussed in more detail in §2.4. There have been similar discussions in the specialist literature whether to treat participles as verbal forms or as adjectives, or whether deverbal nouns are actually nouns or verbal forms.

## 2.2 Concord and index features and mismatched nouns

As noted in §1.2.1, Slavic preserves a great deal of its Indo-European morphological heritage, including elaborate declensional patterns. This has prompted a lot of important typological work to do with case, number and gender agreement, most notably by Corbett (1983; 1986; 2006), among others. Material from Slavic has additionally revolutionised the way agreement is thought of in non-transformational theories like HPSG and LFG. Starting with analyses of Bosnian/

Croatian/Serbian cast in the HPSG framework, Wechsler & Zlatić (2000; 2003) propose that there exist two bundles of syntactic agreement features, labelled concord and index, in addition to purely semantic features. Earlier HPSG work likewise recognises AGR/INDEX features, participating in morphosyntactic vs. index agreement (see Czuba & Przepiórkowski 1995, with references, dealing with agreement and case assignment in Polish; consult also Chapter 1).

In Wechsler & Zlatić's model, concord and index both belong to syntax, the former more closely related to morphological declension and the latter more closely reflecting semantics, while semantic properties form a separate category. All the values reside in the lexical entries of individual nouns and generally match, but not always. The motivation behind postulating three separate sets of attributes comes from Bosnian/Croatian/Serbian nouns like *deca* 'children' and *braća* 'brothers', which are said to control feminine singular attributive targets (concord agreement), neuter plural verbs/participles and pronouns (index agreement) and, potentially, masculine plural pronouns (semantic/pragmatic agreement), as in (6), where I illustrate concord agreement within the subject NP and index agreement in the predicate.<sup>6</sup>

- (6) Bosnian/Croatian/Serbian (from Wechsler & Zlatić (2003: 51))

Ta        dobr-a    deca    su        doš-l-a.  
 that.F.SG good-F.SG children AUX.3PL come-PTCP-N.PL  
 'Those good children came.'

Figure 6.1 provides an LFG representation of the features involved in (6), complete with lexical entries which supply the feature values and/or the requirements of individual word forms, alongside a f(unctional)-structure matrix, expressing the functional syntactic relations between the various elements.

Hristov (2012; 2013) advocates the usefulness of these distinctions in the description of the closely related Bulgarian, which has lost its declensions but nevertheless still exhibits analogous gender mismatches in certain nouns. This fea-

<sup>6</sup>Being closer to declension, the concord bundle is comprised of case, number and gender, whereas the index bundle, being closer to semantics, includes person, number and gender – note that subject-verb agreement in person and number, visible on finite *su* 'are', must therefore operate with the index bundle (cf. Dalrymple et al. 2019: 69–71). Here, I focus on gender and number. The analysis of the participle ending in *-a* as neuter plural rather than feminine singular is justified in Wechsler & Zlatić (2003; 2012), Dalrymple & Hristov (2010), Hristov (2012; 2013). Although this is not shown in (6), anaphora between clauses can involve masculine plural pronouns, e.g. *deca...oni* 'they'/ *koi* 'who', though *deca* can control feminine singular agreement in the relative pronoun, especially when it appears in cases other than the nominative.

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|                         |                         |
|-------------------------|-------------------------|
| <i>ta</i> ‘that’:       | (s CONCORD GEND) = F    |
|                         | (s CONCORD NUM) = SG    |
| <i>dobra</i> ‘good’:    | (s CONCORD GEND) = F    |
|                         | (s CONCORD NUM) = SG    |
| <i>deca</i> ‘children’: | (s CONCORD GEND) = F    |
|                         | (s CONCORD NUM) = SG    |
|                         | (s INDEX GEND) = N      |
|                         | (s INDEX NUM) = PL      |
| <i>došla</i> ‘come’:    | (f SUBJ INDEX GEND) = N |
|                         | (f SUBJ INDEX NUM) = PL |

$$f \left[ \begin{array}{c} \text{SUBJ } s \left[ \begin{array}{c} \text{PRED 'COME(SUBJ)'} \\ \text{SPEC 'CHILDREN'} \\ \text{ADJ 'THAT'} \\ \text{CONCORD } \left[ \begin{array}{c} \text{GEND F} \\ \text{NUM SG} \end{array} \right] \\ \text{INDEX } \left[ \begin{array}{c} \text{GEND N} \\ \text{NUM PL} \end{array} \right] \end{array} \right. \left. \begin{array}{c} \left\{ \left[ \text{PRED 'GOOD'} \right] \right\} \end{array} \right] \right]$$

Figure 6.1: Lexical entries and f-structure for a clause with a mismatched BCS noun (adapted from Dalrymple & Hristov 2010: 189)

ture geometry has been further developed in LFG/HPSG and applied to additional Slavic material by Dalrymple & Kaplan (2000), Przepiórkowski et al. (2002), King & Dalrymple (2004), Dalrymple & Hristov (2010), Hristov (2012; 2013), and Belyaev et al. (2015). Those publications sketch out a formalised typology of agreement configurations in conjoined and non-conjoined environments, as well as factors which might influence the choice of one pattern over another. Such agreement mismatches have been instrumental in formulating hypotheses about the (non-)distributivity of features in conjoined contexts (i.e. does a requirement hold of every single conjunct), feature resolution (i.e. computing the value(s) of a conjoined phrase based on the values of its constituents), or what acts as the default value.

In sum, this tripartite split into concord, index and semantics has been widely adopted by researchers in the LFG and HPSG community and has generally proved fruitful, though it is still a matter of debate, with some disagreement over whether the bifurcation into two syntactic features, concord and index, is really justified (see Alsina & Arsenijević 2012a,b,c, Wechsler & Zlatic 2012, Hristov

2013). It remains an outstanding issue for more conclusive future research to determine which features tend to be distributive, resolving or both, as well as their domain(s) of operation. Wechsler (2011), for instance, proposes that predicative adjectives in Bosnian/Croatian/Serbian can exhibit concord, rather than just index, agreement (cf. (6)). The predicative adjective in (7) shows plural (concord) agreement even when the second person plural subject pronoun is used formally for a single addressee.

- (7) Bosnian/Croatian/Serbian (Wechsler 2011, quoted in Dalrymple et al. 2019: 79)

Vi        ste                duhovit-i  
you.PL be.PRS.2PL funny-M.PL

‘You (one formal addressee/multiple addressees) are funny.’

In Bulgarian, on the other hand, some predicative participles may oscillate between singular and plural, while predicative adjectives will normally be singular with single-addressee *Vie* ‘you.PL’ (cf. Sussex & Cubberley 2006: 567 for variation across Slavic).

### 2.3 Agreement and case assignment in a constraint-based setting

As became apparent in the previous section, agreement is modelled in LFG by relying on the lexical entries of individual word forms, which project information that is then propagated to the *f*(unctional)-structure — the locus of agreement phenomena in LFG (see Figure 6.1, as well as Chapter 1). Unlike transformational approaches, where agreement is handled by copying feature values from one node in the syntactic tree to another or by moving items in order for features to be checked, non-derivational constraint-based frameworks like LFG and HPSG tend to assume that two elements which participate in an agreement relation supply partial information about a single linguistic object — a view which amounts to seeing agreement as multiple specifications of compatible feature values by a controller and its target(s) (see Pollard & Sag 1988: 237, Pollard & Sag 1994: Chapter 2, Bresnan 2001: Chapter 8, Dalrymple 2001: Chapter 5, Corbett 2006: 115, Wechsler & Zlatić 2003, Dalrymple & Hristov 2010: 186, Hristov 2012: 24ff, and Chapter 1).

This works very well for Slavic data, especially when it comes to mismatched or underspecified targets and controllers. It is likewise eminently suitable for pro-drop in subject-null languages like Slavic, where the subject controller is often not present, so it would be mysterious where the agreement information on the

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verbal target was “copied” from (unless one posits “disembodied” features or invisible/underlying elements which are then deleted). These considerations have led LFG and HPSG scholars to reject formalisations of agreement as directional feature copying, favouring instead a view of feature co-specification (with transformational feature checking more in this spirit; see the entry in (16), §2.4.2, as well as §2.6).

Similarly, case assignment is modelled in LFG via the interaction of the inflectional entries of lexemes, c(onstituent)-structure configurations and the flow of compatible features between c- and f-structure, as in Figure 6.2 below (cf. Chapter ??). In the spirit of constraint-based grammatical architectures, case specification can be further governed by language-specific constraints, illustrated for Russian in §2.4.3. Analysis and LFG notational conventions for case assignment in Polish can be found in Patejuk (2015), Patejuk & Przepiórkowski (2014b), and Patejuk & Przepiórkowski (2017: 337–339), where the authors rely on, inter alia, disjunctive rules to account for the variation between accusative or genitive objects depending on the presence/absence of negation. Przepiórkowski (1999; 2000), Przepiórkowski & Patejuk (2011; 2012a,b), Patejuk (2015) and Patejuk & Przepiórkowski (2014b; 2017; 2018) deal with agreement, structural case assignment and control phenomena in Polish, especially in conjoined and gapped contexts. Case in Slavic is an important and interesting topic, and LFG provides many novel ideas and accounts in this area, for which the reader is referred to the relevant works cited above, as well as early work by Neidle (1982; 1988), or Dalrymple et al. (2009) on indeterminacy (to be revisited in (32) below).

## 2.4 Constituent structure, the encoding of grammatical functions and information structure

### 2.4.1 Russian

A contrast was drawn in §1.2.2 between English, where word order encodes syntactic functions, and Slavic, where word order serves information-packaging purposes. These divergent typological preferences find natural reflection in LFG’s parallel architecture, which relies on separate modules to represent constituency and word order (c-structure), syntactic functions (f-structure), and discourse functions (i(nformation)-structure). Albeit separate, all of these modules are appropriately interfaced to constrain each other, so that accurate description of typologically diverse linguistic systems can be achieved (see Chapter ??).

English is traditionally assumed to associate the specifier of IP at c-structure with the SUBJ function at f-structure, in line with the generalisation that word order in English encodes syntactic functions. By contrast, King (1995) demonstrates

that the specifier of IP in Russian is associated with the discourse functions of topic or focus, in line with the generalisation that word order in Slavic encodes discourse functions, rather than syntactic ones. Formalised in Figure 6.2, (8) is an example from King (1995: 206) (also cited in Dalrymple 2001: 72 and Bresnan et al. 2016: 203, where the VP is replaced with S, discussed further below).

- (8) Russian  
 ‘Evgenija Onegina’ napisal Puškin.  
 Eugene Onegin wrote Pushkin  
 ‘Pushkin wrote ‘Eugene Onegin.’’ [in answer to the question ‘Who wrote ‘Eugene Onegin’?’]

In Figure 6.2, the topic value is modelled as a set (indicated with curly brackets), since there can be more than one topic, and the topic is further associated with a grammatical function within the clause, since the topic is simultaneously a constituent which bears a certain syntactic function. In addition, the topic is housed within the f-structure, whereas other authors might prefer to accord it a separate interfaced level (i-structure; cf. King 1995: 216–218, 250–251, King 1997, Dalrymple 2001: 182–183, Patejuk 2015: 22, Bresnan et al. 2016: 98–99, 106, Dalrymple et al. 2019: 121ff., 366–367, 374–394, Chapter ??).<sup>7</sup>

Furthermore, note that in Russian and many other languages, all finite verbs appear in I, while in English this phrase-structure position is reserved for tensed auxiliaries, excluding tensed lexical verbs. Only non-finite verbs appear within the VP in Russian, hence finite verbs are of category I and non-finite verbs of category V (King 1994; 1995, Dalrymple 2001: 53–54, 61–62, Bresnan et al. 2016: 102, 104, 109, 147–150, 199–209, Dalrymple et al. 2019: 99–100, 108ff., 119).<sup>8</sup>

<sup>7</sup>Based on Russian data, King (1997) provides detailed argumentation why a separation between f- and i-structure is necessary. In (8), the focused constituent *Puškin* appears clause-finally – in more emotive and intonationally and/or pragmatically marked contexts, it can be clause-initial, preceding the topic (see further King 1995: 91–92, 153, 207ff.). On the relationship between prosody and constituent-structure in Russian and more generally, see King (1995: 128ff.), Dalrymple (2001: 50), Dalrymple et al. (2019: 94–95, 400ff.); for Serbian/Croatian, cf. O’Connor (2006), as well as Chapter ??.

<sup>8</sup>King (1994), King (1995: esp. Chapter 3), Dalrymple (2001: 62–63), Bresnan et al. (2016: 201–203) and Dalrymple et al. (2019: 110) provide empirical evidence for distinct IP and VP constituents in Russian, including coordination and negation, where the negative proclitic *ne* attaches to finite verbs in I, and not to infinitives in V:

- (i) ja [ne bud-u [pisa-t’ pisem]vp i [čita-t’ knig]vp]r  
 I NEG will-1SG write-INF letters.GEN and read-INF books.GEN  
 ‘I will not write letters and read books.’ [negation scopes over both conjoined VPs and

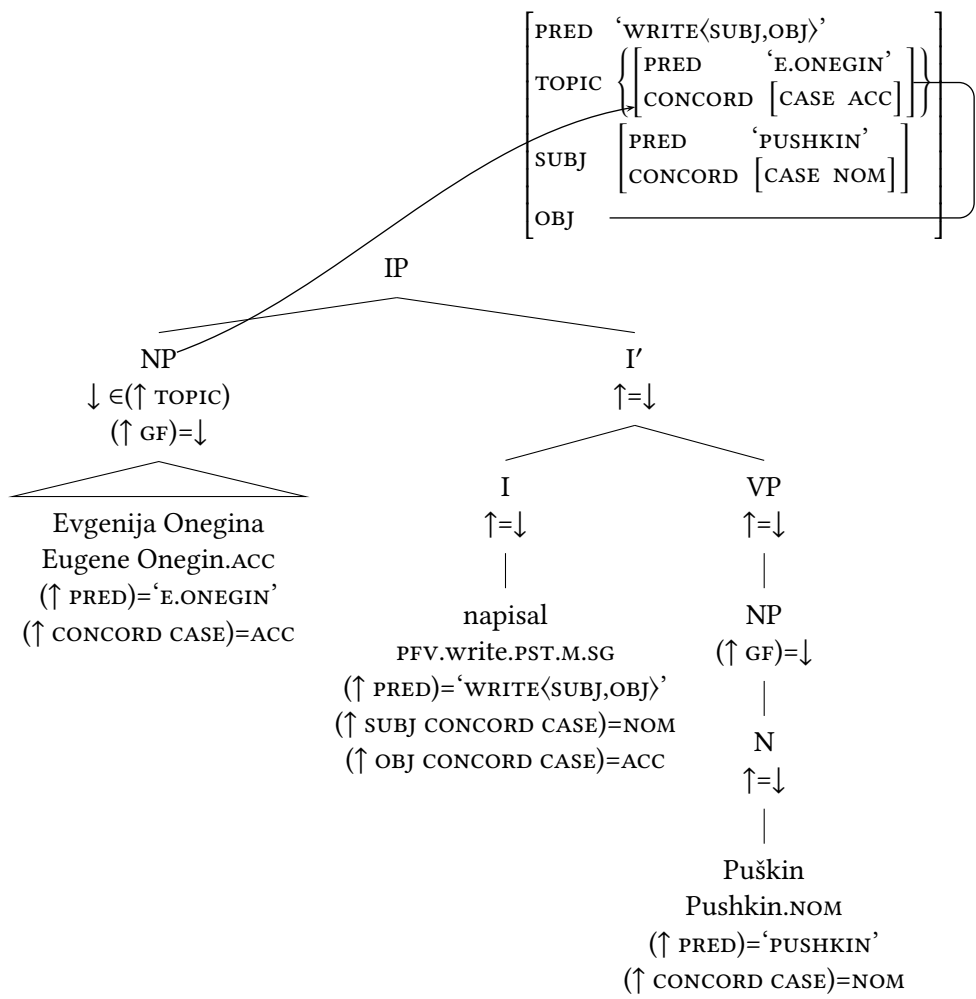


Figure 6.2: C- and f-structure for a Russian sentence with a topicalised object



The topic in (8) happens to be a noun phrase, but it could have been a different type of constituent. To indicate that pretty much any type of phrase can appear in the specifier of CP or IP in Russian, King (1995: 171, 197–198) uses the metacategory XP in the following phrase-structure rules (cf. Dalrymple 2001: 94, 96–97, Dalrymple et al. 2019: 141–142, 144–145, including formal statements to the effect that specifiers appear before heads and complements after heads):

- (9) Phrase-structure rules for Russian:

CP  $\rightarrow$  XP, C'

C'  $\rightarrow$  C, IP

IP  $\rightarrow$  XP, I'

XP is in turn spelled out as follows:

- (10)  $XP \equiv \{NP \mid PP \mid VP \mid AP \mid AdvP\}$

In Figure 6.2, the topic happens to be the object, but topics in general can be identified with any grammatical function. The functional uncertainty of the grammatical function assigned to the topic constituent can be represented by defining an abbreviatory symbol GF as a disjunction of all grammatical functions (Dalrymple 2001: 139–140, Dalrymple et al. 2019: 205–206):

- (11)  $GF \equiv \{SUBJ \mid OBJ \mid OBJ_{\theta} \mid COMP \mid XCOMP \mid OBL \mid ADJ \mid XADJ\}$

Thus, King (1995: 204) proposes the following annotated phrase-structure rule for an IP in Russian, which can be seen as an instruction on how to build a c-structure tree and assign functions to the constituents:<sup>9</sup>

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unproblematically licenses the “genitive of negation” on both objects]

- (ii) .\*ja [ne pisa-l-a        pisem]<sub>I'</sub>    i    [čita-l-a        knig]<sub>I'</sub>  
 I    NEG write-PST-F.SG letters.GEN and read-PST-F.SG books.GEN  
 ‘I did not write letters and read books.’ [negation cannot scope over both I’s; each I’  
 needs to be negated separately; from King (1995: 42–43, 184ff.)]

It is worth stressing that erstwhile *l*-participles like (*na*)*pisal(a)* ‘wrote’ have been reanalysed as finite tensed forms after the loss of the copular auxiliary in what used to be a periphrastic/analytic present perfect construction — now a synthetic preterite in Modern Russian. Analogous IP/VP contrasts exist in Bosnian/Croatian/Serbian and elsewhere in the family (see King 1995: 41, fn. 31).

<sup>9</sup>Note that the rule has GF (rather than GF+ or GF\*), which means that the TOPIC has to bear some grammatical function in the same clause, and not an embedded clause (see Dalrymple et al. 2019: 126); cf. Chapter ??, since many constructions with functional uncertainty allow for long-distance uncertainty (GF\*), and not just local uncertainty (GF); see also the discussion of embedding in Bulgarian below, as well as Dalrymple et al. (2019: 223–225) for embedding in Russian relative clauses.

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$$(12) \quad \text{IP} \longrightarrow \left( \begin{array}{c} \text{XP} \\ \downarrow \in (\uparrow \text{ TOPIC}) \\ (\uparrow \text{ GF}) = \downarrow \end{array} \right) \left( \begin{array}{c} \text{I}' \\ \uparrow = \downarrow \end{array} \right)$$

King (1994; 1995), Bresnan et al. (2016: 70–71, 204–210) and Dalrymple et al. (2019: 113–114) discuss how further topics can be adjoined in Russian (and Bulgarian), as well as the complexities of scrambling, extraction and the domain of the operation of the principles of function assignment. Having thus presented the basics of Russian phrase structure, in the next section I outline the phrase structure of Bulgarian, which has a great deal in common with Russian, but there are some important typological differences too.

## 2.4.2 Bulgarian

Similarly to Figure 6.2 above, since they are focused and hence discourse-prominent elements, *wh*-phrases in Bulgarian will also appear in the specifier of IP (Rudin 1985, Izvorski 1993, Dalrymple 2001: 73).<sup>10</sup> In this respect, Russian and Bulgarian (unlike English) are both discourse-configurational and have in common the fact that the specifier of IP is reserved for arguments with certain (grammaticised) discourse functions (topic and/or focus), irrespective of the syntactic roles those arguments may perform (subject, object, etc.). (13) illustrates a *wh*-question with a sentence-initial topic, formalised in Figure 6.3.

- (13) Bulgarian (from Dalrymple 2001: 73, Dalrymple et al. 2019: 124)  
 Ivan kakvo pravi?  
 Ivan what does  
 ‘What is Ivan doing?’

Unlike Russian, which seems to require strict locality of topic extraction according to the rule in (12), the discourse functions in Bulgarian can be related to arguments in an embedded subordinate clause, as shown in (14) and the accompanying Figure 6.4:

- (14) Bulgarian (from Dalrymple et al. 2019: 125)  
 Ivan kakvo kaza, če pravi?  
 Ivan what say.PST.2SG COMP does  
 ‘What did you say that Ivan is doing?’

<sup>10</sup>On the availability of multiple specifiers with multiple *wh*-constituents in Bulgarian and Russian, consult Rudin (1985: 94ff.), Dalrymple (2001: 57), Jaeger & Gerassimova (2002: 209–210), Dalrymple et al. (2019: 98, 677–678, 694–696), which also feature discussion of long-distance dependencies.

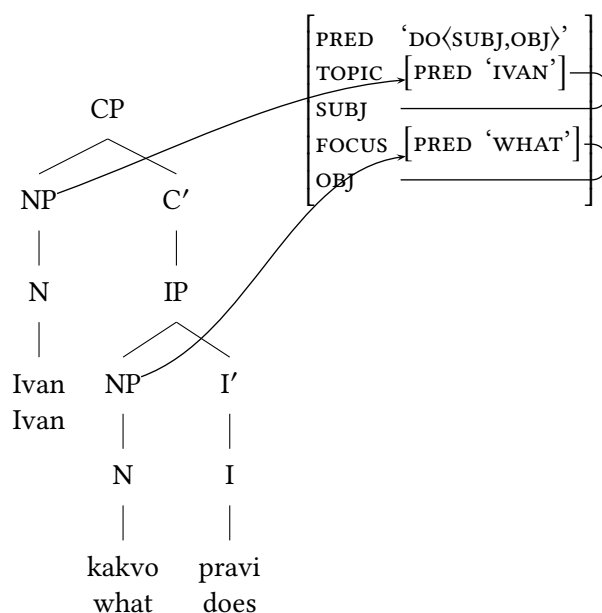


Figure 6.3: C- and f-structure for a Bulgarian sentence with topic and focus

Despite the immediately apparent family resemblance between Bulgarian and Russian, reflected in the structure of their clauses, there are some subtle differences which are worth noting. Figure 6.3 and Figure 6.4 demonstrate that the specifier position of CP is associated with the topic function in Bulgarian and focused *wh*-words appear in the Spec of IP, while in both English and Russian *wh*-phrases are found in the specifier of CP (with Spec of IP reserved for the Russian topic in Figure 6.2).<sup>12</sup> Thus, although word order in Russian and Bulgarian is reasonably free, scholars have arrived at different conclusions as to the way

<sup>11</sup>The VP and V' might host the non-finite form in a periphrastic construction like the viable Bulgarian perfect *si kazal* 'have said' (see footnote 8 for finiteness and *l*-participles). The VP and V' nodes have been copied along with their labels from the original source, but the reader should additionally consult the phrase-structure rules and the discussion of (reasonably innocuous) inconsistency below.

<sup>12</sup>See Rudin (1985: esp. 18ff.), King (1995: esp. Chapters 3, 5 and 10), Dalrymple (2001: 64, 73), Jaeger & Gerassimova (2002: 205ff.), Dalrymple et al. (2019: 124–125), for evidence and argumentation; cf. (1c)–(1d) above, which fit this template of Topic-Focus-Verb very well too. According to other sources, however, either C or Spec of CP does serve as the “landing site” for (certain) question words in Bulgarian (see Rudin 1985: 83ff. and King 1995: esp. 56–60, 120ff., 247–248 for a panoply of proposals, also featuring some discussion of other Slavic varieties). It likewise remains an open question how one should best represent sentences in colloquial Russian which

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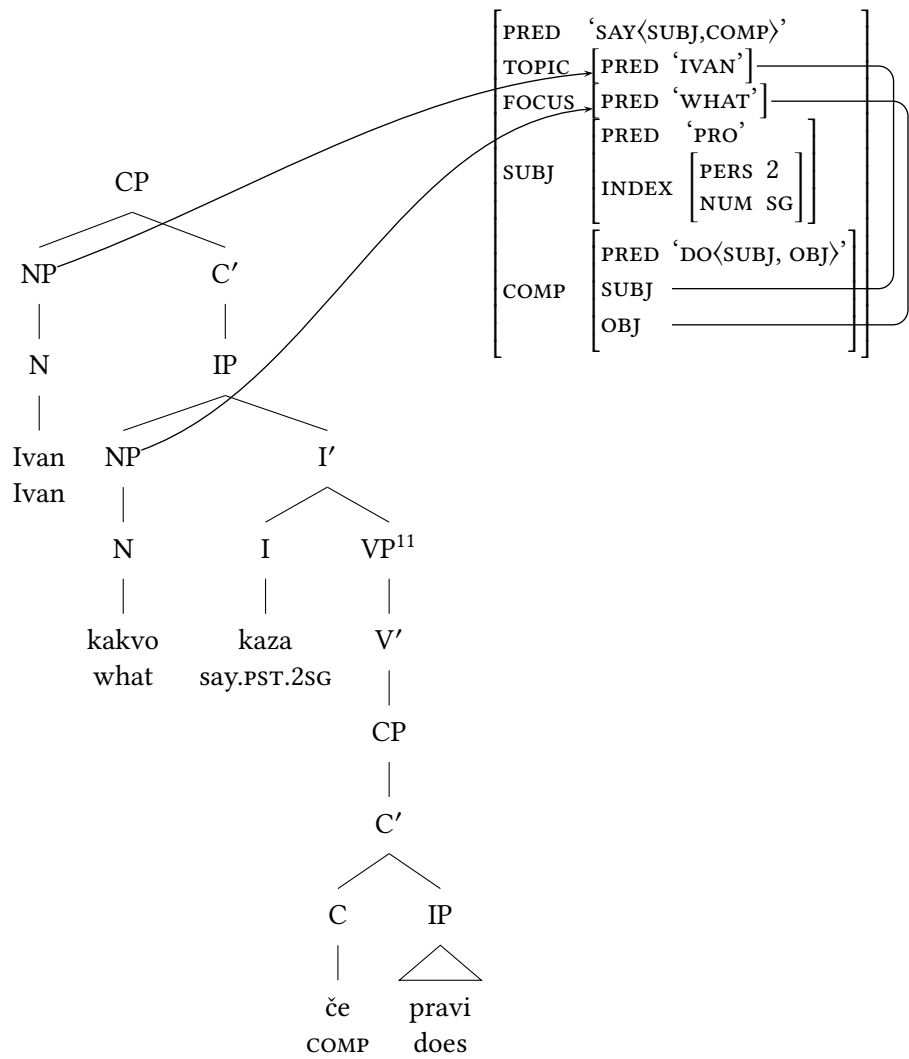


Figure 6.4: C- and f-structure for a Bulgarian sentence with embedding

6 *LFG and Slavic languages*

the constituent structure in each of those two related languages is organised and interfaced with the other levels of representation, most notably the structure of discourse. It remains for future work to subject these conclusions to further empirical and theoretical scrutiny and to extend them to the rest of the family.<sup>13</sup>

Another important point specific to LFG is the optionality of c-structure constituents, including heads. For example, the VP in Figure 6.2 does not dominate a head V node, since the finite verb in Russian appears in I, and Figure 6.3 is missing the head of CP, since the sentence contains no complementiser. Specifiers are also optional in LFG, so if there are no appropriate topicalised or focused constituents, those slots too will remain unoccupied (see King 1995: 171–172, Dalrymple 2001: 60, 63, Dalrymple et al. 2019: 107–108).

As pointed out in §1.2.2, Bulgarian is cross-linguistically unusual in that it allows free word order even though it has lost its nominal case inflections, with only vestigial case forms of pronouns. In this way, Bulgarian and Macedonian stand out typologically among the members of the Slavic family and beyond. Quite frequently, the syntactic functions of subject and object can be identified by relying on subject-verb agreement and/or clitic doubling. There are situations, however, where there are no morphosyntactic clues as to the functions the arguments in a clause will perform – then a phrase may be assigned any of the grammatical functions selected by the predicate, depending on context and/or world knowledge (Rudin 1985, Dalrymple 2001: 133–135, Dalrymple et al. 2019: 184–189).

I will now proceed to first outline some general phrase-structure rules for Bulgarian, followed by a sample entry of a verb, which forms the core of the clause and assigns roles to its arguments. I will then illustrate three possibilities for clauses with or without morphosyntactic clues as to the assignment of syntactic roles. Finally, I will compare the Bulgarian system to those of members of the family which retain case declensions.

In line with the assumption that the specifier of IP is associated with the discourse function of focus in Bulgarian, Dalrymple (2001: 134) proposes the following phrase-structure rules. The NP daughter of IP is assigned the focus discourse function and in addition will bear a grammatical function at f-structure too (GF). As in Russian, there is no requirement as to what this grammatical function will

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contain non-initial *wh*-words, e.g. *Ivan čto skazal?* ‘What did Ivan say?’, which matches the surface order of the Bulgarian interrogative in (13) (cf. the comments about additional topic adjunction in the previous section).

<sup>13</sup>See Patejuk (2015) and Patejuk & Przepiórkowski (2017: 329–330, 340–341) for similar proposals regarding the clause structure of Polish, notably with a suggested flat IP.

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be (cf. the discussion of GF vs. GF\*, which might be needed in the context of embedding; see further [Rudin 1985](#): esp. Chapter 7, as well as the slightly updated notation in [Dalrymple et al. 2019](#): 185).

(15) Annotated phrase-structure rules for Bulgarian

$$\begin{array}{lcl}
 \text{IP} & \longrightarrow & \left( \begin{array}{c} \text{NP} \\ (\uparrow \text{ FOCUS})=\downarrow \\ (\uparrow \text{ GF})=\downarrow \end{array} \right) \left( \begin{array}{c} \text{I}' \\ \uparrow=\downarrow \end{array} \right) \\
 \text{I}' & \longrightarrow & \left( \begin{array}{c} \text{I} \\ \uparrow=\downarrow \end{array} \right) \left( \begin{array}{c} \text{S} \\ \uparrow=\downarrow \end{array} \right) \\
 \text{I} & \longrightarrow & \left( \begin{array}{c} \text{Cl} \\ (\uparrow \text{ OBJ})=\downarrow \end{array} \right) \left( \begin{array}{c} \text{I} \\ \uparrow=\downarrow \end{array} \right) \\
 \text{S} & \longrightarrow & \left\{ \begin{array}{c|c} \text{NP} & \text{V} \\ (\uparrow \text{ GF})=\downarrow & \uparrow=\downarrow \end{array} \right\}^*
 \end{array}$$

In essence, these annotated rules are similar to those operative in other languages which allow relatively free word order, such as Warlpiri or Latin (cf. Chapter ??). Naturally, these phrase-structure rules are only a fragment of a fuller grammar and will need to be elaborated and fine-tuned in order to attain more comprehensive coverage of Bulgarian syntax. The diagrams and the phrase-structure annotations in this section demonstrate that there is still some inconsistency within and between the various LFG publications, so more uniformity would be desirable in future work (cf. the VP in Figure 6.4 to the S here, among other small details, e.g. finite verbs labelled as V rather than I in some of the sources). Nevertheless, this is a good starting point illustrating what the skeleton of a Bulgarian clause looks like. According to the rules in (15), the desired freedom with which the constituents are arranged is achieved with the help of the exocentric S node, which here supersedes the VP from the earlier diagrams and can contain NPs with any grammatical function preceding or following the verb (cf. [Dalrymple 2001](#): 64–67, 77–78, [Dalrymple et al. 2019](#): 112–114).<sup>14</sup>

<sup>14</sup>The S rule licenses any number of NPs or Vs in any order, but having more than one lexical/main/full verb will lead to a clash at f-structure (two different semantic PREDs in the same clause contributed by each of the two verbs; cf. §3.1). So the phrase-structure rule will give too many possibilities (in particular, it will allow any number of verbs), but these will be filtered out by f-structure constraints (assuming that all lexical verbs contribute a semantic PRED – this rule will allow two verbs, as long as one of them is auxiliary-like and contributes only grammatical features, while the other contributes the semantic PRED) (M. Dalrymple, p.c.). Similarly, the NPs will have to be subcategorised for by the verb, which prevents the proliferation of NPs at will. As noted above, other LFG work offers alternative treatments. [Jaeger & Gerassimova \(2002](#): 201–202), for instance, postulate the following flat unordered VP

Moving on to the syntactic core of the clause, the following is the lexical entry for the finite verb form *celuna* ‘(he/she) kissed’, appearing as an I terminal node in tree diagrams:

(16) Lexical entry for a Bulgarian verb

*celuna*      I      (↑ PRED) = ‘KISS<SUBJ,OBJ>’  
                          ((↑ SUBJ PRED) = ‘PRO’)  
                          (↑ SUBJ INDEX PERS) = 3  
                          (↑ SUBJ INDEX NUM) = SG  
                          (↑ SUBJ CONCORD CASE) = NOM  
                          (↑ OBJ CONCORD CASE) = ACC

In addition to stating the subject’s person, number and case properties, this entry contains an *optional* equation which specifies a pronominal value (‘PRO’) for the semantic PRED of the verb’s subject. This is LFG’s way of capturing pro-drop — this equation kicks in only if there is no overt subject and the information about it comes solely from the features marked on the verb (cf. §2.6; Bresnan et al. 2016: 59, 358, 440; Chapter ??). However, for a transitive verb like *celuna* ‘(he/she) kissed’, either an overt object phrase or an object clitic pronoun must obligatorily appear, because no PRED value is specified for the object of the verb.

This lexical entry and the phrase-structure rules can now be combined to generate a clause. In (17), the personal names *Ivan* and *Marija* are not marked for case, so both of them are compatible with either nominative or accusative specifications. As before, the metavariable GF in Figure 6.5 represents any grammatical function — this metavariable is arbitrarily instantiated to SUBJ for *Marija* and OBJ for *Ivan* based on the context or extra-linguistic knowledge (see Rudin 1985: esp. 15–16, Dalrymple 2001: 134, 136). For a sentence like that, language users cannot appeal to phrase-structure position, case marking or agreement to disambiguate the syntactic roles of the two arguments, though SVO might be strongly preferred out of context (cf. (22) and §1.2.2).

(17) Bulgarian

Ivan celuna      Marija  
 Ivan kiss.PST.3SG Marija  
 ‘It was Ivan that Marija kissed.’

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phrase-structure rule for Bulgarian (see further §3.3):

$$(i) \quad VP \longrightarrow \left( \begin{array}{c} XP \\ (\uparrow GF)=\downarrow \end{array} \right), \left( \begin{array}{c} PP \\ (\uparrow OBJ2)=\downarrow \end{array} \right), \quad V' \quad \uparrow=\downarrow$$

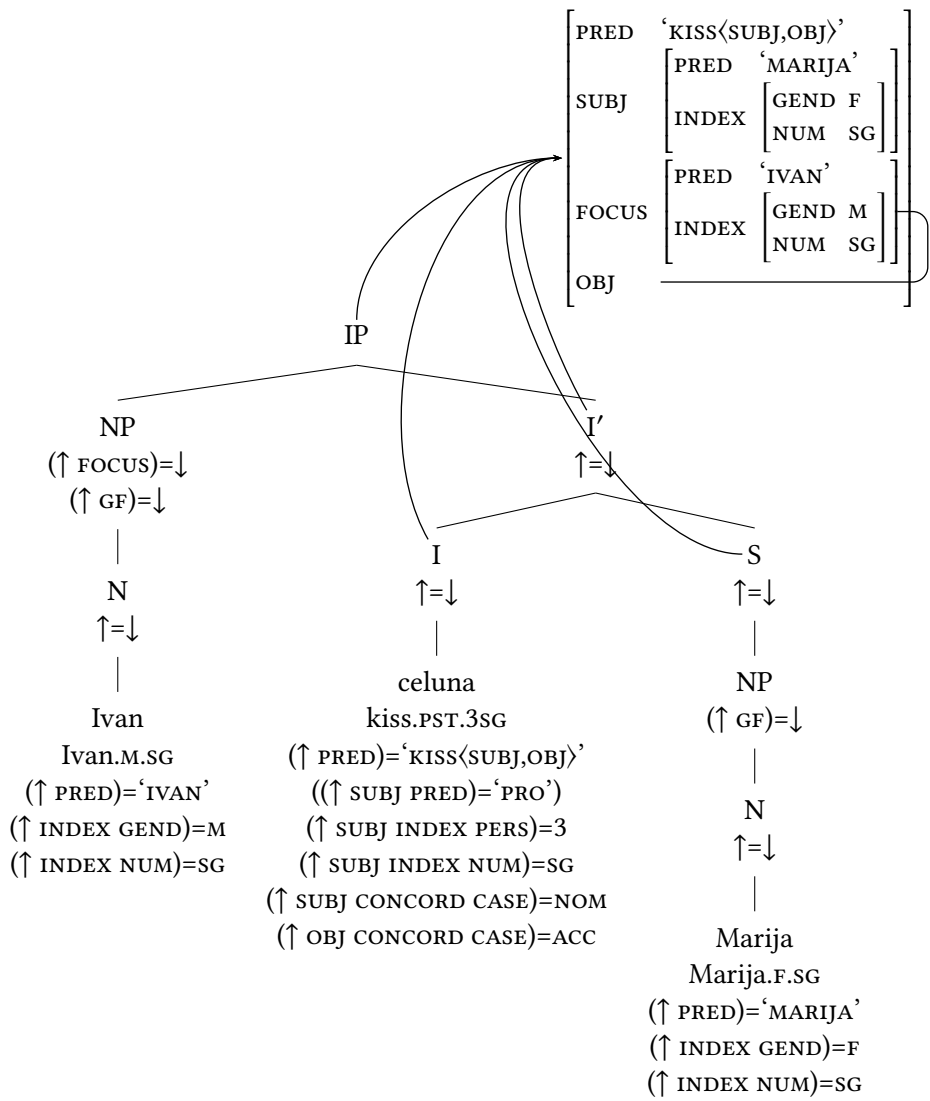


Figure 6.5: C- and f-structure for an ambiguous sentence in Bulgarian



Things are different in (18), which furnishes morphosyntactic clues to the assignment of grammatical functions. Here, the clause-initial FOCUS NP is plural, so the subject must be *Marija* because the verb shows unambiguous third person singular agreement with its subject (consult Rudin 1985: 15, Dalrymple 2001: 137).

- (18) Bulgarian  
 Deca-ta celuna Marija  
 children.PL-DEF kiss.PST.3SG Marija  
 ‘It was the children that Marija kissed.’

Apart from subject-verb agreement, disambiguation can alternatively be achieved by doubled/reduplicated object clitics, as in (20), which relies on the following lexical entry for the clitic pronoun *go* ‘him’:<sup>15</sup>

- (19) Lexical entry for a Bulgarian object clitic pronoun
- |           |                        |
|-----------|------------------------|
| <i>go</i> | ((↑ PRED) = ‘PRO’)     |
|           | (↑ INDEX PERS) = 3     |
|           | (↑ INDEX GEND) = M     |
|           | (↑ INDEX NUM) = SG     |
|           | (↑ CONCORD CASE) = ACC |

If no full object NP is available, the semantic PRED value for the object function will be contributed by the object clitic. Since the PRED of this clitic is optional (enclosed in parentheses), *go* can unproblematically appear even when the object function is filled by a masculine NP like *Ivan*, but not a feminine NP like *Marija*, which would be incompatible in terms of gender (see Dalrymple 2001: 135, 138; cf. §2.8 and Chapter ??).

- (20) Bulgarian  
 Marija go celuna Ivan  
 Marija him.OBJ.CLITIC kiss.PST.3SG Ivan  
 ‘Marija kissed Ivan.’/‘It was Marija that kissed Ivan.’ (with the exact emphasis depending on context and prosody, so Marija could be a focused element or play another role at information-structure)

<sup>15</sup>See Rudin (1985: 17), as well as Jaeger & Gerassimova (2002), on the interaction between word order, information structure and (topic-marking) object clitics.

<sup>16</sup>Alternatively, the object clitic could be represented as a non-projecting noun – see Dalrymple et al. (2019: 188) and §2.8 below.

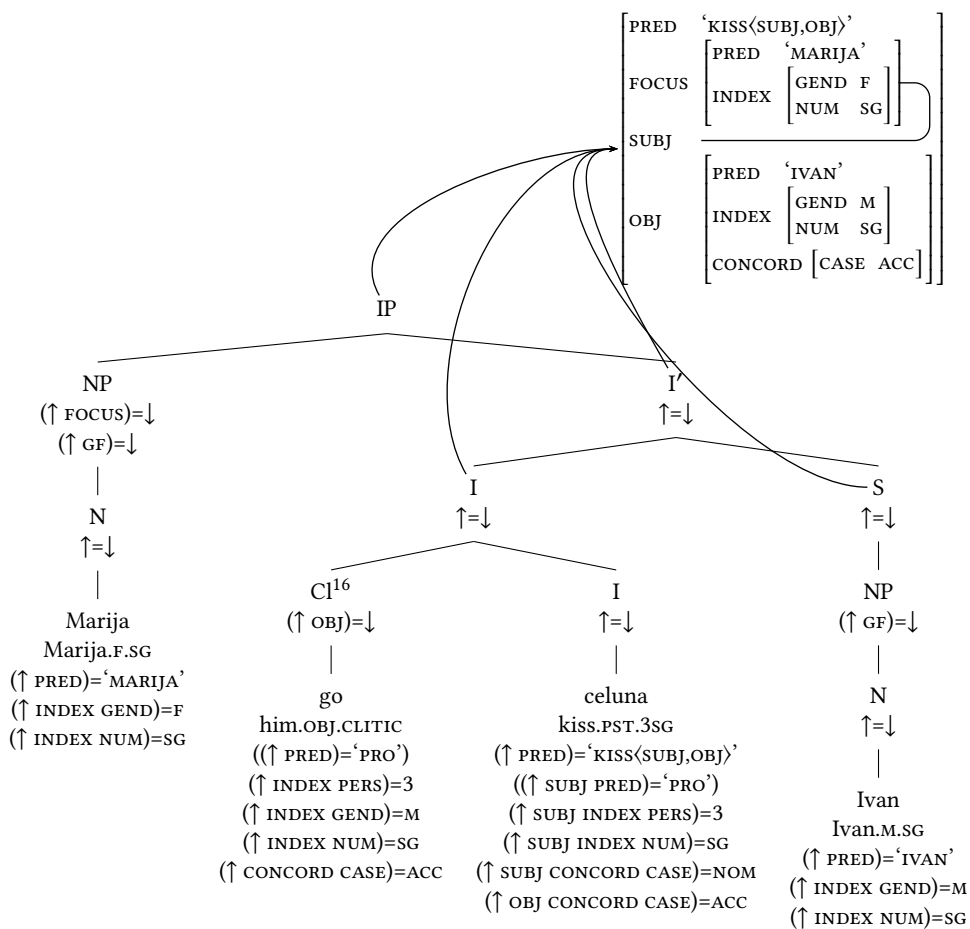


Figure 6.6: Disambiguation with clitics in Bulgarian

Note that the overtly marked case of *go* ‘him’ appears in the f-structure for the non-case-marked *Ivan* because the two c-structure nodes (the clitic *go* and the N *Ivan*) correspond to the same f-structure, with the information from each node in the tree diagram fed into the f-structure that they share (cf. Dalrymple 2001: 74–75, Bresnan et al. 2016: 48). Without providing a separate semantic PRED value (which would go against LFG’s Consistency Principle), the clitic in Figure 6.6 effectively supplies a case value for the caseless noun it agrees with.

### 2.4.3 Slavic in general

The situation in the Slavic languages with healthy case-marking on nouns, such as Russian, Ukrainian, Czech, Polish or Bosnian/Croatian/Serbian, will be very similar to that in Bulgarian. What Bulgarian and Macedonian achieve with clitics will be achieved with case inflections in the rest of the family.<sup>17</sup> The unambiguous case values normally contributed by each nominal argument will serve to uniquely identify that argument’s syntactic function, much as a clitic in Bulgarian/Macedonian (cf. Figure 6.2 and Figure 6.6). The case principles of function specification in Russian can be formulated as follows:

- (21) Case principles of function specification in Russian (from Bresnan et al. 2016: 70–71, 203–205)
- $$(\downarrow \text{CASE})=\text{NOM} \Rightarrow (\uparrow \text{SUBJ})=\downarrow$$
- $$(\downarrow \text{CASE})=\text{ACC} \Rightarrow (\uparrow \text{OBJ})=\downarrow$$

These annotations state that if the case of a node is nominative, it will serve as the subject of the construction that contains it. Conversely, if the case of a node is accusative, it will serve as the object of the matrix construction. Naturally, similar statements will be needed for the additional functions/meanings of cases. These are morphological means of function specification which are independent of c-structure position (the latter would be needed for function specification in a configurational language like English).<sup>18</sup>

In circumstances of syncretism, where case distinctions collapse, the assignment of syntactic functions will of necessity proceed randomly or depending on

<sup>17</sup> An important difference is that clitics are arguably head-marking on the verb, while case is dependent-marking on the nominal arguments of the verb — see Jaeger & Gerassimova (2002), Bresnan et al. (2016: 113–115, 205–207).

<sup>18</sup> Consult Neidle (1988), King (1995: esp. Chapter 8), and Bloom (1999), for the syntactic distribution of Russian cases from a general LFG perspective, including different methods of case assignment (configurational, grammatical/functional, lexical, and semantic). Przepiórkowski & Patejuk (2011; 2012a,b) and Patejuk (2015) offer discussion of Polish.

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the wider context, world knowledge and/or subject-verb agreement, much as in Bulgarian/Macedonian. In (22), neither noun distinguishes nominative from accusative.

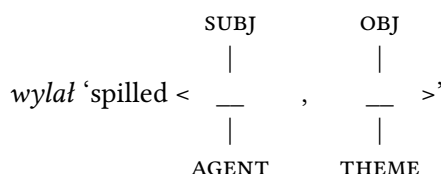
- (22) Russian (from Comrie & Corbett 1993: 14)  
 Mat'                      ljubit doč'  
 mother.NOM/ACC loves daughter.NOM/ACC  
 'The mother loves the daughter.'

Although (22) is syntactically ambiguous in the same way as (17), an SVO interpretation might be preferred as the most neutral out of context (see Jakobson 1936, Comrie & Corbett 1993: 14, King 1995: 2 fn. 2, Sussex & Cubberley 2006: 319, 406–407). In spoken language, intonation will normally dispel the ambiguity, as noted in seminal monographs by Yanko (2001; 2008). LFG's parallel architecture is perfectly suited for handling such phenomena where the interplay between syntax, morphology and prosody is not a trivial one-to-one correspondence.

## 2.5 Passives and related constructions

Instead of being considered a syntactic transformation, the passive is seen in LFG as a lexical operation/alternation in the argument structure of a verb. Argument structure itself is a separate module in the LFG architecture which maps onto the morphology and the syntax — there is an association between thematic/semantic roles, argument slots and syntactic functions, as in (23) (cf. §2.1; Kibort 2007; Bresnan et al. 2016: Chapter 3, 76–79; Dalrymple et al. 2019: 340–345; Chapter ??).

- (23) Argument structure of a Polish transitive verb



In the passive and some related constructions, the thematically highest argument, which is otherwise aligned with the syntactic function of subject, is suppressed or demoted in the argument structure, and hence unavailable for linking to the subject function in the syntax. Therefore, the next highest argument compatible with such a function is mapped/promoted to SUBJ, which ties in well with the general descriptive intuition about what passivisation accomplishes.

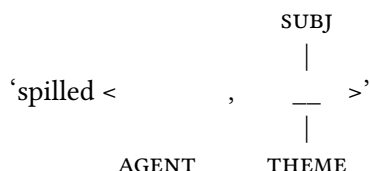
Apart from passives proper, Kibort (2001; 2004; 2006; 2007; 2012) discusses similar alternations which exhibit divergent mappings between the argument structure and the syntactic component, as in the following pair of sentences (cf. §1.2.3):

(24) Polish (from Kibort 2012: ex. 14, also cited in Dalrymple et al. 2019: 343)

- a. Tomek                      wylał                      zup-ę  
     Tomek(M)[NOM.SG] spilled[3SG.M] soup(F)-ACC.SG  
     ‘Tomek spilled the soup.’
- b. Zup-a                      wylał-a                      się  
     soup(F)-NOM.SG spilled-3SG.F REFL  
     ‘The soup spilled.’

Kibort (2001; 2007; 2012) asserts that the transitive and reflexive versions of ‘spill’ have two distinct lexical entries, based on different argument structures, though of course both thematically entail a spiller agent and a spillee patient/theme. The transitive one has an agent (Tomek) assigned to the subject role and a patient/theme (the soup) which is realised as the object, as in (23) above. The reflexive ‘spill’, by contrast, has no core argument position with which the agent can be associated (since it expresses the event affecting the patient/theme without specifying the cause), so the sole patient/theme argument is mapped to the subject role:

(25) Anticausative in Polish (based on Kibort 2001: ex. 43: Kibort 2012: ex. 16)



If the agent is mentioned, it will appear as a secondary/oblique object (a non-volitional human participant or perhaps a maleficiary) or as an optional adjunct – the former scenario entails demotion, while the latter entails suppression of the agent argument. Although they come up with a somewhat dissimilar formal proposal, Patejuk & Przepiórkowski (2015) likewise note that reflexive *się*, rather than being a legitimate reflexive pronoun, here just indicates that the verb has been detransitivised (cf. Schenker 1985; a similar point is made in pioneering generative papers on Bulgarian, Walter 1963a,b, for which see Venkova 2017, as well as in traditional/transformational descriptions, e.g. Bojadžiev et al. (1999:

604)) Kibort (2012) labels such “anticausative” operations as lexical detransitivisers which, according to her, delete the first core argument from the valency frame (though they do not obliterate the corresponding semantic participant).

Kibort (2007; 2012) claims that the passive proper is different from such reflexive anticausative constructions in that it does not suppress/erase the agent argument (thereby relegating it merely to a potential adjunct role in the syntax), but only changes the agent’s argument-structure specifications, so that it is linked to a non-subject syntactic function, such as an oblique argument (though it then ought to be stipulated that such arguments are optional).

Unlike English, even intransitive verbs can be passivised in Polish and elsewhere in Slavic, resulting in an impersonal construction (see Kibort 2001; 2012). Essentially the same account is available for such intransitive impersonals, whereby the agent subject in the active is altered in terms of its argument specifications so that it is forced to map onto an oblique in the passive (if it appears at all). As a result, the sole (optional) argument of a passivised intransitive verb like *palić* in (26) is not realised as SUBJ and the clause is truly subjectless — which takes us to the top of the next section.<sup>19</sup>

- (26) Polish (from Kibort 2006: ex. 55; also cited in Dalrymple et al. 2019: 344)  
 Wchodzi-sz i czuje-sz, że był-o palone.  
 come.in-2SG and smell-2SG that was-3SG.N smoke.PTCP.N.SG  
 ‘You come in and you can smell that there has been smoking (here).’

Kibort’s demarcation of fine distinctions between various possible interfaces amounts to suggesting that meaning-preserving/morphosyntactic operations like the passive interfere only with the argument-to-function mapping, whereas other, morpholexical and morphosemantic, meaning-altering processes (e.g. the anticausative) additionally affect the lexical and/or semantic tiers of representation of the predicate. These intriguing predictions arising from LFG’s modularity have a bearing on describing in greater depth the nature of Slavic argument alternations, more of which are discussed in Kibort’s work.

<sup>19</sup> Alternatively, the agent might be said to potentially surface as an adjunct rather than an oblique argument, if one adopts a suppression as opposed to a demotion account of passivisation. The exact status of these agents remains an unsettled matter, as does the subtle distinction between suppression and demotion. For more detail, including the overarching principles of LFG’s Lexical Mapping Theory and the notational technicalities, consult Kibort (2001; 2007) and Chapter ?? . Passivisation is discussed in relation to raising by Kibort (2012) and Patejuk & Przepiórkowski (2014a), who see the auxiliary as a raising main predicate taking the passive/resultative participle of the lexical verb as its complement.

## 2.6 Pro-drop, subjectless and impersonal constructions

Many linguistic theories include a stipulation that all predicates must have subjects. This is dubbed the Subject Condition in LFG, the Final 1 Law in Relational Grammar and the Extended Projection Principle in Chomsky's (1981) generative framework (see Bresnan 2001: 311, Kibort 2001, Dalrymple et al. 2019: 21). In clauses with pro-drop, the subject has simply been omitted but it can be recovered based on the agreement morphology of the verb. Pro-drop is a widespread phenomenon in Slavic, as noted in §1.2.4. In theories where syntactic functions are defined positionally and equated with phrase-structure configurations, pro-drop is usually regarded as a phrase-structure operation – either the transformational deletion of a pronoun or the licensing of a phonologically null constituent which represents the pronominal argument in the tree diagram. By contrast, in the grammatical design of LFG pro-drop involves the *functional* specification of a pronominal argument by a head – in our case, the verbal head of the clause specifies a pronominal value for its subject argument, as in (16), which entails the (potential) absence of an overt subject pronoun from the phrasal structure (see Kibort 2006, Bresnan et al. 2016: 154 fn. 4, Chapter ??). Still, sentences with pro-drop have a (covert) subject, which is represented in LFG's more abstract f-structure, as in Figure 6.4. Therefore pro-drop does not violate the Subject Condition.<sup>20</sup>

While the Subject Condition holds in English and numerous other languages, it has been argued that certain languages do admit genuinely subjectless sentences. Kibort (2006; 2012) discusses Polish constructions she claims to be truly subjectless. They comprise a small class of inherently impersonal predicates, as in (27) below, or intransitive predicates which have undergone passivisation, as in (26) above (cf. Dalrymple et al. 2019: 22).

- (27) Polish (from Kibort 2006; also cited in Dalrymple et al. 2019: 22)

Słysząc ją / jakieś mrużenie  
 hear her.ACC some.N.ACC murmuring.N.ACC  
 'One can hear her/some murmuring.'

Formally, the verb in (27) is identical with the infinitive, so there is no agreement morphology on this non-finite form which could be said to introduce subject features (as in pro-drop). It has long been recognised in traditional descriptive grammars of Slavic that no subject can be reconstructed for such clauses. As

<sup>20</sup>King (1997) also shows how lexical entries for verbs specifying a PRO value for their subjects can be further annotated with the TOPIC discourse status typical of such elided elements.

noted by Kibort (2006: §4.1), those defective verbs do not have even a “covert” subject which could participate in syntactic control or reflexive binding. The impersonal clauses from §1.2.4, with default third person singular (neuter) agreement on the predicate, are also traditionally regarded as truly subjectless, i.e. clauses which cannot have an overt subject, so the Subject Condition might not be universal in the face of this Slavic data.<sup>21</sup>

## 2.7 Copular constructions

English and many other languages, including members of the Slavic family, require the presence of a copular/link verb in copular clauses. Russian, on the other hand, famously has copular constructions with no overt copula, as pointed out in §1.2.6 and illustrated in (28). The c-structure of a Russian verbless clause can be represented as in Figure 6.7, with a headless IP (Dalrymple et al. 2019: 191; cf. §2.4.2 and §3.1 for headlessness in LFG).

- (28) Russian (from Dalrymple et al. 2004: 192)
- On student
  - He student
  - ‘He is a student.’

In a construction like that, it is not immediately obvious what contributes the main semantic PRED of the clause, which is required for the f-structure to be complete and coherent (see §3.1 below; cf. a similar issue arising from pro-drop). According to one analysis, the main clausal PRED is contributed by the predicative nominal; according to another, the main clausal PRED is contributed by a special phrase-structure rule or the phrase-structure configuration. Such competing analyses have been put forward for both verbless clauses and constructions with an overt link verb (Dalrymple et al. 2004, Nordlinger & Sadler 2007: 141–142; Dalrymple et al. 2019: 189ff. and Chapter ??).<sup>22</sup>

<sup>21</sup>However, Kibort (2006) treats Polish weather constructions and impersonals involving adversity or physical/psychological states as special instances of subject ellipsis/pro-drop, contrary to the traditional view whereby they lack a subject. The reader can find a more elaborate classification of types of subjectlessness in Kibort (2006). In another strand of research, verbs with non-nominative arguments like Russian *menja tošnit* ‘I am sick’ have sometimes been analysed as having “non-canonical subjects”, though this too remains a matter of debate. The same goes for the status of “genitive subjects” in negative constructions (see Timberlake 1993: 868ff., with references).

<sup>22</sup>In the case of overt copulas, the debate surrounding the construction revolves around whether the copula supplies a semantic PRED value or just the tense, aspect, mood, number and person features. Patejuk & Przepiórkowski (2014a) highlight similar issues in the analysis of *be* in Polish passive constructions.



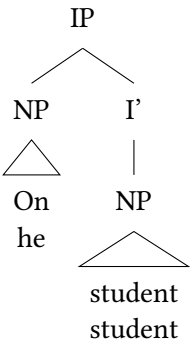


Figure 6.7: A verbless copular clause in Russian

Especially in the absence of a verb, it could be argued that the main clausal PRED value is contributed by the predicative nominal element, which will then select arguments in the same way an ordinary verb would. On this so-called single-tier view, the predicative nominal is the syntactic head of the clause; its f-structure will therefore be identified with the f-structure of the clause and it will contribute the clausal PRED value, as in Figure 6.8. Consequently, there must exist a lexical entry for the noun *student* which contributes the main clausal PRED value and selects a subject, i.e. ( $\uparrow$ PRED) = ‘STUDENT<SUBJ>’, alongside a “normal” lexical entry for the same nominal form which does not require a subject (for clauses such as ‘He met a student’, where the subject requirements are imposed by the verb).

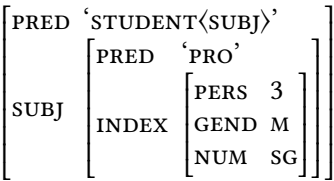


Figure 6.8: Single-tier analysis of *On student* (based on Dalrymple et al. 2004: 192, Nordlinger & Sadler 2007: 141–142, and Dalrymple et al. 2019: 194)

Under the so-called double-tier approach, by contrast, both non-verbal elements are arguments (a subject and a predicative complement/PREDLINK). The main PRED selecting these arguments can be supplied by an overt copula or by the phrase structure (in the case of verbless clauses). This type of analysis might rely on empty-node rules or the constructional properties of the configuration to

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license the requisite PRED value. Importantly, LFG’s rule annotations can introduce a PRED value in the f-structure, but they will not customarily produce any empty nodes in the constituent structure (as might be done in other theories). One possible f-structure resulting from this approach is presented in Figure 6.9.

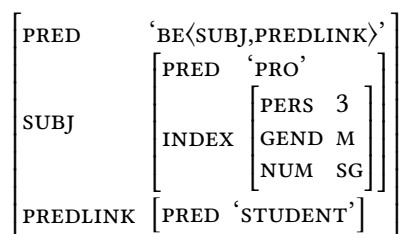


Figure 6.9: Double-tier analysis of *On student* (based on Dalrymple et al. 2004: 193, Nordlinger & Sadler 2007: 141–142, and Dalrymple et al. 2019: 194–195)

In the spirit of LFG, there have been claims that the presence or absence of a copula is just a matter of superficial c-structure variation, and the “underlying” f-structure for both types of construction should be identical, especially in the light of the fact that both constructions can coexist in the same language, with the appearance or omission of the copula correlating with tense, among other factors.<sup>23</sup> The double-tier approach appears to have gained wider currency in the LFG literature, though the debate as to whether a unified solution should be sought, and if so, which one, is ongoing.

## 2.8 Clitics and clitic placement

In the more recent LFG literature, clitics are seen as non-projecting words which do not project their own phrases according to the X-bar schema (see Jaeger & Gerassimova 2002, Bresnan et al. 2016: 116–117; cf. Figure 6.6). This treatment recognises their intermediate status between independent words and bound affixes and concerns primarily the behaviour of clitics at c-structure, which is additionally regulated by language-specific phrase-structure rules of the type we saw

<sup>23</sup>In Russian, the copula is null in the present tense but it has to be overt in the past and the future (Dalrymple et al. 2004: 191–192). Traditionally, this is used as an argument in favour of a zero copula in the present, but an argument can be made that there is a structural difference between copular and copula-less sentences. Ukrainian admits either null or overt copulas in the present tense. See §1.2.6, as well as Patejuk & Przepiórkowski (2014a; 2018), who discuss certain copular constructions in Polish — another Slavic language with optional copulas; cf. Dalrymple et al. (2019: 195–197), and Chapter ??, where Russian features prominently.

for Bulgarian in (15). Other phenomena are modelled via the interface of lexical entries and f-structure.

One important process involving clitics is clitic doubling/reduplication. Some Slavic languages allow it, while others do not. Bosnian/Croatian/Serbian, for one, does not – a clitic pronoun and a full pronoun cannot be used in the same sentence in this South Slavic variety. In the constraint-based lexicalist framework of LFG, the ungrammaticality of clitic doubling is accounted for by giving both types of pronoun, clitic and full, a semantic form of the following shape (as part of the lexical entry):

(29) ( $\uparrow$  PRED) = ‘PRO’

If both a full pronoun and a co-referential clitic were to appear in the same clause, there would be a clash because of the multiple specifications of semantic forms for the same f-structure object, resulting in an ill-formed, inconsistent f-structure (cf. §3.1).

By contrast, it became apparent in the earlier sections that clitic doubling is found in other Slavic languages spoken in the Balkans, including Bulgarian and Macedonian, both central members of the Balkan Sprachbund/Linguistic Area (see Jaeger & Gerassimova 2002; cf. Chapter ?? for Spanish). LFG models this typological parameter by making the PRED value of the clitic optional in a language which admits clitic doubling. A clitic will then contribute a semantic value only if it is the sole object; if it reduplicates a full NP, including a non-clitic pronoun, the clitic will not contribute its own semantic value due to its optionality and no clash will ensue (see entry in (19) and Figure 6.6 above, as well as Franks & King 2000, Dalrymple 2001: 105–106, Bresnan et al. 2016: 357–358, 440, Dalrymple et al. 2019: 130–131, 152–153).<sup>24</sup>

When more than one clitic occurs in a clause, they group in what is known as a clitic cluster. The rules regulating the internal order inside this clitic cluster, as well as where the clitic cluster can go in the clause, can also be very strict and complex (see Franks & King 2000: 234ff. Jaeger & Gerassimova 2002: 201, Bögel et al. 2010; cf. §1.2.5).

<sup>24</sup>In varieties with clitic doubling, the clitic pronouns appear to be undergoing reanalysis as agreement markers which match the morphosyntactic features of the constituent they reduplicate. See Bresnan et al. (2016: Chapter 8) and Chapter ?? for further discussion, including the diachronic developments from one stage to the next, e.g. bleaching from obligatory semantic PRED > optional semantic PRED > no semantic PRED (as for an agreement affix), as well as links to pro-drop, pronoun incorporation and the grammaticalisation of agreement affixes.

## 2.9 Negation and negative concord

The Russian negator *ne* was described as a proclitic in §2.4.1, though this status has been contested for some of its cognates elsewhere in Slavic, as well as for Russian itself. There have been arguments in the LFG literature that, as in Czech, the Polish equivalent negator is actually a prefix, rather than a clitic, though the negator is written as a separate word in Polish, while Czech orthography has long recognised its bound status (see Patejuk & Przepiórkowski 2014a, Przepiórkowski & Patejuk 2015; cf. King 1995 for similar ideas regarding Russian). Irrespective of its status, clitic or prefix, the negative item in Slavic can license morphosyntactic phenomena like the genitive of negation as well as negative concord, both of them already encountered in the preceding exposition (§1.2.1, §1.2.6, §2.3, §2.4.1).<sup>25</sup>

As dictated by negative concord, negative words with negative meaning need to appear in the presence of verbal negation. Indeed, there are words in Slavic which are allowed to occur only where negation is available in the relevant domain. Such words are referred to as *n*-words or negative polarity items and include Polish *nikt* ‘nobody’ in (30), as well as those from Bosnian/Croatian/Serbian in (5), among many others (see Patejuk & Przepiórkowski 2014a: §4.3.1). This sets Slavic apart from Standard Modern English, where such multiple negation is prescriptively “outlawed” (though it is still common in dialects).

- (30) Polish (from Patejuk & Przepiórkowski 2014a: ex. 22)

Nikt                   \*(nie) odszedł głodny.  
nobody.NOM NEG left hungry  
‘Nobody left hungry.’

Although *n*-words are negative in themselves and certainly carry negative meaning (e.g. the word for ‘nobody’ can give a negative answer to a question even when uttered on its own), they do not contribute additional negation when they fall within the scope of sentential negation. This is basically the nature of

<sup>25</sup>The affixal status of the negative marker in Czech and Sorbian is acknowledged in the World Atlas of Language Structures (Dryer 2013), but a similar status is denied there to Polish *nie* (cf. Przepiórkowski & Patejuk 2015: 329, fn. 10). Quite importantly, the claim that the Polish marker is also an affix is made regarding verbal negation only. When the same form *nie* negates a distinguished clausal constituent, it is not a bound morpheme, as it may be separated from the constituent it negates and it may scope over coordination, among other indicative properties. Furthermore, Polish constituent negation does not trigger the genitive of negation, nor does it license other negative words in negative concord.

what is referred to as negative concord, a phenomenon akin to agreement where features need to match for purely syntactic reasons.<sup>26</sup>

Both the genitive of negation and negative concord can work in contexts of clause embedding too (e.g. with so-called open/infinitival complement clauses missing a separate subject), though embedded items are sometimes not obligatorily affected and certain types of embedding can prevent negation-sensitive phenomena (e.g. finite full/closed/sentential complements with their own subject which are insensitive to negation in the matrix clause). This is where LFG's distinction between *xCOMP* for the former (infinitival) complements and *COMP* for the latter (finite) clausal complements comes in very useful in distinguishing between those natural classes (see [Przepiórkowski 2000](#) and [Patejuk & Przepiórkowski 2014b](#)). As is usual for LFG and related theories, the interaction between polarity and polarity-sensitive phenomena such as the genitive of negation and negative concord is modelled via constraints (see Chapter ??). The restrictions also find natural expression in the setting of *f*-structure. Further issues concerning negation in Polish are discussed by [Przepiórkowski & Patejuk \(2015\)](#), who propose different *f*-structure representations for the two major types of negation: constituent negation, as well as eventuality (a.k.a. predicate/sentential negation) negation. In the attribute-value matrices, negation can be introduced as an adjunct feature or as a binary *NEG* or polarity feature. Adjunction makes it easy to represent multiple negation via multiple negative elements in the adjunct set.

## 2.10 Distance distributivity

Distance distributivity is observed in English sentences like *I gave the boys two apples each* — *each* attaches to the NP denoting the distributed quantity (the apples) and looks elsewhere in the sentence, here for a set of boys, to distribute over. In Slavic, distance distributivity is discussed with regard to Polish by [Przepiórkowski \(2013; 2014; 2015\)](#), as well as [Przepiórkowski & Patejuk \(2013\)](#). [Przepiórkowski & Patejuk \(2013\)](#) contend that Polish has a number of function words expressing distance distributivity which share their form and semantic contribution but differ in their syntactic behaviour, namely different lexical items instantiated as *po* 'each'. While *po* may at first glance appear to be a single item, it can in fact be classified as a preposition (governing the strictly prepositional locative case), or as an adnumeral operator compatible with a variety of cases and hence transparent to case requirements. In order to account for this discordant behaviour,

<sup>26</sup>Note that this is a different use of the term *concord*, distinct from the concord bundle of features discussed in §2.2, though both these concepts have to do with the more general idea of agreement.

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Przepiórkowski & Patejuk harness the LFG mechanisms of templates (a complex template of sub-entries within one main entry) and restriction, as well as the notion of weak head borrowed from HPSG.<sup>27</sup> The issue is further explored by Przepiórkowski (2013; 2014; 2015), where he additionally deploys Glue semantics (see Chapter ??).<sup>28</sup>

## 2.11 Coordination

The interaction of coordination with concord and index features was already discussed in §2.2, so the current section will be dedicated to other problematic areas in the analysis of conjoined structures (cf. Chapter ?? for a fuller account). Przepiórkowski & Patejuk (2012a), Patejuk & Przepiórkowski (2012; 2014b; 2017: 338–339) and Patejuk (2015) discuss the coordination of unlike categories in Polish, here an NP and a clause, both serving as arguments (one an OBJ, the other a COMP) of the same predicate, with the same semantic interpretation:

- (31) Polish (from Patejuk & Przepiórkowski 2017: 338)
- |                                              |         |          |     |      |              |         |            |
|----------------------------------------------|---------|----------|-----|------|--------------|---------|------------|
| Lisa                                         | chciała | książkę  | i   | żeby | ktoś         | ją      | przytulił. |
| Lisa.NOM                                     | wanted  | book.ACC | and | that | somebody.NOM | she.ACC | hug        |
| ‘Lisa wanted a book and someone to hug her.’ |         |          |     |      |              |         |            |

Other unlike coordination strategies might involve a governing predicate (or even different heads) taking conjoined nominal arguments in different cases and/or with different grammatical functions. The possibility of all of these is ensured by specifying, say, the verb for ‘want’ in (31) as requiring either a case-bearing accusative NP object or a *that*-clause. Probably the biggest challenges in such cases are to ensure that the different alternatives can be realised simultaneously in the same sentence (rather than only on different occasions), as well as to decide how to label the function of the conjoined phrase as a whole.<sup>29</sup>

The inverse scenario entails having two coordinated heads which impose different restrictions on a shared dependent. Those requirements can be met by a single constituent in cases of syncretism, as in (32).

<sup>27</sup>Weak heads inherit morphosyntactic properties from their complements, for instance whenever *po* appears to be transparent to case requirements and the case value of the phrase it heads is determined by the complement.

<sup>28</sup>See Franks (1995: §5.2.1) for a comparison between distributive *po* across Slavic couched in generative linguistics; cf. Berger et al. (2009: Chapter 32), as well as Sussex & Cubberley (2006: 467–468), who suggest that *po* might even be a prefix.

<sup>29</sup>See further Patejuk & Przepiórkowski (2012), Przepiórkowski & Patejuk (2012a), Dalrymple et al. (2019: 225–230, 617ff., 650–651), where mention is made of the existence of similar constructions in Russian and Croatian. Patejuk (2015: 54–55, 68ff.) discusses both the issues of simultaneous realisation and labelling, in addition to the issue of embedding.

- (32) Polish (from Dylą 1984: ex. 2)  
 Kogo Janek lubi a Jerzy nienawidzi?  
 who.ACC/GEN Janek likes and Jerzy hates  
 ‘Who does Janek like and Jerzy hate?’

The verb *lubi* requires its object to bear accusative case, while *nienawidzi* takes an object marked for the genitive — *kogo* is syncretic/indeterminate between the two and can simultaneously satisfy both requirements. Dalrymple & Kaplan (2000) therefore propose a set-valued case attribute for this syncretic form, as in (33), while Patejuk & Przepiórkowski (2014b) and Patejuk (2015: 41ff.) refine the original proposal.

- (33) Partial lexical entry for Polish *kogo*  
*kogo* Pron (↑ PRED) = ‘WHO’  
 (↑ CASE) = {ACC, GEN}

## 2.12 Anaphoric control

In obligatory anaphoric control constructions, there should be co-reference between an argument of a main/matrix clause and a so-called controlled argument in a subordinate complement clause (see Dalrymple et al. 2019: 561ff.). The co-reference of the two arguments is represented in LFG by coindexing them at f-structure (see Chapter ??, Chapter ??, Chapter ??). Early work on obligatory anaphoric control in Serbian/Croatian was carried out by Zec (1987), while Neidle (1982) covers control in Russian (cf. Bojadžiev et al. 1999: 607–610 for Bulgarian, relying on different types of empty “pro”). Control in Polish is discussed by Patejuk & Przepiórkowski (2018). In (34), the dative experiencer acts as the controller of the unexpressed subject of the bracketed infinitival clause: the author is taken to be both the person experiencing difficulty and the person receiving the details.<sup>30</sup>

- (34) Polish (from Patejuk & Przepiórkowski 2018: 316)

<sup>30</sup>Cf. the discussion of raising in the context of the Polish passive in §2.5, with raising seen as “functional” (as opposed to anaphoric) control in LFG. As noted by an anonymous reviewer, there are no uncontroversial examples of functional control/raising in Slavic, with the exception of the analysis of the passive mentioned above, and also possibly verbs like ‘begin’, although this has not been discussed in LFG.

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Oczywiście autorowi najtrudniej był-o [uzyskać  
obviously author.DAT difficult.ADV.SUPERL was-3SG.N get.INF  
szczegóły].  
details.ACC

‘Obviously, to get the details was the most difficult [thing] for the author.’

### 3 LFG analyses in the context of other frameworks

The preceding sections have provided a survey through the lens of LFG of a wide range of grammatical phenomena illustrated from several Slavic languages, which are not always typologically identical. [Bresnan et al. \(2016: xi\)](#) describe LFG as “a theory of grammar which has a powerful, flexible, and mathematically well-defined grammar formalism designed for typologically diverse languages”. In the LFG view of grammar, the surface form and organisation of clauses differs from language to language. This is reflected in c-structure, which entails no claims to universality. The categories and the types of constituents, as well as their surface arrangement, all have to be justified on a language-by-language basis (cf. the argumentation in §2.4.1). However, the underlying functional makeup of clauses is regarded as cross-linguistically more uniform, as expressed in LFG’s more abstract f-structure (cf. the closing remarks in §2.7). Even close relatives like Bulgarian and Russian were shown to have typologically divergent clause structures, in spite of organising their clauses according to the packaging of information in discourse (§2.4).

In addition, LFG operates with a constraint-based, parallel correspondence architecture. Unlike transformational theories, no use is made of serial derivations, and the framework postulates no “deep” structures as inputs to syntactic operations. LFG shares these principles with theories like HPSG (see Chapter ??; cf. the relevant chapters in [Berger et al. 2009](#)). Indeed, there has been a great deal of common ground and cross-pollination, with numerous ideas borrowed from HPSG, most notably Wechsler & Zlatic’s HPSG-based proposal about agreement features in Bosnian/Croatian/Serbian (§2.2), or [Przepiórkowski’s](#) and [Patejuk’s](#) generalisations about Polish originally inspired by HPSG or cast in HPSG terms and cited on numerous occasions above. It is likewise worth singling out [Borsley & Przepiórkowski’s](#) (1999) edited volume on Slavic in HPSG, which promoted some seminal ideas, or HPSG work on individual languages, e.g. [Osenova’s](#) (2001), [Venkova’s](#) (2006) and [Osenova & Simov’s](#) (2007) analyses of Bulgarian, among many others. While HPSG and LFG analyses are highly compatible and often



easily convertible from one formalism to the other, LFG has some design features which make it stand out from other theories, especially dominant transformational ones. These are briefly outlined below in the light of the Slavic data presented in this chapter.

### 3.1 Optionality of c-structure heads and no movement or other transformations

The optionality of c-structure heads is a distinctive property of LFG (see [Lovesstrand & Lowe 2017](#), [Lowe & Lovesstrand 2020](#)), along with the absence of movement operations, which LFG shares with other non-transformational approaches to grammar. It emerged in the discussion of the phrase structure of Slavic languages (§2.4) that finite/tensed verbs in Russian and in other members of the family appear in the I slot, and the VP may contain no V head. In the theory of LFG, such examples need no special treatment and the verb is not believed to have “moved” to the c-structure position in which it appears (cf. Chapter ??). Due to its finite morphology, a tensed verb is simply assumed to be of category I in LFG, whereas in transformational frameworks it needs to travel from V to I in order to receive or check these morphological features.

The possibility and well-formedness of this non-transformational configuration is predicted by the overarching principles of LFG. Firstly, Russian finite verbs are assigned to the phrase-structure category of I, so they appear in I rather than within the VP. Having two main/full/lexical verbs, one in I and the other in the VP, is ruled out because each verb would contribute a PRED value to the f-structure, and LFG’s Consistency Principle does not allow f-structures having a PRED feature with two different semantic forms as its value (cf. the analysis of clitic doubling in §2.8). Secondly, the theory rules out sentences with no verbs whatsoever, because then the main f-structure would be without a PRED, violating the Coherence Principle (though compare the discussion of verbless clauses). Therefore, exactly one verb must appear and it must be housed in the c-structure position appropriate for its constituent-structure category.<sup>31</sup>

Compared to prevalent transformational approaches, the non-transformational LFG view is empirically more attractive and intuitive in handling typological diversity. A non-transformational theory avoids the biased assumption that languages with a word order and phrase structure very much unlike that of English,

<sup>31</sup>See [King \(1995: Chapter 10\)](#), who additionally provides an account of Russian questions without resorting to movement, as well as [Dalrymple \(2001: 79, 104–106\)](#), [Dalrymple et al. \(2019: 129–130\)](#); consult [Rudin \(1985\)](#) for a transformational treatment of word order, complementation and *wh*-constructions in Bulgarian.

including the Slavic family, actually start out with a deep/underlying structure suspiciously reminiscent of that of English, but then undergo various transformations to achieve the desired “scrambling” effects (see [Bresnan et al. 2016: 6ff.](#); cf. [Rudin 1985](#), who assumes a “non-configurational base” in her transformational treatment of Bulgarian word order).

Modern transformational accounts by now operate with highly abstract underlying structures which, although historically derived from English patterns, even in English itself require a lot of derivation to produce the surface form of the sentence. However, what remains English-influenced is the general idea that (a) constituent structure is the main level of syntactic representation where most grammatical phenomena can be modelled; (b) that constituent-structure positions are strictly associated with specific grammatical functions. LFG, by contrast, works much better for Slavic because its modularity gives more prominence to relational syntax (f-structure), case morphology, etc.<sup>32</sup> LFG can still capture constituent-structure phenomena equally neatly, including “binding” phenomena, as exemplified by Russian *svoj* ‘own’, or VP-internal asymmetries in Russian (cf. [Bailyn 2011: 140–151](#)).

### 3.2 Modularity (parallel architecture)

It emerged in §2 that LFG’s modular parallel architecture was well placed to deal with various grammatical phenomena in Slavic, not least the interdependence between flexible word order and the flow of information in discourse. Appealing to the interaction between c-, f- and i-structure, as well as semantics, proved more satisfactory than relying exclusively on the syntax, which would be inadequate on its own to capture all the generalisations. The independence of grammatical and discourse functions from constituent-structure, coupled with the constrained interface between the different modules, is designed to provide a good fit for languages which do not encode grammatical functions positionally, like the Slavic family.

In the light of these insights, the assignment of nominative and accusative case in Polish and Russian discussed in §2 was tied to grammatical function, independently of the phrase-structure position of the argument bearing this function. However, in a theory like GB or Minimalism, functions are defined positionally,

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<sup>32</sup>This was brought to my attention by an anonymous referee, who adds that it is not an accident that the notion of constituent structure did not really exist in the Slavic local linguistic traditions (e.g. in Russia, or in Prague School structuralism) before Chomsky: a kind of informal dependency grammar was traditionally used, and in the structuralist era, various dependency-based frameworks (Tesnière’s approach or Mel’čuk’s Meaning-Text Theory).

so “structural” case can only be dispensed in certain c-structure configurations, with the relevant constituents then rearranged to obtain the desired “surface” word order. Such theory-motivated complications do not arise in LFG. Another area where LFG’s interfaced modularity made rather interesting empirical predictions was argument alternations, some of which might affect the correspondence between argument structure and syntactic functions, while others might additionally interfere with the semantic representation of events (§2.5).

Moreover, as mentioned by an anonymous reviewer, LFG is different not only from transformational grammar but also from structuralist approaches which view language as a hierarchy of multiple levels (this view is also implicit in a lot of general/descriptive linguistic work). In LFG, the levels are parallel, which allows for a much more natural view of the interaction between them.

### 3.3 Exocentric S

Finally, using the exocentric S node (or equivalents), essentially a string which does not comply with X-bar schemata, also proved expedient in capturing the flexibility of Slavic syntax, similarly to the way it has ensured improved description of other non-configurational languages (see the rest of this volume, as well as [Bresnan et al. 2016](#): 112–116). It was mentioned in §2.4 that there were actually several competing but underlyingly similar proposals — either S, a flat VP or a flat IP have been proposed for Slavic languages, including Russian, Bulgarian and Polish. LFG admits all of those as it does not constrain the rules of syntactic structure by strict binary branching or X-bar theoretic templates at any cost (though see [Bresnan et al. 2016](#): Chapter 6, [Lovestrand & Lowe 2017](#)). Whichever of those solutions a researcher adopts will bring the desirable consequence of more accurate modelling — allowing the requisite surface freedom of constituent arrangement, without scrambling transformations from deep structures which may be empirically hard to justify.

## 4 Conclusion

It has been my aim throughout this chapter to highlight the contribution of LFG to understanding and describing Slavic languages in a theoretically illuminating way, at the same time pointing out how Slavic material has in turn contributed to adjusting and updating the formal apparatus of LFG, for instance augmenting the sets of agreement attributes. The chapter has demonstrated that the typological pliability of LFG is well suited to Slavic data and enhances our understanding

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of it, especially the interplay between “free” word order and information structure, agreement, case assignment and negation phenomena, alternations in the argument structure of verbs or pro-drop and verbless clauses, among other processes. On the other hand, Slavic data has posed some challenges to the design and principles of LFG, notably the existence of genuinely subjectless sentences, which might call for revising or abandoning the Subject Condition. Many of the debates continue and are likely to shed more light on the actual linguistic material as well as the best theoretical tools to explore it with. Needless to say, a great deal more remains to be done in order to attain fuller coverage of Slavic grammar.

## Acknowledgements

For words of encouragement, help and feedback on this chapter, I would like to thank Mary Dalrymple, Jan Fellerer, Steven Kaye, Mira Kovatcheva, Catherine Mary MacRobert, Adam Przepiórkowski, Christo Stamenov, Tzvetomira Venkova, as well as three anonymous reviewers.

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## **Part VII**

# **Comparing LFG with other linguistic theories**



## Chapter 7

# LFG and Cognitive and Constructional Theories

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Goldberg's (Cognitive) Construction Grammar and Langacker's Cognitive Grammar are compared with LFG. The comparison to be made involves differences in the notions coded in the representations recognized in these theories. It is shown that information factored out in different structures in LFG is often coded in a single structure in the two theories examined. Once such differences are recognized, a fruitful comparison of analysis is possible, in spite of apparent differences in the areas of interest in language and the conceptualization of grammar.

### 1 Introduction

In this chapter, I will compare LFG with cognitive and constructional theories of grammar. I will specifically discuss the (Cognitive) Construction Grammar (CxG) of Adele Goldberg, and Cognitive Grammar (CogG) of Ronald Langacker. These two theories have several commonalities, including the nonderivational, parallel-structure architecture of grammar, the central role of form-meaning pairs, the embodiment of the usage-based view of grammar, and the cognitive-linguistic conceptualization of language. These pose interesting similarities and differences in their comparison with LFG.

Yo Matsumoto

## 2 Construction Grammar

### 2.1 What is Construction Grammar?

#### 2.1.1 The characteristics of Construction Grammar

Construction Grammar (CxG) originates in the work of Charles Fillmore in the 1980s, when he began to work on the noncompositional properties of syntactic units larger than the word (e.g. Fillmore 1988, Fillmore et al. 1988; see Fillmore 2020). His thinking was further developed by Adele Goldberg's work on Argument Structure Constructions (Goldberg 1995; 2003; 2006; 2019). Over the years, various versions of Construction Grammar have emerged, including Radical Construction Grammar (Croft 2001), Embodied Construction Grammar (Bergen & Chang 2005), Sign-based Construction Grammar (Boas & Sag 2012), and Fluid Construction Grammar (Steels 2011). (I will not attempt a comparison of these theories; see Hoffmann & Trousdale 2013 for a survey). Culicover & Jackendoff's (2005) *Simpler Syntax* is also a version of construction grammar (see Chapter 8). Langacker's Cognitive Grammar, which will be discussed later in §3, also incorporates the notion of construction (Langacker 2003; 2005). The idea of construction has also been applied to the area of morphology in the Construction Morphology of Booij (2010; 2018).

The constructional view cuts across the distinction between formalist and cognitivist theories of grammar. One of the more formal versions of Construction Grammar is Sign-based Construction Grammar, which has a close relationship with HPSG. In this chapter, I will mainly consider Goldberg's, which is often called Cognitive Construction Grammar (Goldberg 2006: 214) due to the influence of the ideas of Lakoff (1987) as seen in the role of metaphor and prototype (see §2.1.2 for the role of metaphor). I will briefly touch on other theories encompassing the notion of construction.

CxG takes the notion of construction as central. Constructions are conventionalized clusters of syntactic, phonological, semantic, and pragmatic properties. According to Fillmore and Goldberg, construction manifests at all levels of linguistic structures: sentence, phrase, word, and morpheme, etc. This view is encapsulated in the slogan "it's constructions all the way down" (Goldberg 2006: 18).

One example of a sentence-level grammatical construction is given in (1).

- (1) Comparative correlative construction (Covariational conditional construction):

*The higher you go, the cooler it becomes.*



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The comparative correlative construction in (1) has a number of formal and semantic properties unpredictable from the forms/meanings of its parts and the normal rules of their combinations (see [Goldberg 2006: 6](#); see also [Culicover & Jackendoff 2005](#); [Hoffmann 2019](#)). The concatenation of two clauses without a conjunction is unusual in English, and so is the parallel structure involving the preposing of *the* plus comparative. The meaning of correlation cannot be reduced to any of its parts (i.e. there is no overt lexical item indicating correlation, such as the conjunction *as*), although the sense of correlation is implicit in the formal parallelism of the two clauses. It is argued that properties of sentences like (1) must be stated with the pairing of form and meaning at a unit larger than the word, suggesting that the notion of the sign can be extended to nonlexical units, with consequences on the status of compositionality in grammar. One can thus say that CxG focuses on the subregularities found in grammatical combinations, unlike theories like LFG that pay attention to regularities and broad generalizations.

Goldberg's CxG incorporates the usage-based view of grammar and language acquisition: the representation of grammar is shaped by language use (see [Lan-gacker 1988](#), [Barlow & Kemmer 2000](#), [Bybee 2006](#), [Diessel 2015; 2019](#)). This is reflected in the view that "item-specific knowledge co-exists alongside generalizations" ([Goldberg 2006: 12](#)), which is implemented in the hierarchy of constructions in CxG (see §2.1.2). It also means that knowledge of grammatical constructions includes the frequency with which the forms are used ([Goldberg 2006; Diessel 2015; Perek 2015](#)), and language acquisition is seen as the process of making generalizations over the specific constructions ([Goldberg 2006; Goldberg et al. 2004; Tomasello 2003](#)). Such a usage-based view of grammar is largely shared by the probabilistic and exemplar-based LFG ([Bresnan & Hay 2008; Bresnan & Ford 2010](#)), though perhaps not by all practitioners of LFG.

What is regarded as a construction has changed somewhat over the years. In [Goldberg \(1995: 4\)](#), a construction is defined as a form-meaning pair in which "some aspect of form or function is not strictly predictable from its component parts." In [Goldberg \(2006: 5\)](#), the range of constructions was widened to include fully predictable patterns "as long as they occur with sufficient frequency." More recently she states that one needs to keep track of all uses in order to know whether a form-meaning pair occurs with sufficient frequency, and therefore speakers have representations of form-meaning pairs regardless of their frequency. She now defines constructions as "emergent clusters of lossy [i.e. not specified in full detail] memory traces that are aligned within our [...] conceptual space on the basis of shared form, function, and contextual dimensions" ([Goldberg 2019](#):

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8).<sup>1</sup>

## 2.1.2 Argument Structure Constructions

Some constructions such as Ditransitive, Caused motion, Resultative constructions, relate to argument structure, and are thus called Argument Structure Constructions (Goldberg 1995; 2003; 2006; 2019; Boas 2003; Barðdal 2008). Take the example of the Caused motion construction exemplified in (2).

- (2) Caused motion construction:  
*Susan sneezed the napkin off the table.*

What motivates the constructional status of Caused motion is that verbs which normally do not subcategorize for an object and an oblique, such as *sneeze*, can appear with them in this construction. Goldberg argues that the argument structure and the semantics of caused motion in (2) come from the construction, and not from the verb. Goldberg represents the form and meaning of this construction as in (3).

- (3) Caused motion construction, Goldberg (2006: 73):
- | Form                                  | Meaning                                     |
|---------------------------------------|---------------------------------------------|
| [Subj V Obj Obl <sub>path/loc</sub> ] | [X causes Y to move Z <sub>path/loc</sub> ] |

In Goldberg's view, the roles that a verb has and those that a construction has are different, and are called *participant roles* and *argument roles*, respectively. The participant roles of the verb (e.g. sneezer of the verb *sneeze*) is linked to the argument roles of the construction in the way represented in Figure 7.1. Participant roles are based on the semantic frame of a verb (cf. Fillmore 1982), and bear names specific to the event described (e.g. sneezer) rather than thematic role names. The *Coherence Principle* (Goldberg 1995) ensures that only those participant roles compatible with argument roles can be "fused" or linked.

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<sup>1</sup>I would like to add a brief comment on Construction Morphology (CxM; Booij 2008; 2010; 2018; see also Chen & Matsumoto 2018). CxM is influenced by Goldberg's CxG. CxM is a theory of morphology in which complex words are analyzed in terms of constructions (pairs of form and meaning), which are represented in the form of constructional schemas (e.g. [[x]<sub>A</sub>-ness]<sub>N</sub> ↔ 'the property/state of A'). In this theory the lexicon lists both constructional schemas and words that instantiate them, which are organized in a hierarchical network, as in Goldberg's CxG.

One significant similarity of CxM and LFG lies in the "full-entry" view of lexical items (Jackendoff 1997; Jackendoff & Audring 2019). This means that in CxM, words including inflected forms are fully formed and listed in the lexicon, as in LFG. In this respect, CxM is highly compatible with LFG.

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|          |            |   |         |      |       |   |
|----------|------------|---|---------|------|-------|---|
| Sem      | CAUSE-MOVE | < | cause   | goal | theme | > |
|          | R          |   |         | ⋮    |       |   |
| R: means | SNEEZE     | < | sneezer |      |       | > |
|          | ↓          |   | ↓       | ↓    | ↓     |   |
| Syn      | V          |   | SUBJ    | OBL  | OBJ   |   |

Figure 7.1: Composite structure of Caused motion + *sneeze* (Goldberg 1995: 54)

An important notion in CxG is the notion of a *constructional network* (Goldberg 1995; 2006). A network of constructions is built through *inheritance links*, through which many of the properties of particular constructions are motivated by more general or larger constructions. There are several types of inheritance links. One is *metaphorical extension links*, which are posited when two constructions are related by metaphorical mapping in the sense of Lakoff & Johnson (1980). Goldberg states that the Resultative construction is metaphorically inherited from the Caused motion construction (Goldberg 1995), as shown in Figure 7.2.<sup>2</sup>

*Instance links* are posited when a specific construction is a special case of a more general construction. Broad generalizations are captured at the level of general constructions which are inherited by more specific constructions. Sub-regularities are captured by positing constructions that are at lower levels of the network. An ultimate case of specific construction is fully instantiated sentences specified with lexical items. Goldberg (2006: 55) argues that even general constructions are stored in the mental lexicon together with specific examples that are highly conventional and frequent (e.g. *Give me a break* as an instance of the Ditransitive construction). In such a case, she argues, it is clear that both generalizations and instances are stored. CxG allows for such redundancy because specific constructions (including specific examples) are often associated with idiosyncratic meanings and special pragmatic functions. Moreover, speakers have knowledge of the frequencies of specific instances, providing evidence for the inclusion of such instances in grammar for even highly compositional constructions.

It is also important to note that expressions inherit from several constructions due to *multiple inheritance* (Goldberg 1995; 2003). For example, (4) inherits not just from the Caused motion construction but also from the Subject-auxiliary inversion and Passive constructions.

<sup>2</sup>In contrast, Jackendoff (1990) treats the two constructions as parallel instantiations of the same thematic structure, with different semantic field features (see Goldberg & Jackendoff 2004: note 13).

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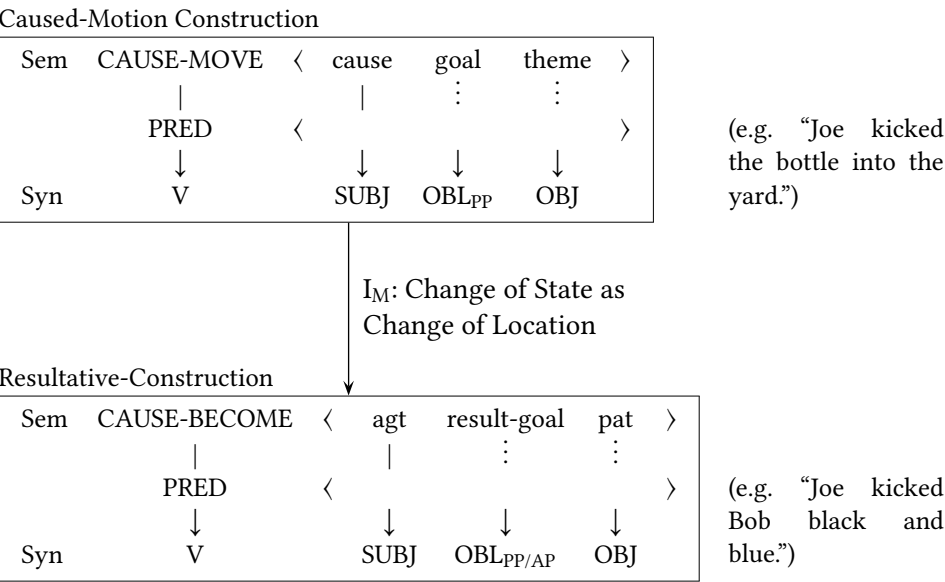


Figure 7.2: Caused motion construction and Resultative construction (Goldberg 1995: 88)

(4) *Was the ball thrown into the net?*

Goldberg’s (1995) theory of argument structure constructions was criticized within the CxG community for the generality of constructions posited and the underestimation of the role of verb meanings; see Boas (2003) and Iwata (2008; 2020) for models in which verb meanings play greater roles.

2.2 CxG and LFG

2.2.1 Factorization of grammar in CxG and LFG

CxG is, like LFG, a nonderivational theory of grammar, in which two representations (form and meaning) are not derivationally (i.e. transformationally) related but exist in a parallel way. In comparing LFG and CxG, it is worthwhile to consider what sort of factorization of grammar is achieved in different representations in the two theories. LFG recognizes c- and f-structures as grammatical structures, in which different grammatical information is coded (Kaplan & Bresnan 1982), and p-structure, a-structure, s-structure and i-structure in addition, to represent other information (see Dalrymple et al. 2019). In contrast, Goldberg’s CxG recognizes two representations, form and meaning.

## 7 LFG and Cognitive and Constructional Theories

One issue to consider is which LFG grammatical structure the form in CxG corresponds to. In some cases, it appears to correspond to c-structure. The form of some constructions, such as lexically filled idioms (e.g. *give the devil his due*), includes the sound forms of words and linear order, which are c-structure information. In the formulation of the Caused motion construction in (3), however, the form contains linearly ordered grammatical functions, and thus contains parts of c-structure and f-structure information. The formalization of forms in CxG is eclectic.<sup>3</sup>

Goldberg's CxG contrasts with some other constructional theories, which have stricter separation of phonology and grammar. Jackendoff (1997), Jackendoff & Audring (2019) and Booij (2010), for example, adopt the tripartite Parallel Structure Architecture, involving phonological, syntactic, and semantic structures. In these theories, constructions are a set of these three structures.<sup>4</sup>

The way Goldberg uses the term *form* has been discussed by Langacker (2005) and Verhagen (2009). Langacker points out that the form in Goldberg's CxG (as well as Croft's Radical CxG) is in many cases not phonological and therefore is not truly the form. He argues that the form must not include grammatical information, which must reside in the relationship between the form and the meaning (see §3).

One may note that Goldberg's formulation of the formal properties of argument structure constructions shows some influence of LFG, as can be seen in the use of grammatical functions such as SUBJ, OBJ, and OBL (though Goldberg often uses the categorial term PP in place of OBL). Sometimes she has even used the LFG term XCOMP to refer to result phrases in the Resultative construction (e.g. Goldberg 1995:3), though not in her later writings (e.g. Goldberg 2006).

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<sup>3</sup>The following quote from Goldberg (2013: 30) reveals her thinking over formalism in her construction grammar.

I have avoided using all but the most minimal formalization in my own work because I believe the necessary use of features that formalism requires misleads researchers into believing that there might be a finite list of features or that many or most of the features are valid in cross-linguistic work. The facts belie this implication. The meanings or functions of words and constructions do not lend themselves to semantic decomposition... and often-suggested syntactic primitives such as noun, subject, agreement, or agent actually vary crosslinguistically as well...

It is to be noted that there has not been much discussion on the phrase structures or phonology of sentences in CxG.

<sup>4</sup>Jackendoff recognizes tiers within a structure. One of them is the Grammatical Function Tier, which represents grammatical functions separately from phrase structure (Culicover & Jackendoff 2005: Chapter 6).

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### 2.2.2 Construction, lexical integrity, and the lexicon

The most important difference between CxG and LFG lies in the role of the syntax-lexicon distinction. LFG treats the Principle of Lexical Integrity as central (Bresnan & Mchombo 1995; Bresnan 2001), by which syntax cannot operate into the internal structure of words. Bresnan (2001: 91) formulates this idea as: “Morphologically complete words are leaves of the c-structure tree and each leaf corresponds to one and only one c-structure.” This principle suggests a clear division of syntax and the lexicon. LFG also assumes that all features of the whole are shared by those of its head, ensured by the up-equals-down functional annotation on the head. In contrast, all grammatical entities (e.g. phrases, words, and morphemes) are constructions in CxG, and in this sense there is no strict division between syntax and the lexicon. Syntactic and lexical constructions differ in their internal structure, but they are essentially the same pair of form and meaning (Goldberg 1995: 7). In addition, CxG acknowledges that the properties of a construction may differ from those of its head, as can be seen in the argument structure involved in the Caused motion construction in (2).

There have been attempts to treat constructional properties in LFG. Kaplan & Bresnan (1982) placed the special properties of an idiom *keep tabs on* in a lexical entry of *keep*, which calls for a specific object to be used in the meaning of ‘observe’. Alsina (1996) and Butt (1995) went somewhat beyond what is normally expected from lexical integrity in LFG and recognized the case where two nonadjacent lexical items form one complex predicate (a single predicate in f-structure). They argue that the mechanism of predicate composition creates a single predicate in such a case, and formulate how a complex a-structure maps onto a single predicate in f-structure (see Chapter ??).

More recently, Asudeh et al. (2013) argue for an analysis incorporating constructions that preserves the notion of lexical integrity. They distinguish between Phrase-structurally flagged constructions (such as the Swedish Directed Motion Construction), and Lexically flagged constructions (such as the English *way*-construction). In the former case, a special construction-specific phrase structure rule is posited, which encodes the subcategorization frame of the construction and introduces a template containing information on the special properties of the construction. In the latter, such a template is introduced by the key lexical item in the construction. In this view, lexical integrity is preserved, but the subcategorization is now constructionally captured in terms of c-structure rules and the one specified in the lexicon is only a default one (see Asudeh et al. 2013: 27–29). It appears that this analysis can capture some properties of sentential constructions. It is not clear, however, whether Asudeh et al. would like to apply this sort

of analysis to all cases of Goldberg’s constructions, which would result in a large number of construction-specific phrase-structure rules.

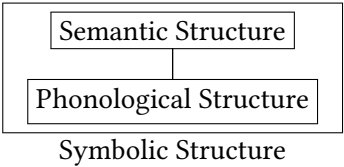
### 3 Cognitive Grammar

#### 3.1 What is Cognitive Grammar?

Cognitive Grammar (CogG) is a theory developed by Ronald Langacker and his associates (Langacker 1987; 1990; 1991; 1999; 2008; 2009; Van Hoek 1995; Kumashiro & Langacker 2003; etc.). The theory grew out of Langacker’s dissatisfaction with generative grammar, which he once adhered to. CogG abandons Chomsky’s autonomy thesis (grammar is independent of semantics or matters of language use) and regards “language as an integral facet of cognition” and grammar as “inherently meaningful” (Langacker 1987: 509). For Langacker, the goal of linguistic investigation is to characterize language as a cognitive entity. In this respect CogG is part of the linguistic endeavor known as Cognitive Linguistics, along with works by Lakoff (1987) and others. While theories like LFG are interested in the role of different grammatical information, CogG is interested in the semantic import of grammatical notions.

CogG posits only semantic structure, phonological structure, and symbolic links between the two, based on the “symbolic” view of language, as shown in (5).

(5) Symbolic structure of Langacker:



Unlike CxG, Langacker posits the form part of the symbolic structure as purely phonological (Langacker 2005: 104). The lexicon, morphology and syntax in CogG reside in the way the phonological and semantic structures are linked, and there is no independent grammatical structure in CogG. In this respect CogG crucially differs from LFG.

Langacker (1987: 53) adopts the *content requirement* for entities used in his representations: only those elements that are part of the directly apprehended primary data or those that emerge from them by means of “basic psychological

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phenomena of schematization and categorization”<sup>5</sup> are permitted in grammar. This has led to the elimination of syntactic notions in CogG:

Semantic structures, phonological structures, and symbolic links between them are the minimum needed for language to serve its communicative function. Cognitive Grammar is thus maximally austere in claiming that only these elements are necessary. (Langacker 2005: 106)

CogG, like Goldberg’s CxG, embodies the usage-based view of language (see Langacker 1988; 2000). Langacker was the first to use the term *usage-based* (Langacker 1987: 46), and for him this meant that, unlike generative grammarians, grammar lists “the full range of linguistic conventions, regardless of whether these conventions can be subsumed under more general statements” (Langacker 1987: 494). Thus, grammar includes not just high-level broad generalizations but also low-level, limited-range generalizations that speakers can make out of the particular forms they are exposed to, a view which influenced Goldberg (see §2.1 above). Recent usage-based research has shifted to corpus-based frequency studies, but Langacker himself has not engaged in corpus-based frequency study.

## 3.2 CogG and LFG

### 3.2.1 Nature of representations

Langacker’s CogG may appear to have little resemblance to LFG, and there has not been much interaction between the two theories. The adoption of image-schematic representation in CogG (see below) may strike LFG practitioners as quite alien, and the CogG abandonment of key grammatical notions used in LFG may lead one to think that any comparison is hopeless. Therefore an important purpose of this section is to try to find commonalities and areas of comparison.

There *are* some interesting similarities between the two theories, inviting meaningful comparison. CogG is a nonderivational theory in which different structures coexist without any derivational (i.e. transformational) relationship between them, as in LFG. CogG recognizes two structures, phonological structure and semantic structure, as noted above. It is beneficial to compare the phonological structure of CogG with LFG’s c-structure and p-structure, and the semantic structure with f-structures and a-structure.

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<sup>5</sup>By schematization, Langacker means “the process of extracting commonality inherent in multiple experiences to arrive at a conception representing a higher level of abstraction,” and by categorization, “the interpretation of experience with respect to previously existing structures” (Langacker 2008: 17).



## 7 LFG and Cognitive and Constructional Theories

Phonological structure encodes surface formal groupings and linear order, and in this sense it encodes part of the information found in LFG c-structure. It also lacks empty categories, again similar to c-structure, in which they are avoided, used only as a last resort (see Kaplan & Zaenen 1989, Bresnan 1998, Bresnan et al. 2016: Chapter 9). Unlike c-structure, however, it does not contain category labels and *syntactic* phrase structure. The formal groupings that Langacker envisages are more phonological than syntactic. The phonological structure of the sentence (6a) is simply (6b), rather than (6c) (Langacker 2003: 79).

- (6) a. *Bill said Joe believes Roger is angry.*  
 b. Bill said / Joe believes / Roger is angry.  
 c. [Bill said [Joe believes [Roger is angry]]]

Langacker argues that the grammatical constituency (embedding) often assigned for sentences like (6a) is in fact conceptual groupings, and does not exist in the phonological structure. Langacker's phonological structure is thus more similar to the p-structure in LFG proposed in Bögel et al. (2009), in which prosodic phrasing is encoded.

The most characteristic aspect of CogG is the adoption of the *image-schematic* representation in the semantic structure. The semantic structure is exemplified in Figure 7.3, which represents the semantic structure of *near the door*.

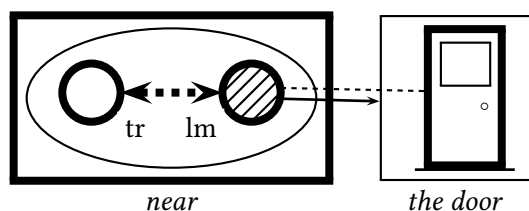


Figure 7.3: The semantic structure of *near the door* (Langacker 2008: 201)

The preposition *near* represents a relationship (represented by a bidirectional arrow) between two entities (represented by circles) within a vicinity (represented by an oblong area). The slashed entity is elaborated by the semantic structure of *the door*, with elaboration represented by a thin arrow), and the dotted line represents identity. (The annotations of “lm” and “tr” will be expounded later).<sup>6</sup>

<sup>6</sup> Concerning the nature of semantic structures, Langacker (2008: 12) states the following:

yet another [misconception] is that the schematic images they employ purport to be

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Note that the semantic structure includes not just what is foregrounded (*profile*) in the meaning of each expression but also what is in the background (*base*), such as the vicinity border. Profiles are indicated in thicker lines. The box for *near* is profiled since it is the head of the phrase *near the door*.

In the two structures seen above, we see an attempt to encode different information in a different kind of representation with its own geometry and categories, as is the case with LFG. Although the particular representations chosen are very different, we see in both theories attempt to find alternatives to phrase structure trees that have been used to represent all kinds of linguistic information. The two theories thus share the spirit of *liberating linguists from phrase structure trees* so familiar to linguists through Chomsky's generative grammar. In LFG, this is seen in the adoption of attribute-value matrices for f-structure, in which functional information is coded (Kaplan & Bresnan 1982). In CogG, it is seen in the adoption of image-schematic representation for the semantic structure seen above.

### 3.2.2 Phrase structure, grammatical categories and grammatical functions

CogG clearly differs from LFG in terms of the (lack of) belief in the independent grammatical structure and grammatical notions. In CogG, there is no phrase structure, grammatical categories or grammatical functions *per se*. CogG's phonological structure does not code syntactic constituency, as noted above. According to Langacker, constituency is in fact conceptual groupings. There is no independent representation in which grammatical categories or grammatical functions are stated, either. What is represented is the *conceptual import* of these notions.

CogG adopts a "notional approach" to grammatical categories (Rauh 2010). Grammatical categories are defined in terms of the nature of the profile in the semantic structure. Nouns designate Things; Verbs designate Processes; Adjectives, Adverbs, and Prepositions designate Atemporal Relationships. In this view, the verb *choose* can be represented in Figure 7.4a, and the noun *choice* (in the sense of the action of choice) in Figure 7.4b (see Langacker 2008: 100).

Here, a circle represents a Thing, and an arrow, a Process. While the verb *choose* profiles a Process involving two Things, for the noun *choice* (in the sense of the action of choosing) the whole Process is construed as a Thing (represented

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direct depictions of conceptual structure. The actual intent of these diagrams is rather more modest: to allow certain facets of conceptual organization to be represented in a format that is both user-friendly and explicit enough to serve as a basis for semantic and grammatical analysis.

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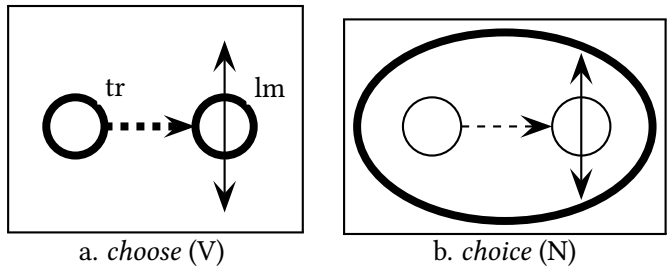


Figure 7.4: Semantic structures for *choose* and *choice*

by a large oblong circle). The two refer to the same event, but they represent different *construals* of the event.

Grammatical functions are not recognized per se, either, in sharp contrast to LFG. Subject and Object in CogG are nominals which designate *prominent* participants in semantic structure. Among the participants of a relational expression like a verb and a preposition, the one given primary focal prominence is called a *Trajector* (tr), and the one given secondary focal prominence is called a *Landmark* (lm). In the case of a verb, the former is the subject of the verb, and the latter, the object. This is illustrated in Figure 7.5, which represents the semantic structure of a transitive verb in the Active, Passive, and Middle uses (e.g. *I opened the door*; *The door was opened*; *The door opens easily*; see Langacker 2008: 396). (The double arrows represent processes involving the transmission of force; single arrows represent changes;  $\Delta$  indicates that a participant is left unspecified.)

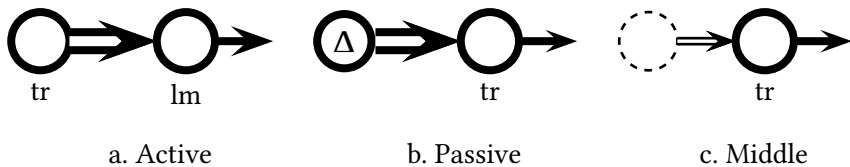


Figure 7.5: Image-schematic representation of Active, Passive and Middle

The three are identical in terms of the *action-chain* represented (the energy source of which is agent, which acts on the patient, which undergoes a change). However, the three representations differ in the participant construed as a Trajector; it is agent in the case of Active, and patient in Passive and Middle. Note also that agent in the Middle verb (which is not an argument of the verb) is represented though not profiled. Langacker’s semantic structure includes this sort of entity existing in the background of the profiled process, unlike LFG’s f- and a-structure.

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The notion of Trajector is utilized to make generalizations that would involve SUBJ in LFG. As is well known, a subject is more likely to be the controller of verb agreement, the antecedent of reflexive pronouns, the controller of the embedded predicative complement, etc. According to Langacker, such phenomena are *symptoms* of the underlying cognitive salience of the Trajector (Langacker 1987: 235). Thus, Japanese subject honorification, which makes reference to SUBJ in f-structure in LFG analyses (Ishikawa 1985; Matsumoto 1996), is analyzed in CogG in reference to the Trajector of a predicate (participant subject; Kumashiro & Langacker 2003, Kumashiro 2016) (see the trajector in Figure 7.6a). CogG additionally recognizes the setting subject or the subject of a clause, utilized in sentences like *Friday saw a big event*, represented by the Trajector in Figure 7.6b. Kumashiro (2016) claims that Japanese reflexivization makes reference to the subject in this sense as an antecedent.

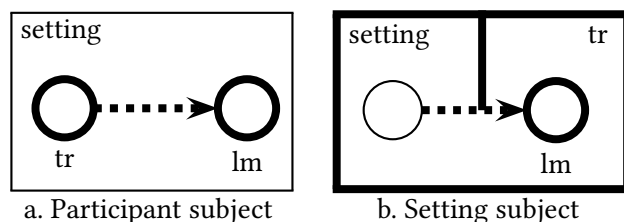


Figure 7.6: Two notions of subject in CogG

Kumashiro (2016) argues that both are present in the double subject construction in Japanese. The participant subject corresponds to LFG's SUBJ in f-structure, while the setting subject may correspond to TOPIC in i-structure at least in some cases.

The correspondence of Trajector and Landmark to SUBJ and OBJ in LFG helps elucidate a CogG analysis of Subject-to-Object raising (Langacker 1995) in LFG terms. Langacker (1995) represents the semantic structure of the sentence *I expect Don to leave* as in Figure 7.7.

In this structure, the whole process of DON's leaving is the target of the process of the verb *expect*, represented by the dashed arrow pointed at the whole process of DON's leaving rather than the circle representing DON. (In contrast, an arrow representing the process of control verbs such as *persuade* would touch the circle representing DON.) On the other hand, it is DON that is given the Landmark status (indicated by a thick circle) with respect to the process of *expect*, which means that it is an object of the verb.

What is crucial in Subject-Object raising is that the main verb process takes something other than its semantic participant as its Landmark. This discrepancy

## 7 LFG and Cognitive and Constructional Theories

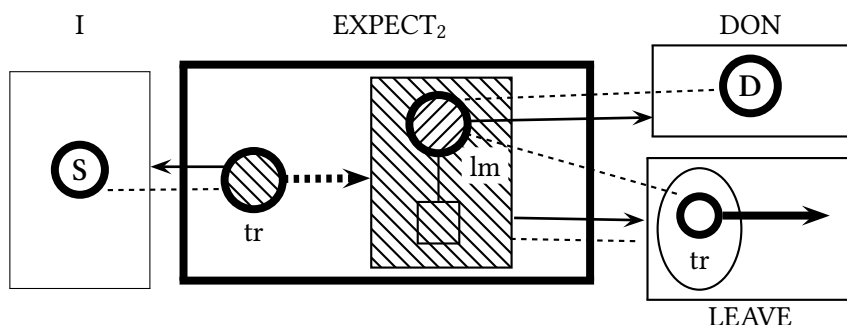


Figure 7.7: The semantic structure of *I expect Don to leave* (Langacker 1995: 34)

is allowed since DON is the “reference point” for DON’s leaving, which is its “active zone” (indicated by shading, as in Figure 7.7) with respect to the verb *expect*. An active zone of a reference point with respect to a process is an entity that in fact participates in the process, even though its reference-point entity metonymically related to it appears in (surface) forms.

One can establish a parallelism of this analysis with an LFG analysis of raising in Bresnan (1982) (see Chapter ??). The landmark status of DON in the semantic structure of EXPECT corresponds to the OBJ status of *Don*, and the Trajector status of DON in the semantic structure of LEAVE corresponds to its SUBJ status in the embedded structure (XCOMP). The lack of contact of the point of the dashed arrow and the Landmark represents the nonthematic status of the OBJ; the active zone with respect to the raising predicate EXPECT corresponds to an XCOMP (which allows the most salient entity inside it (i.e. SUBJ) to be related to an upper PRED); and the dotted line linking the Landmark of EXPECT and Trajector of LEAVE represents (the conceptual import of) functional control.<sup>7</sup>

From LFG’s point of view, CogG’s semantic structure encodes information of different characters, which is factored out in different structures in LFG. From CogG’s point of view, information coded in the semantic structures is all of the same sort, since they are conceptual imports of such grammatical notions as grammatical functions and categories.

<sup>7</sup> Note the following statement of Croft (1999: 108): “Although Langacker is at pains to demonstrate how radically opposed his theoretical framework is to the formalist research tradition (and to a great extent this is true), nevertheless even a committed formalist should be able to identify the essence of his analysis.”

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## 4 Concluding remarks

In this chapter, I have compared (Cognitive) Construction Grammar and Cognitive Grammar with LFG. We have seen some general differences between LFG and those two theories: emphasis on subregularities (CxG) vs generalizations (LFG) and emphasis on grammatical categories (LFG) vs their semantic import (CogG). We have also seen that information factored out in different structures in LFG are often coded in a single structure in the two theories examined. In spite of such differences in the areas of interest in language and the conceptualization of grammar, I have hopefully shown that a comparison of these two theories with LFG is more fruitful than might have been thought, once the nature of information coded in the structures recognized in each theory is understood.

## Acknowledgements

In writing this chapter, I acknowledge the help of Yi-Ting Chen, Keigo Ujiie, Akira Machida, and Mary Dalrymple. I would also like to thank four reviewers for their very helpful comments. All remaining errors are of course mine.

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# Chapter 8

## LFG and Simpler Syntax

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The theories of LEXICAL FUNCTIONAL GRAMMAR (LFG) (Kaplan & Bresnan 1982) and SIMPLER SYNTAX (SiSx) (Culicover & Jackendoff 2005) both emerged out of a dissatisfaction with the conceptual and formal assumptions of MAINSTREAM GENERATIVE GRAMMAR (MGG) (Chomsky 1957; 1965; 1981; 1995). Due to their similar origins, LFG and SiSx have a lot in common: the reduced role of phrase-structure in the explanation of linguistic phenomena, the adoption of constraint-based formalisms and the recognition of autonomous representations for grammatical functions. But there are also crucial differences between the two approaches that relate to some of the most lively issues in linguistics: e.g. the nature of the lexicon and the role of formal grammar in explaining linguistic judgments. The goal of this chapter is to compare these two alternatives to MGG, highlighting their differences and similarities with respect to theoretical and empirical issues.

### 1 Introduction

The goal of this chapter is to provide a comparison between LEXICAL FUNCTIONAL GRAMMAR (LFG) and SIMPLER SYNTAX (SiSx). Historically, both theories were born out of a dissatisfaction with the conceptual and formal assumptions of MAINSTREAM GENERATIVE GRAMMAR (MGG) (Chomsky 1957; 1965; 1981; 1995). Due to their similar origins, LFG and SiSx have a lot in common: the reduced role of phrase-structure in the explanation of linguistic phenomena, the adoption of constraint-based formalisms and the recognition of autonomous representations for grammatical functions, to name a few. But there are also crucial differences that relate to some of the most lively issues in linguistics: e.g. the nature of the lexicon and the role of grammar in explaining linguistic judgments.

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In §2, I offer a quick summary of the SIMPLER SYNTAX HYPOTHESIS (SSH). In §3, I lay out some goals and architectural assumptions that SiSx and LFG share, as well some important theoretical differences between the two approaches. §4 deals with the motivations for the constructional lexicon assumed in SiSx, which does not adhere to LFG's LEXICAL INTEGRITY PRINCIPLE (Bresnan & Mchombo 1995). §5 examines the role of constraints that are not part of the grammar, comparing SiSx with an LFG alternative. §6 wraps up discussing what LFG and SiSx can learn from each other.

Throughout this chapter, I will assume basic familiarity with the LFG side of the comparison and focus mainly on explaining the SiSx approach. The basic source for the latter is Culicover & Jackendoff (2005), but I will also draw freely from Jackendoff (2002; 2010), Jackendoff & Audring (2019) and Culicover (2009; 2013b; 2020).

## 2 The Simpler Syntax Hypothesis

Like other syntactic theories, SiSx is an attempt to describe and explain the language user's ability to establish a correspondence between meaning and sound or gesture. What defines it is the claim that this correspondence should be as minimal as possible – i.e. that syntax should *only* be invoked when other factors (e.g. semantics, prosody, processing) are insufficient to explain the phenomena at hand. This claim is embodied in the Simpler Syntax Hypothesis (Culicover & Jackendoff 2005: 5):

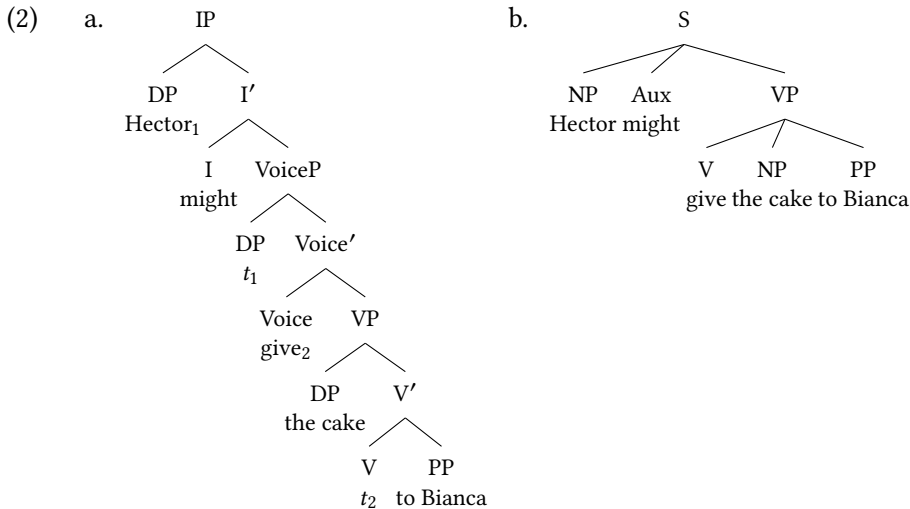
(1) THE SIMPLER SYNTAX HYPOTHESIS (SSH)

The most explanatory syntactic theory is one that imputes the minimum structure necessary to mediate between phonology and meaning.

Assuming Chomsky's (1965) notions of descriptive and explanatory adequacy, what the SSH says is that, given a set of descriptively adequate grammars of a language *L*, the one the theorist should choose (i.e. the more explanatory one) is the one that assigns less structure to the expressions of *L*. The SSH favors, thus, representational economy (Chomsky 1991; Trotzke & Zwart 2014) over other notions of simplicity, such as minimizing the class of possible grammars or the number of principles in particular grammars. The latter two goals are the main driving forces of MGG since the advent of the Principles and Parameters framework (Chomsky 1973; 1981; 1995).

As an example, contrast the relatively flat constituent structure SiSx assigns to the English sentence *Hector might give the cake to Bianca* in (2b) with the MGG

variant in (2a), which is based on the widely adopted VP-shell analysis (Larson 1988; Kratzer 1996; Hale & Keyser 1993; Chomsky 1995):



MGG opts for structures like (2a) because the grammar that generates them involves *fewer* principles (and is allegedly *more restrictive*) than the one that yields (2b).<sup>1</sup> The idea is that (2a) follows a universal blueprint for structure-building that is virtually *invariant* across languages – one that imposes strict binary branching, endocentricity and a rigid order among heads. Moreover, the hierarchical organization of phrases in (2a) is semantically transparent, reflecting a universal THEMATIC HIERARCHY, in which AGENTS are higher than THEMES, THEMES are higher than GOALS and GOALS are higher than MODIFIERS (see Baker 1997).

The structure itself, however, is clearly much simpler in (2b): (2b) has fewer degrees of embedding (just two), no empty functional projections (e.g. VoiceP) and no phonetically null elements (traces or deleted copies). Given a suitably flexible interface, (2a) can also be placed in correspondence with a level of SEMANTIC STRUCTURE (Jackendoff 1990). The semantic properties that (2a) purports to reflect can be more naturally represented in this level, which is independently required to explain inferences that go well beyond what narrow syntax can express.<sup>2</sup> Thus, between representations (2a) and (2b) – the former illustrating simplicity of principles and the latter simplicity of structure – SSH recommends (2b).

<sup>1</sup>The suggestion that (2a) implies a more restrictive grammatical formalism is probably not true. As Kornai & Pullum (1990) show, as soon as empty elements are introduced, X'-theory becomes equivalent to an arbitrary context-free grammar that can generate structures like (2b). Similar considerations apply to minimalist descendants of X'-theory (cf. Chomsky 1995).

<sup>2</sup>Even the rich structure in (2a) fails to encode the inference that Hector is the Source of the

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A theoretical reason for pursuing the SSH (as opposed to other measures of simplicity) is that it approximates syntactic structures to what is directly inferable from input, thereby reducing the task of the language learner (cf. Culicover 1998; 1999; Jackendoff 2011a). The child has no direct evidence for the traces and empty elements assumed in (2a). As Chomsky (1982: 19) notes, this raises poverty-of-stimulus issues, which call for the invocation of a richer UNIVERSAL GRAMMAR (UG). Insofar as SiSx posits more concrete structures, it contributes to the minimalist project of a leaner UG (cf. Chomsky 2005; Hornstein 2009).

Aside from being more *explanatory*, the option for simpler structures is also more *descriptively adequate* than accounts based on rich uniform representations like (2a). Classic constituency tests, for example, only provide motivation for the the major constituent divisions shown in (2b): VPs, PPs, NPs, etc. The empirical virtues of the SSH also manifest in accounts of specific linguistic phenomena (some of which will be mentioned in Sections 4 and 5). Most arguments for SiSx analyses have the following form:

[G]iven some phenomenon that has provided putative evidence for elaborate syntactic structure, there nevertheless exist numerous examples which demonstrably involve semantic or pragmatic factors, and in which such factors are [...] impossible to code uniformly into a reasonable syntactic level [...]. Generality thus suggests that, given a suitable account of the syntax–semantics interface, all cases of the phenomenon in question are accounted for in terms of the relevant properties of semantics/pragmatics; hence no complications are necessary in syntax. (Culicover & Jackendoff 2005: 5)

As this makes clear, the SSH eschews any kind of covert structure that is motivated exclusively in order to provide a uniform mapping onto semantics. This means that SiSx rejects the SYNTACTOCENTRIC architecture of MGG – i.e. the view that syntax is solely responsible for the combinatorial richness of language (Culicover & Jackendoff 2005: 17) –, as well as the assumption of INTERFACE UNIFORMITY – i.e. the view that the interface between syntax and semantics is perfectly transparent (Culicover & Jackendoff 2005: 47).

As an alternative, SiSx adopts the PARALLEL ARCHITECTURE of Jackendoff (2002), according to which linguistic structure is determined by (at least) three independent formal systems: phonology, syntax and semantics. In addition, SiSx borrows from LFG the idea of a separate syntactic layer for representing grammatical

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cake (in addition to the Agent of *give*), or that cakes are artifacts typically used for eating. The latter influences the interpretation of evaluative adjectives: a *good cake* is a cake that is good to eat (Pustejovsky 1995). The phrase-structure formalism has no natural way to represent this.



functions: the GF-tier (Culicover & Jackendoff 2005: chap. 6). Each one of these systems is defined by its own characteristic primitives and formation rules and is connected to the others by means of more or less “messy” interfaces:

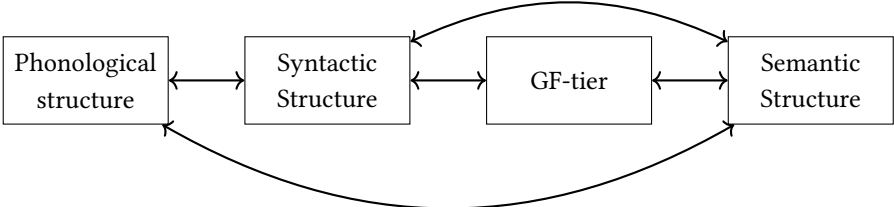


Figure 8.1: The Parallel Architecture of SiSx

A well-formed sentence must be well-formed in each level, in addition to having well-formed links among the interfaces.<sup>3</sup> A toy example is shown in (3), where natural numbers indicate interface links between the components:<sup>4</sup>

$$(3) \left[ \begin{array}{l} \text{PHON} \text{ m}\epsilon\text{æ}r\text{i}_1\#\text{k}\text{i}\text{s}_2+\text{d}_3\#\text{d}\text{ʒ}\text{ɒ}\text{n}_4 \\ \text{SYN} \text{ } [_S \text{ NP}_1 [_{VP} \text{ V}_2 - \text{past}_3 \text{ NP}_4]] \\ \text{GF} \text{ } [_{\text{PRED}} \text{ GF}_1 > \text{GF}_4]_2 \\ \text{SEM} \text{ } \text{past}'_3(\text{kiss}'_2(\text{AGENT:mary}_1, \text{PATIENT:john}_4)) \end{array} \right]$$

The structure in (3) represents the sentence *Mary kissed John*. The most opaque aspect of the formalism is likely the GF-tier. The basic units of this level are PREDs (short for syntactic predicates), which contain a sequence of ranked positions for syntactic arguments (excluding adjuncts). These positions are not explicitly labeled with grammatical function names, like SUBJECT or OBJECT. For reasons that will become clear in §4, these notions are relationally defined as *first GF* of PRED, *second GF* of PRED, etc. The ranking of GFs is determined according the FUNCTIONAL HIERARCHY, which has its roots in Relational Grammar (Perlmutter & Postal 1977; 1983) and Keenan and Comrie’s (1977) work.

<sup>3</sup>An interface link is well-formed *iff* it instantiates some lexeme or construction in the grammar: e.g. the links indicated by subscript 1 in (3) conform to what is stipulated by the lexical entry of *Mary*. The way SiSx represents lexemes and constructions is discussed in §4.

<sup>4</sup>Throughout this chapter, I will use the AVM notation adopted in Culicover (2020) for representing linguistic objects and the constraints that such objects must satisfy. For convenience, the formalism for SEM will be a simplified version of Montague’s (1974) PTQ appended with an (implicit) event semantics. The thematic predicates (AGENT, PATIENT, etc.) are abbreviations for relations between individuals and the events they partake in, as in Parsons (1990). The SEM tier in (3) is, thus, equivalent to  $\exists e[\text{kiss}'(e) \& \text{Agent}'(e, \text{mary}) \& \text{Patient}'(e, \text{john}) \& \text{past}'(e)]$ .

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Note, furthermore, that there is nothing in SYN that signals that NP<sub>1</sub> in (3) corresponds to the string *Mary* – this information is phonological, and, as such, it is only represented in PHON. The terminal strings in a tree like (2b) are, thus, not strictly speaking part of the syntactic structure. A similar division between phonological, syntactic and semantic forms is anticipated in Distributed Morphology (Halle & Marantz 1994; Marantz 1997) as well as in variants of Categorical Grammar that build on Curry’s (1963) PHENOGRAMMAR vs. TECTOGRAMMAR distinction (e.g. Oehrle 1994; Mihaliček & Pollard 2012).

In order to capture the inner workings of the subsystems of language as well as how these systems interact with each other, SiSx abandons the formal device of derivations in favor of CONSTRAINTS (or, in the terminology of Jackendoff & Audring (2019), SCHEMAS). This and many of the other points mentioned above are shared with LFG, as we will see in the next section. SiSx also draws a lot from HPSG (Chapter ??), as will become particularly clear in §4.

### 3 Goals and assumptions

Among all non-transformational syntactic theories, SiSx and LFG are probably the most closely related ones as far as programmatic aspirations and architectural assumptions are concerned. Most of these stem from the adherence to what Jackendoff (2007b: chap. 2) identifies as two founding themes of Generative Grammar: MENTALISM and COMBINATORIALITY.

MENTALISM is the view that language is a product of the mind/brain of individual speakers. SiSx and LFG are committed to a particularly strong version of this, which Bresnan & Kaplan (1982) and Kaplan & Bresnan (1982), following Chomsky (1965: 9), dub the COMPETENCE HYPOTHESIS. This is the suggestion that the *same* body of knowledge underlies *every* type of language-related behavior (e.g. speaking, reading, learning). In this approach, the linguist’s theoretical constructs are not only *psychologically real* in an abstract sense, but must be integrated to an account of how language is actually processed and acquired by real speakers.

The second founding theme of Generative Grammar shared by LFG and SiSx is COMBINATORIALITY: i.e. the view that knowledge of language is instantiated as a finite system of *rules* that define (or “generate”) an unbounded array of structured expressions. The linguist’s explicit formulation of these rules (i.e. the grammar) must, ideally, entail well-formedness for all sentences judged acceptable by speakers – making no principled distinction between pure manifestations of “core grammar” and “peripheral data” (Culicover 1999).

In line with these commitments, LFG and SiSx seek to characterize the human language capacity in a way that is: (i) PSYCHOLOGICALLY PLAUSIBLE, seeking a

graceful integration of linguistic theory with what is known about the structure and function of mind/brain (Bresnan 1978; Jackendoff 2011b); and (ii) FORMALLY AND DESCRIPTIVELY ADEQUATE, representing generalizations of varying granularities with sufficient precision. Different aspects of these objectives are emphasized by LFG and SiSx (e.g., LFG is much more preoccupied with the formal underpinnings and SiSx with the psychological and biological foundations). The remainder of this section summarizes some of the ways the theories converge and diverge in implementing these goals.

### 3.1 The structure of the grammar

The commitments to MENTALISM and COMBINATORIALITY lead SiSx and LFG to similar conclusions regarding the overall structure of grammar. Compare Figure 8.1 above, which contains the architecture of SiSx, with the LFG architecture below:

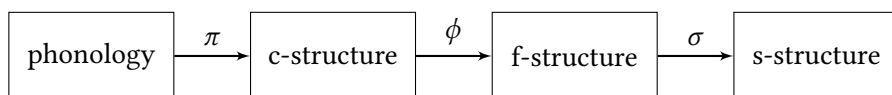


Figure 8.2: LFG Architecture

The most striking similarity between the two architectures above is that they abide by REPRESENTATIONAL MODULARITY, as defined by Jackendoff (1997):<sup>5</sup>

The overall idea is that the mind/brain encodes information in some finite number of distinct representational formats or “languages of the mind.” Each of these “languages” is a formal system with its own proprietary set of primitives and principles of combination, so that it defines an infinite set of expressions along familiar generative lines. For each of these formats, there is a module of mind/brain responsible for it. (Jackendoff 1997: 41)

In both theories, the primitives of phonology are things like segments (or featural decompositions thereof) and syllables. Constituent structure in syntax is built from syntactic categories (e.g. V, N, VP, and Aux) and their dominance and

<sup>5</sup>There are actually different versions of LFG’s general architecture going back to Kaplan (1987) (Asudeh 2006; Findlay 2016; Dalrymple & Findlay 2019, i.a.), but all agree on the essentials of Figure 8.2. The most striking omission from Figure 8.2 is the separate component for a-structure proposed in Butt et al. (1997) and subsequently adopted by most researchers within LFG.

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precedence relationships, as in a context-free grammar. The basic units of the GF-tier and f-structure are syntactic predicates and their arguments. Semantics is composed of entities, events, properties and relations (at least). These modules are connected to one another via systematic correspondences. In this sense, the architectures in Figures 8.1-8.2 can be called CORRESPONDENCE ARCHITECTURES.

The correspondence architecture sets LFG and SiSx apart from sign-based theories like HPSG and SBCG (Chapter ??). The latter use the same kind of data structure to model all aspects of linguistic objects: i.e. typed features organized in AVMs. Different types of information are not related by means of modular correspondences, but in virtue of being values assigned to different attributes of the same sign. The design of HPSG/SBCG does not make it clear that phonology, syntax and semantics are autonomous combinatorial systems. Combinatoriality only exists at the level of signs as a whole (e.g. in features like HD-DTR and COMP-DTR, which take lists of *signs* as values, instead of syntactic nodes).

Even though SiSx follows HPSG/SBCG in using AVMs to represent all aspects of linguistic objects, its basic ontology is much closer to LFG's: each linguistic level is conceptualized as an autonomous formal system in its own right. Just as in LFG, this requires positing correspondence principles to link the objects independently defined by each of these systems.

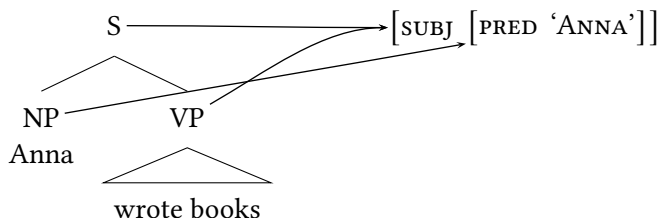
However, LFG and SiSx construe these correspondences in different ways. In LFG, structures of different types are related to each other in virtue of the projection functions  $\pi$ ,  $\phi$  and  $\sigma$  of Figure 8.2. This sort of mapping allows descriptions of elements in the range of a function to be defined in terms of elements in its domain. For instance, the function  $\phi$  – whose domain and range are, respectively, c-structure nodes and f-structures – allows properties of f-structures to be “read off” from c-structure configurations.

This is crucially exploited in LFG's annotated phrase-structure rules. An example is given in (4), where “\*” stands for the node that matches the element above it in the rule and  $M$  is the *mother-of* function (Kaplan 1995: 18):

$$(4) \quad \begin{array}{ccc} S & \rightarrow & \begin{array}{cc} \text{NP} & \text{VP} \end{array} \\ & & (\phi(M(*))_{\text{SUBJ}} = \phi(*)) \quad \phi(M(*)) = \phi(*) \end{array}$$

This rule allows one to deduce from the c-structure of *Anna wrote books* (assuming the annotations on lexical entry of *Anna*) the correspondences in (5):

(5)



Since  $\phi$  is a (total) function, it requires that *all* elements in its domain be mapped into elements in its range. This entails that every c-structure node – even nodes corresponding to adjuncts – must be assigned a particular f-structure.

In SiSx, on the other hand, correspondences between structures of different types are not functional, but merely relational. Therefore, there is no sense in which the properties of any level are “projected” from properties of any other, like f-structure is projected from c-structure in LFG. From the point of view of SiSx, this looks like a residue of MGG’s syntactocentrism. Consider the SiSx equivalent to LFG’s annotated phrase-structure rule in (4) (italics represent that the element is a variable and not a concrete member of its respective category):

$$(6) \quad \begin{bmatrix} \text{SYN} & [_S \text{ NP}_1 \text{ VP}_2]_3 \\ \text{GF} & [_{\text{PRED}} \text{ GF}_1 > \dots]_{2,3} \end{bmatrix}$$

Like (4), (6) expresses the information that the sister of VP corresponds to a SUBJECT (i.e. the highest ranked GF in a PRED). But, unlike (4), (6) is not a phrase-structure rule: it is a CORRESPONDENCE RULE, which is defined over independently well-formed representations on SYN and the GF-tier. No level has primacy over the others, as suggested by the symmetry of the coindexing notation. Since levels of structure are allowed more independence, the mapping between them can also be seen as only PARTIAL. This avoids the implication that all nodes in SYN must correspond to units on the GF-tier. I will come back to some positive consequences of this looser requirement below.

Regardless of these differences, LFG and SiSx both benefit from the general advantages of correspondence architectures, which are better suited for integration with theories of other cognitive faculties than syntactocentric models (this point is hinted at by [Bresnan \(1993: 45\)](#), but see [Jackendoff \(2007a; 2011b\)](#) for full versions of the argument). It is a given that the mind includes relations between non-linguistic representations. For instance, visual and haptic information relate to a modality-independent understanding of the spatial structure of objects ([Marr 1982](#)). This spatial structure, in turn, relates to language in a way that allows us

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to talk about what we perceive (Jackendoff 1987; Landau & Jackendoff 1993). Actions are also spatially guided, requiring an interface between spatial structure and schemas encoding action patterns. It does not make any sense to think of any of these representations as being *algorithmically derived* from any other – they are, rather, related in virtue of modular correspondences.

In this sense, the correspondence architectures of LFG and SiSx see the internal components of language as “connected to each other in the same way as language is connected with the rest of the mind, and in the same way as other faculties of mind are connected to each other” (Jackendoff & Audring 2019: 8). Though many details about how such connections work remain unknown, LFG and SiSx seem better suited for fruitful cross-disciplinary dialogue with cognitive science than MGG, which opts for a syntactocentric derivational design.

### 3.2 The role of grammatical functions

In any theory, grammatical functions (GFs) serve as abstract “relators” between a class of surface syntactic properties (e.g. linear order, case marking) and semantic roles. MGG assumes that these abstract GFs are represented in the same format as syntactic groupings – i.e. GFs are treated as epiphenomena of constituent structure configurations. An early statement of the MGG view is found in Chomsky (1965: 68-74), who claims that notions like SUBJECT and OBJECT are universally definable in terms of the structural positions in (7):



LFG and SiSx both reject this CONFIGURATIONAL DESIGN OF UG for similar reasons. Consider what it implies for the English sentence in (8):

(8) Brad seems to like Janet.

In (8), *Brad* behaves like the SUBJECT of two predicates: the one headed by *seem* (where it establishes agreement) and the one headed by *like* (where it gets interpreted semantically). The configurational design requires that each of these GFs be realized in different positions, which *Brad* has to occupy simultaneously. This, however, is technically impossible in a typical phrase-structure system, since it entails multi-dominance. The alternative is to posit a SEQUENCE of phrase-markers in which these positions are occupied at separate stages, as in (9):

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- (9) seems [<sub>S</sub> Brad [<sub>VP</sub> to like Janet]] ⇒ [<sub>S</sub> Brad<sub>i</sub> [<sub>VP</sub> seems [<sub>S</sub> t<sub>i</sub> to like Janet]]]

The configurational design thus calls for operations that map phrase-markers onto phrase-markers – i.e. syntactic transformations (Chomsky 1957: 44). Note, however, that these mappings are simply a way to encode the effects of multi-dominance in a system that does not naturally allow for it.

Though this might seem plausible for English (where SUBJECTS typically correspond to the configuration in (7)), it is less appealing for languages like Russian, where word order is freer and GFs are signaled mainly by case endings on nouns. A derivation for the Russian OVS sentence (10) would have to look like (11):

- (10) Russian  
 Vaz-u razbila Olj-a (Kallestinova 2007: 30)  
 vase-ACC broke Olya-NOM  
 ‘Olya broke the vase’

- (11) [<sub>S</sub> Olja [<sub>VP</sub> razbila vaz-u]] ⇒ [<sub>S'</sub> [<sub>VP</sub> razbila vaz-u]<sub>i</sub> [<sub>S</sub> Olja t<sub>i</sub>]]  
 ⇒ [<sub>S''</sub> vaz-u<sub>k</sub> [<sub>S'</sub> [<sub>VP</sub> razbila t<sub>k</sub>]<sub>i</sub> [<sub>S</sub> Olja t<sub>i</sub>]]]

The SUBJECT and OBJECT in (11) are base-generated in the positions signaled in (7) and then scrambled to where they are actually pronounced via roll-up movements (cf. Bailyn 2003). The resulting structure is a representation of “several types of information that seem quite dissimilar in nature” (Kaplan & Zaenen 1995: 137): on the one hand, GFs like SUBJECT and OBJECT and, on the other, linear order, dominance relations and syntactic categories.

LFG and SiSx reject this on the grounds of REPRESENTATIONAL MODULARITY. Dominance, order and syntactic categories are naturally represented in a phrase-structure system but the organization of GFs has different formal properties (e.g. multi-dominance) that justify positing a separate component. This is the GF-tier in SiSx and f-structure in LFG. A SiSx analysis of (8) is sketched in (12) (from now on, tenses will be ignored and PHON will be simplified as orthography):

- (12) 
$$\left[ \begin{array}{l} \text{PHON} \text{ Brad}_1 \text{ seems}_2 \text{ to like}_3 \text{ Janet}_4 \\ \text{SYN} \quad [\text{S NP}_1 \text{ V}_2 [\text{VP V}_3 \text{ NP}_4]] \\ \text{GF} \quad [\text{PRED GF}_1]_2 [\text{PRED GF}_1 > \text{GF}_4]_3 \\ \text{SEM} \quad \text{seem}'_2 (\text{like}'_3 (\text{EXPERIENCER:brad}_1, \text{THEME:janet}_4)) \end{array} \right]$$

In the GF-tier, GF<sub>1</sub> (which corresponds to *Brad*) is doubly dominated by the PRED linked to *seem* and the one linked to *like*. This direct encoding of multi-dominance – which is also central to LFG’s functional control analysis of raising (see Bresnan 1982a) – makes transformations like (9) unnecessary.

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Likewise, the autonomy of GFs in SiSx and LFG also makes it possible to state mappings between GFs and SYN without specifying syntactic configuration or linear order. So, for dependent-marking languages like Russian, GFs can be linked directly to Ns with the appropriate case morphology, as in (13) (Culicover 2009: 154).

$$(13) \quad \begin{array}{ll} \text{a.} & \left[ \begin{array}{l} \text{SYN} \left[ \begin{array}{l} \text{S} \dots \text{N-NOM}_1 \dots \end{array} \right]_2 \\ \text{GF} \left[ \begin{array}{l} \text{PRED} \text{GF}_1 > \dots \end{array} \right]_2 \end{array} \right] \\ \text{b.} & \left[ \begin{array}{l} \text{SYN} \left[ \begin{array}{l} \text{S} \dots \text{N-ACC}_3 \dots \end{array} \right]_4 \\ \text{GF} \left[ \begin{array}{l} \text{PRED} \text{GF} > \text{GF}_3 \dots \end{array} \right]_4 \end{array} \right] \end{array}$$

This proposal avoids abstract *ad hoc* MGG derivations like (11), opening the possibility of licensing flat structures. A SiSx analysis for (10) in this spirit could be something like (14). Note that configuration does not play a role in determining GFs in this case. (This does not mean that it cannot play a role in defining information structure properties, which are not being represented in (14).)

$$(14) \quad \left[ \begin{array}{l} \text{PHON} \text{ Vaz-u}_3 \text{ razbila}_2 \text{ Olj-a}_1 \\ \text{SYN} \left[ \begin{array}{l} \text{S} \text{ N-ACC}_3 \text{ V}_2 \text{ N-NOM}_1 \end{array} \right] \\ \text{GF} \left[ \begin{array}{l} \text{PRED} \text{GF}_1 > \text{GF}_3 \end{array} \right]_2 \\ \text{SEM} \text{ break}'_2 (\text{AGENT:olya}_1, \text{PATIENT:the-vase}_3) \end{array} \right]$$

The idea that word parts can carry information about GFs bypassing syntax is shared with LFG (Bresnan 2001). The proposal sketched in (13)-(14) bears a particularly close resemblance to Nordlinger's (1998) CONSTRUCTIVE CASE theory.

Notwithstanding their similar motivations, LFG's f-structures and the GF-tier in SiSx have very different formal properties. The most striking of these is the fact that GFs in SiSx are UNLABELED; hence, notions like SUBJECT and OBJECT are not primitives of the theory. They are defined RELATIONALLY in terms of a hierarchy of arguments, as in Relational Grammar (Perlmutter & Postal 1977; 1983) – the most direct inspiration for the GF-tier, according to Jackendoff (personal communication). A motivation for this will be given in §4.<sup>6</sup>

Another peculiarity of the GF-tier is that it lacks the unlimited embedding found in LFG's f-structures. Each PRED in the GF-tier is represented as a self-contained unit. There is no sense in which the PRED that corresponds to *like* in (12) is embedded under the one that corresponds to *seem*. The f-structure LFG assigns to the same sentence, on the other hand, virtually mirrors the hierarchical organization of the c-structure from which it is projected:

<sup>6</sup>Patejuk & Przepiórkowski (2016) argue that a similar move is advantageous for LFG as well. Following Alsina (1996), they show that most GF labels redundantly represent information already available in morphosyntax and s-structure. Borrowing ideas from HPSG (Chapter ??), they propose to replace GF attributes by a single ordered DEPS list which looks a lot like SiSx's GF-tier. This also allows a direct encoding of the functional hierarchy, which is used in LFG analyses of binding (Falk 2001) and control (Bresnan 1982a).



$$(15) \quad f_1: \left[ \begin{array}{l} \text{PRED} \quad \text{'SEEM}\langle \text{XCOMP} \rangle \text{ SUBJ}' \\ \text{SUBJ} \quad f_2: [\text{PRED} \quad \text{'BRAD'}] \\ \text{XCOMP} \quad f_3: \left[ \begin{array}{l} \text{PRED} \quad \text{'LIKE}\langle \text{SUBJ}, \text{OBJ} \rangle' \\ \text{SUBJ} \quad f_2 \\ \text{OBJ} \quad f_4: [\text{PRED} \quad \text{'JANET'}] \end{array} \right] \end{array} \right]$$

Moreover, since SiSx is not committed to an exhaustive mapping from SYN nodes to the GF-tier, the inventory of GFs can be much smaller than in LFG. Only elements whose morphosyntactic forms are unrevealing about their semantic roles – e.g. direct NP or CP arguments – actually need a representation on the GF-tier (Culicover 2020: chap.6). This is not the case for adjuncts and (most) obliques, whose  $\theta$ -roles are transparent in the morphology or choice of preposition. In English, for instance, PPs headed by *near* and *under* are always LOCATIONS while those headed by *during* and *after* are invariably interpreted as TIMES. Correspondence rules for these elements can, thus, be stated directly as relations between SYN and SEM, circumventing the GF-tier (as anticipated in Figure 8.1).

The GF-tier in SiSx is, therefore, restricted to LFG's CORE GFs (Bresnan 2001: 96): SUBJ, OBJ and OBJ2 (relations 1, 2 and 3 in Relational Grammar). These are the GFs that most strongly justify a tier for GFs in the first place, because they are the typical targets for phenomena like agreement, raising, passive, and structural case-marking – none of which can be stated in terms of direct correspondences between SEM and SYN (Culicover & Jackendoff 2005: 188-189). LFG's NON-CORE functions (e.g. ADJ, OBL $_{\theta}$ , COMP, XCOMP) are not necessary in SiSx.

What this shows is that, all in all, most of the richness that is present in SYN and SEM is absent from the GF-tier, which ends up being a much *simpler* level than LFG's f-structure. This derives from the fact that SiSx builds upon a more radical version of representational economy than the one LFG assumes – one that applies not only to phrase structure, but to ALL LEVELS OF GRAMMAR. If some correspondences *can* be stated as direct relations between SYN and SEM, SiSx can do this without invoking an intermediate mapping through the GF-tier.

This, however, is only possible because SiSx also abandons the assumption of INTERFACE UNIFORMITY (discussed in §2), which is pervasive in MGG and survives – albeit in a much lighter fashion – in LFG's version of the correspondence architecture in Figure 8.2. It is the idea that the mapping to semantics is established uniformly on the basis of GFs that forces LFG to populate f-structure with semantically relevant c-structure information.

SiSx's more sparing use of GFs is partly motivated by the commitment to what Jackendoff (2011a) calls the EVOLUTIONARY CONSTRAINT – namely, the idea that the architecture of grammar should be compatible with a plausible evolutionary

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scenario. Proponents of SiSx concur with mainstream evolutionary psychologists in assuming that the emergence of human language was gradual, involving a series of incremental steps (protolanguages), each of which offers some adaptive advantage over the previous one (Pinker & Bloom 1990; Corballis 2017; Dennett 2017; Fitch 2017; Boeckx 2017; Martins & Boeckx 2019; de Boer et al. 2020).

Given the absence of a fossil record, one of the main ways to investigate the particular stages of this incremental process is reverse-engineering: i.e. asking what components of language are advantageous without the whole system in place (Jackendoff 1999; Jackendoff & Pinker 2005; Progovac 2016). In this spirit, Jackendoff (2002: 261) speculates that the GF-tier is probably “the latest developing part of the architecture”, since its properties are asymmetrically dependent upon the existence of articulated systems of constituent structure and semantics – i.e. the latter two components can exist without the GF-tier, but not vice-versa. It is hard to reconcile the LFG architecture – where f-structures are essential to the mapping between c-structure and semantics – with these considerations.

Regardless of these differences, the point remains that autonomous levels for GFs (as we see in LFG and SiSx) contribute to the overall simplification of the grammar. Insofar as these levels liberate syntax from encoding GFs configurationally, constituent structure can become more concrete. The next section shows that this is an advantage for theories that take psychological plausibility as a goal.

### 3.3 Surface-oriented and model-theoretic grammars

Like HPSG and Construction Grammar (chapters ?? and 7), LFG and SiSx are SURFACE-ORIENTED. A model of grammar is SURFACE-ORIENTED if it posits syntactic structures that are directly associated with observable word strings, with a minimum of empty elements and degrees of embedding. In LFG and SiSx, this WYSIWYG flavor is a consequence of the correspondence architecture – which provides *other* levels for encoding GFs and semantic relations – along with principles that enforce representational economy on phrase-structure representations: Economy of Expression in LFG (Bresnan 2001: 91) and the SSH in SiSx.

Surface-orientation is driven by matters of psychological plausibility. Empty elements are not easily detectable from linguistic input. This raises the question of how they come to be learned (as discussed above in connection to the SSH) and inferred in real-time language processing (see Sag & Wasow 2011). The common conclusion is that they are *not learned*, but constitute part of UG. Though this move does solve the learnability problem (albeit by raising the more diffi-

cult question of how these elements evolved in humans), it hardly addresses the concern over language processing.

However, learnability and processing issues do not arise if empty elements *can* be inferred on the basis of language-internal evidence. This is arguably the case in situations where invisible structure systematically alternates with visible material, such as gaps in unbounded dependency constructions (see [Kluender & Kutas 1993](#); [Clark & Lappin 2011](#)).<sup>7</sup> In these cases LFG and SiSx *do* allow them as a kind of “last resort” to maintain the generality of the mapping between form and meaning ([Bresnan 2001](#): 193; [Culicover & Jackendoff 2005](#): 304).

The status of empty elements in LFG and SiSx is very different from their status in MGG: they are not leftovers of transformations, but directly licensed by CONSTRAINTS. This distinction reflects the contrast between the PROOF-THEORETIC design of MGG and the MODEL-THEORETIC flavor of SiSx, LFG and many other syntactic theories ([Pullum & Scholz 2001](#); [Pullum 2013](#)). A PROOF-THEORETIC GRAMMAR (PTG) relies on the technology of stepwise algorithmic derivations to recursively enumerate the infinite set of grammatical expressions in a language. A MODEL-THEORETIC GRAMMAR (MTG), on the other hand, formulates its basic statements as declarative constraints. The objects that satisfy the constraints (i.e. their models, in the logician’s sense) are the expressions licensed by the grammar.

The manner of characterizing expressions in PTGs invites the dynamic and procedural metaphors that are routinely employed in the MGG literature. The problem with such locutions is that it is unclear what they should mean in terms of real-time processing. The practical consequence of this has been a gradual stiffening of the competence/performance distinction through the history of MGG.

The MTG formalism avoids all such problems, lending itself to a much more direct relation to processing models ([Sag & Wasow 2011](#); [Jackendoff 2007a](#); [2011b](#)). Since constraints have no inherent directionality, they can be invoked in *any* order. Starting with a fragment of phonology, one can pass through its mappings to syntax and semantics and do the same the other way around. This accounts for the fact that the processor is “opportunistic” and uses diverse types of information as soon as they become available ([Acuña-Fariña 2016](#)). It also makes MTGs

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<sup>7</sup>For most of these scenarios, it can also be shown that grammars *with* empty elements are extensionally equivalent to grammars *without* them. This effectively reduces empty elements to notational devices for stating generalizations more directly and reducing the overall complexity of the grammar (see [Müller \(2018: chap. 19\)](#) for discussion). If one assumes a simplicity-based evaluation metric like the one in [Chomsky \(1951\)](#), this notational choice actually has empirical consequences for language acquisition (see [Chomsky \(1965: 45\)](#) for a similar point).

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neutral with respect to production (which goes from semantics to phonology) and comprehension (which goes from phonology to semantics).

Moreover, constraints also yield a monotonic mapping from form to meaning – i.e. there are no destructive operations that throw out information inferable from parts of a structure. This makes MTGs suitable to deal with the grammaticality of linguistic fragments and with the incremental nature of parsing – yet another desirable property in light of psychological adequacy (Chapter ??).

SiSx and LFG can both be naturally stated as MTGs (cf. [Blackburn & Gardent 1995](#); [Pullum 2019](#) for some caveats). This has practical consequences for the general architecture of the grammar. As we will see below, in a full-blown MTG, it is no longer necessary to uphold a rigid distinction between the lexicon and the grammar, because BOTH can be stated in the same format: i.e. as CONSTRAINTS.

## 4 The structure of the lexicon

Up to now, I have talked mostly about how SiSx and LFG represent the structure of LINGUISTIC OBJECTS. This section turns to the kinds of CONSTRAINTS that are responsible for licensing these objects. A widespread assumption is that these constraints fall into two radically different classes, depending on whether they apply to WORDS and their internal parts or to larger PHRASAL UNITS. This view is famously expressed in LFG's LEXICAL INTEGRITY PRINCIPLE (LIP):

- (16) THE LEXICAL INTEGRITY PRINCIPLE ([Bresnan & Mchombo 1995](#): 181):  
Words are built out of different structural elements and by different principles of composition than syntactic phrases.

LFG enforces LIP by separating the LEXICON from the RULES OF (PHRASAL) GRAMMAR. The latter are responsible for the organization of novel phrases while the former is supposed to register idiosyncrasies as well as capture some partial regularities among stored items (in the form of LEXICAL RULES).<sup>8</sup>

<sup>8</sup>In its contemporary form, this distinction dates back to [Chomsky's](#) (1970) LEXICALIST HYPOTHESIS. In that framework, however, the divide between LEXICAL RULES and RULES OF GRAMMAR overlapped with the distinction between CONSTRAINTS and ALGORITHMS. In a MTG – where ALL rules are stated as constraints – these two kinds of rules can only be distinguished by the types of variables they contain: variables on lexical constraints range over word-like elements and the ones on grammatical constraints range over phrases. LIP is, then, requirement that constraints containing different types of variables involve fundamentally different relations (i.e. “different principles of combination”): e.g. constraints on word formation should not mention long-distance relationships between items, like the ones found in phrasal grammar. Though this requirement is formulable in a MTG setting, it is not clear whether it can be empirically justified. See [Bruening \(2018\)](#) for some relevant discussion.

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SiSx argues that there is much to be gained by abandoning this distinction. The first step of the argument involves asking WHAT THE LEXICON IS. Due to the MENTALIST commitment, SiSx frames this issue in essentially psycholinguistic terms, taking the lexicon to be whatever the language user has to learn and store in long-term memory. The argument then goes on to show that a lexicon thus conceived must contain entries of such variety that a sharp distinction between lexical items and grammatical rules becomes artificial (see Jackendoff 1997; Culicover et al. 2017; Jackendoff & Audring 2019, i.a.). The slippery slope from words to rules of grammar prompts SiSx to view the latter as PART OF the lexicon, as in Construction Grammar (Goldberg 1995; Sag 2012). This looks natural under an MTG design, where lexicon and grammar are equally stated as CONSTRAINTS.

A typical instance of a lexical item is an individual word like *cow*. SiSx, following the Parallel Architecture in Figure 8.1, treats this as an interface rule, linking a small piece of phonology, a syntactic category and a meaning, as in (17):

$$(17) \quad \left[ \begin{array}{ll} \text{PHON} & \text{cow}_1 \\ \text{SYN} & N_1 \\ \text{SEM} & \lambda x[\text{cow}'_1(x)] \end{array} \right]$$

The same format can be used to represent items with idiosyncratic subcategorization properties that do not follow from general linking rules. The verb *depend*, for example, subcategorizes for an NP within a PP headed by *on*, as in (18):

$$(18) \quad \left[ \begin{array}{ll} \text{PHON} & \text{depend}_1 \text{ on}_2 \varphi_3 \\ \text{SYN} & [_{VP} V_1 [_{PP} P_2 NP_3]] \\ \text{SEM} & \lambda y[\lambda x[\text{depend}'_1(\text{EXPERIENCER}:x, \text{THEME}:y)]](\sigma_3) \end{array} \right]$$

Italicized elements and Greek letters represent typed variables that must be contextually instantiated in order for the item to be licensed (Culicover 2020). They are what give lexical items their combinatoric potential.

Productive morphology receives a similar treatment. Since regular forms *can* be computed online – and *MUST* be so computed in agglutinative languages like Turkish (Hankamer 1989) – we cannot require every one of them to be stored in the lexicon (Jackendoff 1997; 2002). Therefore, regular affixes must have their own lexical entries with variables specifying the phonology, category and semantics of their putative roots – as was also assumed in American Structuralist models of immediate constituent analysis (Bloomfield 1933). (19) is an entry for the English past suffix.

$$(19) \quad \left[ \begin{array}{ll} \text{PHON} & \varphi_2\text{-ed}_1 \\ \text{SYN} & [_{V} V_2\text{-PAST}_1] \\ \text{SEM} & \text{past}_1(\sigma_2) \end{array} \right]$$

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Note that, as far as SiSx is concerned, there is no deep formal distinction between the *syntactic* combinatoriality of the verb in (18) and the *morphological* combinatoriality of the affix in (19). The only difference has to do with the nature of the variable in SYN:  $NP_3$  in (18) is phrasal and  $V_2$  in (19) is not. So SiSx, unlike LFG (see Sadler & Spencer 2004), has no separate MORPHOLOGICAL COMPONENT.

A lexicon conceived in these terms should also contain a variety of multiword entries (Culicover et al. 2017). Among these are idioms with fully specified material on all tiers, such as *kick the bucket*. In SiSx, these expressions can be stored as whole phonological/syntactic units, linked to noncompositional semantics, as in (20). We know that this particular idiom instantiates the canonical syntactic structure of an English VP because *kick* inflects just like an ordinary verb (e.g. *John kicked the bucket*, *John will kick the bucket*, etc.).

$$(20) \quad \begin{bmatrix} \text{PHON} & \text{kick}_1 \text{ the}_2 \text{ bucket}_3 \\ \text{SYN} & [\text{VP } V_1 [\text{NP Det}_2 \text{ N}_3]]_4 \\ \text{SEM} & \lambda x [\text{die}'_4 (\text{PATIENT}:x)] \end{bmatrix}$$

Like the verb in (18) and the affix in (19), some idioms have variables that grant them combinatorial potential of their own. These are cases like *stab NP in the back*, *put NP on ice* and *catch NP's eye*. Here is a lexical entry for this last one:

$$(21) \quad \begin{bmatrix} \text{PHON} & \text{catch}_1 \varphi_2 \text{'s}_3 \text{ eye}_4 \\ \text{SYN} & [\text{VP } V_1 [\text{NP } NP_2\text{-GENITIVE}_3 \text{ N}_4]] \\ \text{SEM} & \lambda x [\text{notice}' (\text{EXPERIENCER}:\sigma_2, \text{THEME}:x)] \end{bmatrix}$$

The entries in (20) and (21) pose a kind of ordering paradox for theories that assume a radical separation between grammar and lexicon, as prescribed by the LIP. The information that *kick the bucket* and *catch NP's eye* are VPs has to be stated in the lexicon, because their semantics is idiosyncratic. However, the phrase-structure rule that generates VPs can only apply *outside* the lexicon.

In addition to these cases, the lexicon also has to include a class of CONSTRUCTIONAL IDIOMS that use normal syntax to unusual (i.e. noncompositional) semantic ends (Jackendoff 1997; 2002). An example is the SOUND+MOTION CONSTRUCTION in (22) (Levin & Rappaport Hovav 1995; Goldberg & Jackendoff 2004):

$$(22) \quad \begin{array}{l} \text{The car } [\text{VP rumbled past Sue}]. \\ \text{go}' (\text{THEME:the-car, PATH:past-Sue, EFFECT:rumble}' (\text{the-car})) \end{array}$$

Syntactically, the VP in (22) is merely a sequence of a verb followed by a PP. Its semantics is unusual because the verb is not interpreted as a functor over the PP,

but as specifying the EFFECT of a motion that is not codified by any of the words in the sentence. The effect of the motion, is, moreover, predicated of whoever is interpreted as the THEME (i.e. the entity undergoing the motion). A lexical entry with these properties is sketched in (23).

- (23) SOUND+MOTION CONSTRUCTION (adapted from Culicover 2013b: 42):
- $$\left[ \begin{array}{l} \text{SYN} \quad [_{VP} V_1 PP_2] \\ \text{SEM} \quad \lambda x [\mathbf{go}'(\text{THEME}:x, \text{PATH}:\sigma_2, \text{EFFECT}:\sigma_1(x))] \end{array} \right]$$

What is peculiar about constructional idioms is that the SYN tier in their lexical entries consists *entirely* of variables that are completely unlinked to phonology.<sup>9</sup> This makes them much more rule-like than word-like.<sup>10</sup> However, since their interpretation does not follow from general principles, they have to be explicitly learned and stored just like words are (see Culicover 1999).

Two other examples of constructional idioms along with the relevant lexical entries proposed in the SiSx literature are given below: (24) represents the DITRANSITIVE CONSTRUCTION (Jackendoff 1990; Goldberg 1995; Asudeh et al. 2014); and (25) represents the PROXY CONSTRUCTION (Nunberg 1979, Jackendoff 1997, Varaschin 2020), wherein the meaning of NP is coerced into a proxy of its literal denotation.

- (24) DITRANSITIVE CONSTRUCTION (adapted from Culicover 2020: 40):

a. Brad kicked Janet the ball.

- b. 
$$\left[ \begin{array}{l} \text{PHON} \quad \varphi_1 \varphi_2 \varphi_3 \\ \text{SYN} \quad [_{VP} V_1 NP_2 NP_3] \\ \text{SEM} \quad \lambda x. \mathbf{transfer}'(\text{SOURCE}:x, \text{GOAL}:\sigma_2, \text{THEME}:\sigma_3, \text{MEANS}:\sigma_1(x)) \end{array} \right]$$

<sup>9</sup>The existence of “defective” lexical items lacking terms in some level is not surprising in a correspondence architecture. Jackendoff (1997: 94) notes that there are words with phonology, syntax and no meaning (e.g. expletives), others with meaning, phonology and no syntax (*hello, ouch, yes*) and even sequences nothing but phonology (*e-i-e-i-o, inka-dinka-doo, tra-la-la*). All of these are clearly stored in long-term memory and recognized in the same way typical words are. Moreover, they fit into the phonotactic and stress patterns of English. This indicates that, though some of them have no syntax, they are still part of language. The only reason for excluding them from the lexicon is syntactocentrism – which is abandoned in SiSx and LFG.

<sup>10</sup>This is what drives Asudeh et al. (2013) to propose that idioms like (23) are not derived from lexical entries, but from phrase-structure rules annotated with templates. Other idioms, like the WAY CONSTRUCTION (e.g. *Sue laughed her way out of the restaurant*), would be lexically encoded by individual words (in that case, by *way*). However, it is not clear how this account extends to idioms like (20)–(21), which are specified by *discontinuous* portions of morphosyntax. Space prevents me from exploring further details of LFG’s template-based accounts of constructions.



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(25) PROXY CONSTRUCTION (adapted from Varaschin 2020: 11):

a. I put  $\langle \textit{book-by} \rangle$  Keynes on the top shelf.

b. 
$$\begin{bmatrix} \text{SYN} & NP_1 \\ \text{SEM} & \textit{proxy}'(\sigma_1) \end{bmatrix}$$

Language turns out to be full of constructional idioms like these (see Goldberg 1995; Jackendoff 1997; 2008; Culicover 1999). However, insofar as recognizing their existence commits us to syntactically complex lexical items without phonology, nothing stops us from seeing general syntactic and interface rules – usually thought of as part of the GRAMMAR – in the same way. The context-free rule for a transitive VP can be construed as a declarative schema for licensing a particular configuration of labeled nodes, as in (26):

(26) TRANSITIVE VP CONSTRUCTION (adapted from Jackendoff 2002: 180):

$$[\text{SYN} \text{ } [_{VP} V NP ]]$$

As far as SiSx is concerned, this is simply one of the possibilities allowed by the system: a lexical item with no idiosyncratic phonology or semantics, just syntactic category variables arranged in a particular configuration. In this respect, SiSx deviates from variants of Construction Grammar which require every syntactic configuration to be paired with a meaning (e.g. Goldberg 1995).

Default principles of compositional type-driven interpretation can also be represented as lexical items which license a maximally general correspondence between syntactic variables and meaning variables of the appropriate type. (27) represents the two possible scenarios of Heim & Kratzer's (1998) Functional Application rule (where X, Y and Z are variables over syntactic categories).<sup>11</sup>

(27) COMPOSITIONALITY CONSTRUCTIONS:

a. 
$$\begin{bmatrix} \text{SYN} & [_X Y_1 Z_2] \\ \text{SEM} & \sigma_1(\sigma_2) \end{bmatrix}$$

b. 
$$\begin{bmatrix} \text{SYN} & [_X Y_1 Z_2] \\ \text{SEM} & \sigma_2(\sigma_1) \end{bmatrix}$$

Likewise, the main intuition guiding linking hierarchies – such as the one in LFG's Lexical Mapping Theory (Bresnan & Kanerva 1989) – can also be formalized, within SiSx, as constructions that establish a correspondence between GF

<sup>11</sup>These general constraints on form and interpretation do not need to be instantiated by ALL grammatical expressions in a language. Many of them are not satisfied in idioms, for instance. For a linguistic object to be licensed in SiSx, it suffices that each of its terms and correspondences fully instantiate SOME constraint (Culicover 2020). This entails that a linguistic object can fail to satisfy a given constraint and still be grammatical AS LONG AS there is some other constraint in the grammar which it satisfies. For instance, the idiom in (22) fails to meet the compositional constructions in (27). Since there is another (more specific) construction which it satisfies (the SOUND+MOTION CONSTRUCTION in (23)), SiSx predicts that (22) is grammatical.



variables and SEM variables. (28) represents the rule that says that the highest thematic argument maps to the first GF.

- (28) LINKING CONSTRUCTION (adapted from Culicover & Jackendoff 2005: 185):
- $$\begin{bmatrix} \text{GF} & [\text{PRED } GF_1 (> \dots)]_2 \\ \text{SEM} & \sigma_2(\theta; \sigma_1, \dots) \end{bmatrix}$$

Correspondences between GFs and SYN – which are accomplished by functional annotations in LFG – can be stated as abstract lexical items as well. The canonical correspondence for SUBJECTS and (transitive) OBJECTS in English are (29a) and (29b), respectively:

- (29) ARGUMENT STRUCTURE CONSTRUCTIONS:
- a.  $\begin{bmatrix} \text{SYN} & [_S NP_1 VP_2]_3 \\ \text{GF} & [\text{PRED } GF_1 (> \dots)]_{2,3} \end{bmatrix}$       b.  $\begin{bmatrix} \text{SYN} & [_{VP} V_2 NP_1]_3 \\ \text{GF} & [\text{PRED } GF > GF_1]_{2,3} \end{bmatrix}$

In this set up, the PASSIVE can be seen as a more complex strategy for linking the GF-tier to SYN, as in (30) below. The same applies to relation-changing constructions in other languages (e.g. applicatives, anti-passives) (Culicover 2009).

- (30) PASSIVE CONSTRUCTION (adapted from Culicover & Jackendoff 2005: 203):
- $$\begin{bmatrix} \text{PHON} & \varphi_1 (\text{by}_2 \varphi_3) \\ \text{SYN} & [\dots V\text{-PASSIVE}_1 ([_{PP} P_2 NP_3])]_4 \\ \text{GF} & [\text{PRED } GF_3 > [\text{PRED } GF]_{1,4}] \end{bmatrix}$$

The construction in (30) looks very much like a non-derivational version of the Relational Grammar account of passivization (Perlmutter & Postal 1977). It expresses two fundamental intuitions: (i) that the first GF (i.e. the “logical subject”) is “demoted” to an optional *by*-phrase (without disrupting the link between this GF and its  $\theta$ -role, as defined by (28)); and (ii) that the second GF gets mapped to SYN like a typical SUBJECT would in virtue of (29a). This last result is accomplished by adding a second pair of brackets around the second GF.<sup>12</sup> A concrete example of a linguistic object which instantiates (30) is given in (31):

<sup>12</sup>This also happens to be the main technical reason why GFs in SiSx are unlabeled. If GFs were defined in terms of substantive roles (e.g. SUBJ, OBJ), as in LFG, a constructional account of relation-changing rules like PASSIVE would involve replacing one function name by another. This would violate monotonicity and Kaplan & Bresnan’s (1982) DIRECT SYNTACTIC ENCODING principle. LFG avoids this problem by stating PASSIVE as a LEXICAL RULE (Bresnan 1982b). For evidence that lexical accounts of argument structure (like the one found in LFG) are superior to the SiSx constructional account sketched here, see Müller (2013; 2018). For a lexical account of PASSIVE in SiSx (which resembles the LFG one), see Culicover (2020).

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$$(31) \left[ \begin{array}{ll} \text{PHON} & \text{The-cake}_1 \text{ was-eaten}_2 \text{ by}_3 \text{ Hector}_4 \\ \text{SYN} & [_S \text{NP}_1 [_{VP} \text{V-PASSIVE}_2 [_{PP} \text{P}_3 \text{NP}_4]]]_5] \\ \text{GF} & [_{\text{PRED}} \text{GF}_4 > [_{\text{PRED}} \text{GF}_1]_{2,5}] \\ \text{SEM} & \text{eat}'_{2,5}(\text{AGENT:hector}_4, \text{THEME:the-cake}_1) \end{array} \right]$$

SiSx’s rule-like lexical entries can play two roles in the grammar: a **GENERATIVE ROLE**, where they are used in on-line processing to derive novel structures *via* **UNIFICATION** with other lexical entries; and a **RELATIONAL ROLE**, where they function like nodes in an inheritance hierarchy, “lending” their structure to other independently stored items (Jackendoff & Audring 2019).

The relational role of lexical entries can be defined in terms of **ENTAILMENT** between separate constraints stored in the lexicon. A lexical entry  $\alpha$  entails an entry  $\beta$  *iff* every linguistic object which is a model of  $\alpha$  is a model of  $\beta$ . When a specific lexical entry  $\alpha$  entails a more general entry  $\beta$  we can say that  $\alpha$  inherits structure from  $\beta$ . In this sense, the *kick the bucket* idiom in (20) inherits structure from the more general VP construction in (26), which, in turn, inherits from a more abstract **HEAD-COMPLEMENT CONSTRUCTION**, akin to the head-complement schema of HPSG (Pollard & Sag 1994, Chapter ??).

Likewise, if particular passive or past tense verbs happen to be overtly stored due to high frequency, they will inherit from the past tense and passive schemas in (19) and (30). These relational links can be represented in an inheritance hierarchy, where the more dominated nodes entail the less dominated ones. SiSx assumes that, other things being equal, a lexical item with relational links should be easier to store and learn than one without such links (see Jackendoff 1975).

There is an obvious connection between this relational function of lexical entries and the use of templates in LFG and constructions in HPSG/SBCG (Sag et al. 2003; Dalrymple et al. 2004; Asudeh et al. 2013). These devices all do the work of lexical rules in earlier approaches going back to Chomsky (1970). But there is a difference: since many of SiSx’s abstract entries can *also* be used generatively, unmarked lexical properties (e.g. regular morphology, subcategorization) can, *in principle*, be kept out of individual lexemes. There is no need to list separately the active, passive and regular past tense forms for ALL verbs. These forms can be “built” by unification with abstract items like (29b), (30) and (19) (respectively) (Culicover & Jackendoff 2005: 188). In LFG terms, its as if schemas like (29b), (30) and (19) were, at once, templates that can be invoked in particular lexical entries and rules to license novel structures that are not in the lexicon.

The SiSx view, is, in sum, that rules of grammar ARE lexical items. There is a *continuum* from stereotypical words, which specify fully linked phonology, syntax, and semantics (cf. (17)), through idioms with a few variables (cf. (21)), constructional idioms with *nothing but* variables (cf. (23)-(25)) to fully general rules

(cf. (26)-(30)), from which many constructions can inherit structure. All of these things are stated in the same format: as declarative schemas, either licensing structures at a single level (e.g. (26)) or establishing correspondences between various levels (e.g. (17)). Theories like LFG, which adopt a rigid lexicon/grammar distinction, must draw an artificial line somewhere in this *continuum*.

## 5 Constraints outside of the grammar

If language is indeed integrated into the larger ecology of the mind, it is expected that grammatical constraints are not all there is to explain the (un)acceptability of sentences. Since Miller & Chomsky (1963), the influence of EXTRA-GRAMMATICAL factors on linguistic judgments has been a major topic of investigation – one that is very much relevant to the pursuit of the SSH. In this section, I explore this issue in connection with the phenomena of UNBOUNDED DEPENDENCIES (UDs).

The hallmark of UD is the presence of a GAP, by means of which a constituent in a non-canonical position (i.e. a FILLER) acquires its semantic role. In SiSx – as in HPSG (Pollard & Sag 1994: 161) – the effect of a gap can be reproduced by a lexical item that establishes a correspondence between an arbitrary phonological sequence containing the empty string ( $\epsilon$ ), a constituent containing an XP and a property which results from  $\lambda$ -abstraction over whatever semantics XP would have (see Muskens 2003 for a similar proposal in Categorical Grammar):

- (32) GAP CONSTRUCTION: (adapted from Culicover 2020: chap.7)
- $$\begin{bmatrix} \text{PHON} & / \dots \epsilon \dots /_2 \\ \text{SYN} & [\dots \text{XP} \dots]_2 \\ \text{SEM} & \lambda z[\sigma_2(z)] \end{bmatrix}$$

SiSx also needs a phrase-structure construction akin to (26) in order to license fillers in the left-periphery of clauses. (33) accomplishes this effect:

- (33) FILLER CONSTRUCTION:
- $$[\text{SYN } [_{S'} \text{ YP S } ]]$$

Consider how this works in the simple case of topicalization in (34) (I ignore the GF-tier and the information structure status of topics). The construction in (32) licenses an empty NP as the complement of *Janet kissed*, which, in turn, gets interpreted as a property (i.e.  $\lambda z[\text{kiss}'(\text{AGENT:janet, THEME:}z)]$ ). (33) licenses a filler (i.e. *Brad*) in sentence-initial position. In virtue of the COMPOSITIONAL CONSTRUCTION in (27b), the property attained by (32) is applied to the semantics of the filler, yielding the right interpretation.

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$$(34) \quad \left[ \begin{array}{ll} \text{PHON} & \text{Brad}_1, / \text{Janet}_2 \text{ kissed}_3 \varepsilon /_4 \\ \text{SYN} & [_S' \text{ NP}_1 [_S \text{ NP}_1 [_{\text{VP}} \text{ V}_3 \text{ NP}]]_4] \\ \text{SEM} & \lambda z [\text{kiss}'_{3,4} (\text{AGENT:janet}_2, \text{THEME:}z)] (\text{brad}_1) \end{array} \right]$$

A similar structure is ascribed to the *wh*-question in (35). I follow Culicover (2020) in positing a quantifier-like entry for the *wh*-word, as in (36).

$$(35) \quad [\text{What}_i [\text{did} [\text{Sue say Don bought } t_i]]?]$$

$$(36) \quad \left[ \begin{array}{ll} \text{PHON} & \text{what}_1 \\ \text{SYN} & \text{NP}_1 \\ \text{SEM} & \lambda P [\text{WH}x_1 (P(x))] \end{array} \right]$$

The GAP CONSTRUCTION licenses a property interpretation for the portion of (35) which excludes the *wh*-phrase (*Sue say Don bought*  $\varepsilon$ ). This property, in turn, is fed as an argument to the **WH** quantifier (licensed in initial positon by (33)), which ends up binding a variable corresponding to the gap. (37) illustrates the  $\beta$ -reductions in the SEM tier of (35):

$$(37) \quad \begin{aligned} & \lambda P [\text{WH}x (P(x))] (\lambda z [\text{say}' (\text{AGENT:sue}, \text{THEME:buy}' (\text{AGENT:don}, \text{THEME:}z))]) \\ & \rightarrow \text{WH}x (\lambda z [\text{say}' (\text{AGENT:sue}, \text{THEME:buy}' (\text{AGENT:don}, \text{THEME:}z))](x)) \\ & \rightarrow \text{WH}x (\text{say}' (\text{AGENT:sue}, \text{THEME:buy}' (\text{AGENT:don}, \text{THEME:}x))) \end{aligned}$$

The constructions (32)-(33) and standard principles of type-driven interpretation are all SiSx needs to model the syntactic and semantic effects of UD<sub>s</sub>.<sup>13</sup> The dependency between the filler and the gap is represented as variable-binding, while a null XP in SYN guarantees that the subcategorization requirements of the head that licenses the filler are locally satisfied.

However, since this mechanism assumes that gaps can be freely introduced into representations, it does not explain why sentences like (38) are bad:

$$(38) \quad * \text{Who}_i \text{ does that Brad admires } t_i \text{ disturb Janet?}$$

It is entirely possible to derive a perfectly well-formed structure for (38) given the principles laid out so far. Most approaches to UD<sub>s</sub> take this “overgeneration” to be a flaw and attempt to encode into the grammar restrictions that prevent gaps from occurring in ISLAND environments like (38) (Ross 1967).

<sup>13</sup>Note incidentally that the type-driven rules in (27) make the presence of subject gaps in sentences like *Who sang?* unnecessary. In those cases, the **WH** quantifier can combine directly with the bare property semantics of the VP, with no need to invoke the GAP CONSTRUCTION.

## 8 LFG and Simpler Syntax

Kaplan & Zaenen's (1995) LFG account of island constraints exemplifies this tendency. Their proposal represents UD's in terms of functional identity in f-structure (Chapter ??). So, for the sentence (35) above, the identification between the focalized *wh*-word and the OBJ of *buy* is accomplished by the equivalence ( $f_{\text{FOCUS}} = f_{\text{COMP OBJ}}$ ). This expression is an instantiation of a more general functional uncertainty equation which is annotated to the phrase-structure rule that introduces discourse functions (namely TOPIC or FOCUS). The particular equation Kaplan & Zaenen (1995: 153) suggest for English is (39).

$$(39) \quad (f \text{ DF}) = (f \{ \text{COMP}, \text{XCOMP} \}^* \text{GF-COMP})$$

What (39) says is that the f-structure for any discourse function (DF) will be identical to a subordinate f-structure somewhere along a (possibly empty) path of COMP and XCOMP functions, as long as that path terminates in a GF function which is not a COMP. The specifications on the BODY (i.e. the middle) and on the BOTTOM of uncertainty paths like (39) are how LFG records restrictions on UD's.

For example, an identification between the filler and the gap in (38) requires passing through SUBJ, which is not specified as a possible attribute in the body of (39). This accounts for SUBJECT ISLAND violations in general. Likewise, COMPLEX NP ISLANDS like (40) are also covered, because RELMOD (the GF Kaplan & Zaenen (1995) assign to relative clauses) is not designated on the body of (39) either.

$$(40) \quad * \text{What castle}_i \text{ does Janet know the strange man [who owns } t_i \text{]}?$$

From the point of view of SiSx, the functional uncertainty formalism is unobjectionable as a device to model UD's. However, it is not clear whether it should really embody substantive restrictions to account for the unacceptability of UD's in syntactic terms. Upon closer examination, there does not seem to be a purely grammatical characterization of precisely the contexts in which certain patterns of UD's are ruled out by speakers. The explanation for most (if not all) island constraints must, therefore, lie outside of the grammar, in pragmatics, discourse structure or in processing complexity. A growing body of literature points to this conclusion (Hofmeister et al. 2007; Hofmeister & Sag 2010; Hofmeister et al. 2013; Kluender 1991; 1992; 2004; Kluender & Kutas 1993; Sag et al. 2009; Chaves 2013; Chaves & Dery 2014; 2019; Culicover 2013a,b). In what follows, I briefly summarize some of the empirical evidence against grammatical theories of islands. Space limitations prevent me from getting into the details of particular performance-based alternatives.

The suspicion that something is amiss in purely grammatical accounts of island phenomena comes from the observation that concrete proposals tend to be

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both too weak and too strong. The constraint in (39), for example, is too weak because it fails to explain real contrasts like (41)-(42), originally due to Erteschik-Shir (1973: 84).

- (41) a. What<sub>i</sub> did Janet claim that veganism can do *t<sub>i</sub>* for you?  
       b. ?? What<sub>j</sub> did Janet transcribe that veganism can do *t<sub>j</sub>* for you?
- (42) a. What<sub>i</sub> did Frank say that Brad would like *t<sub>i</sub>* for lunch?  
       b. ?? What<sub>j</sub> did Frank snarl that Brad would like *t<sub>j</sub>* for lunch?

The equation in (39) predicts the b-cases to be just as good as the a-cases since, in both of them, the value for the FOCUS attribute is identified with the value of OBJ through a path consisting of a single COMP – exactly as in (35). That is, a-cases and b-cases both contain (*f* FOCUS)=(*f* COMP OBJ) in their f-descriptions.

It is, of course, possible to assign different GFs to the complement of *transcribe* and *snarl* other than COMP (something like ISLANDCOMP). In this case (41b) and (42b) would be excluded due to the body constraint in (39). But this move is simply a stipulation – one that is hard to imagine how a child could learn. The ultimate explanation might be related to the lexical semantics of the verbs (i.e. UD's are impossible with verbs that specify *manner* of speaking) or simply to frequency (*claim* and *say* are more frequent than *transcribe* and *snarl*). Whatever the ultimate truth is, no apparent syntactic difference – in f-structure or otherwise – can be identified for pairs such as (41)-(42).

There are also cases in which grammatical principles that purport to account for island phenomena are too strong – i.e. they exclude sentences that are actually acceptable. I observed above that (39) derives the effects of SUBJECT ISLANDS and COMPLEX NP ISLANDS. However, UD's whose gaps are contained within Subjects and Complex NPs are reasonably acceptable under suitable conditions (Kluender 2004; Sag et al. 2009; Chaves 2013), as the b-cases in (43)-(44) show:

- (43) a. \* Who<sub>j</sub> does [that you baked ginger cookies for *t<sub>j</sub>*] irritate you?  
       b. Who<sub>i</sub> does [baking ginger cookies for *t<sub>i</sub>*] irritate you?
- (44) a. \* Who<sub>i</sub> did Phyllis hear the claim [that Bob is dating *t<sub>i</sub>*]?  
       b. Who<sub>j</sub> did Phyllis make the claim [that Bob is dating *t<sub>j</sub>*]?

The equation in (39) rightly excludes (43a) and (44a). The problem is that, by the same token, it also bars (43b) and (44b). Since the a-b pairs are functionally

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indistinguishable – the bracketed strings map to the same GFs (SUBJ in (43) and RELMOD in (44)) – the real explanation for the contrasts must lie elsewhere.

Kluender (2004) argues that the contrast in (43) is due to a difference in the amount of discourse referential processing. In (43a), the SUBJECT is a finite clause, which introduces the reference to a temporal event. This reference is absent for the non-finite form in (43b), which makes the sentence in question less complex in processing terms (see Gibson (2000) for a similar account).

For (44), Culicover & Jackendoff (2005) suggest an explanation along the lines of Kroch (1998): (44a) presupposes the existence of *the claim* while in (44b) doesn't. The unacceptability of (44a) follows from a general principle which says that a gap cannot be referentially dependent on an operator if its reference is part of a presupposition in the discourse. This principle extends to contrasts like (45), which are also hard to account for in purely syntactic terms.

- (45) a. \* Who<sub>i</sub> did he buy that picture of *t<sub>i</sub>*? (presupposes there is a picture)  
 b. Who did he buy a picture of *t<sub>i</sub>*? (no presupposition)

The debate on whether all island constraints reduce to extra-grammatical factors is still very much ongoing (see Newmeyer (2016) for a useful survey). What this section meant to illustrate is that the SiSx view – which might seem too unconstrained at first glance – could turn out to be just what the data requires. If there is no grammatically coherent characterization of when UD's are unacceptable, then island constraints should not be built into the rules that license UD's (in SiSx terms, they should not be registered as conditions on the GAP CONSTRUCTION). On this view, sentences that incur in island violations are not technically ungrammatical, but merely unacceptable for performance-related reasons.<sup>14</sup>

The overall view SiSx ends up with is this: Explanations about our intuitions regarding which structures are possible divide between grammatical constraints (as recorded in the lexicon) and extra-grammatical factors (pragmatics, processing, etc.). The former tend to correlate with sharp judgments, while the latter

<sup>14</sup>Extra-grammatical accounts of island constraints have a long history in SiSx. They go as far back as Jackendoff & Culicover (1972). In this early paper, the authors propose that “perceptual strategy constraints on acceptability” explain otherwise puzzling contrasts like (i):

- (i) a. Who<sub>i</sub> did John give a book to *t<sub>i</sub>*?  
 b. \*? Who<sub>j</sub> did John give *t<sub>j</sub>* a book?

Note that (i) is also not explained by Kaplan & Zaenen (1995), since the equation required to establish the dependency in (ib) – i.e. (*f* FOCUS) = (*f* OBJ) – satisfies the constraint in (39).



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tend to show more variability and dependence on contextual factors (see Culicover 2013c). Sources of universals are mostly confined to extra-grammatical factors and to the pressure to reduce constructional complexity (Culicover 2013b). These correspond to the THIRD FACTOR properties of Chomsky (2005).

This leads to a very minimalist conception of UG – as it happens, one that conforms (in an unorthodox way) to what Baker (2008: 353) calls the BORER-CHOMSKY CONJECTURE: the hypothesis according to which all parameters of variation among languages are attributed to individual properties of lexical items. In this respect, SiSx is closer to MGG than to LFG. But the difference between SiSx and MGG is that, as discussed in §4, lexical items are highly structured and include what is traditionally thought of as rules of grammar. The result is that most aspects of speakers' knowledge of language end up being potentially subject to variation.

## 6 What can SiSx and LFG learn from each other?

The purpose of this chapter was to survey the theoretical landscape of SiSx and compare it to LFG. This exercise revealed that both approaches seek to reconcile formal theories of grammar and psychological reality – a common goal that leads them to adopt similar architectures and analyses for particular phenomena.

However, despite these programmatic and architectural similarities, the two theories differ in important respects. Many of these differences stem from SiSx's radical commitment to representational economy, which is sustained even when this entails messier and less systematic interfaces. Another source of discrepancies is the explicit recognition, on the part of SiSx, of extra-grammatical influences on linguistic judgments, as discussed in §5.

Insofar as SiSx posits fewer constraints and fewer representational devices, less knowledge about abstract linguistic structure (of all kinds) is attributed to learners. This reduces the impulse to posit rich principles of UG, which, in turn, alleviates some of the burden on evolutionary accounts of the language faculty (Jackendoff 1999; 2002; Jackendoff & Pinker 2005). A similar concern with evolutionary adequacy drives current Minimalist work in MGG (Hornstein 2009; Berwick & Chomsky 2015). This does not seem to be much of a worry in LFG, which is more preoccupied with providing a formally precise and computationally tractable framework.

There is sometimes a trade-off between formal refinement and the general goal of unification with other sciences. As we saw in §3, the fact that the mapping from form to meaning can bypass the GF-tier in SiSx helps integrating the theory



into gradualist scenarios of language evolution, given that it is implausible that stages of protolanguage had anything like abstract GFs (Jackendoff 1999; 2002; Progovac 2016). Since LFG makes the mapping to semantics critically dependent on *f*-structure, it is hard to imagine a story of how these simpler sound-meaning pairings could have existed in the evolutionary antecedents of language. On the other hand, LFG's rich conception of *f*-structure lends itself to a much more complete and computation-friendly formalization, which makes the theory more easily testable.

SiSx and LFG can, therefore, learn a lot from each other. LFG can profit from SiSx's more ambitious aspiration of connecting linguistics to human biology. This implies seeking theories of language which are not only descriptively and explanatorily adequate, but which also offer the prospect of integration with plausible evolutionary scenarios. Simpler Syntax, in turn, can benefit from a number of the virtues found in LFG, such as: (i) the development of a formally precise and fully explicit architecture which can feed computational applications and simulations; (ii) the great variety of typologically oriented work which constantly submits the theory's formal assumptions to the test of descriptive adequacy (Part VI).

Once SiSx and LFG assimilate each other's merits, some of differences between them might diminish and some others might become even sharper. Regardless of the outcome, the process of cross-theoretical comparison is a fruitful one, as it often leads to formal innovations and surprising discoveries about the foundations of linguistic theory.

## Acknowledgements

I would like to express my gratitude to Peter Culicover, Ray Jackendoff and Rafaela Miliorini for the constant dialogue and for the numerous comments on previous drafts of this chapter. I would also like to thank Bob Levine, Vitor Augusto Nóbrega and Symon Stevens-Guille for discussions about some of these topics, as well as Mary Dalrymple for the help with  $\text{\LaTeX}$ . This research is funded by a CAPES-PROEX scholarship 88882.344838/2019-01 and a CAPES-PDSE scholarship 88881.189650/2018-01.

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