Field guide to the Minimalist Program

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Abstract

In the same way that an ornithological field guide helps an new birder identify the birds they encounter, we hope that this paper can help a newcomer to Chomsky's Minimalist Program (MP) navigate the basics of this approach to syntax. This is an introduction to the MP for students, and perhaps for linguists who know about syntax (even generative syntax) but don't know the Minimalist Program in particular. It is written especially for those who need some relevant background to navigate research papers they are trying to read. We specifically wrote this with students of the Claremont Colleges in mind, where we use it to transition between an introductory course using Carnie's (Carnie) text to an advanced syntax course where we read original research written within a Minimalist framework.

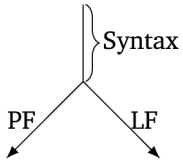
NB: this is an incomplete draft, lacking in some places citations that are desirable, and some additional sections that are intended to be included but are not readable yet, e.g. on Distributed Morphology and on cartography.

1 Introduction

This paper provides an introduction to the Minimalist Program (MP) as proposed by Chomsky (2000, 2001) and developed in subsequent work by Chomsky and many other generative syntacticians. It is not intended to be a defense of the MP or a full technical foundation;[1] rather, it describes the working assumptions that researchers using the MP as an analytical framework often make. The primary goal of this paper is to communicate the foundational concepts of the MP as currently practiced. In this way, we view it as a bridge between introductory courses on generative syntax and current research in the MP. So, this paper is written for individuals who are familiar with syntax but do not have formal training in the MP in particular. We specifically wrote this with students of the Claremont Colleges in mind, where we use it to transition between an introductory course using Carnie's (2013) text to an advanced syntax course where we read original research written within a Minimalist framework.

Against this backdrop, we begin by outlining the overall goals of the MP. According to the MP, syntax is a system that creates two outputs: sound and meaning. These outputs are known as phonological form (PF) and logical form (LF), respectively.[2] The relationship between syntax, PF, and LF can be schematized as an "inverted Y" shown in (1).

(1)



In this model, syntax mediates the connection between sound and meaning. Syntactic processes take lexical items from the lexicon and combine them to generate a structure, which feeds into PF and LF upon Spellout (i.e. the point in the diagram where syntax branches into PF and LF). Consequently, the MP aims to reduce the proposed mechanisms of syntax to those that are strictly necessary to explain this connection (see §3 for more discussion). Chomsky formalizes this idea as the strongest minimalist thesis (SMT), which "hold[s] that language is an optimal solution to such [interface] conditions" (Chomsky 2001: 1). This relatively pared-down approach can be viewed as a response to the increasingly complex principles and parameters proposed under models of X'-syntax (e.g. Government and Binding theory).[3]

[1] For those interested in writing along these lines, we suggest consulting Adger (2003); Hornstein et al. (2006); Allott et al. (2021), among others.

[2] At points you will see PF described as the sensorimotor interface (SM), and LF described as the conceptual-intentional (CI) interface, following Hauser et al. (2002).

[3] See Hornstein et al. 2006 for a full discussion of the transition from GB to the MP.

In the aim of simplicity, Chomsky offers the Uniformity Principle: "In the absence of compelling evidence to the contrary, assume languages to be uniform, with variety restricted to easily detectable properties of utterances" (Chomsky 2001: 2). As a working hypothesis, this maxim assumes that all languages have the same foundational/underlying structure, with strong restrictions on what kinds of differences may actually occur between languages. A famous proposal that is fundamentally related to the Uniformity Principle is the concept of Universal Grammar (UG; Chomsky 1965, 1981, 1995b), which states that all humans have an innate capacity for language. Given this shared innate linguistic knowledge, human languages show many important similarities in the structures that they do and do not permit. In this way, UG is often used to refer to two related, though slightly distinct concepts: 1) that humans are born with innate linguistic knowledge, and 2) that the range of possible variation in human languages is constrained by language-specific aspects of cognition.

While the Uniformity Principle falls out from the SMT quite naturally, actual languages are obviously not uniform: different languages have observably different syntactic profiles. Generative grammar traditionally attributes cross-linguistic differences to "parametric variation." Parameters on the traditional perspective are predetermined (innate) cognitive "switches" that children set in acquisition based on the language they are learning. So, an example of a parameter may be that heads either precede or follow their complements (e.g. V-OBJ vs OBJ-V). Nowadays syntacticians are more likely to adopt the view that parameters are simply points where UG underdetermines / underspecifies possible linguistic structures, so that it's possible for different languages to take different approaches.[4] So, taking our example above, the head-complement structure of verbs and objects would be related to UG, but the linear order is not specified, so languages can evolve either order.

Chomsky claims that "any such [cross-linguistic] variation is a prima facie imperfection" in that it introduces additional complexity into the linguistic system (Chomsky 2001: 2). Because the goal of the SMT is essentially to limit imperfections, the MP aims to develop a model of syntax that captures the full range of empirical phenomena while positing a restrictive account that limits the possible range of cross-linguistic variation. Especially in light of the explosion of recent work on understudied and endangered languages, a goal of much modern work in the MP is to understand how to account for a diverse array of syntactic phenomena using a limited set of syntactic tools. In this way, the grammatical system remains as close to 'optimal' as possible given the empirical landscape (on this interpretation of 'optimal,' which is the simplest set of cognitive properties necessary to explain the connection between sound and meaning in language).

With this background in mind, the remainder of this paper offers more information about how the MP is implemented in current work. It is structured as follows. §2 outlines the starting assumptions that this paper builds upon. In §3, we discuss the role that syntax's interfaces with PF and LF play in understanding what must be a part of core syntax. §4 describes the central grammatical mechanisms used in the MP. In §5, we summarize a few additional assumptions that often underlie current work in the MP. We briefly discuss generative frameworks that are in tension with the MP in §**??**. §6 concludes.

2 Starting assumptions: X'-syntax

We assume that readers of this paper have some background knowledge about syntax, including topics like constituency, arguments vs. adjuncts, and basic structures in X'-syntax. In this section, we recap some key ideas as review. More advanced readers can skip this section, and we refer readers without the background summarized here to resources like Carnie (2013) and Haegeman (1994).

Key in generative syntax is the notion that sentences are not simply chains of words connected like beads on a string. Instead, sentences have internal structure. For example, English speakers likely have intuitions about which words go together and which ones do not in (2).

(2) Amelia devoured a sandwich in the park.

Devoured a sandwich seems like a reasonable chunk of the sentence, whereas *sandwich in the park* does not. This intuition arises due to constituency, where a constituent is a part of sentence whose components work together as a unit. (3) lists some constituents from (2). Note that a constituent can be a single word or a collection of words.

[4] An excellent recent treatment is Roberts (2019), as well as many of the references cited therein.

(3) a. [$_{DP}$Amelia]
b. [$_{DP}$a sandwich]
c. [$_{VP}$devoured a sandwich]
d. [$_{PP}$in the park]

These constituents are phrases that receive labels based on whichever word is the head of the phrase. Speakers often have intuitions about constituency in a sentence, but there are also diagnostics that we can use to test for constituency. Some example tests for the constituent *a sandwich* are shown in (4). Generally, these diagnostics check whether or not the relevant chunk of the sentence functions as a unit. If these tests are not familiar to you, we refer you to the resources listed above.

(4) a. Question formation: What did Amelia devour in the park? *A sandwich.*
b. *Pro*-form substitution: Amelia devoured *it* in the park.
c. *It*-clefts: It's *a sandwich* that Amelia devoured in the park.

The DP *a sandwich* acts as a unit in each of these diagnostics; it serves as a stand alone answer to a question in (4a), is replaced by a single pronoun in (4b), and surfaces as the pivot of a cleft in (4c). Given these behaviors, we conclude that it is a constituent.

Importantly, not all constituents are created equal; some constituents seem more essential to the sentence than others. For instance, removing the DP *a sandwich* from (2) results in ungrammaticality.

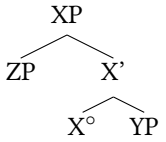
(5) * Amelia devoured ~~a sandwich~~ in the park.

By contrast, the PP *in the park* can be deleted from (2), which removes some information from the sentence but does not give rise to ungrammaticality.

(6) Amelia devoured a sandwich ~~in the park~~.

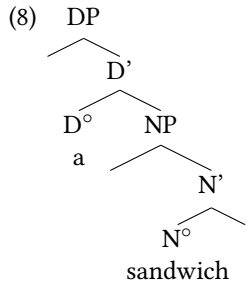
These different behaviors between the DP *a sandwich* and the PP *in the park* are due to the distinction between arguments and adjuncts. Arguments are phrases that serve to complete the meaning of a verb or noun. For instance, the DP *a sandwich* answers the essential question "What did Amelia devour?" and, in so doing, provides key information about the verb *devour*. Verbs assign semantic roles (also known as theta roles) to their arguments, which indicate the semantic relationship between the two elements. The argument DP *Amelia* in (2) receives the AGENT theta role, since Amelia is doing the devouring, while the argument DP *a sandwich* receives the PATIENT (or THEME) theta role, since it is what is being devoured. Adjuncts, on the other hand, are phrases that provide information that is not strictly required by a verb or noun. The prepositional phrase (PP) *in the park* in (2) is an adjunct because it provides optional information about where the devouring took place.

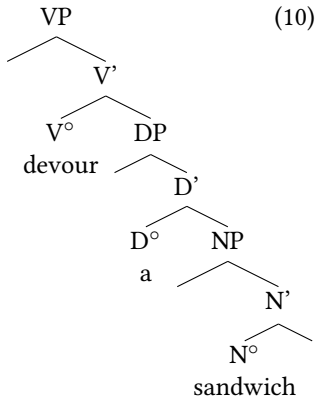
Constituency and the argument vs. adjunct distinction can be visually represented using a syntactic tree, which is a diagram showing how constituents in a sentence are related. In X'-syntax, phrases like those in (3) contain a head, complement, and specifier. Phrases have the general structure in (7), where the head supplies the label for the phrase.

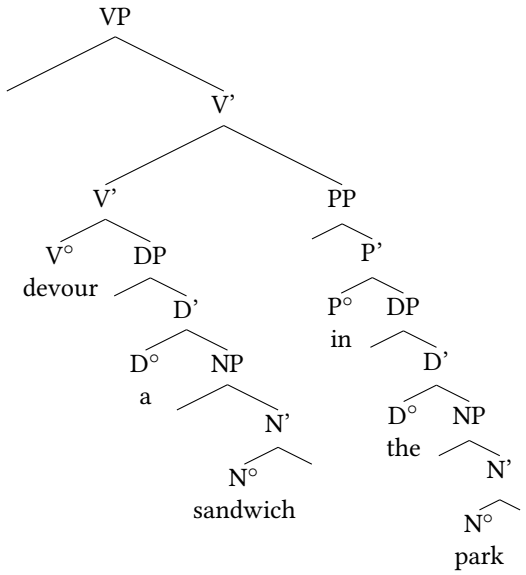
(7)


X° is the head of the phrase, providing the XP label. The sister of X is known as its complement, which is YP in (7). X' is the label for an intermediate level of structure; X' levels are phrasal in that they contain multiple distinct syntactic elements, but in X'-syntax they cannot stand on their own, they always project to an XP level. ZP in (7) is located in the specifier of XP—also called Spec,XP. Specifier positions are sisters to X' levels and daughters of XPs. In X'-syntax, phrases are always assumed to have heads, specifiers, and complements, even if these positions do not always contain phrases as in (7).

For concreteness, consider the derivation of (2). In (2), the verb's arguments are the subject DP *Amelia* and the object DP *a sandwich*. The structure of the DP *a sandwich* is given in (8). Following the schema in (7), both the NP *sandwich* and the DP *a sandwich* must contain a head, specifier, and complement.

(8)


(9)


(10)


Here, N° does not take a complement and Spec,NP is empty, though these positions are both still present in the representation because heads in X'-syntax always project a full XP. The NP *sandwich* is the complement of D, while Spec,DP remains empty. The VP *devoured a sandwich* has the structure in (9). V° takes as its complement the object DP *a sandwich*, and we leave Spec,VP empty for the moment (but more on this below). The way in which these structures nest together as we build from NP to DP to VP hints at how syntactic trees indicate constituency; any word or group of words dominated by a given node in the tree comprise a constituent. This definition provides a structural explanation for the more intuitive understanding of constituency discussed earlier in this section.

The metaphor of a family tree is often used to describe structural relationships in trees (both in syntax and in other fields). So in (10), V° is the sibling of DP. Both V° and DP are children of V', and V' is the parent of V° and DP.[5]

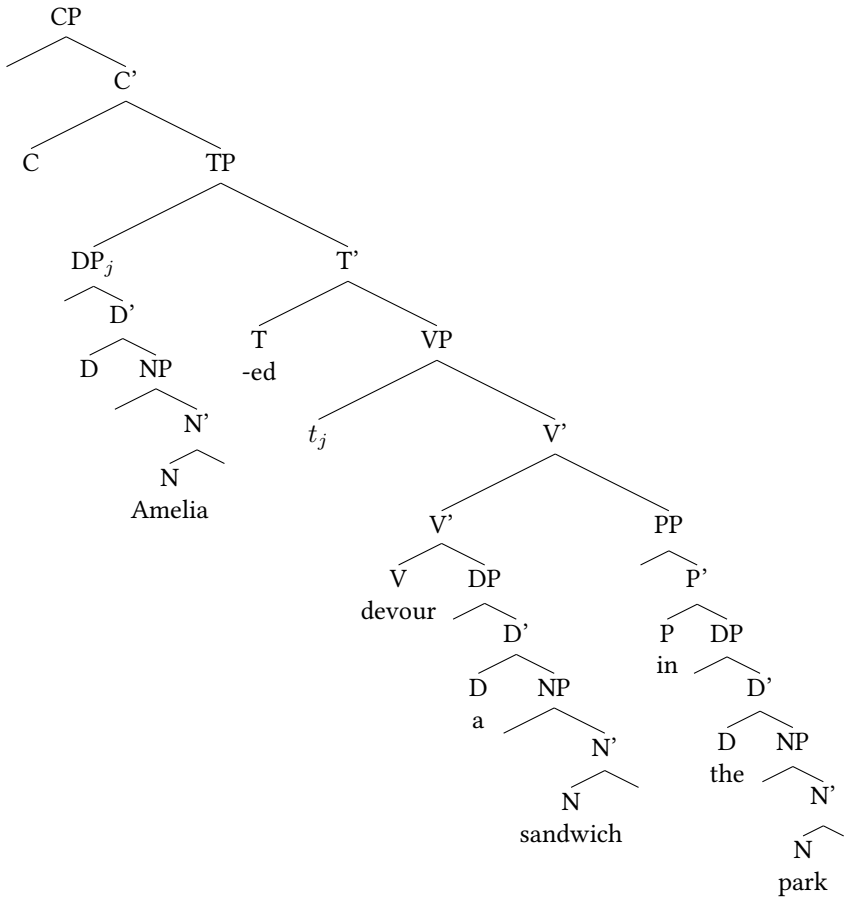
We can also observe the argument vs. adjunct distinction in a syntactic tree based on where in the structure a phrase is located. Arguments are either complements to heads or in specifier positions. This can be seen in (9) for the argument DP *a sandwich*, which is the complement to V. Adjuncts, on the other hand, are sisters to X' projections. For instance, the PP adjunct *in the park* attaches to the structure in (9) as seen in (10). The PP *in the park* is neither the complement of V° nor in Spec,VP, as these positions are reserved for arguments. Instead, it is adjoined to V' and dominated by another V'. In this way, adjuncts provide motivation for X' levels; without these intermediate projections, adjuncts would be indistinguishable from phrases in specifier positions.

The full structure is shown in (11). As argued by a large range of work (Koopman and Sportiche 1991 and much that follows, which we won't summarize here), subjects start low in the structure (drawn here in Spec,VP) and in English move to Spec,TP.[6] This includes TP (Tense Phrase, which houses tense) and CP (Complementizer Phrase, which houses whole-clause-related information). In our English example here, the DP *Amelia* moves to Spec,TP. In X'-syntax, movement is marked using traces; the original position of a moved element contains a silent trace—written as t—that shares an index with the moved element in its derived position. In (11), t_j in Spec,VP represents the trace of the moved subject, which itself is in Spec,TP.

[5]Traditionally in linguistics, the field has used female-gendered terms for these structural relationships (sister, mother, daugher), for reasons unknown to us. We use the gender-neutral terms here.

[6]Current assumptions on the base positions of subjects are slightly different: read on

(11)



Within Government and Binding Theory (Chomsky, 1981; Haegeman, 1994) there are two levels of representation within syntax: D-structure (the base position of elements) and S-structure, the position of elements after movmement. Operations/conditions in GB could be posited as applying to either of these levels of representation.

On this approach, differences in word order between languages are accounted for by movement of different constituents to different structural positions. Likewise, both within and across languages there is variation in the particular functional projections that occur in any given sentence.

3 A deductive/reductive approach: Interfaces

The structures in §2 might seem quite clunky to you; there are several empty complements and specifier positions represented in the structure, which do not seem to serve any syntactic purpose beyond satisfying the general X' schema in (7). This clunkiness speaks to a larger issue surrounding theories of X' syntax—as languages beyond English, French, and other widely spoken European languages were studied, models of X' syntax became increasingly complex in ways that seemed cognitively unrealistic. In light of this, simplification was a key goal in the development of Minimalism, in particular as discussed in Chomsky (1995b, 2001). Work in the MP aimed to streamline the syntactic machinery to just the components that were strictly necessary. For instance, PF and LF were deemed conceptually necessary in a theory that models the mapping between sound and meaning; without these two components, there would be neither sound nor meaning. However, distinctions between deep structure and surface structure in the syntax lacked this conceptual necessity, despite their utility in capturing empirical patterns found in language. Nevertheless, there was no *a priori* reason why syntax required two levels of representation.

Against this backdrop, Chomsky used PF and LF as starting points to understand what was essential in the narrow syntax and what was not. In short, if the job of the syntax is to create a structure to feed PF and LF, then a Minimalist syntax should contain only those components that are necessary for producing these sound-meaning

pairs. Rather than making use of deep structure and surface structure, the MP eliminates levels of representation apart from syntax's interfaces with PF and LF. Nevertheless, the syntactic output that feeds PF and LF is still subject to constraints, motivated by a need for interpretability across the syntactic, phonological, and semantic components. These interface constraints ensure that the syntactic objects sent off to PF and LF are interpretable by these cognitive systems. In this way, interface constraints are conceptually necessary to ensure interpretability, even within a Minimalist grammar.

Chomsky then suggests that if syntax can be simplified to just the interface conditions that are necessary to ensure interpretability across grammatical modules, then human linguistic competence is something like an optimized system. Computational burden is reduced for the narrow syntax, since there are just interface conditions rather than multiple distinct levels of representation. However, a consequence of the grammatical architecture described here and schematized in (1) is that there is no direct connection between PF and LF. This means, for example, that any semantic information with phonological encoding must be mediated by the syntax, since LF cannot communicate directly with PF. These types of semantic effects are common cross-linguistically, including, for example, English focus intonation. In corrections like (12) where the speaker of (12b) corrects the speaker of (12a) regarding who baked the cake, the DP *Allegra* is pronounced with a particular intonation—indicated with small caps.

(12) a. Did Wesley bake the cake?
b. No, ALLEGRA baked the cake.

This intonation serves the semantic purpose of highlighting the fact that Allegra baked the cake, rather than Wesley or any other salient individual in the discourse. This special pronunciation, then, carries semantic meaning, even though there is no way for PF and LF to communicate given the architecture in (1). Therefore, this semantic information must be encoded in the syntactic structure that serves as input to PF and ultimately gets pronounced as the intonation in (12b). Given such phenomena, some researchers argue that there should be a direct connection between PF and LF (see e.g. Haidou 2004), though the architecture in (1) is by far the most widely assumed.

4 Core Grammatical Mechanisms of the MP

According to the MP, only three core mechanisms are at work in the derivation of a given sentence—namely Merge, Move, and Agree. These mechanisms are discussed one-by-one in the following subsections.

4.1 Merge and bare phrase structure

Merge is the syntactic operation that takes two objects from the Numeration (i.e. the set of lexical items that ultimately become part of the sentence) and combines them to build syntactic structure. According to Chomsky (2001), Merge is the only operation that "comes for free" in our theory, in that it is strictly necessary for structure building (i.e. it is not an arbitrary stipulation to include it). Since the primary goal of syntax is the creation of an output that can feed PF and LF, Merge can be thought of as a bare necessity of the syntax. Merge takes two syntactic objects and combines them to create one larger syntactic object; we use the '+' here informally to annotate a Merge operation, and $\rightarrow$ to informally annotate the outcome of the Merge operation.

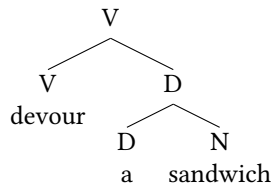
(13) $\alpha + \beta \rightarrow [_{\gamma}\ \alpha\ \beta\ ]$

Chomsky describes two flavors of Merge: external Merge and internal Merge. External Merge involves adding new material to the growing structure, whereas internal Merge involves copying an already-incorporated constituent and Merging the copy in a new (higher) position. Although these two processes can be collapsed into a single Merge operation, most Minimalists use different descriptors for these two types of Merge. External Merge is often simply referred to as "Merge", while internal Merge is commonly informally referred to as "Move," or an instance of movement (see §4.3).

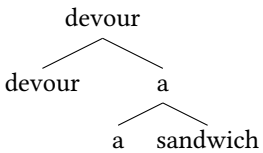
The structure created by Merge follows the principles of Bare Phrase Structure (BPS), which is a proposal within the MP that emphasizes getting by with a bare minimum of syntactic machinery (Chomsky, 1995a). BPS differs from X'-syntax in how phrases are labeled and with respect to which projections are present in any given structure. Like in X'-syntax, the structure generated by Merge receives a label from one of its constituent syntactic

objects—whichever is the head of the developing phrase.[7] However, BPS makes no fundamental distinction between X° vs. X' vs. XP levels. Instead, all nodes within a phrase are directly labeled based on their content. For example, BPS representations of the VP *devoured a sandwich* is shown in (14), which makes for a useful comparison with the X' representation in (9). At times representations like (14a) will be used, but even more faithful to a strict interpretation of bare phrase structure is (14b), where each node is labeled directly based on its content.

(14) a.

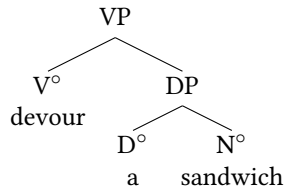


b.

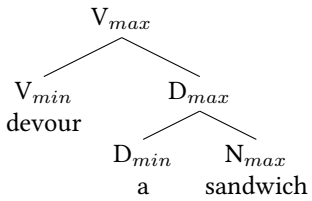


The structures in (14) do not distinguish between V° vs. VP or D° vs. DP because, in BPS, this distinction has no real theoretical standing. Heads, intermediate projections, and maximal projections all have the same structural status. Nevertheless, most syntacticians working within the MP find it easier to process trees when the different levels of structure are labeled differently (e.g. such labeling makes it easier to talk about particular parts of the structure). For this reason, many Minimalist works will still draw trees as in (15), which shows a few different ways of representing structures in BPS.

(15) a.



b.

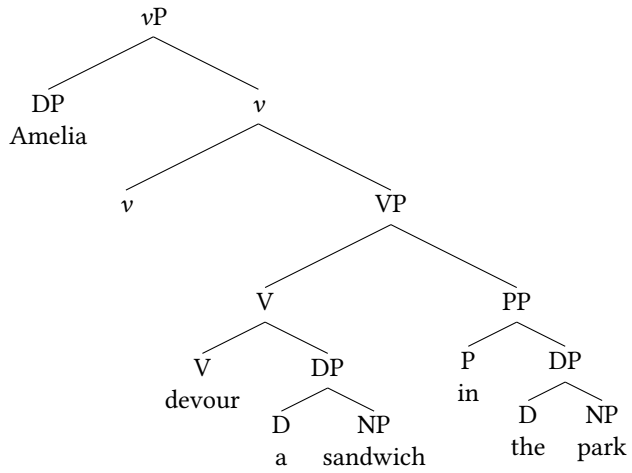


These diagrams use different labels for heads and phrases including X° vs. XP and X_{min} vs. X_{max}. The structures in (15) and (14) are not theoretically identical, but for most analyses of most phenomena there is no difference between the labeling choices in (15) and (14), and they can generally be read as equivalent. For simplicity, we adopt the type of representation in (15a) throughout the rest of the paper.

A further difference between X'-syntax and BPS is the absence of empty specifier and complement positions in BPS. Following the X'-syntax schema in (7), all phrases must contain a complement position and a specifier position. However, this requirement results in there being quite a few empty specifiers in the syntactic structure, as seen in (11). BPS within the MP does away with these empty specifier positions because Merge is the only operation which builds structures, so it is impossible to generate the kinds of empty branching nodes in a structure that occurred in X'-syntax (bc Merge combines syntactic objects). This difference can be seen by comparing the X' representation of the VP *devoured a sandwich* in (9) with its BPS representation in (14). Here, none of the phrases project specifiers. Yet the BPS representation of the *v*P in (16) *does* contain a Spec,*v*P position, which houses the DP subject *Amelia* when it is first Merged. Note here a development that occurred around a similar time to the MP, the analysis of subjects structurally higher than VP, though still structurally lower than TP/CP. This is generally called "little-v," and "little-vP."

[7] Chomsky proposes a specific labeling algorithm to account for the labeling of phrases. We do not discuss this algorithm here, but see Bauke and Blümel 2017 for a recent collection of relevant work.

(16)

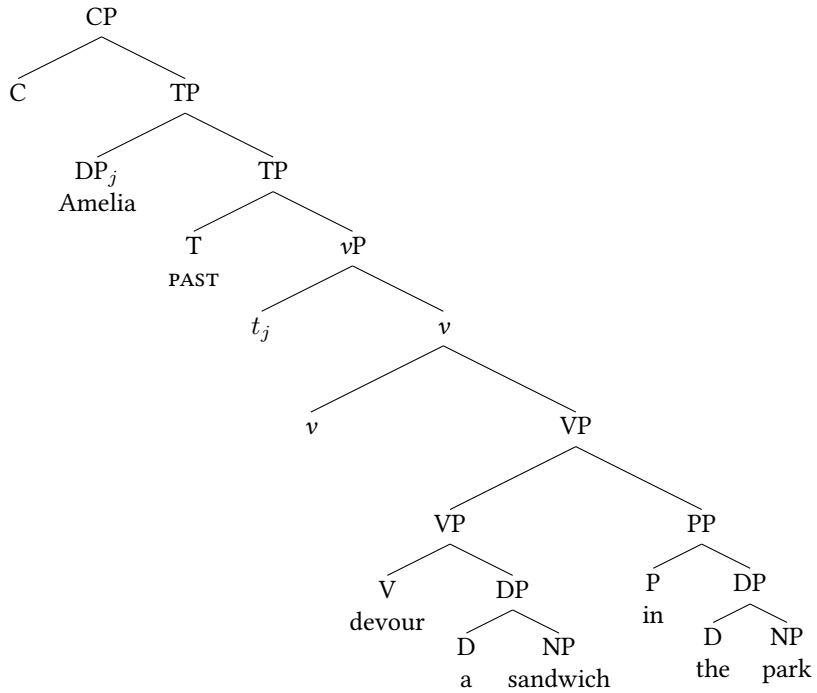


The representation in (16) is much simpler than its X' equivalent, which is a welcome outcome given the goals of the MP and BPS. Yet in eliminating X' levels, the distinction between arguments in specifier positions and adjuncts is collapsed. In X'-syntax, the difference between arguments in specifier positions and adjuncts boils down to whether the phrase is dominated by an X' or an XP; if it is sister to and dominated by an X', it is an adjunct, whereas, if it is sister to an X' and dominated by an XP, it is in a specifier position. Since BPS does away with X' levels, the structural difference between arguments and adjuncts is less clear. Instead, the argument vs. adjunct distinction is captured via selection in the MP. Arguments are selected for by the verb or noun whose meaning they complete, while adjuncts are not.

Finally, a Minimalist representation of (11) is offered in (18). The Numeration is the array (a set) that contains the lexical elements that will be drawn upon to build the structure. The structure is then constructed bottom-to-top, as Merge-based structure building requires.

(17) **Numeration**: {park, the, in, sandwich, a, devour, *v*, T:PAST, C}

(18)



To be specific about the derivation of the sentence in (18), the subject and object DPs and the adjunct PP are assumed to be constructed separately from the main tree (in separate 'workspaces'). To build this structure via

Merge, the verb and the DP object are merged to form VP, which merges with the PP becoming a larger VP. Little *v* then merges to create a *v*P, and the DP subject *Amelia* then merges with that *v*P. The T head merges, at which point the DP subject Amelia moves from Spec,*v*P to Spec,TP. C then merges with TP, creating the final CP root node. In this way, Minimalist structures are built "bottom-up," starting with the predicate (usually a verb) and merging arguments, followed by various functional projections like tense, aspect, mood, agreement projections, negation, etc (depending on the particular sentence).

4.2 C-command

Many structural configurations can be defined over the tree structures that are generated within this framework: the history of Government and Binding Theory consists of many of these (e.g. *government*, *m-command*, and many others). There is one that plays an especially large role in Minimalist theorizing, known as **c-command**.

(19) **C-command (definition)**
A node A c-commands another node B if B is the sibling of A, or if B is contained within the sibling of A.

To illustrate in the tree in (18), the T head c-commands its sibling (*v*P) but it also c-commands any node contained inside *v*P. So T c-commands the V head (*devour*), T c-commands the NP (*sandwich*), T c-commands the PP (*in the park*), and so on. c-command *can* be symmetric: for example, the T and *v*P nodes symmetrically c-command each other. But c-command can also be asymmetric: T c-commands V, but V does not c-command T.

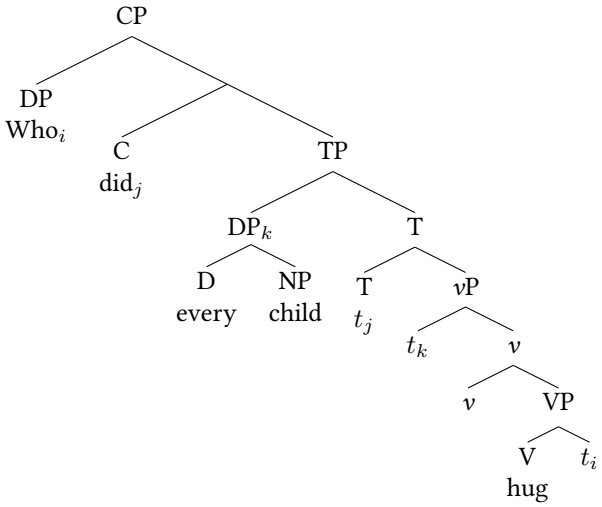
If c-command is unfamiliar to you, it can feel quite arbitrary - why choose that particular structural relationship to describe and name? The short answer is: human language syntax seems to care about the c-command structural relationship. There are a wide variety of phenomena that are well-described when referencing the c-command relationship. Minimalist structure building gives a hint about why: when a new syntactic element is merged into the structure—for example, T in (18)—all that exists in that structure is T and the structure it merged with, *v*P.

4.3 Move

The operation Move (an instance of Merge known as "internal Merge") moves an element in the syntactic structure from one position to another. This process is motivated (in part) by the fact that syntactic constituents are often interpreted in different positions from the ones where they are pronounced. For example, the *wh*-question in (20) involves movement of the *wh*-word *who* from the complement of the verb *hug* to Spec,CP, as illustrated in (21).

(20) Who did every child hug?

(21)



Evidence that *who* in (20) begins its derivational life lower in the structure comes from the fact that it can be interpreted in this low position; in particular, (22) is a valid answer to (20), where the value of *who* co-varies with the quantifier *every child*.

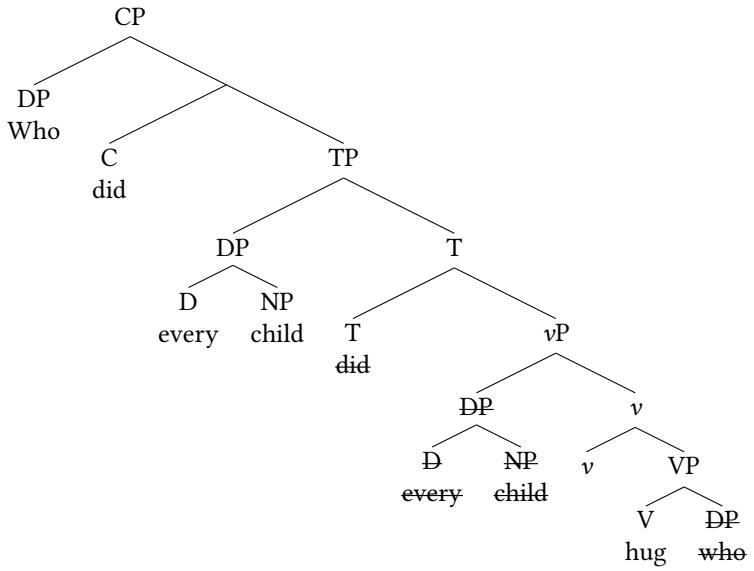
(22) Emily hugged Alex, Ben hugged Myriam, Kyle hugged Margaux, etc.

The existence of this co-varying reading indicates that *who* can be interpreted below *every child*, despite the fact that it is pronounced in a higher position. That is, the answer in (22) is based on an interpretation of the question that interprets *who* as dependent on the meaning of *every* (i.e. in the 'scope' of *every*).[8] Relative scope is usually indicative of structural height.

The phenomenon seen in (20) and others like it show that displacement of constituents from one position to another is a core component of syntax, regardless of the analytical framework. Nevertheless, movement is modeled differently in X'-syntax vs. in the MP. In X'-syntax, movement is represented using traces, where a trace is a silent element left behind in the former position(s) of a moved constituent. Traces share an index with the moved element in its derived position, which enables them to be interpreted appropriately. For instance, Spec,*v*P in (**??**) contains a trace with the index j—written t_j—because the subject DP *Amelia* moves from this position to Spec,TP. However, traces and indices do not fit neatly into the MP because they would necessarily be created/added over the course of the derivation. According to the MP, all elements that ultimately become part of the syntactic structure are present in the Numeration. Since traces and indices are merely a by-product of movement, they cannot be part of the Numeration and thus challenge this Minimalist assumption.

An alternative approach—introduced in Chomsky (1993) and developed in much subsequent work (e.g. Nunes 2004, Corver and Nunes 2007)—is the Copy Theory of Movement. In this framework, a moved element does not leave behind a trace, but instead leaves behind a full copy of itself. Then, in PF, it is determined which copy of the moved constituent ends up being phonologically realized. For instance, (23) provides an alternative representation of (21) with copies rather than traces, where unpronounced copies are crossed out.

(23)



This account of movement meshes better with the MP for two reasons. First, it does not involve the creation of new material like traces and indices over the course of the derivation. Second, it streamlines the syntax of movement by offloading some of the work to PF, since this module of the grammar actually determines which copy of the moved element is pronounced. Often the highest copy in a movement chain is phonologically realized; this is the case in (20). However, the Copy Theory of Movement predicts that, in certain cases, a lower copy or even multiple copies of a moved element could be pronounced and, in fact, this prediction is upheld. Kandybowicz (2008) argues that this is what is occurring in predicate cleft constructions in many languages, where the verb is doubled in emphatic cleft constructions.

(24) a. Nupe (Kandybowicz, 2008, 79)

[8]The contrasting interpretation where *who* is not dependent on the meaning of *every* (i.e. has higher scope than *every* is that captured by this rephrasing: "Who is the one that every person loves?" A question like that cannot be answered by (21).

Bi-ba Musa à ba nakàn o.
RED-cut Musa FUT cut meat FOC

'It is CUTTING that Musa will do to the meat (as opposed to say, cooking).'

b. Korean (Lee, 1995)

Ket-ki-nin Cheolswu-ka kel-ess-ta.
walk-ki-TOP Cheolswu-NOM walk-PST-DECL

'It is WALK that Cheolswu did.'

c. Russian (Abels, 2001)

Citat′ Ivan eë citaet, no nicego ne ponimaet.
read.INF Ivan 3rd.FEM.ACC reads but nothing not understands

'Ivan DOES read it, but he doesn't understand a thing.'

We will see some additional examples of copying constructions in (34) below. The Copy Theory of Movement offers various other benefits: it allows for analyses of covert movement, i.e instances where an element behaves in some way as if it has moved, but occurs without any obvious evidence of movement: this can be analyzed as pronunciation of a lower copy (CITATIONS). Alternatively, sometimes an element has moved but behaves (for some purpose) as if it is interpreted in its lower position: this is readily explained by interpretation of a lower copy (CITATIONS). Some researchers argue that clitic doubling involves the pronunciation of multiple copies within a single movement chain (e.g. Kramer 2014, Harizanov 2014).[9]

Given the empirical and theoretical advantages of the Copy Theory of Movement, most researchers working in the MP adopt this model. However, for simplicity, people often notate movement using traces, since including copies of moved elements can cause trees to become cluttered and hard to read. Unless the paper is explicitly about movement or some other process related to movement, you are likely to see traces included in syntactic trees. In this way, illustrations like the ones in (21) and (23) could both be found in modern Minimalist papers. As with the use of X vs. XP labels in BPS, we want to highlight that the choice to represent movement with traces is often for notational convenience rather than to make a claim about the nature of movement. The key takeaway here is that both types of annotations are found in Minimalist papers, although most researchers assume that movement actually leaves behind copies rather than traces.

The operation Merge does not require justification because it is necessary for structure building, which is a primary component of syntax. Since Move is a subtype of Merge (i.e. internal Merge), it also does require justification. However, there is still the related question of what motivates movement in a given structure. Are elements able to move freely or is movement somehow constrained? There is currently no single answer to these questions—even within the MP—but we sketch a few of them here. Some research assumes that movement happens to satisfy requirements on particular positions (e.g. Rizzi 2007, Rizzi and Shlonsky 2006, Rizzi and Shlonsky 2007). For instance, the classical EPP states that there must be a filled Spec,TP position in all English sentences; movement of subjects to Spec,TP, then, happens to check this requirement (Chomsky, 1981, 1995b). Other research assumes that movement simply happens to get constituents in the appropriate places in the structure. In effect, these people remain silent on what actually drives this movement. Finally, a third group holds that movement must be prefigured by Agree (see §4.4 for discussion of this operation). This approach offers a more constrained set of possible movements, since Move is only possible if Agree takes place. Because there is no consensus among Minimalists about what triggers movement, you will likely read papers that make any of these assumptions. Determining what drives syntactic movement is an open and productive research area in modern Minimalism.

4.4 Agree

The final operation is Agree, which results in features being "shared" between two elements within a sentence. For instance, verbs can show features of their DP arguments, as illustrated in (25). Here, the auxiliary verb *nasu* agrees in ϕ-features with the sentence's subject and object, which are optionally expressed as full pronouns.

[9] A 'chain' is a term used to refer to all of the copies of a moved element. Chains at some points have been theorized about as theoretical elements that have their own properties and constraints, though in most Minimalist work 'chains' is used as little more than a descriptive term for all the copies of a moved element.

(25) Basque (Arregi and Nevins 2012: 52)

(Su-**k**) (neu-∅) ikus-i **n**-a-**su**.
2SG-ERG 1SG-ABS see-PRF 1SG.ABS-PRES-2SG.ERG

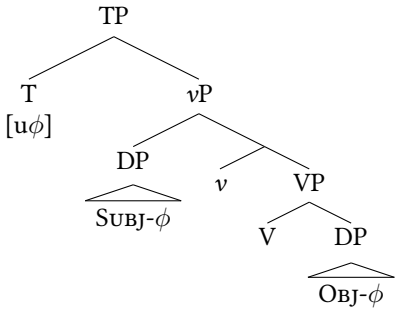
'You have seen me.'

Likewise, argument DPs can express features that they receive from the verb that introduces them. The case-marking on the pronouns in (25) demonstrates this point; the case suffixes *-k* 'ERG' and *-∅* 'ABS' which attach to the pronouns indicate the grammatical roles that the verb assigns to these arguments.[10]

To account for these instances of shared features, Chomsky (2000) proposes the operation Agree, in which certain elements enter the derivation with unvalued features that must be checked by other elements in the sentence with corresponding valued features.[11] Agree involves two components: a probe and a goal. The probe bears the unvalued features, while the goal has the corresponding valued features. For instance, suppose that the Basque auxiliary *nasu* in (25) is located in T, which is a common landing site for auxiliaries cross-linguistically. Given that this auxiliary shows agreement, we could say that T houses a [uϕ] probe, meaning that it has unvalued ϕ-features. This probe then looks in its search domain for a goal with valued ϕ-features that it can copy back to itself. Typically, a probe's search domain is its c-command domain, though there are variations on this basic set-up (see e.g. Spec-head agreement or cyclic expansion as in Rezac 2003). Once a probe finds a goal, it copies those features back to itself and, in so doing, its previously unvalued features become valued. This valuation process is often—but not always—spelled out as agreement morphology, like *n-* '1SG.ABS' and *-su* '2SG.ERG' in (25). Once a probe's unvalued features are valued, the probe becomes inactive.

In addition, Agree is subject to locality restrictions. It is not the case that a probe can Agree with just any goal; rather, it must Agree with the *closest* goal. Consider again a [uϕ] probe on T with the general structure in (26). Here, the subject and object both have ϕ-features, making them both potential goals for T's [uϕ] probe.

(26)



Despite the fact that both arguments have the correct types of features, the subject is structurally higher than the object, making it closer to the probe. In this way, only the subject is a viable goal for T's [uϕ] probe; Agree between T and the object is blocked by the presence of the intervening subject. This outcome is welcome in languages where agreement only tracks the subject. Subject-orientation falls out of the fact that the subject is closer to T than the object. Yet the story for Basque must be more complicated, since the auxiliary Agrees with the subject and the object. There are a number of ways to capture this pattern, though one possibility involves positing two [uϕ] probes in the structure: one on T and another on *v*. These probes Agree with different arguments, which enables exponence of both ergative and absolutive agreement morphology.

(Baker, 2008, 40) summarizes the Agree operation in the following way (modified slightly here for our current purposes):

[10] This analysis assumes that Case is assigned via Agree between an argument DP and the verb. While this is a common approach (see e.g. Chomsky 2000; Woolford 2006; Clem 2019), Case-via-Agree is not the only existing analysis of Case assignment. We do not engage the question of Case in any depth here, though it is area of active, ongoing research. See Woolford (2006), Bobaljik and Wurmbrand 2009 Oxford Handbook, Baker 2013 Cambridge Handbook, Polinsky and Preminger 2014 Routledge Handbook Baker (2015) Andrews 2017 WB companion, among others, for overviews of Case.

[11] In addition to unvalued features, Chomsky (2000) also discusses uninterpretable features, which must be deleted before the end of the derivation; otherwise, the derivation crashes. We focus only on unvalued features here, since most modern conceptions of Agree do without uninterpretability and the exact semantic criteria that define uninterpretability are unclear. For more discussion of (un)interpretable features, see CITE.

(27) F agrees with XP only if (XP has the features F is seeking, and):

a. F c-commands XP. (the c-command condition)

b. There is no YP such that YP comes between XP and F and YP has the sought-for features. (the intervention condition)

c. F and XP are contained in all the same phases. (the phase condition)

d. XP has an unvalued case feature. (the activity condition)

If you understand the c-command condition and the intervention condition, you are well-prepped to read most Minimalist papers in that respect. Unless you are reading a paper specifically about Agree-theoretic issues, you likely won't need to delve too deeply into the Activity Condition. The term 'phases' is probably new to you: we discuss phases in §4.5 below.

In subsequent work on Agree, various components of this basic mechanism are expanded upon or called into question. Béjar (2003) shows that Agree can be sensitive to only certain types of ϕ-features. In languages like Georgian and Algonquian, for instance, verbal ϕ-agreement shows a preference for 1st and 2nd person arguments over 3rd person ones. Béjar analyzes this preference as the result of a probe specified to look for [PARTICIPANT] ϕ-features, which appear on 1st and 2nd person arguments but not on 3rd person ones. Preminger (2014) pushes back against the idea that unvalued phi-features must be valued via Agree before the end of the derivation. Instead, he argues that certain syntactic operations like Agree are obligatory processes over the course of a derivation, although unsuccessful instances of Agree (i.e. those in which the probe does not find a goal) are tolerated—contra Chomsky (2000). Finally, Deal (2015) does away with unvalued features altogether, instead claiming that probes are specified in terms of interaction and satisfaction conditions. An interaction condition dictates which features the probe copies back to itself, while a satisfaction condition states which features cause the probe to stop searching. Because these sets of features are distinct, Deal is able to account for instances where the morphological realization of Agree involves more features than initially meet the eye.

The existence of agreement phenomena like those seen in (25) suggest that some operation like Agree must exist in natural language. However, this observation raises the question of *why* Agree is a core grammatical mechanism. Unlike Merge and, by extension, Move, Agree requires justification, since it is not a core structure building operation. What larger purpose, then, does Agree serve—beyond helping to derive the observed morphological patterns? Different analyses of Agree provide very different answers to this question. Most researchers assume that Agree deletes unvalued features, which would cause the derivation to crash if not deleted (e.g. Chomsky 2000, OTHERS). By contrast, Deal (2015) proposes a communication-based explanation, suggesting that Agree introduces redundancy into the grammatical system, which facilitates information transfer between speaker and addressee. In this way, answers to the question of "why Agree?" vary in whether they hinge on theory-internal requirements or on communicative need. At present, there is no consensus on why Agree is a core grammatical mechanism. But it is relatively non-controversial that it IS a core grammatical mechanism. And in fact, Agree-theoretic solutions have been proposed for a large range of phenomena that are not surface-identical to phi-feature agreement, such as binding (Reuland, 2011), information structure like topic and focus (Miyagawa, 2010), and control constructions (Landau, 2013), among many other things.

4.5 Phases

In the Minimalist Program, the operations Merge, Move, and Agree apply within restricted structural domains which are referred to as *phases* (Chomsky 2001). This means that a sentence is not just one constantly growing structure, but rather contains several distinct domains/chunks whose contents are not necessarily accessible to the other pieces. The boundaries between phases are determined by phase heads, which are syntactic heads that trigger Spellout of their complement once the phrase is complete. Widely assumed phase heads include D, *v*, and C, though there is some cross-linguistic variation in which syntactic heads are phasal; for instance, Chomsky (2008) argues that TP is never a phase, Deal (2016) argues that it is sometimes a phase (at least in certain languages), and Assmann et al. (2015) argue that it is always a phase. Thinking back to the "inverted Y" model in (1), we can situate phase boundaries at the split from syntax to PF and LF, because phase heads are what trigger Spellout, i.e. Transfer of material to LF and PF.

As with the other topics in this Field Guide, *phases* are subject to a broad range of empirical and theoretical

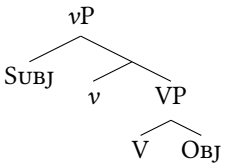
work. Citko (2014) offers a relatively thorough overview of the core theory for those who are interested. More recent work includes the ideas that phases may be of variable size (Bošković, 2014; Harwood, 2015), that phases correspond to prosodic units (REFERENCES from barry paper), that phases delimit the domain where calculations of coreference between anaphoric elements and their antecedents occurs (REFERENCES), among other things. In this small overview section we simply describe foundational assumptions about how phases operate, as well as some basic evidence for why syntacticians think that something like phases exists.

When building a syntactic structure, once the phrase headed by a phase head is complete, the complement of the phase head undergoes Spellout, which sends that structure to LF and PF. For instance, *v* is a phase head, which triggers Spellout of its complement—typically VP—once *v*P is complete (e.g. once the subject Merges in Spec,*v*P). After Spellout, phases are argued to be impenetrable (Chomsky 2001), meaning that subsequent syntactic processes cannot look into completed phases to perform syntactic operations. This requirement is known as the Phase Impenetrability Condition (PIC).

(28) Phase Impenetrability Condition (informal): Once the complement of a phase head has undergone Transfer/Spellout it is inaccessible to subsequent syntactic operations (like Move or Agree).

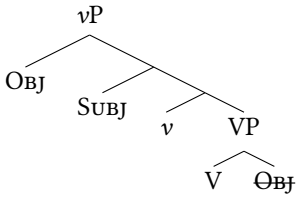
The only way a syntactic element can escape a phase and remain accessible later in the derivation is by being in the specifier position of the phase head, which is often referred to as an "escape hatch". For instance, consider again the *v*P phase schematized in (29), which triggers Spellout of the complement of *v*.

(29)

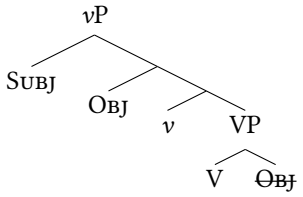


Once *v*P is completed, the contents of VP undergo Spellout and are no longer accessible to further syntactic operations; for instance, the object—which is the complement of V—is trapped and cannot be targeted for movement or agreement. In order to remain accessible later in the derivation, the object must Move to an additional Spec,*v*P position, as shown in (30), where the object can land above or below the subject.

(30) a.



b.



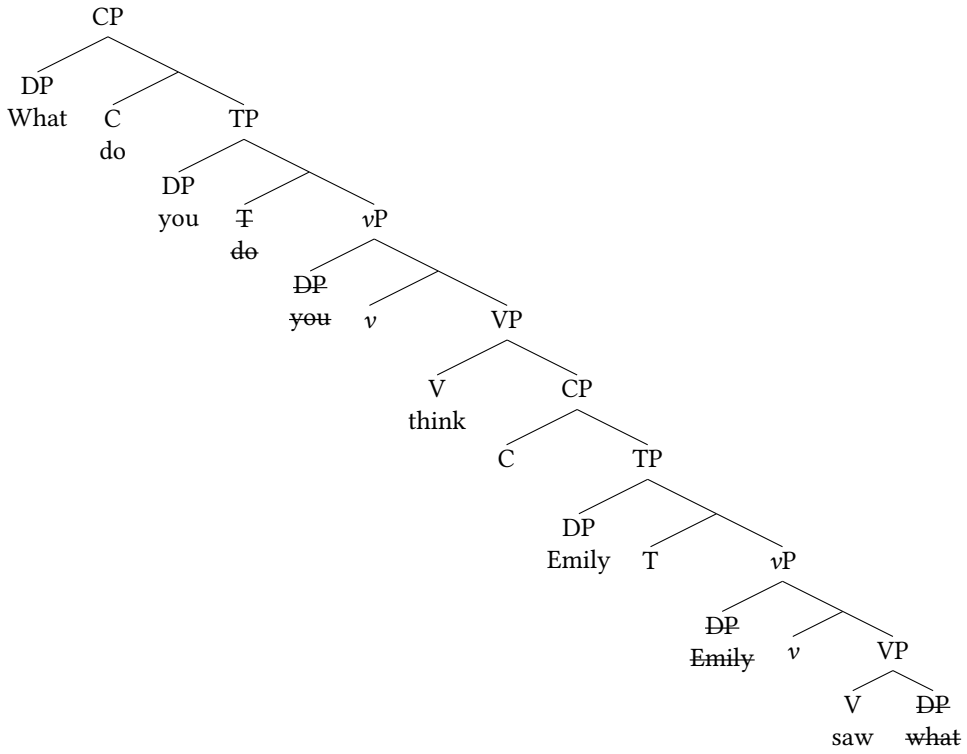
This type of object shift is common cross-linguistically and enables the object to escape the *v*P phase and participate in syntactic processes beyond those within *v*P. Analyses vary with respect to what motivates movement of the object to the Spec,*v*P escape hatch, but the types of structures in (30) are quite common in the literature (see van urk 2020 for an overview).

Empirical support for phases comes from successive cyclic movement, which is long distance movement that occurs in multiple steps rather than in one fell swoop. Let's consider an object *wh*-question that involves multiple clauses like the one in (31).

(31) What do you think Emily saw?

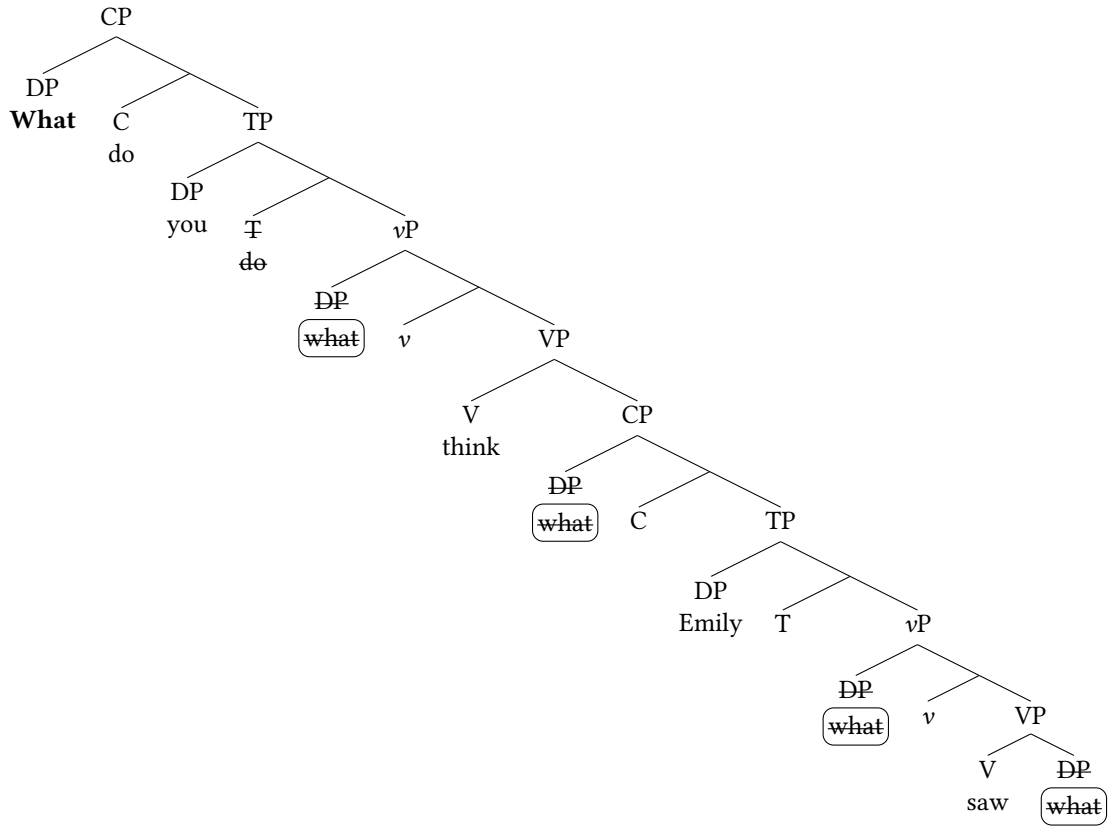
This sentence contains two clauses: the matrix clause with the verb *think* and the embedded clause with the verb *saw*. The *wh*-word *what* begins its derivational life as the complement of *saw*, since it is the object of this embedded verb, yet it ultimately surfaces at the beginning of the entire sentence, in a position argued to be matrix Spec,CP. However, according the the PIC, movement directly from the base generated position of *what* to matrix Spec,CP is impossible, since it crosses multiple phase boundaries—namely those associated with embedded *v*, embedded C, and matrix *v*. Therefore, if movement of *what* took place as in (32), the resulting structure would violate the PIC.

(32)



Yet there is evidence that movement of *what* to clause-initial position is not as in (32), but rather that *what* moves through various intermediate positions on its way to matrix Spec,CP, which are all phase escape hatches. This alternative movement path is illustrated in (33). For simplicity, lower copies of subjects in Spec,*v*P positions are omitted in (33), but a more proper derivation would include these lower copies as well.

(33)



In the alternative derivation shown in (33), *what* first Moves to embedded Spec,*v*P, thereby escaping the embedded *v*P phase. It then Moves to embedded Spec,CP and avoids being trapped within the embedded CP phase. Its next movement is to matrix Spec,*v*P to escape this phase and remain accessible later in the derivation. Finally, it Moves to matrix Spec,CP where is actually pronounced.

Although this movement chain is admittedly complicated, it does receive empirical support. Evidence for these intermediate movements is not particularly forthcoming in English, though certain German dialects provide clearer indication of this movement path. In some dialects of German as well as Frisian, Afrikaans, and Romani, the *wh*-word can actually surface multiple times in this type of question in precisely the intermediate Spec,CP position shown in (33).

(34) a. German (Felser 2004: 544)

Wen glaubst Du, **wen** sie getroffen hat?
who think you who she met has

'Who do you think she has met?'

b. Frisian (Felser 2004: 544)

Wêr tinke jo **wêr**-'t Jan wennet?
where think you where-that Jan resides

'Where do you think John lives?'

c. Afrikaans (Felser 2004: 544)

Waarvoor dink julle **waarvoor** werk ons?
wherefore think you wherefore work we

'What do you think we're working for?'

d. Romani (Felser 2004: 544)

Kas o Demìri mislenola **kas** i Arìfa dikhla?
who Demir think who Arifa saw

'Who does Demir think Arifa saw?'

In the examples in (34), various *wh*-words begin the derivation in the embedded clause and are pronounced twice in the sentence—in matrix Spec,CP at the beginning of the sentence and in embedded Spec,CP. While this pattern does not provide direct evidence for intermediate movement through Spec,*v*P positions, it does show that this long-distance *wh*-movement occurs in stages, which aligns with the predictions of the PIC.[12]

[12]This empirical pattern is also cited as support for the Copy Theory of Movement introduced in §4.3. If movement leaves behind a full copy of the moved element rather than just a trace, the type of multiple pronunciation seen in (34) is predicted to appear in at least some contexts; such

We see overt evidence of this kind of cyclic movement occurring at the edge of the *v*P phase as well, though this kind of evidence is much harder to come by than that for CP. In Dinka (Nilotic, Sudan) A'-movement leaves copies of the moved element at the edges of *v*P phase boundaries. In Dinka, these appear as pronominals agreeing in features with the moved element, which occur at the edge of every *v*P that is crossed in the course of the movement (bolded in the examples below). van Urk 2020: (43)

(35) *Movement in Dinka triggers pronoun copying at vP edge:*

a. Bòl à-cé̤ **ròo̤o̤o̤r** [$_{CP}$ cè̤ [$_{vP}$ **kêek** lâat]] tí̤i̤ŋ.
Bol 3S-PRF men PRF.3SG 3PL insult.NF see.NF
'Bol has seen the men he has insulted.'

b. Yè **kɔ̂ɔc-kó** [$_{CP}$ yí̤i̤ Bôl [$_{vP}$ **ké** luêeel [$_{CP}$ è̤ cí̤i̤ Áyèn
be people.CS1-which HAB.OV Bol.GEN 3PL say.NF C PRF.OV Ayen.GEN
[$_{vP}$ **ké** tí̤i̤ŋ]]]?
3PL see.NF
'Which people does Bol say Ayen has seen?'

This is just the kind of pattern we expect to arise in some languages if movement must proceed through phase edges.

Interestingly, this type of question with multiple pronounced copies of the moved *wh*-word is also a common error in child language acquisition in English—a language without the pattern seen in (34) in adult grammars. (36) provides an example of such a question generated by a 2-year-old in the process of acquiring English. A video of the child producing this sentence can be found here.

(36) What do you think what she said?

These types of errors do not show up in the data that English speaking children have access to when acquiring the language, since the construction is not found in adult English. Yet such mistakes are quite frequent in the speech of young English speaking children, which suggests that successive cyclic movement is a key property of human language; when children are acquiring language, they posit intermediate steps for long distance movement, even when there is no overt evidence for it in the target language. The need to posit these intermediate movements is driven by the existence of phases and the fact that they are impenetrable once completed.

5 Common Working Assumptions, "minimalist" and otherwise

In this section we briefly outline common working assumptions you will encounter reading papers couched in the Minimalist Program. These are not necessarily Minimalist (and, often, Minimalist work specifically on these issues sometimes reveals different conclusions). But the point of this paper, again, is to help readers navigate the literature written within this framework, so the subsections here are devoted to issues that we thought would be helpful in this regard.

5.1 Uniform Theta Assignment Hypothesis (UTAH)

A long line of research has shown that the underlying position of arguments of a predicate (AGENTS, RECIPIENTS, THEMES, etc) occur in consistent structural positions crosslinguistically (Perlmutter, 1978; Baker, 1988; Pesetsky, 1995; Baker, 1997, among many others)

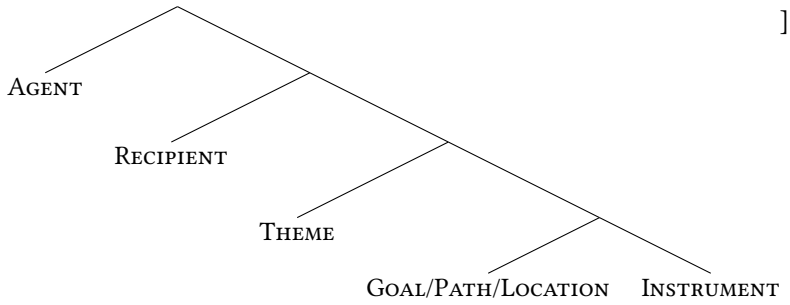
(37) **The Uniformity of Theta Assignment Hypothesis (UTAH)**: Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure. (Baker, 1988, 46)

The MP does away with the notions of D-structure and S-structure, so a Minimalist interpretation of UTAH would be that the first-merge positions of thematic arguments are uniform cross-linguistically. And while you

a pattern arises when lower copies are not deleted in the way that they are in English.

may see some variability in the specific labels of the projections introducing the arguments, you will see robust consistency in the hierarchical relationships between these thematic roles, reflecting consistent syntactic behaviors (regarding hierarchy) in their crosslinguistic behavior.

(38)



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These ideas touch on an extraordinary range of interesting questions in both syntax and lexical semantics, and the very brief discussion here is in no way sufficient as an introduction to relevant research questions about argument structure. But in the spirit of a field guide intended to equip you to read literature in the field, this description will serve you well.

5.2 Universal Grammatical Categories

As a general practice, most researchers in the Minimalist framework presuppose common grammatical categories in their work (NPs/DPs, VP/vP, TP, CP, etc), especially when working on issues that are not directly related to the nature of those categories. There is certainly some specific work on the universality of grammatical categories (Baker, 2003), and there are large literatures probing the question of whether particular functional projections are universally a part of particular constructions. For example, there is an extended debate about whether the DP hypothesis originating from Abney (1987) is universal or not (Bošković, 2005, 2008; Pereltsvaig, 2007; Salzmann, 2020; Köylü, 2021), and a number of analyses of raising and control constructions hinge on the presence/absence of CP (for a useful overview, see Boeckx et al. 2010 and Polinsky 2013). There are many such kinds of analyses; these are simply some examples. Yet, in work that isn't specifically probing those issues, the question of grammatical categories in any particular language is largely not addressed, and cross-linguistically common categories are commonly assumed without empirical defense.

This is commonly critiqued (Haspelmath, 2007, 2010; Dryer, 1997), with good reason: there is a lot of variation across languages in the language-particular properties of grammatical categories that we often assign the same label (e.g. determiners). Likewise, it is not clear that all categories actually occur in all languages. At the same time, when pressed regarding universals and the content of UG, it is unclear to us how many Minimalist syntacticians would specifically propose an innate inventory of grammatical categories. That is to say, many Minimalist syntacticians (certainly not all, but our impression is that it is many) would likely demur on this issue: while assuming common grammatical categories allows syntactic analysis to proceed for understudied languages, a lot of those analyses don't directly necessitate that a "adjective" or a "determiner" in those languages be exactly identical to what a "adjective" or a "determiner" is in another language.

Work like Wiltschko (2014) and Ritter and Wiltschko (2014) makes this explicit, claiming that what is universal is a categorization device and also domains of clause structure (the "Universal Spine"), but on this approach, specific grammatical categories are emergent properties of any given language. Wiltschko (2014) argues that what is universal is in fact a categorization mechanisms, and the cross-linguistic generalizations that emerge are the result of this "Universal Spine" (more on this below). So there is consistency across languages that the verbal/thematic domain is structurally lower than the inflectional domain. But the particular details of which categories a language contains (and what it's properties are) are, according to Wiltschko (2014) and Ritter and Wiltschko (2014), definitively NOT a part of UG and instead emerge from other more fundamental aspects of human experience and the historical development of a particular language.

To be clear, as Martin Haspelmath has repeatedly argued (references), *some* generative syntax work does make explicit claims of universality of categories. But for the most part, Minimalist work is silent on the issue and simply assumes cross-linguistically grammatical categories. For more on these questions, see the references cited

above; also, see references.

5.3 Parameters

The obvious challenge for any theory of human language capturing universal properties or tendencies is that there is extraordinary linguistic variation. Any theory of universal aspects of language must necessarily account for variation that occurs. The notion of a 'parameter' in generative syntactic work addresses that (obvious) fact about the world. A parameter encodes/explains points of variation across languages in generative syntactic theory.

Classical Principles and Parameters theorizing (Chomsky, 1981; Haegeman, 1994; Chomsky and Lasnik, 1993) assumed that parameters literally genetically encoded: a common metaphor is the notion of a series of cognitive 'switches,' like a lightswitch. The idea is that we are genetically encoded with a finite set of parameters (switches) that in aggregate can account for the full range of crosslinguistic syntactic variation (Baker 2001 offers a non-technical introduction to this classic conception of parameters). As children are exposed to linguistic data and acquire their first language(s), they encounter data that inform them as to how each parameter is set in their language(s). Classic proposals about parameters include whether or not a language allows null subjects and whether complements precede or follow heads (REFERENCES).

The collective conclusion of the field seems to be that this notion of parameters cannot be true: this has been most clearly articulated by Newmeyer 2005. Aside from the cognitive concerns about the viability of genetically-endowed parameters (REFERENCES), the more pressing concern is that almost all of the parameters that had been initially proposed have been shown to be non-universal: either languages are internally inconsistent on the relevant issues, or predictions of co-variation have not been shown to be true (that is, claims like "all languages that allow you to leave the subject unpronounced (i.e. null subject languages) have property X" have not held up). The most common modern assumption is that crosslinguistic variation in grammatical properties emerges at points that are underspecified by UG (REFERENCES). That is to say, UG is taken to determine some core properties of language, but leaves many properties unspecified, and it is those unspecified properties that allow for variation to evolve across languages.

Again, we are simply giving some quick-hit discussion of concepts that readers will encounter in the Minimalist literature. For more specific discussion of these points, an excellent starting point in the recent work is Roberts (2019), which cites a range of relevant recent work from Michelle Sheehan, Ian Roberts, and Theresa Biberauer (Biberauer and Roberts, 2017; Biberauer, 2019). (more REFERENCES here)

It is our sense of the current theoretical climate that not many Minimalist researchers are committed to innately-specific parameters, or at least are not committed to there existing a large number of them. So why still discuss parameters? Different researchers would probably give different answers. For some, the contemporary notion of a parameter is simply shorthand for a point of variation between languages, placeholder for discussing that variation. It also then opens the door for potentially discovering co-variation between languages being linked to abstract properties. It is often another way of saying that a property of language being proposed is not universal, even if the researcher is not arguing for a traditional cognitive parameter. So we still see plenty of discussion of parameters, though it is our sense that very few contemporary researchers (if any) assume a finite and comprehensive set of parameters that are genetically encoded in humans.

6 Conclusions

6.1 What do Minimalist syntacticians work on?

To close out the field guide, we can comment briefly on what readers might expect as they begin a foray into the original Minimalist literature. From a pure theory perspective, there is still work to be done to completely re-theorize known properties of language from the Government and Binding era from the base principles that the Minimalist Program makes available. This includes Binding Theory (the GB-era theory that accounts for the distribution of referring noun phrases, pronouns, and reflexives), raising vs. control constructions ('seems'-type verbs vs. 'hope'-type verbs), among others. While a lot of progress has been made, there are a lot of open questions, and not all aspects of previously-theorized aspects of syntax have been captured within the Minimalist Program.

In addition, vast amounts of work theorize about Minimalist theoretical constructs based on novel empirical

findings. To give an example, the theoretical construct of Agree is meant to capture how features are shared between two elements in the syntax. Agreement phenomena are pervasive in language, and while Agree as currently theorized captured a large amount of those data patterns, researchers continue to document examples at the margins that are not easily captured by the existing theory, and then use those examples to question whether the theory ought to be revised, or perhaps that the theory is correct and those examples are in need of re-analysis, or are only *apparent* counter-examples that can be shown to covertly be consistent with Agree. Work on (hyper)-raising, clitic-doubling, case, DP-licensing, and much more can be described in this way.

Overlapping with that kind of work is what Hornstein (DATE) calls 'philology' - essentially, investigating the properties of languages, but couched in the framework of the Minimalist Program. As the whole of generative syntax work has shown, human knowledge of language is much more complex than occurs on the surface - speakers of every language have systematic judgments about complex ranges of patterns in a wide range of constructions. The existence of a long history of generative research on syntax has produced a rich backdrop that new research proceeds in. So, for example, if a researcher wants to study object marking in a particular language for which it hasn't been researched before, the existing work in the field has produced a large range of questions that can be investigated in that language. A lot of Minimalist syntacticians are as much language researchers as they are theoreticians, and a lot of work in Minimalist syntax uses the framework as a discovery mechanism, an interpretive framework, and/or an analytical framework. That is, a lot of work may not be trying to advance any part of the theory particularly apart from expanding the empirical base of the field in some way that is theoretically relevant, even if that theoretical work is not yet resolved.

6.2 What is in Universal Grammar?

Chomsky's early work insisted that the Minimalist Program was a research program, and not a theory itself. In some ways this is not really true; the MP is treated as a theoretical framework by the field, analyses are given predictive force, evaluated against empirical evidence, and revised on the basis of that empirical evidence. But in another sense (CITATION) it is true that the MP is not a theory of language, in that it is not (yet) a coherent and exhaustive theory of human language that is itself falsifiable as a whole. This is perhaps not surprising, in that the empirical domain it addresses is so expansive, there is much work to be done. But it can often be overwhelming, as the suite of assumptions that a researcher adopts in order to analyze any particular puzzle will not be the same as adopted by other researchers, or even by that same researcher on another project. This arises because the entire field continues to probe the question of what concepts are in fact generalizeable to all languages, and which ones are not. But it can certainly make it very difficult to articulate unambiguously what the field takes to be a part of "Universal Grammar."

So what, exactly, does a Minimalist theoretician assume is a part of Universal Grammar? Even more to the point, what does a Minimalist syntactican even mean when they theorize about Universal Grammar? Following traditional assumptions, UG is a language-specific cognitive capacity that explains the universal development (in neurotypical children) of a natural language. Taken on face value, then, proposals about so-called Universal Grammar are proposals about this innate language-specific cognitive ability.

That said, the entire goal of the Minimalist Program is to reduce what is proposed to be a component of UG. Hauser et al. (2002) famously claimed that Merge is the only component of UG, though very few people hold to that in practice. In general, proposals about the properties that generate language fall into one of three categories: genetic endowment (UG), experience, and general principles that are distinct from UG.

(39) Three factors that enter into the growth of language in the individual (Chomsky, 2005, 6)

1. Genetic endowment, apparently nearly uniform for the species, which interprets part of the environment as linguistic experience, a nontrivial task that the infant carries out reflexively, and which determines the general course of the development of the language faculty. Among the genetic elements, some may impose computational limitations that disappear in a regular way through genetically timed maturation. Kenneth Wexler and his associates have provided compelling evidence of their existence in the growth of language, thus providing empirical evidence for what Wexler (to appear) calls ''Lenneberg's dream.''
2. Experience, which leads to variation, within a fairly narrow range, as in the case of other subsystems

of the human capacity and the organism generally.

3. Principles not specific to the faculty of language.

A major effort in the MP is to reduce the number of proposals that fall under genetic endowment, and instead reduce as many properties of language as possible to third factor explanations, i.e. principles external to language.

It seems to us that for the theoretical constructs of the Minimalist Program (we can call them Minimalist Analytical Constructs: MACs), despite often being referred to as part of UG, many Minimalist researchers would be thrilled if those constructs were found to derive from non-language-specific aspects of cognition (i.e. readily welcomed as third factor effects). On this approach, these MACs are an articulation of what cognitive abilities play into the syntactic structure of language, but they can be theorized about without necessarily needing to reference innate, language-specific aspects of language. That is, they may instead be a detailed description of some other cognitive ability as it is realized when applied to language. It is perhaps unfortunate that we don't have a distinction in our theoretical discussions between MACs that are proposed to necessarily be part of UG as traditionally articulated, and those MACs that are necessarily part of the human ability to mentally represent a language, but which a researcher does not desire to attribute to a traditional domain-specific UG. Because, in fact, the MP as currently practiced could well conclude that there does not exist any language-specific innate UG, and still proceed with its standard practices, because we nonetheless can theorize about the MACs without needing those constructs to be cognitive properties that are domain-specific to language (i.e. the traditional definition of "Universal Grammar"). In practice, many researchers are agnostic about whether the UG being theorized about is the traditional UG (in the sense of being domain-specific to language and not a result of more general properties of cognition).

To delineate what is a part of UG (i.e. domain-specific to language) and what is a MAC that could be explained by other aspects of cognition, a researcher would specifically need to be examining a particular MAC and its analogs in non-linguistic cognition. Very few of us are doing this, of course, because we are syntacticians focused on the analysis of natural language syntax (and, the domain of syntax is still not yet close to full empirical documentation). So here, instead of proposing what is a component of UG, instead we will comment on what are the MACs (again, Minimalist Analytical Constructs) that appear to be necessarily a part of the human ability to acquire and mentally represent a language. This question can be answered more directly and more precisely than any question about a traditional UG.

(40) Widely accepted MACs:

- Merge (and reMerge, giving movement)
- Copy (for movement, also to represent individual sentence structure with elements from the Lexicon)
- Agree, in some formulation
- Phases, in some formulation
- mechanism for forming grammatical categories, or a universal set of grammatical categories
- mechanism for forming features, or a universal set of grammatical features

(41) Open Questions - phenomena that may require their own MAC, or which might be explainable on the basis of the preceding ones:

- binding (patterns of coreference between anaphors, pronouns, and R-expressions)
- some kind of explanation for universal aspects of functional hierarchy
- either UTAH or explanation for universal hierarchies of arguments
- patterns of DP-licensing
- (among others)

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