

Glossing of descriptive terms, and how to read a grammar

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1 Theoretical orientation

1.1 The surface-based approaches

The contemporary generative syntax is usually in a lexical-decomposition manner: that is, sub-word and even sub-morpheme features are the basic units of morphosyntactic operations. The features are fed into Merge to construct a binary tree with possible multi-domains (or a binary tree with chains recording copying or Internal Merge), and then the tree is linearized and post-syntactic operations are applied so features are assembled together to form words. This approach is not appropriate for language documentation, the latter requiring a more surface-oriented approach.

There have already been several relatively stable descriptive frameworks. Modern descriptive grammars of underdocumented languages are usually carried out within the framework of Basic Linguistic Theory (BLT), which is theorized in [Dixon \(2009, 2010, 2012\)](#), and, according to Dixon, deviates striking from the bond-to-fail generative approach. The BLT approach assumes no fine-grained constituency hierarchy, represents dependency relations not by constituency structure, and views constituent order as mostly driven by pragmatic reasons. In a word, BLT is the lay version of functional syntax à la Simon Dik.

On the other hand, already well-known languages are often described in the framework proposed in The Cambridge Grammar of the English Language (CGEL) ([Huddleston and Pullum, 2002](#)). This framework is also taken in [Abeillé and Godard \(2021\)](#); [Huang and Shi \(2016\)](#), and its varieties are used in [Demonte \(1999\)](#); [Muñoz et al. \(2000\)](#); [Bosque \(1999\)](#). The CGEL approach is more informed by generative syntax: it maintains a largely binary-branching analysis, and dependency relations are still highly bounded to the surface-oriented constituency tree, though certain dependency relations that involve movements that are hard to find by looking at the surface form require special treatment: and thus the subject in a clause is recognized as a complement of the verb, but since it is outside the verb phrase (VP) and the A-movement to SpecTP is not recognizable in a surface-oriented, a new syntactic function label *external complement* – essentially a way to represent a dependency relation – is invented to cover the relation between the subject and the verb. In a word, the CGEL approach is the surface-oriented version of the mutual consensus of Minimalism (and GB) and HPSG.

Though the BLT approach, and the contemporary generative approach, or the Minimalist one, differ in several important aspects, the two frameworks roughly describe the same grammatical complexity class: I will show this in the rest of this note. For abstract discussion, see chap. ?? in [my notes about Chinese syntax](#). The take-home message is CGEL may be viewed as the surface-oriented dual theory of the constituency structure of Minimalism, while BLT may be viewed as the surface-oriented dual theory of the dependency-based formalism of Minimalism. The relation between the three is visualized in Fig. 1.

In the literature, the constituency-based approach is frequently called the *structuralist* one, while the dependency-based approach is frequent called the *functionalist* one. The latter does not necessarily look like more theoretical ‘functionalist’ approaches, like the Systematic Functional Grammar. We see both extremes are not suitable for surface-oriented analysis: the surface-oriented constituent tree is not enough and additional function labels like *subject* and *internal complement* are required, while the surface-oriented dependency tree cannot reveal what commonly attributed to constituency relations, like extraction properties. The CGEL approach is closer to the so-called

structuralist approach,¹ and the BLT approach is closer to the so-called functionalist approach. We know there is no substantial divergence between the two. Indeed, people often say “modern typology is based on functionalist syntax” and “descriptive grammars used in typology are strongly influenced by structuralism à la Bloomfield” at the same time, and as we see, both claims are correct.

Note that it is frequent for comprehensive grammars about well-known languages to be carried out in term of BLT. Examples include [Batchelor and San José \(2010\)](#); [Batchelor and Chebli-Saadi \(2011\)](#). This is possibly because these languages fit in the framework of traditional grammar well, and since BLT may be regarded as “traditional grammar informed by theories”, that certain grammars of well-documented languages are BLT-like is expected.

Box 1.1: BLT in the generative community

Indeed, contrary to the prevalent idea in the so-called functional-typological community, there *are* generative linguists participating in language documentation and description, though in the generative community, the BLT approach is usually said to be simply *descriptive*, in contrast with *theoretical* works, i.e. generative works. Here is a list of some linguists participating in both descriptive and theoretical enterprises (as they call them) and their descriptive works:

- David Adger: [Adger \(1997\)](#); [Adger and Ramchand \(2006\)](#); [Harbour et al. \(2012\)](#).
- Chris Collins: [Collins and Honken \(2014\)](#); [Miller et al. \(2007\)](#), as well as videos with subtitles that can be found with a Google search.
- Daniel Harbour: [Watkins and Harbour \(2010\)](#), and his collaboration with David Adger.
- Roberta D’Alessandro: [Andriani et al. \(2022\)](#); [Frasson et al. \(2021\)](#).

There is no qualitative boundary between their “descriptive” and “theoretical” works: the descriptive part reveal grammatical categories, dependency relations, and constraints on constituent order demonstrating functional domains, and all these things are put together in the theoretical i.e. generative part. Their workflow differs from with functional-typologists only in how they deal with the output of the BLT part: the generative approach shows the construction in question is possible in the sense that it can be derived with processes observed before, while the typological approach measures how probable it is by comparing with other languages. These two approaches are in fact complementary and not contradictory.

1.2 Questions to ask about the underlying theory

Beside the discrepancy between the BLT and the CGEL approaches, there are still further divergences within the BLT approach. So here I list some dimensions of divergence.

1.2.1 Pre-compiled phrasal templates

Is the theory purely lexicalist, or are there syntactic templates?² Though in a quick glance, it seems the lexicalist approach agrees with the Minimalist syntax while the templatic approach agrees with

¹Actually, there is no wide gap between the old-fashioned structuralist approach and the modern CGEL approach: if we look closer to structuralist grammars in the age of Bloomfield, e.g. [Chao \(1965\)](#), we will still find primary function labels like *subject* and *predicate*. The main differences include function labels are sometimes mixed with category labels i.e. form labels, for example in terms like *verb-object construction*, and argumentation in support of function labels (see § 2.5.3) is often in lieu. But using category labels in place of function labels sometimes is acceptable (§ 2.4.1), and argumentation may be omitted in the grammar (§ 2.5.1), so the differences are merely about writing styles rather than theoretical divergence.

²Sometimes the term *lexicalist* means the syntax works on words and not sub-word units. This is not the meaning intended here. The meaning intended here by *lexicalist* is “all grammatical rules can be reduced to how to use certain lexicon entries (lexical or functional)”, which may be words or morphemes or features. In other words, a lexicalist theory has no or few “global” phrase structure rules, as opposed to early generative grammars. This usage of the term *lexicalist* is attested in [Matchin and Hickok \(2020\)](#).

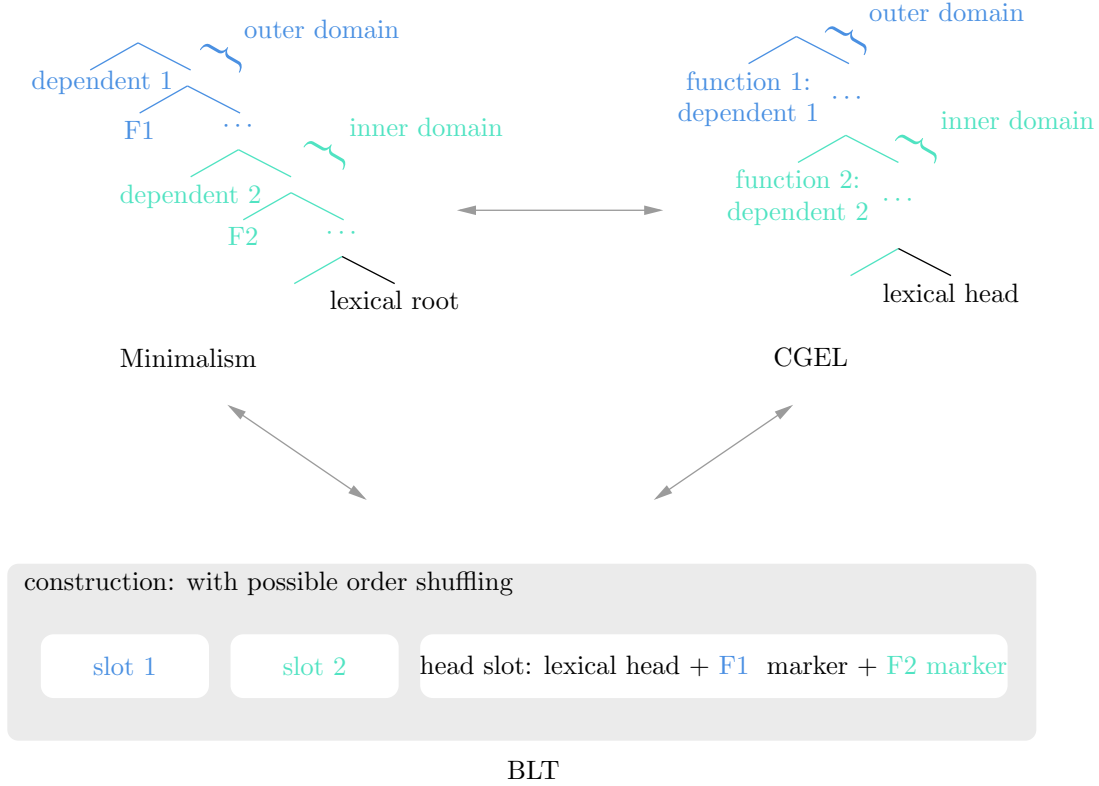


Figure 1: The generative formalism and two surface-oriented formalisms used in language description. The hierarchy information of the Minimalist formalism lost when deriving the surface-oriented formalisms is remended by grammatical functions like *indirect complement* and *function fusion* in the CGEL formalism, and by grammatical dependency relations like “slot 1 is the syntactic topic” and “the dependency relation between the lexical head and the F1 slot is coded by the F1 marker” in the BLT formalism.

the constructionism, things are not that simple: remember, a Minimalist syntax runs on features which are not directly visible, and words and morphemes are just quirky reflections of them. The corresponding surface-oriented version of a Minimalist syntax with lots of features that are used to guide the syntactic derivation (e.g. the EPP feature), then, inevitably contains syntactic templates that are hard to place under any lexicon entry. The Cinque hierarchy of clause structure, for example, contains tons of invisible functional heads, and once we “integrate out” these functional heads, the resulting grammar has a clause template. The linguist has to consider whether to introduce a chapter named “the structure of noun phrases” or a chapter named “the clausal structure”.

1.2.2 The morphology model

How is morphology dealt? This parameter has strong association with the previous parameter, since there is no clear distinction between a morpheme and a word. In morphology the lexicalist extreme is the Item-and-Arrangement approach, while the templatic extreme is the Word-and-Paradigm approach. The Item-and-Process approach is somehow in the middle, maybe in a position closer to the former and further from the latter. What brings in more complexity in morphology is there are post-syntactic operations: even when the features do spellout into morphemes, the Distributed Morphology-style post-syntactic operations blur the correspondence between features and morphemes, and hence the idea that words are built up by morphemes does not lead to any constraints on the form of the word, raising doubts about whether in a surface-oriented analysis, morphemes are of any theoretical significance at all (Anderson, 2017). The linguist needs to pick up a specific way to show how words are built up.

1.2.3 Where to find grammatical relations

How are grammatical relations (in other words, dependency relations) introduced? Together with morphemes that bear them, or words, or constituents, or with separate chapters and sections? This parameter has certain correlation with the top-down/bottom-up parameter, because in a top-down analysis, the grammatical functions of constituents in a larger construction are obviously introduced before what fill the constituent slots are discussed. On the other hand, a bottom-up grammar tends to introduce grammatical relations when discussing the smallest unit that bear them, for example talking about the case marking of various complements in the noun morphology chapter.

1.2.4 Notion of head, complement and modifier

What is the relation between a phrase and words contained in it? What is the head? What are the complements? What are the modifiers? In Minimalist syntax, all functional categories serve as heads, but lexical categories are never heads. This may appear strange but has underlying consistency (see § ?? in [my notes about Chinese syntax](#)). This approach, however, is not acceptable for a surface-oriented grammar, and here another concept – what determines the “overall” property of a constituent – is accepted as the standard to decide what is the head. Thus a *nP* and a *DP* are all headed by the central noun in the surface-oriented analysis, because both of them are built surrounding the core noun stem, and since the core noun stem is phonetically realized as the central noun – a lexical word – the latter is recognized as the head. Disagreements then arise when whether a word is functional or lexical is not that certain. Should the preposition be considered as a head? The preposition in a peripheral argument may be seen as the marker of a syntactic case system (so in the generative analysis, we have *PP* and *CaseP*), and under this analysis, the preposition is not a head. But in many languages like English, the preposition category has certain predicative properties, making it appear like a lexical category, and then it seems a noun phrase (*NP*) with a preposition is no longer a *NP* – it is a preposition phrase (*PP*) headed by the preposition.

1.2.5 Constituent levels

Are there fine-grained constituency structures, or are there just noun phrases and clauses? Some grammars, like the CGEL, posits an anatomy of *NPs* with the following functional domains: head

noun – nominal – minimal NP with a determiner – external modifiers. Others just list possible NP dependents or clausal dependents, without discussing which is closer to the head. If the latter approach is taken, the linguist has to introduce effects due to the relative position of constituents in another way, like “the O argument in ergative languages is more topic-like”. The main reason to take the latter approach – which is the approach advocated in BLT – is only NPs and clauses have complete semantic significance. See BLT § 1.11, (33) and (34): Dixon does not like the binary-branching (Minimalist) approach (33), because it does not illustrate the fact that the function words are different from lexical ones. But this is more a problem of terminology: the term *phrase* in BLT corresponds to a maximal domain like DP or CP in generative syntax, while a generative *phrase* – like *vP* or *AdvMannerP* – corresponds to a grammatical construction in BLT.

1.2.6 The syntax-morphology distinction

Whether to adopt a clear distinction between syntax and morphology.³ From a Distributed Morphology perspective, the only distinction between what is traditionally regarded as syntax and what is traditionally regarded as morphology is that the latter involves more post-syntactic operations. Once these operations are undone, CGEL and BLT analysis for syntax is applicable to the morphemes (or grammatical categories in the Word-and-Paradigm approach): the lexical stem of a word may be regarded as with no definite category, and hence lexical category labels are in essence function labels (Fig. 2).

1.2.7 Constituent order

How is constituent order (often called *word order*) introduced? Is there a separate chapter devoted to constituent order? Constituent order can be understood as a manifestation of constituent hierarchy, while in more functionalist approaches, it is understood as a method parallel to morphological marking that marks the constituent positions in a larger construction. Note that the second claim does not go against the first one: certain features, e.g. EPP, are indeed reflected by the surface constituent order in generative syntax. Languages may also have macroparameters directing how to linearize generative syntactic trees, which does not involve features (which are syntactic objects) and are rules on the interface between PF and the syntax proper. Indeed, there are linguists claiming that constituent order is merely morphology and should not be taken too seriously when discussing the syntax proper.⁴ Certain mechanisms that do not involve features (e.g. Antisymmetry) cannot be translated transparently back into the second approach, though, but they can be framed in the second approach as “the human language faculty just rejects certain constituent orders anyway”.⁵

1.2.8 The notion of canonical constructions and transformation rules

Whether a set of canonical constructions is established. Viewing non-canonical constructions as transformed from canonical ones (or by adjunction, etc.) is a powerful descriptive tool, but it is often the case that certain constructions that are uncontroversially deemed non-canonical do not have a canonical counterpart. This is one of the reason transformational rules are finally abandoned in generative syntax. Transformational rules (and adjunction, etc.) are still handy when doing description, though: no one wants to read a grammar that treats positive clauses and negative clause in the same way.

³This parameter involves the term *lexicalist* in another sense (compare footnote 1.2.1). If there is a clear distinction between syntax and morphology, i.e. there is a stable notion of *word*, then the theory is *lexicalist*.

⁴In BLT, Dixon says constituency order is a way to mark constituents’ function label and is of secondary interest. He contrasts this with the approach taken by “formalists”, who allegedly want to use an English-informed framework to catch all things of a largely unknown language. The point here is Dixon’s approach *is* in fact the approach taken by formalists in the real world.

⁵One controversy here is the generative feature-driven constituent order often involves movement, while functionalists accept constituent order variations “as they are”. This controversy is false, because for many generative linguists, movements can be unmarked, and what movement means is simply dual syntactic function of a constituent or the imperfect relation between constituent order and dependency relations (e.g. cross-serial dependencies).

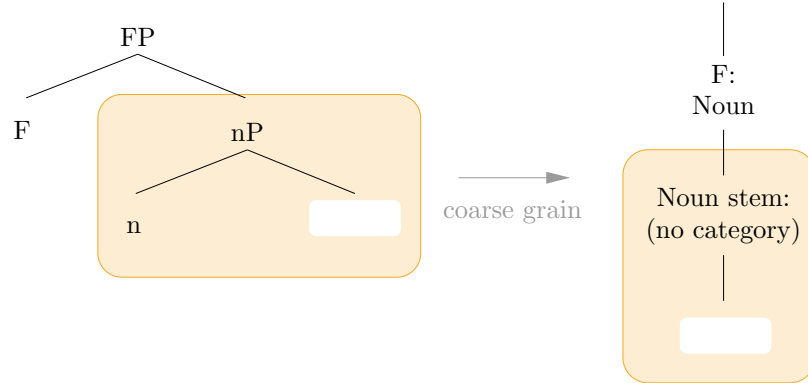


Figure 2: The lexical category *noun* as a function label: in a generative grammar, a nP (nominalizer phrase) is placed in a functional projection FP, and a noun stem is placed as the complement of the nominalizer. After coarse-graining the generative syntax tree and using function labels to replace functional heads, the F functional head in the FP projection is replaced by the F label on the right side. Then, by the same logic, the nominalizer should be coarse-grained into a “Noun-stem” function label, and the nP projection is coarse-grained into the “Noun” category label. In practice, the orange box on the right side is contracted into one single word, i.e. the noun, and thus we can see the category label of a word also has a hidden function label inside.

Both BLT and CGEL have strong tendencies in the values of some (though not all) parameters listed above. The parameters that are largely fixed by the overall descriptive framework include whether fine-grained constituency hierarchies appear, how is constituent order introduced, and the definition of *head*. It is of course possible to mix the BLT and the CGEL approaches: [Friesen \(2017\)](#), for example, despite being a largely BLT-like grammar, uses the term *verb phrase* in the way of CGEL, while the parts about NPs are typically BLT-like. On the other hand, [Muñoz et al. \(2000\)](#), despite its employment of CGEL-like terms, does not emphasize on tree diagrams and constituency structure, nor its possible constraints on the constituent order, and is much more BLT-like than the CGEL itself or the great French grammar ([Abeillé and Godard, 2021](#)). Another example of mixing of the CGEL approach and the BLT approach can be found in CGEL itself: ditransitive clauses can be analyzed in Minimalism, but the analysis inevitably involves lots of movements to make the dependency relations correct, so CGEL just gives up binary branching in exchange of a much clearer surface-oriented analysis, where the syntactic properties of the direct and indirect objects (two grammatical functions not found in monotransitive clauses) are manually stipulated. This is just how BLT works when the constituency relations are complicated.

Choosing between the approaches in CGEL and BLT and the rest of the parameters are to be decided by the grammarian, and some best practices are introduced in § 2. In principle, the above parameters are free to choose. In practice, they have to be fine-tuned or otherwise the grammar will be hard to read.

2 Common practices of grammar writing

2.1 What influences the organization of the grammar

Parameters in § 1 have to be fine-tuned according to the following factors:

- The properties of the language. If a linguist unfortunately decides to write a Chinese grammar in a bottom-up manner in which a grammatical relation is introduced in the chapter about the lexical category about its head, a reader will soon be stuck in questions like what are the possible linear order between object(s), directional complement, and aspectual markers. On the other hand, it is okay – and even desirable to write a Latin grammar in this way, because

Latin is much more free-order than Chinese and grammatical relations are mostly marked by morphology.

- Whether the language is already well-known. In § 1 we have already seen that comprehensive grammars of well-known European languages are usually CGEL-like, while newly documented languages are usually captured by BLT-like grammars. This is again expected, because in-depth partition of constituents is never the priority when describing a newly encountered language.

It should be noticed that what is in the final version of the grammar has no absolute relation to what is done to reveal the grammar. A chapter in a grammar about verb morphology may list all attested Tense, Aspect, Mood, Evidentiality (TAME) categories marked on the verb, and then show morphemes corresponding to these categories, while the workflow to investigate the paradigm is likely to be carried out in reverse order: grammarians often first record all attested forms of a verb, and then try to find the morphemes, and finally link them to TAME categories. The morphemes attested, actually, are the strongest evidences for or against certain analyses of what TAME categories are coded. This explains why many authors love the bottom-up approach. But again, they inevitably need some top-down partition: at least they have to be able to identify NPs and clauses! These scaffolds are removed once the building of the grammar is finished. They may still leave traces in the finished work: This is the topic I am going to discuss in § 2.5.

2.2 Introductory chapters

2.2.1 The introduction chapter

In modern grammars, the first chapter of a grammar is usually about its genetic affiliation, its population, geographic and cultural information, typological significance, and similar topics. Grammars focusing on raw fieldwork data may also list available texts and corpora.

2.2.2 The grammar sketch, the top-down or bottom-up question, and argumentation

It is common – but not necessary, counterexamples including Grimm (2021) – to have a grammar sketch chapter then. This brings some (though not all, for reasons below) benefits of the top-down approach to a grammar that is not carried out strictly in the top-down manner, and thus makes it easier both for readers to understand the language and for the author to describe what he or she knows. In many grammars, though, the grammar sketch chapter is just the zipped version of the following chapters organized in a bottom-up manner instead of something like § 3 and § 4, and readers in a hurry – possibly readers who want to know what syntactic categories are marked in the clause, or readers reading a grammar to give a construction a generative analysis – are unlikely to find what they want in the chapter without reading it from the beginning to the end. They should not expect what they need is fully summarized in a single section.

Take Jacques (2021) as an example. The morphosyntactic part of chap. 2 is thoroughly bottom-up, with attested lexical categories being introduced first, then nominal morphology, then verbal morphology, then argument indexation and flagging, and finally constituent order and subordination. Readers need to dive deep into § 2.4.3.2 to see what TAME categories are marked in the clause – since they are marked on the verb complex and the author writes the grammar in a bottom-up way, introducing grammatical categories in the sections about smallest constructions that manifest them, a comprehensive list of TAME categories can only be found in a small corner in the section about verbal morphology.

There is one particular benefit of having a grammar sketch chapter. A grammar needs argumentation to support a function label. When the author says “the subject is available for more extractions than internal complements”, the readers are expected to know where these movements happen, which, unfortunately, are usually introduced after the concept *subject* appears, in the chapter about information structure. Having a grammar sketch means non-canonical constructions can be used to support a particular analysis of a canonical construction.

Another benefit of the grammar sketch chapter is necessary top-down information can be collected there.

2.2.3 Phonetics and phonology

The following chapter(s), if any, is usually about phonetics and phonology, and possibly about the preferred writing system. This chapter may be omitted for languages already well known, like English. There is no phonology chapter in CGEL, for example. This note is not about phonology, so I will just skip this part. It should be noted that readers interested in a largely unknown language would better know something about the phonology, even if their primary interest is about morphosyntax, because phonological rules can blur otherwise clear constructions.

What happens next observes more variations. In the following I discuss frequent strategies to arrange chapters about morphosyntax. These strategies are not mutually contradictory: good grammars mix them to meet the need in § 2.1.

2.3 Order of chapters

2.3.1 Top-down or bottom-up

Top-down (i.e. structuralist partition-based), or bottom-up (i.e. based on the usage of smaller units)? In PSGs there is a clear correspondence between the two, but for actual language documentation things are often complicated: a top-down grammar is awkward to write because the author has to enumerate all possible configurations in a construction to fully characterize it (“a clause is either coordination of clauses or a subject-predicate construction” – oh no, supplementation and pre-nucleus constructions are forgotten), while a bottom-up grammar is awkward to read because the reader has to infer all possible configurations in a construction (“the verb is the prototypical content of the predicate slot” – any other possibilities? Nobody knows). This parameter is in principle orthogonal to the parameter about how constituent order is introduced, but a bottom-up grammar without a chapter (or several chapters) devoted to constituent order will be extremely hard to read: the reader may find a sentence like “the object follows the verb” in the chapter about verbs. Alright, can an adverb intervene between the verb and the object? No answer.

A bottom-up grammar is about item and arrangement. A top-down grammar is about anatomy. It is possible to mix the two approach. For example, there may first be several chapters about morphology, and then syntax is discussed, so the morphology-to-syntax narrative order is bottom-up, but in the syntax part, first the subject-predicate relation is discussed and then the inner structure of the predicate, so the inner structure of the syntax part is top-down.

2.3.2 The NP-clause division

Some grammars can be divided into two parts: one is about NPs, the other clauses. Since BLT tolerates using names of lexical categories in place of the naming of their prototypical functions, sometimes we say these grammars are divided into a part about nouns and a part about verbs. Other grammars mix the noun chapters and the verb chapters together.

2.3.3 From canonical constructions to non-canonical ones

If two constructions are of the same type, but one is much simpler than the other, whether to place the simpler version together with the less simple version, or to place the simpler construction with other relatively simple constructions. Examples include whether the serial verb construction should be discussed together with the simple verb-complement construction – the alternative arrangement is to place the verb-complement construction together with alignment and argument indexation in a chapter named, say, “simple clauses” – and whether the relative clause construction should be introduced in the chapter about NP dependents, or in the chapter about clause types, or in a separate chapter. This chapter is related to the parameter about canonical constructions: NPs without relative clauses may be viewed as canonical NPs, and non-canonical NPs containing relative clauses can be obtained by substituting attributive modifiers with relative clauses.

2.4 Terminology

2.4.1 Form-based grammatical relation terms

Some people tend to use the lexical or phrasal category that prototypically fills a grammatical function slot as the name of that grammatical function. Here is a list of relevant terms:

- *Adverbial*, which is actually peripheral argument (Box 3.1).
- *Serial verb construction*, which is actually serial predicator construction.
- *Verb complex*, which is actually predicate (in the BLT sense) or the predicate minus complements (in the CGEL sense).

BLT-oriented grammars tend to use more form-based terms about function, possibly because these grammars are usually results of language documentation projects, in which linguists do not have much time to decide which is the best analysis of a phenomenon, and a large corpus with at least some annotation – despite possible quirks – is better than a few grammaticality judgement tests.

Confusing terms about form and function in practice does *not* cause much problems – see § 1.2 in [my notes about Latin](#).

2.5 Argumentation

2.5.1 The amount and position of linguistic argumentation

This section is about how to make linguistic analysis and argumentation, and how it is shown in a grammar. A grammar without argumentation will be confusing: readers will ask “why does the author say there is clear distinction between nouns and verbs”, and the answer can only be found by comparing the distribution of nouns and verbs by themselves. To a certain extent, a grammar without enough argumentation is not truly finished. It is just an *legend* about the “shape” of a language, and all the reader need to do is to accept the story as it is and never ask why.

A grammar with too much argumentation will be messy. Consider a grammar in which there are discussions both on how to do a top-down partition of a clause and on how to assemble verbs and NPs into a clause. It is often the case that the reader has to switch between the two parts frequently because a grammar point is introduced in one but a highly relevant grammar point can only be found in the other.

Even when the amount of argumentation is appropriate, where to place them is still quite an art. Argumentation for distinguishing ditransitive verbs and monotransitive verb with an extended argument, for example, may be carried out in a chapter mainly about canonical clauses, but it inevitably involves something about non-canonical constructions (passivization, extraction, etc.) which are still largely unknown for readers reading the grammar from the beginning to the end. Adding a grammar sketch chapter may ease the problem (§ 2.2.2).

Sometimes argumentation is mixed with description. It is possible to talk about what argument can be passivized in the chapter about clausal dependents in canonical clauses, and then shun the topic in the actual chapter about passivization. This makes the grammar concise but also harder to read, because readers interested in passivization will then have to switching between the two chapters.

2.5.2 Constituency partition

In BLT, the constituency relations are relatively simple, because there are only two basic types of constituents: NPs and clauses, while in the CGEL approach, the constituency relations are much more complicated (see Box 3.2).

2.5.3 Identifying function labels and dependency relations

The importance of function labels and dependency relations is exemplified well in § 3.1.5, and there is no need to repeat here.

2.5.4 Distinguishing lexical and phrasal categories

Lexical and phrasal categories can be classified by their internal makeup as well as their external distribution. Similarly to argumentation about function labels, if a category label is established, then certain implicational rules about the category exist in the grammar. The claim that “Latin verbs conjugate, not decline, and they head clauses” can be equivalently formulated without mentioning *verb* as “if the inflectional endings of a word attested fit in the so-called conjugation table, not the declension table, then it is likely that the word prototypically appears in the predicator position of clauses”.

2.6 Corpus data

2.6.1 Deeply annotated or shallowly annotated

How corpus examples are given – fully bracketed and labeled, or represented as is? In the first case, an example is a demonstration of the grammatical *rules* generalized in the grammar, while in the second case, an example is just there as a piece of observation. In practice, no reference grammar is truly generative in the sense of listing all permitted forms and excluding ungrammatical forms. Thus, examples are never presented purely as examples of grammatical rules. But whether they are “deeply” or “shallowly” annotated still observes lots of variations. This parameter has relation with the top-down or bottom-up parameter, but the relation is not absolute: in general, the more bottom-up a grammar is, the more observation-based it is, i.e. the examples are provided as is without much tree diagrams or bracketing expressions. But it is of course possible to have a top-down grammar which does not make much generalization about grammatical rules that generate grammatical utterances and exclude ungrammatical ones. Indeed, this is exact the case for the structuralist Immediate Constituent Analysis: partition of corpus data is made, but there is no generalization about what is permitted and what is not. The correlation between the bottom-up narrative order and the observation-based approach is likely due to it is the easiest way to document something about a language without mistakes.

2.6.2 Full or segmental utterance

Another parameter about how to give examples: as a bracketed constituent in a full utterance, or taken out of the context? Structuralist works, like [Chao \(1965\)](#), tend to employ the latter approach, while modern grammars are the opposite. Despite being concise and easy to formalize, the first approach is not easy to use (for obvious reason) and not easy to update: since the scaffolds of the generalizations are removed once the structuralist work is finished, readers are unable to find why the author decided to take a particular analysis when he or she was writing the grammar, and just like all (semi-)formalized theories, changing one rule may cause unexpected overgeneralization.

2.7 Workflow

It is now time to summarize the basic workflow to carry out a grammar. Though most modern grammars are bottom-up (just like their traditional antecedents), top-down constituency and dependency analysis of clauses is still important and is likely to be the first step in understanding the language. A toy example can be found in § 2 in [this exercise](#).

§ 3 and § 4 summarize how to do top-down analysis. Details of constructions that may be met are not discussed in the two sections. They are discussed in the bottom-up sections after § 4. The organization of sections below implies our workflow: to first give a sketch of the language (where top-down analyses are important), and then dive in the details (and carry out the grammar in a bottom-up way).

3 Top-down partition of the clause structure

Even for a largely bottom-up grammar, top-down analyses are sometimes necessary, both as scaffolds or as argumentation, which is discussed at the end of § 2.1. In this section, I discuss what to expect when analyzing and annotating clauses.

3.1 A sketch of the constituency tree

This section starts with a purely form-based analysis of clause structure. That is to say, distinction between grammatical labels like “subject” or “topic” is not touched. We first show possible syntactic devices – in other words, constituent analysis and “movements” – and then discuss what grammatical categories are marked by these devices, or in other words, how to assign function labels like “subject” and “predicator” to the nodes of the constituency tree obtained.

3.1.1 A clause is built up by one or more nuclei with certain syntactic processes

The top-level partition of a clause is given as the follows:

- (1) A **clause** is
 - the coordination of two clauses (§ 7.1), which may involve ellipsis in and/or movement out of the conjuncts, or
 - a clause with supplementation (§ 8), or
 - a clause without the two.
- (2) A clause without coordination or supplementation is
 - a clause with pre- or post-nucleus constructions (the residue of the nucleus clause undergoing relevant syntactic processes is named the **nucleus**), like the English subject-auxiliary verb inversion or *wh*-movement, or
 - a nucleus clause (see (3)).

Note that the distinction between coordination and adjunct clause construction (a type of subordination) may be not so clear for some languages, for example Latin (see [my notes about Latin](#), § 2.7). Also, there is no strict application order between coordination, supplementation, and pre- and post-nucleus constructions: in the English question *on that particular day – I mean the day when the unfortunate incident happened – did you pass that site or hear anything usual in that direction*, first a coordination construction is used, followed by a subject-auxiliary verb inversion (a pre-nucleus construction) and then supplementation and finally another pre-nucleus construction (topicalization of the time adjunct). Another remark here is the syntactic processes from nucleus clauses to more complicated ones may only work for certain inputs: in English, for example, the supplementation *not even ...* is only possible for a clause in negative voice. A final remark is that finding the boundary of the nucleus requires testing the transformational properties of each clausal dependents. The constituency tree obtained by immediate constituent analysis is without labels, and it is impossible to decide, say, whether a constituent is a topic (a prenucleus construction) or a subject (a dependent within the nucleus). This fact leads some Chinese grammarians to abandon the distinction between topic and subject. Here is not the best space to have in-depth discussion for the definition of the nucleus. A working definition is given in § 3.1.2, but it involves terms like *complement* and *adjunct*, which cannot be defined by the label-free constituency tree obtained by clause partition.

3.1.2 Clausal dependents in the nucleus

Now it is time to define the nucleus clause:

- (3) A **nucleus clause** is
 - a minimal nucleus clause, or

- a nucleus clause with adjunction.
- (4) A **minimal nucleus clause** is a complex of
- the **predicator**, prototypically a verb but with possible alternatives, possibly marked for grammatical categories involved in the clause structure, and
 - one or more visible or invisible **complements**, and
 - possible function words marking clausal grammatical categories
- or it is a serial verb construction (§ 3.3).

Here **adjunction** means adding **adjuncts** into the tree structure, in the manner in Tree-adjoining grammar (TAG). This is the surface-oriented counterpart of optional projections in Cinque hierarchies. Adjuncts are contrasted with complements, the latter being somehow closer to the predicator, but not necessarily obligatory. There are several tests to find whether something is a complement or an adjunct (see CGEL § 4.1.2, for example), but the distinction is usually quite blurred and language-specific (§ ?? in [my notes about Chinese syntax](#)). The complement-adjunct distinction is usually hard to test simply by pure constituent analysis, because an adjunct is not necessarily higher than all complements. The distinction is not what can be studied here – it has to be delayed to § 3.1.5.

The term *adjunct* used in this note means clausal modifier. *Adjunct*, in generative syntax, means optional non-head components of any projection, though nowadays, especially in the Syntactic Cartography program, it is often assumed that there is no adjoin operation beside the usual Merge, and so-called adjuncts are specifiers of certain optional functional heads, and hence the term *adjunct* loses its structural significance. Many descriptive grammars, like (Quirk, 2010), use the term *adverbial* for the term *adjunct*. A third name used for adjuncts are *peripheral argument* in BLT.

The term *complement* may sometimes be used to denote specifically *complement clauses*. In BLT, the term *complement* is usually replaced by *core arguments*. CGEL insists on a strict form-function distinction and hence the term *argument* is reserved for semantics. BLT, on the other hand, emphasizes on the semantic basis of syntax, and so the term *argument* is used. But here comes a subtle difference between BLT's standard of clausal dependents and CGEL's: certain constituents, like the direction complement in Mandarin Chinese (see § ?? in [my notes about Chinese syntax](#)), are definitely complements under the standard of CGEL, but are definitely not arguments, and hence they are not recognized as clausal complements in BLT – they are thus recognized as a part of the BLT predicate (see Box 3.2).

3.1.3 Pre- and post-nucleus constructions not well defined for free-order languages

It should be noted that for languages with a relatively free constituent order, it is almost impossible to find a neutral order, and hence pre-nucleus and post-nucleus constructions cannot be well-defined, let alone the fact that some linguists posit so-called in-VP scrambling and the pronominal argument construction for radical non-configurational languages where argument NPs are actually adjuncts, which are by no means pre- or post-nucleus constructions but nonetheless induces changes in the constituent order. In this case, (2) and (3) should be merged together, and notions like pre- and post-nucleus constructions are to be replaced by discussions on the relation between constituent order and semantic and pragmatic information.

3.1.4 Syntactic topic

3.1.5 Classification of clausal dependents

In the above discussion I intentionally avoid mentioning subject and object or more generally, any complement and adjunct types, because as is discussed in the end of § 3.1.1 and in § 3.1.2, by staring at the surface form, it is impossible to define these terms. The constituent analysis of the surface syntax gives us a constituency tree without labels. In this section, I discuss how to add function labels to the nodes of the tree. The above discussion – why the surface-oriented constituency tree is not enough – has a strong flavor of CGEL. For BLT, the importance of function labels is much

clearer: the complexity of the constituency tree is highly limited, so most of the information has to be conveyed in terms of dependency relations, i.e. function labels.

Trivially, the label of a node can be assigned as the category of the node. Thus we have $[_S [I]_{\text{Pron}} [_{VP} [like]_V [_{fruits}]_{NP}]]$. But of course *I* and *fruits* occupy different syntactic positions: from folk grammar we know the first is the subject while the second is the object. Can this distinction be seen from their structural positions? It is true that in generative syntax, complement positions can be distinguished purely in structural terms (SpecTP, SpecvP, etc.), but in the surface-oriented analysis the relevant functional heads are all invisible, and inevitably there are occasions when structural terms are occasionally insufficient to decide the role of a clausal dependent. A grammarian may want to define the *subject* as “the most external clausal dependent in immediate constituent analysis”, and this leads to the ridiculous conclusion that in *quietly, he entered the room*, the adverb *quietly* is the subject.

This example is a vivid example of the importance of *functional* labels in the constituency tree.⁶ Another illustration can be found in Fig. 1 in [my notes about CGEL](#): the information contained in the functional projections in the left tree is displayed in the functional labels like *predicator*, *agent*, *patient*, etc. in the right one. In the above example of the definition of the subject, “the most external clausal dependent in the nucleus” seems to work well. But *what* is the nucleus? This question is raised at the end of § 3.1 but has never been answered definitely. One may want to define it in semantic terms: “a nucleus clause contains all constituents that are necessary to complete the meaning of the verb”. But isn’t *quietly he entered the room* such a clause?

The conclusion is that in order to find complement positions, adjunct positions, the definition of *nucleus* – in a word, functional labels – in a language, syntactic tests based on transformational behaviors (or to be precise, based on comparison between regularly related constructions) is needed. The grammarian should expect lots of cross-linguistic variation of available functional labels, because they are reflections of the underlying feature structure, which allows plenty of variations. In a purported language without any EPP feature, SpecTP may not be of much significance, and hence the label *subject* – the combination of the syntactic agent i.e. the topmost argument in the argument structure, and the obligatory “topic” i.e. the topmost argument after TP is finished – is of little use. An example of how to find complement types is Fig. 11 in [my notes about CGEL](#). By six syntactic standards – constituent order, passivization, preposing, postposing, gap controlling, and predicative adjunct – five object-like complement types are identified, and four of them are recognized as objects with one being kicked out of the object family.

3.1.6 Alignment

Recognizing complement types is mostly about syntax. Semantics is also involved, of course, because otherwise it is impossible to decide whether one clause is transformed from another. But this is not what people already with knowledge on traditional grammar expect. What do semantic roles of complements and adjuncts do in complement type recognizing? They are important factors in determining complement and adjunct types, but they are by no means the decisive ones. Passivization is a well-known counterexample of the uniform matching between semantic roles and complement types. A locative role may be realized as a complement or an adjunct. The defective – yet still largely regular – mapping between semantic roles and complement or adjunct types is therefore worth separate treatment. This is what known as **alignment**.

There are usually much fewer complement types than semantic roles. The detailed semantic classification of verbs – and their complements – is quite messy. Table 3.1 in BLT lists the semantic classification of the most frequent verbs in English. There are 16 semantic roles mentioned, and if the linguist just lists his/her testing results of the syntactic behavior of each of them, the reader will be driven mad! A well-organized description of the alignment of a language therefore is based on the mapping relation between complement and adjunct roles and coarse-grained semantic roles. A priori no one knows how to coarse-grain semantic roles so that the resulting “macro-roles” make sense both syntactically and semantically. After periods of investigation, several macro-roles have

⁶Here *functional* means syntactic function and not pragmatic function.

already been identified. The most important three are S, A, and O⁷. S is the only argument in the intransitive clause. A and O are the more agentive argument and the more patientive argument in the transitive clause, respectively. Other argument labels include E (whatever that occurs together in addition to a SV or AVO construction – see § 4.5.2 in [my notes about CGEL](#)), G (the goal-like argument in a ditransitive construction with a meaning of “transferring” – see § 4.5.3 in [my notes about CGEL](#)), and T (the theme-like argument).

If somehow S and A are realized by the same complement type – which is commonly named the *subject* – then the language is **nominative-accusative** or simply **accusative**. If, however, S and O are realized by the same complement type, then the language is **ergative-absolutive** or simply **ergative**. As is shown by Fig. 11 in [my notes about CGEL](#), to say two complement types are essentially the one has a vague meaning: the monotransitive object and the T argument in the English V-G-T construction (*sth.* in *give sb. sth.*) are both analyzed by CGEL as implements of the direct object, but they differ in passivization. The same is for identification between S and A or O. A language can be accusative under certain standards while ergative under others. For details, see § 3.1 in [my notes about alignment](#).

There is some drifting in the meaning of these argument labels. Essentially being functional labels just like *subject* and *nucleus*, these labels are syntactic concepts in some contexts, including “passivization means turning the O argument into S and suppress the A argument into E” and “the A argument always binds⁸ the O argument, which means O can be filled by a reflexive pronoun bound by A, while reflexive pronouns do not occur in the A position”. The notion of S argument is also an inherently syntactic one, because S arguments in so-called unaccusative verbs are closer to O, not A. When the S, A, O, etc. concepts are syntactic, we may say “the agent argument is marked as A”, or “the goal argument is marked as E”, and complement or adjunct labels are just coarse-grained S, A, O, etc. labels (e.g. the *subject* label is the clustering of A and S), because the S, A, O etc. labels denotes complement types with semantic specification.

On the other hand, there are contexts in which the S, A, O, etc. notations are defined on an almost solely semantic footing: the English G argument shows rather split behaviors in the V-G-T and V-T-pG constructions, as is shown in Fig. 11 in [my notes about CGEL](#). Now we do not say “the agent argument is marked as A”, but “the G argument is marked as the indirect object in the V-G-T construction”. Note that in this case there is no simple relation between complement types and the argument labels: for example, in Fig. 12 in [my notes about CGEL](#), The O argument and some instances of the T argument are marked as the monotransitive object, while the rest of the instances of the T argument are marked as the ditransitive direct object, so there is no surjection relation from argument labels to complement types, but nor is there surjection relation from complement types to argument labels.

The requirements of uniform syntactic behaviors, of uniform semantic behaviors and of conciseness often cannot be satisfied together, giving rise to the above phenomenon.

The above discussion on clausal dependents can be summarized as the follows:

Box 3.1: Nucluse clause and clausal dependents

Clauses can be constructed from nucleus clauses via pre- and post-nucleus constructions and/or coordination and supplementation. The nucleus clause contains clausal dependents, a lexical verb, and auxiliaries. In the CGEL approach, the clausal dependents include complements and adjuncts. In the BLT approach, the clausal dependents include core arguments and peripheral arguments.

This note keeps all the four terms: *complement*, *adjunct*, *core argument*, *peripheral argument*. Though roughly complements correspond to core arguments, and adjuncts correspond to peripheral arguments, certain complements – like the non-argument complements in Chinese – are certainly not arguments, and may be included as parts of the BLT predicate (see

⁷Many denote it as P, to be consistent with the A argument (agentive/patientive). In this note I use O to be consistent with Dixon.

⁸The term in BLT chap. 13, Appendix 1 is *control*, but *control* has its specific meaning in a class of verbs that take an object and an infinitive complement clauses.

Box 3.2). Adjuncts are also referred to as *adverbials* in some grammars.

The complement-adjunct distinction and subclassification of the two types of clause dependents rely on syntactic analysis and argumentation based on extraction properties like preposing, valency changing properties like passivization, and marking of constituent order and morphology. Without syntactic argumentation, it is impossible to distinguish adjunct, complement, and topic (a pre-nucleus construction) or to find subtypes within clausal dependents, for immediate constituent analysis is unable to provide relevant information.

There is typically uniform but nontrivial mapping from semantic roles to complement and adjunct types. Coarse-grained semantic roles based on similar syntactic and semantic properties include S, A, O, G, T, etc., and the alignment of a language decides the relation between these argument labels and complement and adjunct types. The exact meaning of the argument labels varies. Sometimes these argument labels are just clausal complements subclassified according to the semantics, and sometimes they are mostly semantic.

3.2 The inner structure of the verb-complement construction

3.2.1 The subject-predicate analysis of the verb-complement construction for syntactically accusative languages

(4) is a flat-tree analysis, but there are several evidences suggesting a fine-grained hierarchy is useful even for surface-oriented analysis. For accusative languages, the S and A arguments are and hence are identified as the *subject*, and we have the following facts:

- The subject is much easier to be extracted out of the nucleus, which can be explained by the theory that it is somehow higher and movement operations are localized.
- The quantifiers of the subject and internal complements, explicit or implicit, demonstrate a stable scope hierarchy: the scope of the subject quantifier is always larger. When talking about a charity organization, one may say *every woman helps three boys*. Here, the subject is bounded by \forall and the object is bounded by ‘there exists three ...’, and $\forall > \text{three}$ and $*\text{three} > \forall$: the meaning of the sentence aforementioned is ‘for each woman, there are three boys that she helps, but I do not know who they are, and possibly the boys Sarah helps are not the boys Lily helps’. After a seemingly trivial passivization, we get *three boys are helped by every woman*, which means ‘there are three boys – I don’t know who, but anyway there are three – who are helped by every woman in our organization’, and we have $\text{three} > \forall$ and $*\forall > \text{three}$. If we assume the semantics is related to the syntactic structure at least partially, then this is a piece of evidence that the subject is higher in the syntactic tree, no matter what its semantic role is.

- If the subject is indefinite, then it is by default bounded by \forall , TODO: really???

Some notes about BLT chap. 13, Appendix 1: TODO: S argument and A argument are by default bounded by \forall , while O is bounded by \exists – is this cross-linguistically correct? This also explains why verb-object incorporation is frequent: *a cat kills some animals* = *a cat kills*. It seems the only argument – be it peripheral or core – that is by default bounded by \forall is S in intransitive clauses and A in transitive clauses (which may be seen as a double check). What’s the counterpart in syntactic ergative languages?

- Verb-argument incorporation, nominalization, etc. (for example compare *solve problem* and *problem solving*) usually happens between the verb and the internal complement(s), not between the verb and the subject.⁹

⁹Grammaticalization of a span is also in principle possible, so incorporation between the verb and the subject may still rarely occur. But note that operation on span is usually seen for functional hierarchies, in which what are spellout as a single word are highly lightweight functional heads, not more substantial lexical categories.

- If there is something looking like reflexive pronouns, then it usually follows the Government and Binding scheme, and using this as a test, the subject is always predicted to occupy a higher position.

The list can go on and on, and hence it is useful to divide the nucleus clause into the subject and the predicate:

- (5) A nucleus clause is made up by an **external complement**, often named the **subject**, and a predicate.
- (6) A **predicate** is either a predicate without adjunction, which may be
 - a predicator-complement construction, or
 - a serial verb construction,
 or a predicate after adjunction, or a predicate after syntactic processes marking clausal grammatical categories like negation, modality, etc.
- (7) A predicator-complement construction consists of a predicator (which is the head of the predicate and the clause) and its **internal complements**.

The above rules replace (3) and (4). These are the rules used in CGEL, and actually also the Chinese school grammar (see § ?? in [my notes about Chinese syntax](#)). CGEL does not acknowledge the role of verb complex, which is in principle correct, because English is already highly analytic and rigid-order, and most information about dependency relations can be reconstructed from the surface-oriented constituency analysis. Therefore, the term *predicate* is used as in traditional grammar: it means the nucleus minus the subject, and its status as a constituent summarizes the above listed facts.

3.2.2 The flat-tree analysis of the verb-complement construction

It should be noted the above concept of *predicate* does not always correspond to an uncontroversially constituent in the surface structure: in a VSO language, for example, the predicate is discontinuous. This urges some to accept a flat-tree approach to describe the nucleus predicate.

To see another motivation of the flat-tree approach in surface-oriented description, consider the following facts. There are some controversies arising from the “what is the head” parameter in § 1. Some verbs are auxiliary verbs. In the clause *I should do this*, what is the predicator? Here we are in the same dilemma as the one concerning “preposition phrase”. An analysis in which the predicator is *should* will face the criticism that function words are never heads in a surface-oriented analysis, or otherwise, in order to be self-consistent, its bound morpheme counterparts should also be regarded as heads, which falls back to the generative functional head analysis.

The above two motivations urge us to take the analysis in which the main verb *do* is the predicator. This approach usually occurs with the flat-tree approach, or otherwise *should* is analyzed as a clausal dependent similar to the determiner in a NP, which is acceptable in the structuralist analysis of Chinese non-argument complements (see chap. ?? in [my notes about Chinese syntax](#)) but is not prevalent outside the Chinese grammar community. The nucleus minus arguments (core and peripheral) is named *verb phrase* in BLT, while in CGEL the term *verb phrase* means the verb plus its internal complements, which is the form of the predicate. The BLT *verb phrase* is the hierarchy *span* (as in *span spellout*, or the head slot in the BLT part in Fig. 1) of the CGEL VP shell. To avoid conflict, the term *verb complex* may be used to denote the verb phrase in the BLT sense (Hockett, 1948; Friesen, 2017; Wilbur, 2014). Now since there is no need to do fine grained partition of the nucleus, the term *predicate* can be assigned to something else and the commonly accepted practice is to use it to denote the verb complex. In this way, (5), (6), and (7) are replaced by the following:

- (8) A nucleus clause is made by a predicate (with a different meaning with the *predicate* in (6)) and core and peripheral arguments. Rearrangement of constituent order may be necessary.
- (9) A **predicate** may be a simple one or a serial verb construction (§ 3.3).

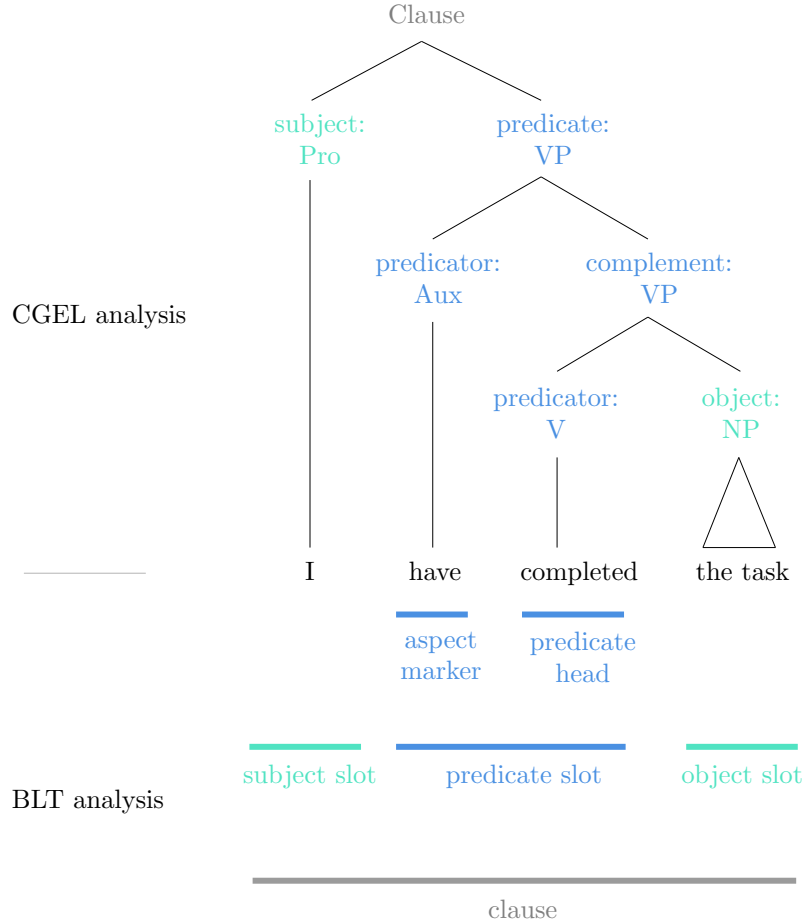


Figure 3: Comparison between a BLT analysis and a CGEL analysis

- (10) A simple predicate consists of a head (prototypically a lexical verb) and possible grammatical category markers (including auxiliary verbs).

This approach is not without doubt: the analysis that the main verb *do* is the main verb also faces a problem of non-consistency: the boundary between auxiliary verbs and lexical catenative verbs is somehow vague in some languages, and in this case, in somewhere in the grammaticalization process the head status suddenly flip from verb to another. Also, the problem of discontinuous constituent (the verb complex) still exists, which can also be seen from Fig. 1. But this is the practice accepted in BLT and most of grammars sticks to this paradigm, so I introduce it here.

3.2.3 Switching between the two

Finally I discuss how to translate between the two approaches. There are only two key points: in BLT, most heavy lifting jobs are done by dependency relations within a large, non-branchable constituent, not constituency relations, and what is a constituent depends heavily on semantics. Consider Fig. 3, which illustrates the divergences between CGEL and BLT over a simple predicator-complement construction. Here is a comparison between the two analyses:

- The argument positions in both approaches are labeled by explicit functional labels. The necessity has been argued in § 3.1.5: in Minimalism, the argument positions can be decided purely in terms of the structure: the subject is SpecTP, and object is SpecTransP, etc. But in the surface-oriented formalisms information contained in the constituent structure is not

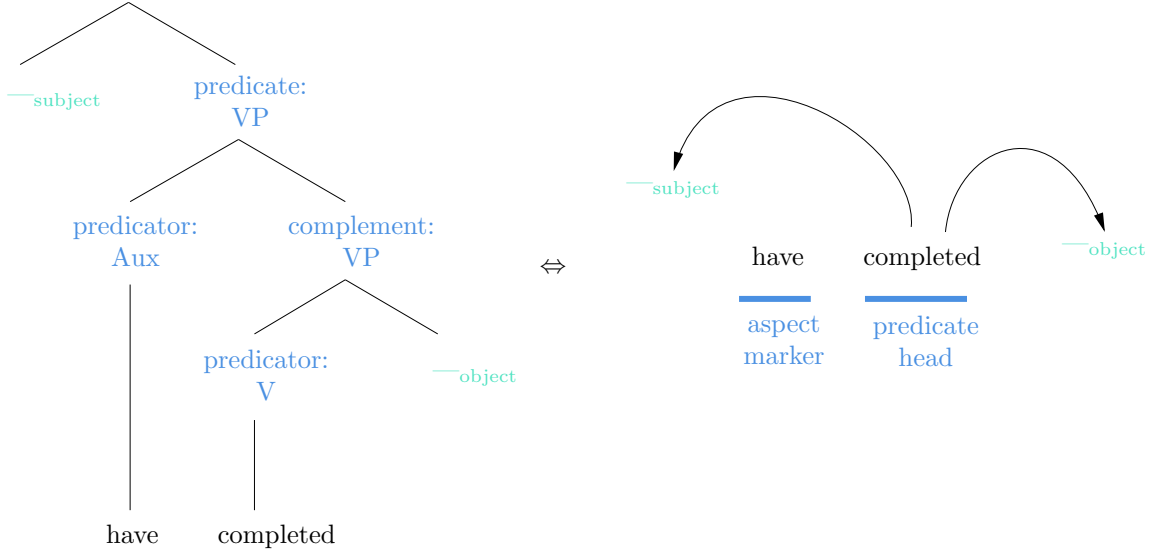


Figure 4: The structure of a simplest BLT predicate

enough to tell us the role of arguments, and hence arguments are explicitly labeled via notions like “subject:”, “object:”, “subject slot” and “object slot”.

- The binding relation between the subject and the object is realized in BLT as “the subject tends to somehow control the object cross-linguistically”. This reflects the dependency relation-based nature of BLT: the fact that the subject is somehow “higher” than the object is not reflected in the constituent structure, but rather by a dependency relation placed in the clause template.
- The fact that *have completed* is a span in the TP projection is reflected in the CGEL analysis also by constituency structure, but *have completed* is recognized as a constituent in the BLT approach. This reflects the semantic-informed constituent standard in BLT: as can be found in the CGEL part of Fig. 3, in the clause structure we have a VP *have completed the task*, but it is neither a clause nor a NP, so it is not a constituent in BLT, but once the NP *the task* is stripped away, the purely verbal skeleton *have completed* – which is a span and colored as blue – is of semantic significance: it describes the event going on, and the internal gap for the object as well as the external complement (i.e. subject) gap are interpreted as valency (here the dependency-based nature of BLT is also reflected). So *have completed*, a span in CGEL, gets recognized a constituent in BLT and it fills the predicate slot. This is illustrated in Fig. 3.

Similarly, the generative constituency relation-based illustration of serial verb construction in e.g. [Chen \(2016\)](#) is replaced the dependency relation-based syntactic process to insert several verbs into a single predicate and alternate the dependency relation between the verbs and the arguments in BLT. Fig. 5 is an illustration of the correspondence between the analysis in [Chen \(2016\)](#) and a BLT analysis. The phenomenon discussed in the diagram is the direction complement construction or direction compounding construction (see § ?? in [my notes about Chinese syntax](#)), in which a word indicating spacial movement (picked from a closed category) – which is the direction complement or direction compound – is merged together with a TransP, and the object – in this case *tāng* ‘soup’ – in the TransP also becomes a complement of the direction complement, and by head movement, the direction complement is attached to the main verb – *sòng* ‘send’ here – and hence a compounding verb *sòng laí* is formed, which precedes the object. Now we try to translate the above derivational process to a BLT account:

- The fact that *tāng* is both the complement of the main verb *sòng* and the direction complement *laí* (by appearing in two specifier positions) is reflected by the two dependency relations on the right side.

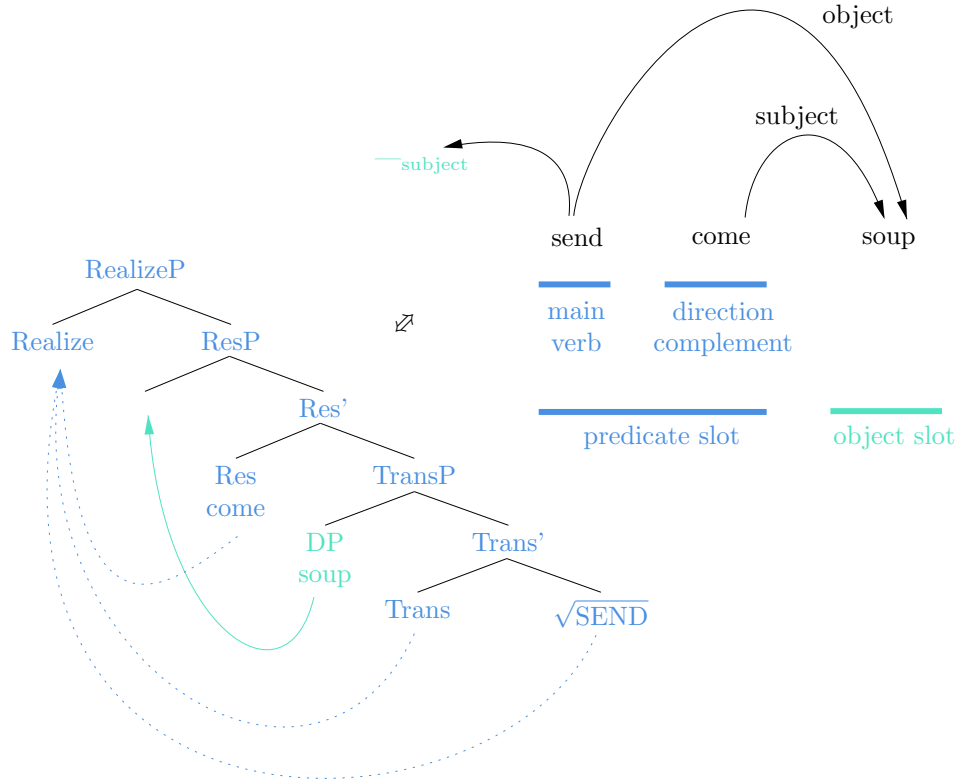


Figure 5: An example of serial verb construction: *send come soup* is the literal translation of the Chinese *sòng lái tāng*, which means ‘send soup here (= send soup and make it come here)’. Based on (74) in [Chen \(2016\)](#), which adjustment to make it compatible with Distributed Morphology.

- The fact that *sòng lái* is the span spellout of the verbal projections minus the object is reflected by putting the two words into the predicate slot. The constituent order information is reflected in a flat-tree way.

Here I intentionally skip the CGEL approach because the complexity of serial verb construction is already comparable with the functional projection that gives rise to the *have been being done* hierarchy ([Ramchand and Svenonius, 2014](#)), and the surface-oriented CGEL analysis will not be substantially different from the BLT analysis shown in Fig. 5.

There are adjustable parameters in both the CGEL approach and the BLT approach. The aforementioned “what is the head” question and “whether discontinuous constituents are recognized as constituents” are obviously parameters. For BLT, since auxiliary verbs are not considered as heads in clauses containing them, the question what are lexical verbs arises, since in many languages, there are catenative verbs that seem to already undergone some degree of grammaticalization, but are not typically auxiliary verbs nonetheless. This question decides what is the head in the BLT analysis. Similarly, certain adverbs are actually lexical markers of TAME categories, and hence

whether they should be considered as a part of the BLT predicate like auxiliary verbs is a question without a universal answer. The CGEL approach is unable to analyze VSO languages with the subject-predicate division without movements, but similarly, the BLT approach suffers the problem of discontinuous predicate in cases like V2 languages.

The fine structure in a nucleus which is a verb-complement construction can therefore be summarized as follows:

Box 3.2: The fine structure of the nucleus and the terminology about *predicate*

There are fine structures within the nucleus, but they are caught with radically different approaches in BLT and CGEL. The comparison between the two is given in Fig. 3.

In CGEL, if *subject* can be defined for a nucleus clause, the nucleus clause is divided into the subject and the *predicate*, and the predicate can be then be further divided by successively stripping off the most external dependent. In a predicator-complement construction, after all adjuncts and complements are separated, the remaining of the predicate is the *predicator*, the head of the predicate, the nucleus clause, and the whole clause, which is prototypically filled by a verb. The phrasal category of the predicate is typically called the *verb phrase*. It is also possible to have a serial verb construction, where there is more than one predicator-like syntactic item. The CGEL constituent analysis is the immediate constituent analysis plus dependent types annotated by argumentation mentioned in Box 3.1. The constituency tree is the coarse-grained result of the constituency relations in the corresponding generative syntax, which plays a role in deciding binding government and binding between arguments, which verb to move in subject-auxiliary inversion, etc.

In flat-tree approach grammars, i.e. BLT, the only uncontroversial constituent types are NPs and clauses, and all constituents within a larger constituent are placed on the same plane. What are not arguments in a nucleus clause are all placed into the *predicate*, which corresponds to a span in the verb phrase in CGEL. The predicate in BLT is also said to be a *verb phrase*, or *verb complex* to avoid confusion with the CGEL meaning of the term. What is conveyed by constituency relations in the CGEL approach is alternatively articulated by dependency relations.

Certain constituents acceptable as complements in CGEL, like the direction complement in Chinese, tend to be placed in the predicate position in BLT (see Box 3.1), because these non-argument complements are somehow comparable with auxiliary verbs.

It can be seen that for surface-oriented sketching of previously unknown languages, the BLT approach is more flexible, since there is no need to do surface-oriented binary-branching in-depth constituent analysis, there is no subject-predicate division which is dubious in ergative languages, and surface constituent order is not taken to be directly reflecting the dependency structure. However, since the predicate is the surface correspondence of the verbal skeleton span, it can be expected that the predicate may be more frequently realized discontinuously compared with arguments which themselves are also constituents in generative syntax, and some may want to reduce the content of the predicate to ensure continuousness, while others may not. When there are auxiliary verbs, the CGEL approach naturally recognizes the most external auxiliary verb as the head of the whole clause, the then the second most external auxiliary verb is deemed the head of the VP dependent of the top auxiliary verb, etc., while in BLT, the general tendency is to deem the head of the predicate as the main verb, and not the most external auxiliary verb. Both CGEL and BLT have the problem of noncontinuous constituents, and whether to split them is an adjustable parameter. These parameters are left to the grammarian to decide.

3.3 Serial verb construction

When in the BLT predicate there are more than one verb that acts as I have already introduced an example of serial verb construction in the discussion about Fig. 5 how serial verb constructions are described in terms of both the generative approach and the BLT approach, and that since

the derivation of serial verb constructions is already of the same complexity level of how auxiliary verbs are constructed according to TAME features, the CGEL approach to serial verb constructions is largely similar to the BLT one, and the verbs appearing in a serial verb construction may be regarded as morphological components of a complex predicator.

Here I review the typology of serial verb constructions.

3.4 Grammatical systems and categories in the clause

3.4.1 Arguments: flagging, indexation, alignment

3.4.2 TAME categories

TAME categories, or *non-spatial settings* (the name used by Dixon), are prototypical TP categories.

3.4.3 Finiteness

In generative syntax, finiteness is in a low position in the CP domain. It determines

3.4.4 Information packaging

Information packaging, i.e. syntactic marking of the information structure, involves several strategies. The simplest ones are topicalization and

3.4.5 Clause types

4 Top-down partition of the noun phrase

5 Lexical categories

5.1 The noun category

Despite some morphological and syntactic varieties, all languages have nouns. A noun is typically a head of a phrase filling an argument slot (see Box 3.1) – this distribution feature is the *prototype* role of nouns, and also an important criteria to recognize a noun class.

5.1.1 Possible distribution

5.1.2 Semantic classification

5.2 The verb category

5.2.1 What is recorded in the dictionary entry of a verb

Here is a list of what needs to be described in the dictionary entry of a verb if the dictionary is expected to provide full information instructing how to build a sentence from words:

- Grammatical categories marked on the verb and

5.2.2 Semantic classification

5.3 Distinguishing nouns and verbs

5.4 The adjective category (or categories)

6 Morphology

6.1 The notion of *word* and the coverage of morphology

6.1.1 Words as black boxes in syntax

Morphology, roughly speaking, is the study of the inner structure of words. But what are words, anyway? It should first be noted that the definition of phonological words does not necessarily agree with the definition of grammatical words. BLT spends a whole chapter (chap. 10) to discuss criteria to decide the two. And what is a grammatical word is also not without controversy. Morphosyntactic phenomena used to decide whether a syntactic unit is or is not a grammatical word can be summarized as certain versions of the Lexicalist Integrity Hypothesis, i.e. when it comes to the syntax, the speaker does not really feel the inner makeup of the unit.¹⁰ Today, we know the hypothesis is not really necessary. Extraction constraints exist on all levels of morphosyntax, which can be explained without mentioning *word*. The distinction between word and phrase is likely to be a secondary concept, derived from more fundamental laws of morphosyntax (Bruening, 2018). And the hypothesis is also not one hundred percent correct. What is uncontroversially syntax, like coordination, can definitely see how a word is formed, as in *pre- and post-revolutionary France*.

One way to redeem this definition is to loosen it. We may define the word as a constituent that is somehow small enough. A single noun or verb without any inner structure (like *apple* or *hit*) is a word, and if a construction is unable to take complements larger than a word, then the construction is a word. And if we are sure a construction only take word complements, then whatever complement it takes is a word. The rules can be used recursively to decide the range of words. It is possible to arrive at a self-consistent definition of *word* now. The problem is the resulting definition often goes against with native speakers' "common sense". For example, *American history teacher* may be argued to be a word. Its inner components are hard to be extracted out in syntax. Attributives never go into the constituent. The form **late American history teacher* is not grammatical, and hence in the construction which starts with the field of learning and ends with *teacher*, the field of learning part must be a word, so *American history* is a word, and *American history teacher* is also likely to be a word. But this of course conflicts with the orthographical standard of wordhood. In some languages like Chinese, wordhood defined by the above morphosyntactic tests differs so much from everyday intuitions, making people wondering whether it is a good idea to just throw the term *word* into the trash bin.

6.1.2 Words as minimal utterance

Another way to distinguish words is not based on morphosyntactic tests done by linguists, but the native speakers' intuition in discourses: a word may be defined a smallest unit that appears in metalinguistic discourses, or maybe it is defined as a smallest unit of ordinary utterance. Here the definition of *word* relies more on the condition of being somehow minimal, rather than on being a unit that is felt by the speaker in actual discourses, because many – actually most – morphosyntactic constituencies that are clearly there (which can be tested using standard constituency tests) are

¹⁰A stronger claim is the speaker does not feel the inner makeup of words at all. It is true that native speakers' intuitive partition of words is often problematic when examined closer. The representation of Japanese verbal conjugation in the Kana system – in which stem alternation is invoked – is accepted by most native speakers, but a closer look reveals that concatenative morphology is enough to account for the observed conjugation paradigm, though the stem may end up with a consonant and thus native Japanese speakers do not find the concatenative analysis. But ignorance of minimal analyzable units happens equally in syntax: native speakers often forget to mention important function words when they are invited to introduce a construction of their language. When a native Chinese speaker is invited to talk about the disposal construction, the optional function word *gei* in clauses like *tā bǎ wǒ gei chūmāi* is often left untouched.

never cited in metalinguistic discourse, and they are of all sizes. What are universally realized by the speaker in intuitive language use seem to be limited to NPs and clauses in syntax, the two being the only constituency types recognized in BLT or in other words, two maximal functional domains in generative syntax, namely the DP domain and the CP domain (see § 1). In this perspective, the relation between morphemes and words is similar to the relation between clausal dependents and heads and clauses. Consider the theory on categorizers in Distributed Morphology, for example. A categorizer phrase, presumably a phrase, adds category labels to the stem, without definite categories, which resides in the lowest position of the whole functional projection, in the same way CP and TP grammatical relations are added to a *v*P. What singles words out is they are the *smallest* units that can be cited.

This view, unfortunately, also suffers from several issues. The most important problem is speakers sometimes do cite affixes. Consider the following dialogue:

- (11) – You mean ‘pre-revolutionary’, or ‘post-revolutionary’?
 – ‘Pre’.

The second problem is “appearing independently in discourse” is not self-consistent once several standards are considered together. In English, single-verb utterances are rare, but verbs can be cited metalinguistically. So the two standards – minimal everyday utterance and minimal metalinguistic utterance – run against each other. The third problem is the status of function words as words is challenged in this view: the article *the*, for example, never appears on its own as an utterance, but since it appears as a dependent in the NP, it has to be a word, not a morpheme. Dixon seems to be content with this, since in BLT § 1.11 he says there is no need to treat “function words” in the same way as lexical ones: the former are grammatical markers that can be enumerated in the grammar and it is even appreciated if they are not listed in dictionary.

6.1.3 Words as units with conventionalized meanings

The inner structure of words are subject to fossilization. This gives rise to the so-called criterion of wordhood that a word has a single conventionalized meaning, which cannot be seen by looking at morphemes inside it. Thus, the structure of syntactic units directly implies its meaning, while the structure of words, though analyzable, is of primarily historical and etymological interest.

But fossilization exists, of course, in syntax, examples including idiomatic verb-preposition constructions and verb-particle constructions, and periphrastic conjugations as well. The distinction between fossilization of word structure and fossilization of syntax is better regarded as quantitative, rather than qualitative. Fossilization means storing a whole structure in the lexicon, which of course works better for smaller constructions i.e. so-called morphological trees, rather than large syntactic ones.

As is often said, morphological rules are usually less productive than syntactic ones, and among morphological rules, derivation is less productive than inflection in general. The reason of the first observation is already said above: smaller structures are easier to routinize and hence relevant rules are easier to be eroded. This also explains why derivation is usually less productive than inflection: since inflection interacts with the syntactic context of a word, it can be expected that functional projections involved in inflection are somehow more external, and thus the stem together with derivational heads constitute a smaller constituent than the stem together with derivation heads and inflectional heads, so the former is easier to fossilize. This does not mean there is no fossilization in inflection. Fossilization in inflection is the same as collapsing of the functional hierarchy involved, which increases the fusion index of the language. So fossilization of inflection makes the inflection rules more obscure – but there are inflectional rules, after all, because the spellout of the inflectional functional projection span still needs to be concatenated to the stem. On the other hand, fossilized derivation results in new words, and the corresponding rules are just gone.

6.1.4 What morphology is about

Several conclusions can be drawn from the above discussion. First, what does the heavy lifting in any definition of wordhood is always minimality: most of the criteria raised apply to what is

uncontroversially recognized as syntax as well, and it is minimality that tells words from phrases. Second, different criteria usually give conflicting definition of wordhood. The true meaning of the term *word* will definitely contain some idiosyncrasies of the language in question as well as the personal preference of the author of the grammar (or the cultural tradition, especially the orthography). The term *word* can still be useful as a language-specific descriptive concept, but the grammar writer has to be explicit about what he or she means by the term.

Considering the chaos in defining *word*, expectedly, what is involved in morphology is highly heterogeneous, much more heterogeneous than the case in syntax. The following mechanisms involved are the same as ones in syntax:

- Constituency tree within the word: functional projections (and thus function labels or grammatical relations in surface-oriented terms) that may appear in categorizer phrases. For example, we accept *faithful* as a word, then the function label of *-ful* never appears outside the adjectival categorizer phrase: in English phrases it is never possible to simply add a word and term a noun into an adjective meaning “full of ...”. Function labels within the word may also be the same with the labels in syntax. In Chinese, the predictor-object relation is both found in the clause structure and in verb morphology.
- Span spellout without much nontrivial post-syntactic operations: a span of functional projections are spelt out into morphemes in a transparent manner. Japanese conjugation is a good example of this: the conjugation endings may be seen as auxiliary verbs, which is reflected in the terminology in the School Grammar tradition. This is also seen in syntax: the BLT definition of *predicate* (Fig. 4) is a typical example of how a span is analyzed as a constituent in a surface-oriented theory.

As is said above, the syntactic (in the sense of Distributed Morphology) part of morphology (in the sense of surface-oriented analysis) has nothing different with the syntax (in the sense of surface-oriented analysis) in basic structure building mechanisms. But beside these, languages also have highly localized processes. The following mechanisms are highly localized and therefore are usually only observed in what we call morphology:

- Nontrivial spellout: post-syntactic operations like fusion,¹¹ and spellout based on underspecification. Portmanteau is a good example.
- Phonological realization may combine two grammatical words into one or split a grammatical word into several phonological words. It is even possible for a morpheme of a grammatical word to be attracted by and attached to another grammatical word in phonological realization (BLT § 10.6). These subtleties are usually not introduced in detail in the name of “phonology” and should be accounted for in chapters about morphology.

Of course, nontrivial spellout and phonological rules also appear in syntax (in the surface-oriented meaning): English auxiliary hierarchy, like *have been being done*, involves nontrivial span spellout, while the auxiliary inversion involves head movement, which may be analyzed as an example of post-syntactic operation. Prosody drives lots of syntactic phenomena in many languages, and may even break a word into its parts.

All processes mentioned above are subject to fossilization. Fossilization is another source of so-called Lexical Integrity phenomena (one source being phasehood of categorizer phrases): once a word with complex internal structure is fossilized, its internal structure is of no synchronic significance, and thus “morphological rules” – to be exact, fossilized diachronic morphological rules – are irrelevant to “syntactic rules”.

¹¹Sometimes they are called morphological operations, though the latter term is kind of misleading, since post-syntactic operations work on features and not morphemes. The term *morphological operation* suggests a surface-oriented analysis, which is dual to Distributed Morphology but is not identical to it superficially.

6.2 Three models of morphology

6.2.1 The Item-and-Arrangement model

For people not interested in recent developments of morphological theories, the Item-and-Arrangement model may be the default model. It is the standard model used in American Structuralism and dates back to the work of Pāṇini. It breaks a word into a sequence (with fixed order by default) of morphemes, each morpheme carries a piece of semantic information.

The major problems of the Item-and-Arrangement morphology, despite its clearness and conciseness, include that in this model the difference between functional and lexical morphemes are not recognized, that certain morphological devices, like duplication or deletion, are impossible to account for using purely concatenative morphology, and that sometimes morphemes have no direct meanings.

Distributed Morphology can be regarded as the modern incarnation of the approach, which solves the aforementioned problems. Nonconcatenative morphology is accounted for by “abstract morphemes” which serve as tags for following phonological readjustments. An internal change of vowels, for example, may be modeled as a *simulfix*, which guides the morphology-phonology interface to change the relevant vowels. As [Anderson \(2017\)](#) points out, Distributed Morphology is essentially a theory of features, where alleged “morphemes” undergo so many operations that their correlation with actual morphemes observed in structuralist analysis of languages is undermined.

A more straightforward surface-oriented equivalence of Distributed Morphology is the Item-and-Process approach. Recall that in Distributed Morphology, a functional projection hierarchy is mostly a stem surrounded by a series functional heads (which allow span spellout) and their specifiers, and there are phonological rules following the vocabulary insertion to produce things like Semitic template morphology [Tucker \(2011\)](#) or stem alternation. The surface-oriented counterpart of the process above therefore starts from a stem, features it carries and its “arguments” (which, in the generative theory, are the specifiers of functional heads), and then the stem is modified according to the features, and the “arguments” are glued to the modified stem at certain stages, the result undergoing modification as well.

6.2.2 The Item-and-Process model

The Item-and-Process morphology is a variant of the Item-and-Arrangement approach. As is said at the end of § [6.2.1](#), it works on *lexemes* instead of morphemes, which means functional morphemes are kicked out of the lexicon. What exist are lexemes or “stems” and a set of morphological processes that can be used to alter the lexemes, like adding an ending or changing the internal vowels. The input to the rules are lexemes and features like person or number that the speaker wants the result to carry. This solves the first and the second problems of the Item-and-Arrangement model, and the third problem about meaningless morphemes is also eliminated because the rules are free to add morphemes that bear no specific meanings to meet, say, phonological constraints.

The Item-and-Process model is not without problems. It does not explain why most of the time, the Item-and-Arrangement model does a good job. In other words, it seems the Item-and-Process model often overproduces. Maybe it is a good idea to add some of the affixes to the lexicon. Nor does the Item-and-Process model explain why sometimes affixes – i.e. functional morphemes – seem to be somehow “real”, in marginal cases like [\(11\)](#).

6.2.3 The Word-and-Paradigm model

The Word-and-Paradigm model is the modern revival of the framework of traditional Latin (and Greek) grammar. It regards words – and sometimes periphrastic inflection forms like *have been working*, so to be precise, a better term for the Word-and-Paradigm model is Item-and-Pattern – as the smallest units in grammar, carrying the information of the stem and (morphosyntactic, not inherent) features like case and number, and all of the information is packaged into *one* form, without real compositional inner structures. Words differ only in features they carry form a concrete paradigm, and generalizations can be made to extract abstract paradigms (like Latin conjugations)

or schemas or analogical rules from concrete ones. The morphology of a language is represented by a set of prototypical words and analogical rules generalized from them. When a new word is acquired, it is inclined tentatively according to the analogical rules (or in other words, schemas). In the Item-and-Arrangement and the Item-and-Process models, the paradigm is epiphenomenal, while in the Word-and-Paradigm approach, it is in the central stage.

The basic idea of Item-and-Pattern morphology resembles the overall picture of construction grammar, though the former has nothing to do with the innateness debate, because the possible ways people make generalization about word paradigms may be – and are likely to be – limited by domain-specific factors. (People never encode grammatical categories into things like the Morse code, for example.) What really makes the Word-and-Paradigm approach special is psychological reality. If we are just talking about producing all and only grammatical utterances, then the Item-and-Process model (and the Item-and-Arrangement model plus abstract morphemes) is equivalent to the Word-and-Paradigm model.¹² But there are some evidences suggesting paradigms are psychologically real. Back-formation cannot be easily explained, for example, without assuming speakers do not have paradigms in their brains.

Still, the Item-and-Pattern model is not universally recognized, since it is unable to describe derivational morphology, and we know there is no clear boundary between inflection and derivation. And the old problem faced by the Item-and-Process model – which the morpheme-based theory works well in many cases – is not answered, either.

6.2.4 What to do

The Item-and-Arrangement model catches the overall picture of morphology in many languages but is unable to account for nonconcatenative morphology easily. The Word-and-Paradigm or Item-and-Pattern model is strikingly powerful to describe nonconcatenative morphology and implies the psychological reality of paradigms but is unable to catch the psychological reality of morphemes or explain why morpheme-based analysis works quite frequently. The Item-and-Process model is somehow in the middle, which (under some adjustment) emphasizes on the significance of morphemes and has the same productivity with the Item-and-Pattern morphology, but cannot explain things like back-formation that implies the existence of paradigms.

What is actually used in grammar writing is a mixture of the three models. Dixon argues strongly for the Item-and-Process model in BLT § 3.13. But it is quite often that terms like *simulfix* (“affix of vowel change”), which implies abstract morphemes that guide nonconcatenative processes, are widely used in grammar writing. The Word-and-Paradigm approach is largely ignored in descriptive linguistics (BLT does not mention it), though it is said that in a small corpus situation, the Word-and-Paradigm approach is more efficient for at least knowing something about a language (Copot et al., 2022). This is possibly because of the classical structuralist idea that psychological reality does not really matter in a descriptive grammar. The term *paradigm*, though, frequently appears in grammars.

7 Coordination

7.1 Clausal coordination

7.2 Coordination in NPs

8 Supplementation

References

Anne Abeillé and Danièle Godard. *La grande grammaire du français*. Éditions Actes Sud, 2021.

¹²There may be mismatches about specific models, like for fusional languages, Word-and-Paradigm models work well, while a Item-and-Process model in which a process corresponds to only one grammatical category breaks down.

- David Adger. Vso order and weak pronouns in goidelic celtic. *Canadian Journal of Linguistics/Revue canadienne de linguistique*, 42(1-2):9–29, 1997.
- David Adger and Gillian Ramchand. Dialect variation in gaelic relative clauses. *Rannachadh na Gàidhlig*, 3:179–192, 2006.
- Stephen R Anderson. Words and paradigms: Peter h. matthews and the development of morphological theory. *Transactions of the Philological Society*, 115(1):1–13, 2017.
- Luigi Andriani, Jan Casalicchio, Francesco M Ciconte, Roberta D’Alessandro, Alberto Frasson, Brechje van Osch, Luana Sorgini, Silvia Terenghi, Matt Coler, and Andrew Nevins. Documenting italo-romance minority languages in the americas. problems and tentative solutions, 2022.
- Ronald Ernest Batchelor and Malliga Chebli-Saadi. *A reference grammar of French*. Cambridge University Press, 2011.
- Ronald Ernest Batchelor and Miguel Ángel San José. *A reference grammar of Spanish*. Cambridge University Press, 2010.
- Ignacio Bosque. *Gramática descriptiva de la lengua española: Entre la oración y el discurso. Morfología*, volume 3. Espasa, 1999.
- Benjamin Bruening. The lexicalist hypothesis: Both wrong and superfluous. *Language*, 94(1):1–42, 2018.
- Yuen Ren Chao. *A grammar of spoken Chinese*. ERIC, 1965.
- Zhishuang Chen. *Mandarin directional serial verb constructions: A constructionist approach*. PhD thesis, University of York, 2016.
- Chris Collins and Henry Honken. The plural prefix in kx’a, !ui, and taa. In *Proceedings of the 5th international symposium*, 2014.
- Maria Copot, Noah Diewald, Stephanie Antetomaso, Micha Elsner, et al. A word-and-paradigm workflow for fieldwork annotation. In *Proceedings of the Fifth Workshop on the Use of Computational Methods in the Study of Endangered Languages*, pages 159–169, 2022.
- Violeta Demonte. *Gramática descriptiva de la lengua española: Sintaxis básica de las clases de palabras*, volume 1. Espasa Calpe Mexicana, SA, 1999.
- RM Dixon. Basic linguistic theory. volume 3: Further grammatical topics, 2012.
- Robert MW Dixon. *Basic linguistic theory volume 1: Methodology*, volume 1. OUP Oxford, 2009.
- Robert MW Dixon. *Basic linguistic theory volume 2: Grammatical topics*, volume 2. Oxford University Press on Demand, 2010.
- Alberto Frasson, Roberta D’Alessandro, and Brechje van Osch. Subject clitics in microcontact: A case study from heritage friulian in argentina and brazil. *Heritage Language Journal*, 18(1):1–36, 2021.
- Dianne Friesen. *A grammar of Moloko*. Number 3 in African Language Grammars and Dictionaries. Language Science Press, Berlin, 2017. doi: 10.5281/zenodo.824016.
- Nadine Grimm. *A grammar of Gyeli*. Number 2 in Comprehensive Grammar Library. Language Science Press, Berlin, 2021. doi: 10.5281/zenodo.4737370.
- Daniel Harbour, Laurel J Watkins, and David Adger. Information structure, discourse structure, and noun phrase position in kiowa. *International journal of American linguistics*, 78(1):97–126, 2012.

- Charles F Hockett. Potawatomi iii: The verb complex. *International journal of American linguistics*, 14(3):139–149, 1948.
- Chu-Ren Huang and Dingxu Shi. *A reference grammar of Chinese*. Cambridge University Press, 2016.
- Rodney Huddleston and Geoffrey K. Pullum. *The Cambridge Grammar of the English Language*. Cambridge University Press, 2002. doi: 10.1017/9781316423530.
- Guillaume Jacques. *A grammar of Japhug*, volume 1. Language Science Press, 2021.
- William Matchin and Gregory Hickok. The cortical organization of syntax. *Cerebral Cortex*, 30(3): 1481–1498, 2020.
- Amanda L Miller, Johanna Brugman, Bonny Sands, Levi Namaseb, Mats Exter, and Chris Collins. The sounds of n—uu: Place and airstream contrasts. *Working Papers of the Cornell Phonetics Laboratory*, 16:101–160, 2007.
- Ignacio Bosque Muñoz, Violeta Demonte Barreto, Fernando Lázaro Carreter, and María Victoria Pavón Lucero. *Gramática descriptiva de la lengua española: Las construcciones sintácticas fundamentales. Relaciones temporales, aspectuales y modales*. Espasa-Calpe, 2000.
- Randolph Quirk. *A comprehensive grammar of the English language*. Pearson Education India, 2010.
- Gillian Ramchand and Peter Svenonius. Deriving the functional hierarchy. *Language sciences*, 46: 152–174, 2014.
- Matthew A Tucker. The morphosyntax of the arabic verb: Toward a unified syntax-prosody. 2011.
- Laurel J Watkins and Daniel Harbour. The linguistic genius of parker mckenzie’s kiowa alphabet. *International journal of American linguistics*, 76(3):309–333, 2010.
- Joshua Wilbur. *A grammar of Pite Saami*. Number 5 in Studies in Diversity Linguistics. Language Science Press, Berlin, 2014. doi: 10.17169/langsci.b17.34.