The Cartographic Enterprise in Syntax

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1. Introduction

Cartography is a research program within the Principles & Parameters framework of syntactic theory. It emerged and gained its name in a series of colloquia held in Italy in the late 90's and became widely known through the publication of the first three volumes of the OUP series *The Cartography of Syntactic Structures* (Belletti 2004; Cinque 2002; Rizzi 2004).

According to Cinque & Rizzi (2008), Cartography endeavors “to draw maps as precise and detailed as possible of syntactic configurations” but its place lies in a broader research project, namely the study of functional (or grammatical) categories, their content, number and order.

This survey outlines the development of Cartography and its theoretical underpinnings, it presents its major achievements and discusses some outstanding open questions.¹

2. The uniformity of syntactic structure

Guiding Cartography is the view that syntactic structures are uniform, locally simple and both necessary and sufficient to structurally represent the grammatical or functional information relevant for semantic/pragmatic interpretation.

The basic structural unit of categories in syntax is a head, or zero-level category, which projects a phrase or a “maximal projection”. A head may have a sister, namely a complement, and a specifier, an immediately c-
commanding phrase (an “aunt”). This configuration generates recursive structures, simply because complements and specifiers are themselves phrases.

Arguably, this configurational schema, known as X-bar theory, is the only kind of structure that syntactic representations exploit. Other structural options, such as adjuncts to phrases, multiple specifiers of a single head, etc., have been experimented with in various ways but Cartographic research has, for the most part, eschewed these options, retaining only the core structures afforded by the X-bar schema. Indeed, Cinque (1999) argues forcefully against the adjunction of adverbials, as reviewed below. The core structural relations defined by X-bar theory seem to be not only necessary, but sufficient to characterize syntactic structure.²

X-bar theory evolved from Chomsky’s (1970) Remarks on Nominalization but was restricted initially to apply only to the lexical categories (which, for Chomsky, were the four combinations of the features [±N] and [±V]).³ Inflectional categories such as tense and complementizers remained outside the X-bar system.

Things changed with the publication of Barriers, (Chomsky 1986), which opens with an explicit proposal to generalize the X-bar system to Infl(ection) and C(omplementizer). The universal, general schemata for phrase structure which Chomsky proposed is in (1), where \(X = \{[\pm N], [\pm V], I(nfl), C(omplementizer)\}\). This schema is retained in Minimalist research, though not in its axiomatic form; rather, it is derived from the interplay of Merge and Project.

\[
\begin{align*}
(1) & \quad X' = X X'' \\
& \text{b. } X'' = X'' X'
\end{align*}
\]

The adoption of Kayne’s (1984) binary branching hypothesis – limiting the number of specifiers and complements to zero or one – imposed a significant constraint on structural representations. In a non-binary

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² The adjunction of heads to heads is, nevertheless, appealed to - even by adherents of the “adverbs as specifiers” approach. It is not inconceivable that head movement is a case of substitution, not of adjunction, (Rizzi & Roberts 1989); cf. also Matushasky (2006). A more radical direction is taken by e.g., Koopman & Szabolcsi (2000) who argue that head movement is actually phrasal movement “in disguise”, where the phrase is a remnant XP out of which all material but its head has been extracted.

³ Jackendoff's (1977) generalization of the X-bar schema to other categories was an important early harbinger of developments in the 80s.
branching system, multiple complements or specifiers could be configured by simply adding daughters to a
node. The adoption of Kayne's hypothesis required a re-thinking of a myriad phenomena, from multiple
complements in *donate a book to the library* or *tell Mary that she should leave* through multiple
topicalization in *tonight, dinner, I think I'm going to skip* via clause-internal adverbial modifiers, multiple
complementizers (e.g., in Dutch) or multiple wh fronting in e.g., Serbo-Croatian. As often happens,
constrained theories drive research forward by narrowing down the range of options open to analysis and
hence sharpening and re-defining the research agenda.

3. The birth of Cartography

One of the first results of the shift to a more constrained X-bar theory was Larson's (1988) demonstration
that the representation of multiple complements requires a VP shell-like structure, with (at least) two head
positions (and thus two VPs). This and related proposals for the widening of the VP space spawned research
into the hierarchical organization of thematic roles in VP and opened up possibilities for treating various
argument-structure alternations by combining the structure afforded by shell-like VPs with verb raising and
NP-movement, as in work inspired by Hale & Keyser (1993). These developments, in turn, lead to the vP/VP
distinction (Chomsky 1995; Kratzer 1996) and to much current work on the syntactic representation of
aktionsart (verbal aspect) and events.

As this work progressed, in the course of the 80s and 90s, it became clear that the impoverishment of
structure must be compensated for by postulating more movement (e.g., head-movement from one V head to
another). It also became necessary to expand the feature makeup of heads beyond the rudimentary [±N],
[±V], for example, in order to distinguish different V heads in the VP shell.

A parallel line of investigation was pursued by Pollock in his study of functional categories in the
inflectional domain. Pollock (1989) argued that a proper description of verb positions in French required the
postulation of two, rather than a single inflectional head. His argument took off from the observation –
illustrated in (2) - that finite verbs in French appear higher than negation, *pas*, and higher than adverbs like
souvent 'often'. Nonfinite verbs – illustrated in (3) - appear lower than negation and optionally higher or lower than souvent.

(2) a. Il ne parle pas souvent
   he ne speaks neg often

   b. *il ne pas parle souvent
      he ne neg speaks often

   c. *il ne pas souvent parle
      he ne neg often speaks
      'He doesn't often speak.'

(3) a. *ne parler pas souvent
    ne speak neg often

    b. ne pas parler souvent
       ne neg speak often

    c. ne pas souvent parler
       ne neg often speak
       'not to speak often'

To graphically describe these paradigms, suppose we use the template in (4), in which X₁, X₂ and X₃ are possible positions for verbs and emoticons indicate the options for verb placement in French.

(4) X₃ Negation X₂ Adverbs X₁
    V₁-Fin ☺ ☺ ☺
    V₁-fin ☺ ☺ ☺

X₁ is plausibly the base position of the verb, while X₂ and X₃ are functional heads. Finite verbs must move to the highest functional head, while non-finite verbs may either remain in their base position or move to the intermediate functional head, above souvent but below negation.

Why is verb movement keyed to the finiteness of the verb? Finite and nonfinite verbs differ in their inflectional features: The former are inflected for agreement and tense while the latter are not. Since two
inflectional heads must be postulated, not one, it stands to reason that the feature content of Infl is split among these two heads, an Agr head and a T head, both projecting phrases in accordance with the X-bar schema.

Pollock’s paper had an enormous impact. By demonstrating that Infl was not a unitary head, it broke the ice and led the way to the crosslinguistic exploration of the inflectional space. X-bar theory and binary branching constrained the form of syntactic structures. but the number and content of heads and categories was not formally constrained. If Infl can be split, then why only into two heads and not into many more? Indeed, if the number of functional categories is not constrained by some formal property of UG, only detailed empirical research could determine the degree of ‘splitting’ that actually exists. The foundation of cartographic research was thus laid and although the term ‘cartography’ was only coined a decade later, research in the aftermath of Pollock’s paper set upon the endeavor to discover new functional heads and study their hierarchical organization. The local simplicity of the X-bar schema is preserved in natural languages, but as Rizzi (2004:8) puts it, “at the price of accepting a higher global complexity, through the proliferation of structural units.”

Pollock held that V movement is triggered by the need to pick up inflectional features such as Tense or agreement (person and number.) The idea that the pieces of inflectional morphology are not united in the Lexicon but come together in the syntax has its roots in Chomsky's (1957) analysis of the English auxiliary and modal system. Pollock connected this idea with the technology of verb-movement, arguing that successive verb-raising serves to inflect the verb, i.e., to associate it with the relevant inflectional material. This view of inflectional morphology closely resembles and in fact, constitutes an extension of Baker’s (1985) Mirror Principle, which captured correlations between the order of derivational affixes and the order of the syntactic operations they induce (passivization, causativization, etc.)

The extension of the Mirror Principle to inflectional morphology has not gone unchallenged either conceptually or empirically. Some, though not all of these challenges can be met by relaxing somewhat the connection between inflectional features and their morphological forms, allowing phonetically unrealized
features to be active syntactically and permitting a limited range of postsyntactic re-arrangement operations (as in e.g., Distributed Morphology, (Halle & Marantz 1993), see also: http://en.wikipedia.org/wiki/Distributed_morphology.)

This interpretation of the paradigms in (2) and (3) depends on the assumption that the negative specifier *pas* and adverbs do not move (unless topicalized or focalized.) Thus, they serve as markers which indicate the surface position of the verb with respect to them. This assumption turned out to be a key insight of the cartographic research methodology.

Pollock argued that of the two inflectional heads, T c-commands Agr. Belletti (1990) took the opposite view, namely that Agr was higher than T. Ouhalla (1991) suggested that the ordering of T and Agr was a matter of parametric variation. Chomsky (1991) sided with Belletti, but argued that there was a second Agr head below T that served objects (object agreement) and developed an arsenal of formal devices to ensure that subject and objects target AgrS(ubject) and AgrO bj ect) respectively. Some time later, Chomsky (1993; 1995) put an end to the debate by pointing out that since agreement (on verbs) had no interpretative content, it could not survive the interface-driven economy conditions that Minimalism brought to syntactic theory. Only “substantive” heads, i.e., those which receive an interpretation at the interface, are tolerated in syntactic representations. These include the lexical heads and some functional heads such as Tense, but not Agr. The features of Agr, the phi/Case features, are uninterpreted features which drive syntactic computation (internal merge) but must be either deleted or valued at the interface.

4. Functional heads and their content

The impact of the Minimalist turn on the emerging cartographic enterprise was significant. In particular, it narrowed the search domain for novel functional heads to those with semantic/pragmatic content and reasserted the role of features as the ultimate building blocks of structural representations. Concretely, the Pollockian Agr had to give way to a contentful functional head which research would endeavor to identify.
An important step in this direction was taken in Cinque's (1999) study of adverbs and functional categories. Cinque argued that despite their general optionality, adverbs “should not be seen as accessory appendices to clause structure (as the traditional notion of “adjunct” would suggest), but rather as an integral part of it.” (Cinque 2004:693). Adjunction, he reasoned, is virtually incompatible with three salient properties of adverbial syntax.

The first property is that adverbs are rigidly ordered or serialized. Although grammatical judgments of adverb orders are often delicate and notoriously difficult when more than two or three adverbs are involved, Cinque found a way of testing the order of adverbs, which he then applied systematically to adverbs in a number of languages. His method consisted of comparing the order of two adverbs in a sentence, say A1 and A2. In most cases, one order is judged more acceptable than another. Suppose it is A1>A2. Now, the introduction of a third adverb, A3, leads one to expect three potential orders consistent with the order previously established, and not the combinatorially-possible six orders. These are A3>A1>A2, A1>A3>A2 or A1>A2>A3. One should now test the order of A3 and A1. If A3 precedes A1, then, by transitivity, it should precede A2 and we obtain the order A3>A1>A2. If it turns out that A3 follows A1, then one must further test whether it precedes or follows A2 to determine whether the correct cline is A1>A3>A2 or A1>A2>A3.

Consider the following demonstration. *Often* precedes *always*

(5)a. He's often always late.
   b. *He's always often late.

*Usually* precedes *often:*

(6)a. He's usually often late.
   b. *He's often usually late

By transitivity, *usually* precedes *always:*

(7)a. He's usually always late.
   b. *He's always usually late.
We can safely conclude that *usually > often > always.*

A systematic comparison of pairs of adverbs across different (primarily Romance) languages, leads Cinque to a cline of over 30 adverbs. Adjunctions to maximal projections typically do not show such rigid ordering constraints and even if a mechanism were devised to impose such an ordering, the second property of adverbial syntax demonstrates that such a device would fail, in principle.4

This second property is that a verb can appear between any two adverbs. The following set of data, adapted from Cinque op. cit: 45, demonstrates that the Italian past participle *rimesso* 'put back' can not only appear either to the left or to the right of the adverb series (8a) & (8d), but, crucially, in between any pair of adverbs, (8c,d).

\[
\begin{align*}
(8) & \quad \text{a. Non hanno} \quad \text{rimesso} \quad \text{di solito} \quad \text{sempre} \quad \text{completamente} \quad \text{le cose} \quad \text{a posto} \\
& \quad \quad \text{neg have-2pl} \quad \text{put back} \quad \text{usually} \quad \text{always} \quad \text{completely} \quad \text{the things} \quad \text{in place} \\
& \quad \text{b. Non hanno} \quad \text{di solito} \quad \text{rimesso} \quad \text{sempre} \quad \text{completamente} \quad \text{le cose} \quad \text{a posto} \\
& \quad \quad \text{neg have-2pl} \quad \text{usually} \quad \text{put back} \quad \text{always} \quad \text{completely} \quad \text{the things} \quad \text{in place} \\
& \quad \text{c. Non hanno} \quad \text{di solito} \quad \text{sempre} \quad \text{rimesso} \quad \text{completamente} \quad \text{le cose} \quad \text{a posto} \\
& \quad \quad \text{neg have-2pl} \quad \text{usually} \quad \text{always} \quad \text{put back} \quad \text{completely} \quad \text{the things} \quad \text{in place} \\
& \quad \text{d. Non hanno} \quad \text{di solito} \quad \text{sempre} \quad \text{completamente} \quad \text{rimesso} \quad \text{le cose} \quad \text{a posto} \\
& \quad \quad \text{neg have-2pl} \quad \text{usually} \quad \text{always} \quad \text{completely} \quad \text{put back} \quad \text{the things} \quad \text{in place}.
\end{align*}
\]

Cinque concludes that the most economical structural expression of these facts is to take adverbs to be specifiers of projections, the heads of which can host a raised verb. This is shown schematically in (9), where X stands for a head position.

\[
\text{(9) usually} \quad X \quad \text{always} \quad X \quad \text{completely} \quad X
\]

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4 Movement operations (in particular, phrasal movement,) can disrupt the order. Cinque adheres to Kayne’s (1994) antisymmetry approach and argues that adverbials can find themselves on the right edge of a clause only when phrasal (typically, remnant) movement can displace all material externally-merged below the adverbial to positions on its left.
The third property leads to a characterization of the heads of the functional categories of which the adverbs are specifiers of. Cinque shows that that the order of adverbs can be matched with the crosslinguistically stable order of heads such as inflectional affixes, functional particles, preverbs of different sorts and auxiliaries. If these elements are taken to overtly manifest, in head format, the functional portion of the clause then AdvPs “could be seen as the overt manifestation of the same functional distinctions in specifier format.” (Cinque, loc. cit.)

Cinque’s proposal for the cartography of the functional space of IP, incorporating both the AdvP specifiers and the labeled functional heads is graphically displayed in (10) (from a handout of D. Pesetsky’s: http://ocw.mit.edu/NR/rdonlyres/Linguistics-and-Philosophy/24-902Fall2003/90BC8DE5-3A86-411E-BAEC-CFBA247448CE/0/class_1_handout.pdf.)

Although harbingered by Benincà (1988) and Cinque (1990), Rizzi (1997) is the first explicitly cartographic
study of the complementizer space, or as he calls it, the clausal left periphery. He proposes that (fronted) topics and foci structurally conform to the X-bar schema and are articulated as projections of a Topic or Focus head. YP in (11), the specifier of Top or Foc, contains the topicalized or focalized constituent. XP is the “complement” of the Top or Foc head. It constitutes the 'comment' or rheme in the TopicP and the presupposition in the FocusP. The heads of these projections, Topic\(^0\) and Focus\(^0\) are overtly realized in some languages.

(11) 

\[
\begin{array}{c}
\text{TopicP/FocusP} \\
YP \quad \text{Topic'/Focus'} \\
\text{Topic/Focus} \quad \text{XP}
\end{array}
\]

Rizzi further argues that the Focus Phrase is wedged-in between two TopicP articulations, the lower one frequently masked by obligatory verb-movement to Foc. Subsequent work has refined this proposal by proposing a privileged position for fronted adverbs, (Rizzi 2004) and distinguishing different kinds of (hierarchically ordered) topic phrases, (e.g. Benincà & Poletto 2004; Frascarelli & Hinterhölzl 2007).

5. The universality of the functional hierarchy

Just as cartographic studies of the VP space allowed for a syntactic articulation of verbal aspect and event semantics and studies of the inflectional space made it possible to better ‘syntacticize’ aspect, tense and mood, the cartography of the left periphery opened the flood gates to formal studies of information structure. An important achievement of the cartographic project has thus been the unification of the heretofore largely independent work in formal syntax, “lexical” semantics, aspect, tense and information structure. By drawing these research domains closer to one another, cartography contributes to a better understanding of “interface” issues or the relation of narrow syntactic computation to meaning and use. This is perhaps one of the reasons for the impact that this project is having on the field and the its extension to the nominal domain (see e.g., the papers collected in (Cinque 2002)), the structure of prepositional phrases, (papers in (Cinque & Rizzi: To appear)) and the cline of adjectives, (Cinque: To appear; Laenzlinger 2005; Svenonius 2008). Sub-parts of the functional domain have also received attention, notably the VP periphery (which Belletti (2004) takes to
host “low” topic and focus projections), the subject field, (Cardinaletti 2004; Poletto 2000) and the internal structure and feature makeup of number and degree words, (Kayne 2005a,b; 2007).

The accumulated results of these and other cartographic studies make a strong case for the universality of the functional hierarchy. Two interrelated questions arise at this point: First, where do the contents of this functional structure come from? Second, what explains the particular order or hierarchy in which they appear? Both questions are rather difficult to answer because they relate not only to properties of the computational system itself but to its interface with other cognitive faculties.

It stands to reason that the choice of functional items is not an arbitrary, irreducible property of UG although familiar arguments from the poverty of stimulus militate in favor of the hypothesis that the functional features and their hierarchical arrangement are wired into the grammar and not learned or otherwise acquired through experience. Minimalism introduced a distinction between interpretable and uninterpretable features. The latter drive computations: Movement or internal merge is triggered by the need to check and delete these features, (Chomsky 2004) or value them, (Chomsky 2001). Interpretable features, on the other hand, are those that can be understood and exploited by the modules which interface with the computational system, semantics, pragmatics and indirectly, the thought systems.

The question of what is coded or articulated by grammatical features can be rephrased as following: Of the properties which enter into human thought and belief systems, which ones are represented as grammatical features? Although we are quite far from seriously addressing this question from the perspective of studies of human perception/cognition, comparative and typological studies of particular grammars can provide a rough estimate of the magnitude of the inventory of the features involved as well as of their degree of granularity. Kayne (2005b:12-14) lists about 40 but notes that that the estimate is conservative in that it fails to take into consideration features which are unpronounced in languages he has come across and that moreover, some mono-morphemic forms arguably contain more than a single feature. Citing Heine and Kuteva's (2002) study of grammaticalization targets, Cinque and Rizzi (2008) raise the order of magnitude by 10, to about 400. Kayne's recent work (2005a,b, 2007 and recent papers listed in
suggests that even some 'lexical' items may, in fact, be decomposed into a lexical core surrounded by functional material. If UG respects a principle of decompositionality, as he suggests (Kayne 2005b:15), whereby every interpretable syntactic feature projects a unique head, than 400 may turn out to be a low estimate of the magnitude of syntactic features.

The study of the feature inventory of UG requires a massive database compiled on the basis of detailed studies of particular grammars. As Kayne has frequently argued (e.g., Kayne 2005b), this is about the only way to uncover functional material which remains unpronounced, and hence difficult to sequence when one studies only a small set of languages. Whatever the actual number of features turns out to be, it will surely be as subset of the properties which enter into cognition, thought or communication. Just as there are certain participant roles which appear to lie outside the realm of thematic role coding (viz. (Reinhart 2002)), there are perceptual/cognitive categories that do not appear to be coded as functional features: “For example, various syntactic processes make use of the singular/plural distinction, but none so far as I know ever make use of the red/orange distinction.” (Jackendoff 1987:381).

A close look at the structural maps which cartographic studies have drawn reveals some systematicity in the composition of the functional domain and the hierarchy of projections. Closest to the verb, one finds aktionsart projections, which determine the event-type of the predicate (Vendlerian classes; see e.g., Ramchand (2008).) In the Cinquean hierarchy in (10), the two tense heads (Past and Future) are arrayed above all the aspectual heads. The heads encoding illocutionary force, evidentiality and other “moods” are positioned higher than tense. In the higher, left-peripheral space, one finds scope and discourse/informational projections, including quantificational elements, interrogative particles, topics and focus.

The richness of the feature structures discovered by syntactic cartographers can be exploited to sharpen the view that parameters are formal properties of features, in particular, if Kayne (2005b:15) is right in that “UG imposes a maximum of one interpretable syntactic feature per lexical or functional element” (featurally-complex heads arising through movement; see Cinque and Rizzi 2008:50.) Features can:

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5 If Kayne (2005b) is correct, ‘orange’ or ‘red’ are modifiers of the category ‘color’, as in e.g. a red COLOR car.  
6 This view of parameters has its origins in Borer (1984) and Ouhalla (1991) who articulated the view that parameters
be interpretable or not,
• be null or overt,
• act as probes,
• attract a category to their specifier (EPP),
• attract a head.

While the range of options is quite limited, the combinatorial possibilities which arise when they are
evaluated for each feature engender an astronomical number of possible settings and hence of possible
grammars.7

To the degree that this view of parameters is valid, it is conceptually distinct from the notion of parameters
either as properties of grammatical principles or as “clusters of properties”. The switchboard metaphor of
parameters endorsed by Chomsky in the Government and Binding framework (see Boeckx (2010) for recent
discussion,) may be retained, but construed somewhat differently: Every feature is endowed with its own
switchboard, consisting of half a dozen or so binary options.

It remains to be seen, of course, whether such a view of parameters can express the richness of syntactic
variation in a an appealing way and whether it can overcome the dichotomy between macro-parameters and
micro-parameters (Baker 2008 and references,) and capture the kind of generalizations that e.g., Reinhart &
Siloni’s (2005) Lex-Syn parameter is able to capture.

6. Cartography and the interface

To the degree that this hierarchy feeds semantic computation, one expects a tight correspondence between
the ordering of the rules of semantic composition and the cartographic sequence. This is largely true.
However, the fairly transparent correspondence between the cartography of clause structure and its semantics
does not lead to the conclusion that the hierarchy can simply be reduced to semantic considerations (which is

reside in functional as opposed to lexical categories. See Gianollo et. al (2008) for a recent discussion.
7 See Roberts and Roussou for relevant discussion.
not to deny that some aspects of it may, viz. Cinque and Rizzi (2008:52-53). Indeed, such a reduction is at best circular (because there is no a-priori way to determine whether syntax determines semantics or vice-versa) and at worst vague (because ‘meaning’, ‘reference’ and the like hinge on notoriously complex, perhaps obscure notions like ‘intentionality’; see e.g. (Hinzen 2006)). In this context, one cannot exclude the more radical thesis that syntax, rather than being “tailored to the needs of the expression of meaning” (Cinque and Rizzi (2008:53),) imposes the pattern and the seams which delimit meaning and use.

Cartographic work is not very explicit as to how the hierarchy of heads is formally guaranteed. If it is derived by precise statements of selection (e.g., Asp27 selects Asp26), then it follows that the entire cartographic hierarchy must be merged in every full clause. This view receives some prima facie support from empirical studies of reduced or truncated structures. These appear prominently in the grammars of children between 2 and 3 years of age (see Guasti (2002) for an overview). Rizzi (1994) argues that the mechanisms of truncation cannot pick and choose which projections to effect; the entire structure down from the point of truncation must be retained. Supposing that the full structure is thus present in the clause, some mechanism is needed to distinguish “active” from “inactive” projections, that is, those which receive an interpretation and those which are interpretively null. One way of achieving this is to extend Chomsky’s dichotomy of interpretable and uninterpretable features to this domain. Thus, the entire structure is and must be represented syntactically, but only certain features are activated and feed interface interpretation. Seen from this perspective, the Pollockian verb-attracting Agr head should be replaced by a substantive functional head which albeit not receiving an interpretation at the interface is nevertheless active computationally.8

7. Cartography and Minimalism

The maps drawn by Cartography require some rethinking of the traditional division of the clause into a v/VP, TP and CP domains. This is particularly relevant in light of the relatively simple structures that Chomsky’s Minimalism works with. In part, this is a division of labor: Minimalism focuses on mechanisms of computation (Merge and Search) and the role of uninterpretable features, while the cartographic enterprise is

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8 One might, alternatively, reconsider Agr’s interface contribution in light of Rizzi’s (2006) view that preverbal subjects occupy a criterial position, akin to wh expressions, topics and foci.
primarily concerned with the inventory of interpretable features. Hence, Under this view, minimalism needs an abbreviated structure, the C-T-v-V system, while cartography explores the full representation (see (Chomsky 2001, note.8) for a comment to this effect.)

In practice, however, Minimalist research has adopted the C-T-v-V system not merely as an “expository convenience” (Rizzi 2004, p.7), but as a substantive hypothesis for clause structure. The tension between Minimalism's impoverished structures and the richness of cartographic representations is a real one.

Thus, phases (CP and vP) and their edges (i.e., their heads and specifiers) play a key role in the computation of locality in minimalist syntax. It is far from clear how to integrate these notions into the structural maps of cartography, in which the clause is typically seen as a homogenous hierarchy of projections. In Cinque’s system, for example, T dissolves into two distinct projections (Past and Future). Each should, in principle, have a specifier but which one corresponds to T? Similarly, what does “little v” correspond to in a cartographic articulation of lower aspect and event-type? Which one of these lower heads should be taken to constitute the edge of vP? The problem is just as acute in the CP domain, where the edge of CP is its (outer) specifier, but in a cartographic perspective, should it be equated with Spec/Fin, Spec/Force or perhaps Spec/Focus (which, according to Rizzi 1997, hosts wh operators)?

Perhaps an even more nagging problem is that of selection. Minimalism inherits from previous approaches the view that selection is carried out under sisterhood. Thus, C selects T and V selects C. How is selection satisfied in e.g., an indirect question, if the head bearing the interrogative feature is Foc or Int (cf. Rizzi (2001)) and thus not a sister to V? Or take the familiar problem of how subjunctive features on an inflectional head can be selected by a higher predicate, given the number of intervening heads between V and the relevant mood head?9 The locality of selection plays a major role in Chomsky’s most recent work (Chomsky (2008); see also Richards (2007)), in which C transfers Case features to T. Which C? Which T?

The desirable goal of integrating the research agendas of Minimalism and Cartography requires, so it seems,

9 This problem remains if the relevant mood feature is present in the CP domain. If that head is Fin, then how does V “reach down”, as it were, to the lowest head of CP, bypassing all the others?
modifications in the way structure, in the cartographic sense, is manipulated by the computational system. One possible direction would be to formally implement the notion of “abbreviated structures” by construing the cartographic structures not as a homogeneous hierarchy of equiponent propositions, but as a structure composed of delimited “domains” or “extended projections”, in the sense of Grimshaw (2000), a vP domain, a TP domain and a CP domain. Such a delimitation of structure is necessary for good empirical reasons, as well, since one needs to explain not only the clustering of similar features in the structure but also the delimiteness of verb-movement, NP movement and other operations which depend, in Minimalism, on uninterpretable features like Case or agreement. Why, one may ask, do these features typically fail to extend to the heads of left periphery? Cartographic works have, for the most part, implicitly assumed delimited structures or spaces but have not provided a formal implementation of domains.

8. Conclusion

The emergence of Cartography as a research topic is a natural development in a theory of grammar concerned with how interpretable features are structurally represented. In a sense, every single variant of syntactic theory, from Chomsky’s early works onwards, assumed some kind of cartography. The question was and remains which is the right one. The appeal of Cartography is, first and foremost, due to the fact that it provides an impetus for detailed research into comparative morpho-syntax and provides handy tools for expressing crosslinguistic similarities and variation. Cartography is not an alternative to Minimalism. On the contrary, the feature-driven approach to syntax, the reliance on simple operations such as Merge, Project and Search pave the way to a research program whose goal is to draw up a precise inventory of features and discover their structural relations.

References


