Phrase Structure and its Limits

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1. Overview

A central empirical fact about many expressions in natural language is that they involve, at some level of mental representation, arrangements of nested constituents that enter into relations of various kinds by virtue of being so arranged. A theory of phrase structure (PS) in the most general sense is a set of hypotheses about how this internal organization of expressions and the dependencies it supports are mentally represented as part of the speaker's knowledge of language. The specific implementation of the theory of PS varies dramatically across the different frameworks that have emerged in the development of Generative Grammar.

This vignette will not attempt a systematic review of these developments, an ambitious task undertaken elsewhere (e.g. Carnie 2010); detailed discussions of particular ingredients of PS theory, such as labels, and related notions such as cycles/phases, can be found in the dedicated chapters in this volume (see also De Vries 2012: 143f.). Instead, this vignette will focus on the somewhat neglected question of the *limits* of PS theory. After demarcating, in most general terms, the analytical purview of such a theory, I will turn to a number of illustrative examples of constructions that have resisted a coherent description in PS terms, which I suggest indicates that they fall altogether outside its scope.

2. Minimal PS descriptiom

Any theory of natural language must specify a subtheory of constituency incorporating a recursive generative procedure (GP). Hierarchical organization (an empirical fact) is formalized in terms of PS (a theory), such that properties of the *atoms* of syntactic computation determine properties of complex expressions constructed from them. Which properties exactly are so determined is a theory-dependent decision that cannot be made *a priori*.

Traditional phrase-structure grammars (PSGs), including Chomsky's (1986) generalized X′ -Theory, incorporate rules of *projection* and *linear order*, yielding labeled and ordered non-terminal and terminal symbols. By contrast, Chomsky (1995: 378) expresses the hope that "we may be able to eliminate the theory of phrase structure entirely," and the theory of GP sketched in Chomsky 2013 and Chomsky et al. 2019 contains only remnants of PS: syntactic objects are assumed to be unordered and unlabeled; syntactically encoded headedness is replaced by a 'labeling algorithm,' dissociated from the structural description proper.[1] Unlike a PSG, which

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[1] For an alternative that avoids recourse to labels, see Collins 2017; also Collins & Seely 2020. Chomsky's (2013) approach in fact maintains further assumptions of classical PS theory, such as the asymmetric nature of adjunction (in the form of Pair-Merge).

yields objects of the general form (1a) derived by a production rule $\alpha \rightarrow$ X Y, this approach assumes recursive formation of unordered sets, as in (1b), via binary Merge(X,Y):

(1) a. $[\alpha$ X Y] ($X \prec Y$; labeled α, $\alpha \in \{X,Y\}$)
b. {X,Y} (X, Y unordered; no label)

Regardless of which general approach to GP is assumed, the system defines fundamental relations of sisterhood/inclusion: both representations in (1) specify an object that contains X and Y, and thus derivatively, for instance, that X c-commands Y and everything included in it. Whether we think of a theory of GP generating objects such as (1b) as incorporating a minimal PS theory or no such theory at all seems to me to be a terminological choice rather than a substantive matter.[2]

3. The limits of PS description

Regardless of its specific assumptions about PS, any theory of GP must begin with the question of which expressions of natural language are and are not within its analytical scope. In some cases, this is straightforward. For instance, it has always been assumed that expressions consisting of multiple sentences fall outside the scope of PS theory. This is because multi-sentential sequences do not support the kinds of dependencies we take to be indicative of phrase-structural organization, chiefly c-command and derivative "syntagmatic" relations such as movement, binding, agreement, and licensing, which hold within but not across sentences:

(2) a. He_i bought the story. But $John_i$ believes everything.
b. *He_i bought the story that $John_i$ believes everything.

(3) a. Who does Mary suspect _? John is innocent.
b. *Who is Mary innocent? John suspects _.
(intended: *which x : Mary is innocent, John suspects the person x*)

(4) a. Nobody believes that John offended anybody.
b. Nobody believes that. John offended anybody. (no NPI interpretation)

The *connectivity* observed sententence-internally differs from relations and dependencies above the sentence level; consequently, we take PS theory to be limited to sentence grammar as opposed to discourse grammar, which defines rhetorical relations (see Cinque 1983).

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[2] What *is* a substantive matter, however, is the question of whether (and how) the traditionally separate structure-building and transformational components can be collapsed into a single-cycle GP, as originally proposed in Bobaljik 1995 and argued in Chomsky 2004; for some significant problems of this approach, see Collins & Groat 2018.

Not all cases are this clear-cut, however. Since the earliest days of Generative Grammar, Chomsky has pointed out that PS theory is inadequate to capture what he calls *unstructured coordination* (UC):

(5) John is tall, (and) happy, (and) hungry, … and bored with TV.

As indicated above, UC is a sequence of conjuncts $<XP_1, \ldots XP_n>$, with a coordinator interspersed such that it appears with either just XP_n or with each XP_i. The problem for PS theory is that the sequence appears to be 'flat' rather than internally structured. Chomsky (1961: 15f.) notes that "[t]he only correct P[hrase]-marker would assign no internal structure at all within the sequence of coordinated items," whereas a PSG "must necessarily impose further structure, in quite an arbitrary way." Miller & Chomsky (1963: 298f.) elaborate that "[i]n order to generate such strings, a [PSG] must either impose some arbitrary structure (e.g., using a right-recursive rule), in which case an incorrect structural description is generated, or it must contain an infinite number of rules," since "no internal structure should be assigned at all within the sequence of coordinated items" (see also Chomsky 2018: 132). The problem is not specific to PSGs; in Merge-based theories, the infinitely-many-rules problem becomes an unrestricted-Merge problem: to avoid unwanted structure in UC, we would need *n*-ary Merge yielding flat sequences of XPs.[3] But a theory of GP incorporating such an operation assigns a flat structural description to *any* sentence, falsely predicting resultant symmetric c-command relations.

We will return to the case of UC below. The general point is that the scope of PS theory, regardless of specifics of implementation, is limited to expressions with clearly detectable signs of internal hierarchical organization (inclusion relations); expressions that are devoid of such indications must receive a different treatment to avoid the imposition of structure by GP. An integral part of the development of an explanatory theory of GP—certainly one that aspires to be 'minimalist'—is thus the proper identification of the range of expressions that actually fall within its scope.

The problem observed by Chomsky for UC arises quite generally for the class of expressions descriptively categorized as *parentheticals* (italicized in (6) below), which show no signs of being compositionally embedded within their 'host' expressions.[4]

(6) a. He was walking, *he said*, toward the railway station. (De Vries 2008)
b. He asserted—*and this is how all moralists speak*—that the young are spoiled.
c. These weapons are meant to wound, *to kill*, *even*.
d. I told them, *mistakenly*, *it turned out*, that she had already left.
e. *John*, go open the window, *please*!

[3] For further discussion and references, see Lasnik 2011 and Lasnik & Uriagereka 2012.

[4] For a typology of parenthetical expressions based on some simple descriptive parameters, as well as discussion of their syntactic 'invisibility,' see De Vries 2007.

McCawley (1982) introduces complex graphs with crossing lines to integrate parenthetical expressions into their host sentences, whereas DeVries (2007, 2012) defines an operation dubbed *Par(enthetical)-Merge* that yields linear integration without structural inclusion. Such approaches thus posit significant enrichments of PS theory in order to incorporate the phenomenon of parenthesis into its descriptive scope.[5]

An altogether different—and, I think, correct—perspective is developed by Peterson (1999), who suggests that parenthesis is a *bona fide* non-syntagmatic relationship (see also Espinal 1991; Burton-Roberts 1999). Discussing parenthetical expressions of various kinds, Peterson argues that the "distinction between juxtaposition (end-to-end sequencing) and parentheticals ('interrupting' one unit with another) […] is to a large extent a matter of superficial ordering" (p. 230), rather than a distinction to be modeled in terms of PS description. The structural non-integration of parentheticals is evidenced by their insensitivity to c-command:

(7) a. I didn't predict, *(*any of) you bastards*, that we would win. (McCawley 1982)
b. *Which politician did the FBI frame _, *therefore the voters didn't reelect* _ ?
c. *Every guest$_i$—*he$_i$ had just arrived*—was talking about Hank. (De Vries 2007)
d. He$_i$ said—*and this is typical for John$_i$*—that he didn't want help.

Peterson points out that there is also no c-command relation from a parenthetical insertion to its host, as evidenced, e.g., by the inability of a host-internal NPI to be licensed by a negative parenthetical:[6]

(8) *Anyone, *I don't think*, will solve this problem.
(cf. *I don't think anyone will solve this problem*)

Similarly, the scope of adverbs is confined to the parenthetical insertion (9a), and the illocutionary force of such insertions independent of that of their hosts (9b).

(9) a. Someone, *probably John's mom*, told him to leave.
b. Jake said—*why am I not surprised?*—that he hates bicycles. (De Vries 2007)

Peterson's conclusion is that "we must reject *any* account that incorporates the parenthetical item as a constituent of the 'host' clause" (p. 236). Instead, parentheticals *qua* independently

[5] These works assume that linear integration of parentheticals into their hosts justifies their characterization in terms of PS theory, but Ott 2016 argues that this is mistaken: interpolation of expressions, just like their sequential juxtaposition, can occur in production. De Vries's (2017:207) assertion that parenthetical expressions "*are* structurally integrated within the host, but not in a way that can be detected by c-command relations" strikes me as incoherent. In a footnote (*ibid*) he cites Case of nominal appositives as a sign of this integration, but Ott 2016 shows that the argument is a *non sequitur*.

[6] For a fuller discussion of the absence of c-command relations between parentheticals and their hosts, see De Vries 2007.

generated expressions are juxtaposed or interpolated in discourse (as a "production phenomenon"),[7] exactly as in a sequence of sentences or a sentence uttered 'within' another as an interpolated expression. That is, Peterson suggests to remove parentheticals entirely from the scope of the theory of PS, and thus the theory of GP ("sentence grammar") altogether.

Peterson's claims echo Haegeman's (1991) analysis of certain kinds of parenthetical adverbial clauses, which she argues to be syntactic 'orphans,' i.e. structurally independent expressions. Similarly, Fabb (1990) argues that appositive relative clauses are not syntactically connected to their hosts.[8] Like other parentheticals, these never permit extraction (even in languages that do permit extraction from restrictive relatives), nor other forms of connectivity such as discontinuous idioms:

(10) a. The horrible face [that Harry made _ at Peter] scared him. (De Vries 2007)
b. *The horrible face, [which Harry made _ at Peter], scared him.

If these proposals are correct, parenthetical adverbials and relatives are generated by GP separately from their hosts and associated with the latter only in discourse grammar, related by rhetorical/discourse-anaphoric relations in interpretation and linear juxtaposition/interpolation in production. While their internal organization is a matter of PS theory (they are constructed by GP), the association of these expressions with their host sentences is not mediated by Merge or whatever equivalent structure-building mechanism is assumed.

Cinque (1983) reaches a similar conclusion with regard to so-called 'hanging topics,' which he shows display no connectivity into their hosts that would justify a description of the phenomenon in PS terms. Ott (2014, 2015) and Ott & De Vries (2016) argue that Cinque's reasoning applies to dislocated elements generally, including those that are standardly assumed to be syntagmatically related to their hosts. Unlike Cinque's hanging topics, left- and right-dislocated elements display a subset of connectivity effects, evidenced by their binding and case properties (Fernández-Sánchez & Ott 2020). These, Ott and Ott & De Vries argue, are best captured by analyzing the surface dislocate as an elliptical clause that is structurally separate from but underlyingly parallel to the host sentence. This is illustrated below for a right-dislocated 'afterthought' expression:

(11) a. My favorite movie star is coming to Australia: Paul Jones.
b. [my favorite movie star is coming to Australia] ≺ [Paul Jones ~~is coming to Australia~~]

Ott (2014, 2015) argues for an analogous analysis of left-dislocated XPs as parenthetical cataphora, removing the extended left sentence periphery from the scope of sentence grammar.

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[7] As Peterson (1999:240) points out, this entails that constraints on parenthetical interpolation are non-syntactic, i.e. pragmatic or prosodic, although they may be indirectly constrained by syntactic factors such as constituency to the extent that these have pragmatic/prosodic correlates.

[8] Safir (1986) assumes appositive relatives to be attached at a post-LF level of representation he calls LF′, but his discussion makes it clear that this level is really not part of sentence grammar.

The approach differs strikingly from 'cartographic' proposals inspired by Rizzi 1997, where the characterization of these expressions in terms of PS theory is taken for granted without argument and their parenthetical nature customarily ignored.

Ott (2016) extends the analysis of dislocates as juxtaposed elliptical parentheticals to nominal appositives, which differ from their peripheral counterparts only in their superficial linear interpolation (see also Peterson 1999:243ff.):

(12) a. My favorite movie star, Paul Jones, is coming to Australia. (Peterson 1999:247)

b. [my favorite movie star is coming to Australia]

↖

[Paul Jones ~~is coming to Australia~~]

Ott demonstrates that nominal appositives are not syntagmatically related to their hosts; where this seems to be the case, this is the result of ellipsis of an underlying clause that is parallel to the host sentence. The analysis vindicates Peterson's assertion that linear interpolation does not, in and of itself, motivate a PS description of the resulting complex pression (*pace* Potts 2005).[9]

The parenthetical analysis of dislocation may extend to the oldest explicitly recognized problem for the general theory of PS, i.e. UC as illustrated in (5) above. On such an approach, what appears to be an unstructured sequence of conjuncts is really a discursive sequence of separately-generated elliptical expressions:[10]

(13) [John is tall] ≺ [(and) ~~he is~~ happy] ≺ [(and) ~~he is~~ hungry] ≺ [*(and) ~~he is~~ bored with TV].

An analysis along these lines captures the core properties of the construction: the prosodic isolation of the conjuncts, each bearing (sentential) stress; its 'flatness' and the resultant individual rather than collective interpretation of the predicates; indefinite iterability; and the opaqueness for extraction of all members in the sequence (cf. (7b)). Occurrence of the coordinator in either all or minimally the last conjunct appears to mirror its preferred distribution in a corresponding sequence of non-elliptical sentences.

A related kind of peripheral construction that may fall altogether outside of the scope of PS description is the class of constructions referred to as *Right-node Raising* (RNR).

(14) John bought, and Bill sold, a house yesterday.

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[9] On the rhetorical relations connecting nominal appositives to their hosts, see Onea & Ott forthcoming.

[10] Chomsky (2013:45) suggests that UC can be analyzed as a case of Pair-Merge, which supposedly yields its core properties. It is unclear, however, how Pair-Merge avoids imposing structure; it certainly does impose structure in cases of regular adjunction (as evidenced by scopal properties of adjuncts: Ernst 2001). For the inapplicability of Pair-Merge to parenthesis in general, see De Vries 2012:157, fn. 12.

Research into RNR has generally taken for granted that the phenomenon falls within the scope of PS theory. However, as Peterson (1999:242) observes, the construction exhibits parenthetical prosody (a fact that has been mostly ignored in the literature), and the interpretation is equivalent to the sequence of sentences *John bought a house yesterday, and Bill sold a house yesterday*. This suggests, as Peterson points out, that RNR is really a discursive amalgamation of sentences rather than a single generated construction. His conclusion is supported, albeit not explicitly, by Larson's (2012) demonstration that a PS description of RNR is untenable in principle.

Peterson suggests that RNR involves an interpolated parenthetical clause, i.e. (14) is an amalgam of independent expressions analogous to (15).

(15) John bought, Bill tells me, a house yesterday.

On this view, (14) consists of not one but two expressions (16), amalgamated in discourse (17).

(16) [John bought a house] [and Bill sold one (/a house)]

(17) [John bought a HOUSE]
↖
[and Bill sold ~~one~~]

An analysis along these lines begs the question why the elliptical parenthetical must appear interpolated rather than juxtaposed, a problem that is likely to be related to the murky issue of exceptional licensing of ellipsis noted below.

Prosody suggests a different arrangement for cases of RNR where the shared material is discourse-old and pronominalized, in which case there seems to be a juxtaposition of expressions:[11]

(18) a. John bought, and Bill sold it.
b. [John BOUGHT ~~it~~] ≺ [and Bill SOLD it]

An obvious objection is that such an analysis posits deletions not otherwise observed. But parenthetical amalgamation appears to generally enable kinds of incompleteness that are otherwise unavailable, for reasons that remain ill-understood (see, e.g., the interpolated clause in (6a)); for some discussion, see Kluck et al. 2014 and references therein.

The above remarks do not purport to be definitive analyses; they are meant to illustrate the fact that the scope of PS theory, no matter how pared-down its implementation, is not fixed *a priori*. Despite the fact that this is a matter rarely discussed explicitly, its resolution is of fundamental importance for the theory of GP.

[11] In the literature on RNR, the idea that different structures might be involved depending on the discursive status of the shared material has rarely been entertained; an exception is Valmala 2012, 2013.

4. Outlook

What we want a theory of PS to do for us largely depends on our assumptions about the notions of projection and linear order. The more the role of these notions is diminished, the more minimal our theory of PS becomes as a result. While these issues have figured prominently in syntactic theorizing in recent years, a more fundamental question has been sidelined—surprisingly, given its centrality for the demarcation of the theory's scope: what kinds of constructions are amenable to an analysis in terms of PS description at all, and which are not?

Minimally, a theory of PS is a theory of constituency, i.e. the way in which linguistic expressions are internally structured (possibly minimally, as in (1b)). But a large number of constructions occuring in natural language resist an analysis in terms of internal structure, be it assigned by a top-down PSG or bottom-up recursive Merge: while their component parts show signs of internal organization, their overall arrangement does not. This class includes, chiefly, expressions involving juxtaposed or interpolated parentheticals, although the exact scope of parenthesis remains to be determined. This is a central issue for the theory of grammar precisely because it arises independently of our assumptions about the ontology of PS theory.

Following Peterson's (1999) lead, I have suggested here that those constructions resisting PS analysis are composed in discourse grammar, a plausible option once the ubiquity of ellipsis and linear interpolation in language use is taken into account. The idea that certain kinds of expressions we intuitively perceive as "sentences" might in fact be composed in discourse rather than syntax is not a particularly remarkable or radical one; what is far more radical, yet rarely justified, is the assumption that such common-sensical preconceptions could delimit, with any significant degree of accuracy, the class of expressions to be accounted for by PS theory.

Pursuing these hypotheses further is an inherently interdisciplinary endeavour that promises to lead to a clearer understanding of the division of labor between syntax and discourse in the composition of complex expressions. If, as I suspect, more constructions than customarily assumed turn out to fall outside the limits of PS theory, this will be a welcome result enabling a significant simplification of the theory of GP.

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