EXPLANATIONS AND 'ENGINEERING SOLUTIONS'? ASPECTS OF THE RELATION BETWEEN MINIMALISM AND HPSG

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Papers like Levine and Sag (2003), Müller (2013) show what can be done.

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Minimalism is concerned with '… what conditions on the human language faculty are imposed by considerations of virtual conceptual necessity?' (Chomsky 1995a: 385)

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It seems to have no clear meaning.

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As Lappin, Levine and Johnson (2000) note, biologists do not ask of physical organs how closely they approach an optimal solution to design conditions that the system must meet to be usable at all.

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There is no basis for the idea that Minimalism is more explanatory than other frameworks.

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Because the relevant phrase type only allows a PP as a non-head daughter (Sag 1997).
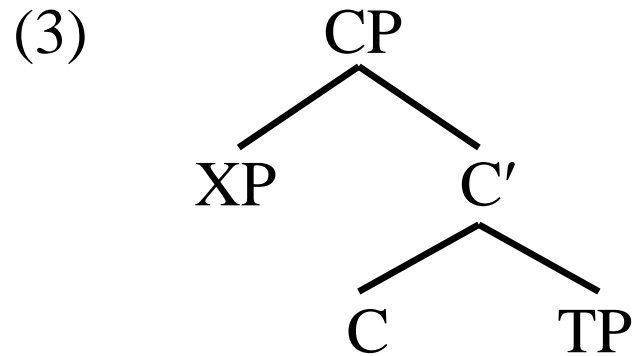
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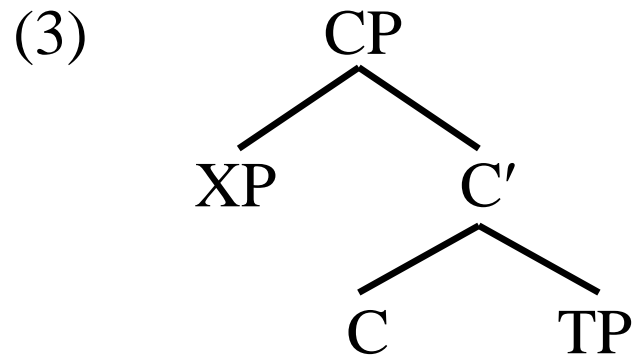
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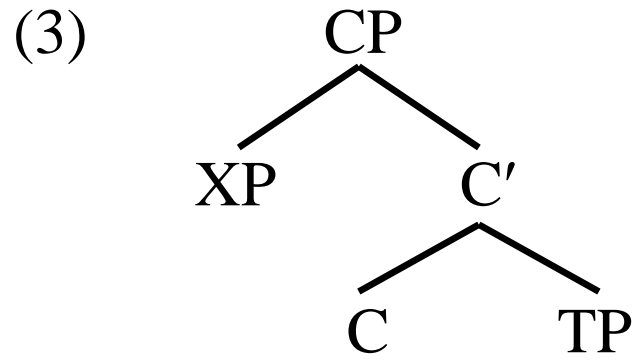
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The Minimalist answer:

Because the relevant phonologically empty complementizer only allows a PP as its specifier.

These are different answers, but there is no reason at all to think that one is just engineering whereas the other offers an explanation.

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But like other approaches, Minimalism tries to make sense of syntactic phenomena and provides analyses (or at least sketches of analyses). The analyses can be compared with those in other frameworks.

3. Differences between Minimalism and HPSG that are not so important

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Some features of Minimalism are not essential in that Minimalism would still be Minimalism without them. Others are essential, and without them it would be a different framework.

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But Minimalism would still be Minimalism if its practitioners developed a taste for detailed formal analyses.

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'the MP does encourage lack of concern for the data, above and beyond what is unfortunately already the norm in formal syntax, because the connection between analysis and data is allowed to be remote.' (Bender 2002: 435)

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It is not clear that there are significant contrasts here, which could support different analyses.

Minimalism would not be a new framework if the practitioners became more careful about data.

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No argument seems to be offered for the procedural approach.

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(7) An X and Y can be combined to form a larger X or Y
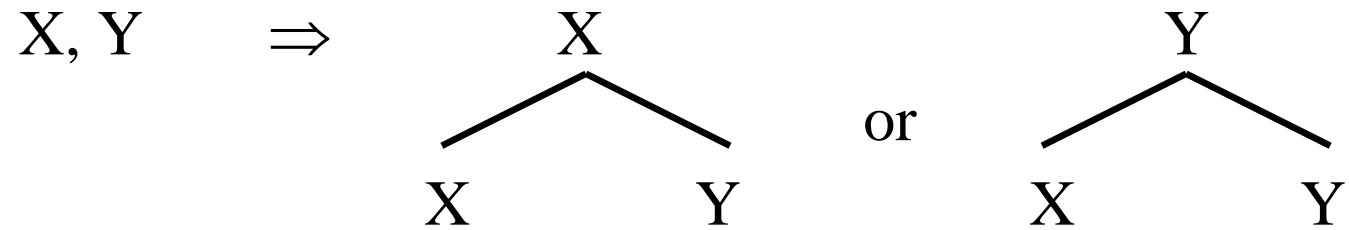
X, Y   ⟹   X   or   Y
                    ╱   ╲   ╱   ╲
                 X   Y   X   Y

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The other Minimalist procedures (Agree and Move/Internal Merge) could also be reformulated in declarative terms.

4. Differences between Minimalism and HPSG that are important

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There are at least three features of Minimalism which seem essential.

4.1. Complex vs. relatively simple structures
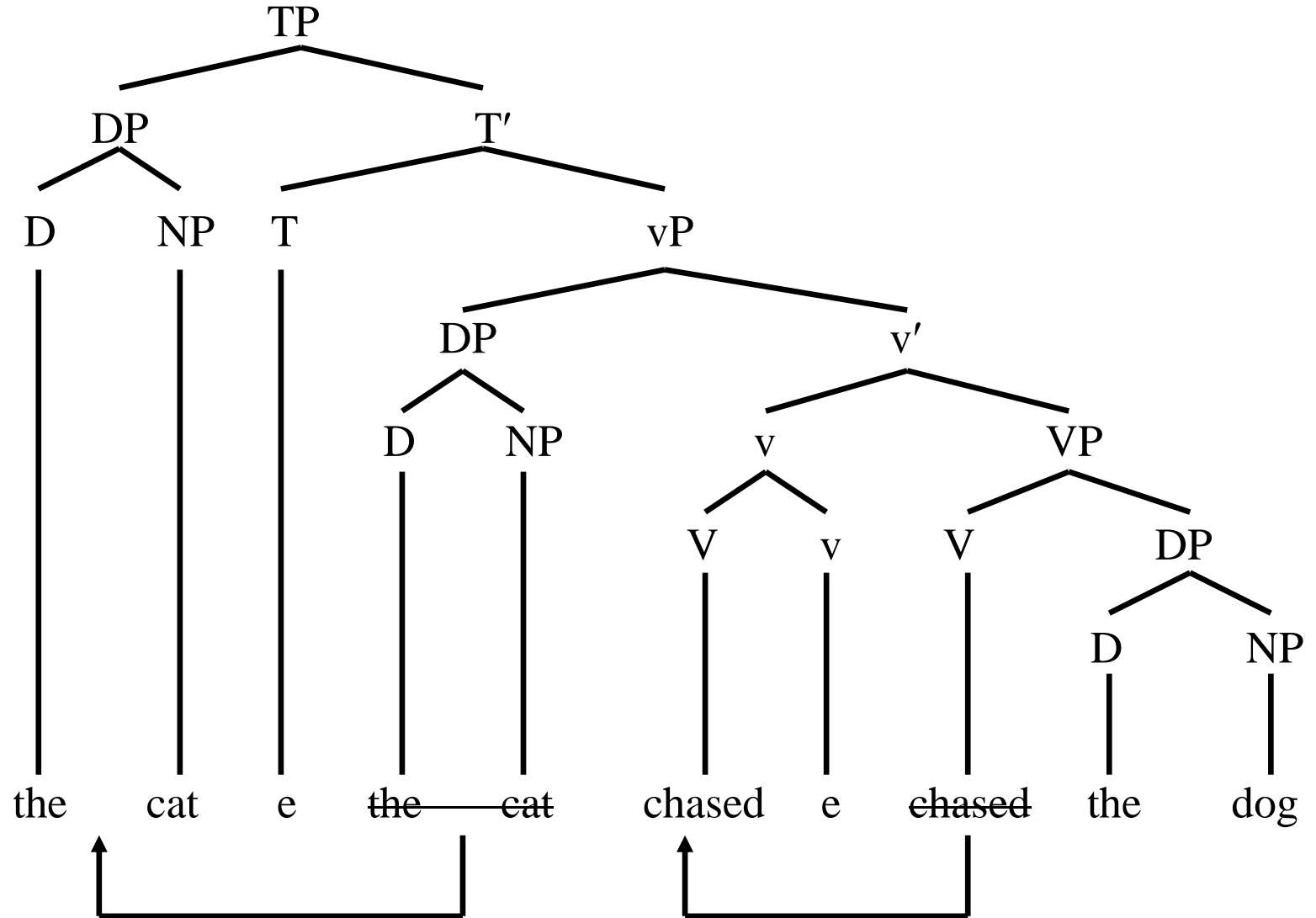
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Here is the structure for a very simple sentence:

(9)

```
                                    TP
                          _____
                         DP                       T′
                      _____              _____
                     D      NP         T                 vP
                     |       |         |         _____
                     |       |         |        DP                 v′
                     |       |         |      _____         _____
                     |       |         |     D     NP        v           VP
                     |       |         |     |      |      _____       _____
                     |       |         |     |      |     V    v      V       DP
                     |       |         |     |      |     |    |      |      _____
                     |       |         |     |      |     |    |      |     D    NP
                    the     cat        e    the    cat  chased e   chased the    dog
```

the · cat · e · ~~the~~ · ~~cat~~ · chased · e · ~~chased~~ · the · dog

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    [$_{IP}$ sing]$_i$ to [$_{VP}$ tried t$_i$] $\Rightarrow$
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See Borsley (2001) for critical discussion.

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There is no basis for such a belief.

Probably also important are various assumptions about 'uniformity' (Culicover and Jackendoff 2005).

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It is essentially an extreme version of the approach to relative clauses developed in Pollard and Sag (1994: chapter 5)

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The contrast between the two approaches can be illustrated with unbounded dependency constructions, such as *wh*-interrogatives and relative clauses.

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(12) a. the man [who Kim talked to]
   b. the man [(that) Kim talked to]
   c. a man [to whom to talk]
   d. a man [for you to talk to]
   e. a man [to talk to]

Detailed analyses assuming phrase types/constructions are provided in Sag (1997, 2010) and Ginzburg and Sag (2000).

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We might have eight complementizer as follows:

C-element	Form	Complement	Specifier	Aux-attraction	N′-modification
main-finite-*wh*-interrogative	∅	finite TP	int-*wh*-DP/PP/AP/AdvP	yes	no
subordinate-finite-*wh*-interrogative	∅	finite TP	int-*wh*-DP/PP/AP/AdvP	no	no
non-finite-*wh*-interrogative	∅	Non-finite null-subject TP	int-*wh*-DP/PP/AP/AdvP	no	no

C-element	Form	Complement	Specifier	Aux-attraction	N′-modification
finite-*wh*-relative	∅	finite TP	rel-*wh*-DP/ PP	no	yes
finite-empty-spec- relative	*that* or ∅	finite TP	empty-rel-DP	no	yes
non-finite *wh*-relative	∅	non-finite null subject TP	rel-*wh*-PP	no	yes
non-finite-empty-spec-relative-2	*for*	non-finite overt subject TP	empty-rel-DP	no	yes
non-finite-empty-spec-relative-1	∅	non-finite null subject TP	empty-rel-DP	no	yes

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The following might be proposed:

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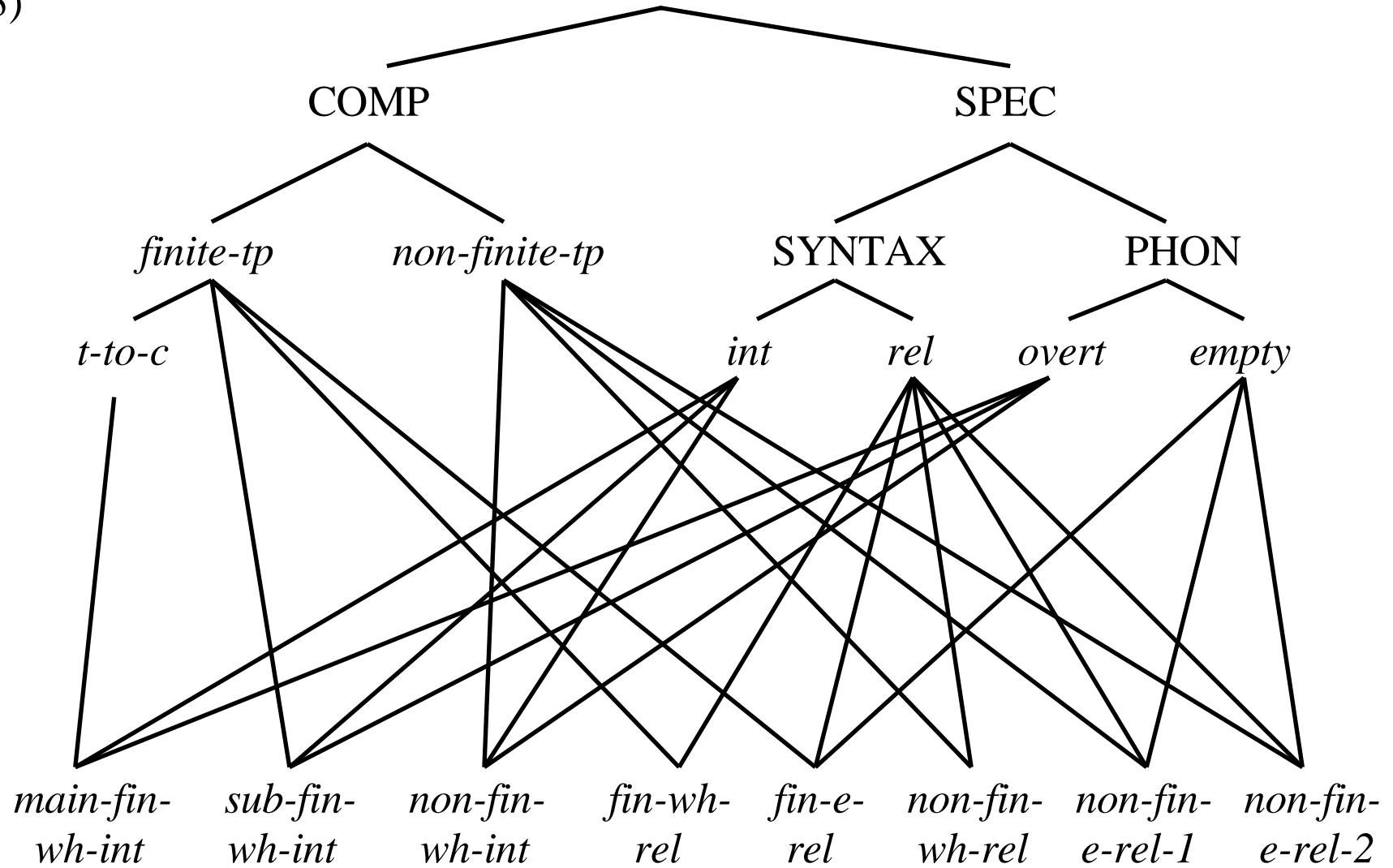
The types will need to be constrained as follows:

Type	Constraints
finite-tp	constrained to ensure that a head takes a finite TP complement
non-finite-tp	constrained to ensure that a head takes a non-finite TP complement
t-to-c	constrained to ensure that an auxiliary is moved to C
int	constrained to ensure that a head requires an interrogative specifier
rel	constrained to ensure that a head requires a relative specifier and modifies an N′ agreeing with the rel value of the specifier
overt	constrained to ensure that specifier has some phonology
empty	constrained to ensure the specifier has no phonology and that it is a DP

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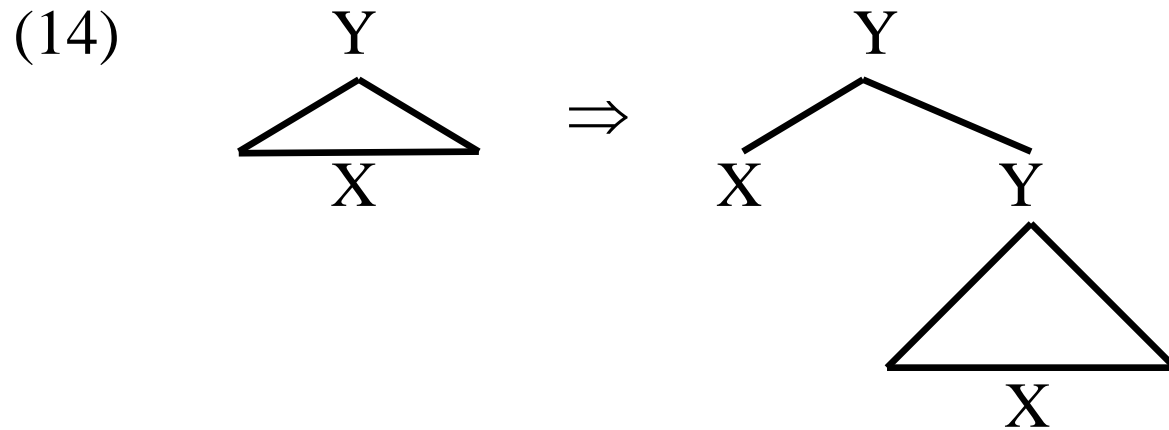
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(14)

```
      Y                          Y
     / \                        /  \
    /___\        ⇒             /    \
      X                       X      Y
                                    / \
                                   /___\
                                     X
```

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(15)

```
            Y
          /   \
        X       Y
               /\
              /  \
             /____\
               X
```
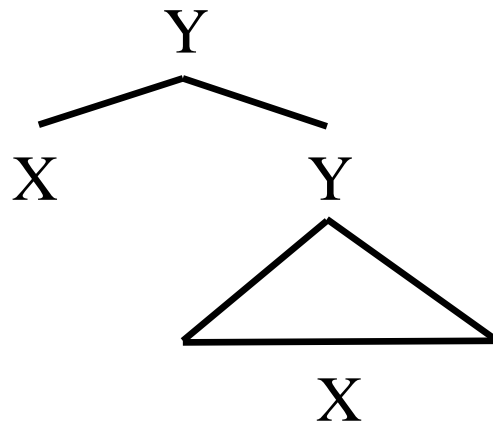
The deletion/non-realization of the lower S seems to require a non-local constraint.
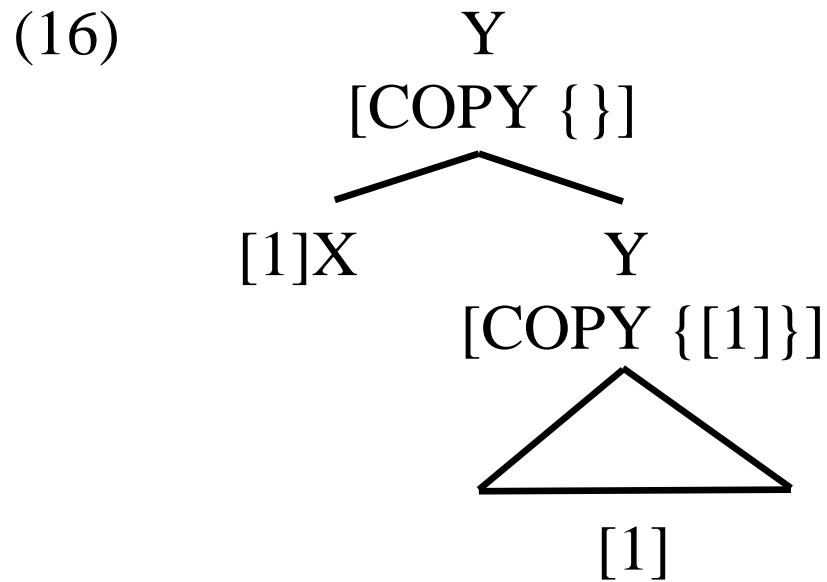
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(16)

Y
[COPY {}]

[1]X   Y
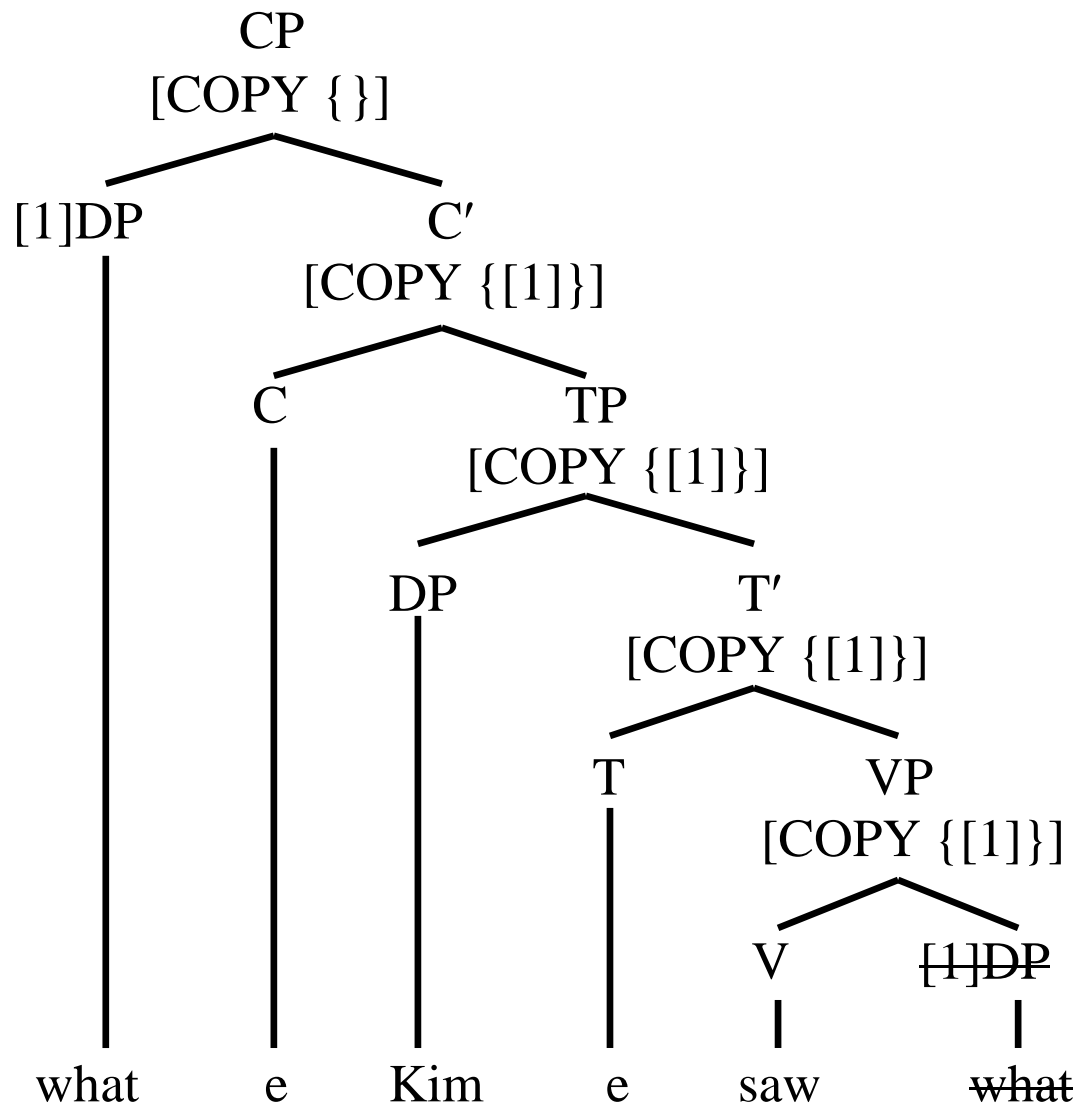   [COPY {[1]}]

[1]

This will mean that the bracketed *wh*-interrogative in (17) has the representation in (18).

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(17) I wonder [what Kim saw].

(18)

CP
[COPY {}]

[1]DP — C′
[COPY {[1]}]

C — TP
[COPY {[1]}]

DP — T′
[COPY {[1]}]

T — VP
[COPY {[1]}]

V — [1]DP

what   e   Kim   e   saw   ~~what~~

Deletion/non-realization of the lower *what* could be achieved by a stipulation that a daughter which appears in the COPY set of its mother makes no contribution to its mother's PHONOLOGY.

This interpretation of Internal Merge makes it a lot like a version of the SLASH approach to unbounded dependencies.

Deletion/non-realization of the lower *what* could be achieved by a stipulation that a daughter which appears in the COPY set of its mother makes no contribution to its mother's PHONOLOGY.

This interpretation of Internal Merge makes it a lot like a version of the SLASH approach to unbounded dependencies.

But (a) it is broader in scope and (b) it is less flexible.

The scope of Internal Merge

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    b. Kim [has disappeared ~~Kim~~].
    c. Kim [seems [~~Kim~~ to be clever]].

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(20) Who did you think [Lee saw ___]?

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(21) Who do you think [___ saw Lee]?

There is no obvious evidence for these claims in English.

If there is any evidence in other languages, this may just mean that they have rather different passive, unaccusative, or raising sentences.

The inflexibility of Internal Merge

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(22) a. the book [Kim bought ___]
    b. Lee is too important [for you to talk to ___].
    c. Lee is important enough [for you to talk to ___].
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It is more or less necessary to assume an invisible filler (a so-called empty operator) within Minimalist assumptions.

Unless there is some independent evidence for such invisible fillers, they are little more than an ad hoc device to maintain the Internal Merge approach.

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Within the SLASH approach, there is no reason to think that there will always be a filler in an unbounded dependency.

Conclusion: Unbounded dependencies with no filler cast doubt on Internal Merge but are no problem for SLASH.

- With Internal Merge one expects the gap to have all the properties of the filler.

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(23) a. Kim will sing, which Lee won't ___.
  b. Kim has sung, which Lee hasn't ___.
  c. Kim is singing, which Lee isn't ___.
  d. Kim is clever, which Lee isn't ___.
  e. Kim is in Spain, which Lee isn't ___.
  f. Kim wants to go home, which Lee doesn't want to ___.

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    e. Kim is in Spain, which Lee isn't ___ .
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Which here appears to be the ordinary nominal *which* but the gap is a VP, an AP, or a PP.

One response to these data might be to propose that *which* in these examples is not the normal nominal *which* but a pronominal counterpart of the categories which appear as complements of an auxiliary, mainly various kinds of VP.

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But ordinary VP complements of an auxiliary cannot appear as fillers in a relative clause, as shown by the (b) examples in the following:

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But ordinary VP complements of an auxiliary cannot appear as fillers in a relative clause, as shown by the (b) examples in the following:

(24) a. This is the book, which Kim will read ___.
  b. *This is the book, [read which] Kim will ___.
(25) a. This is the book, which Kim has read ___.
  b. *This is the book, [read which] Kim has ___.
(26) a. This is the book, which Kim is reading ___.
  b. *This is the book, [reading which] Kim is ___.

There is also evidence from coordination that *which* is an NP

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(27) Kim has often ridden a camel, which most people haven't ___ and some consider ___ too dangerous.

There are similar examples with a topicalized demonstrative pronoun.

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(28) a. They can only do their best and that they certainly will ___.

<div align="right">(http://www.britishcycling.org.uk/web/site/BC/gbr/News2008/
200807018_Jamie_Staff.asp)</div>

b. Now if the former may be bound by the acts of the legislature, and this they certainly may ___, ...

<div align="right">(Thomas Christie, <i>The Analytical Review, or History of
Literature, Domestic and Foreign, on an Enlarged Plan</i>,
Princeton University, 1792, p. 503)</div>
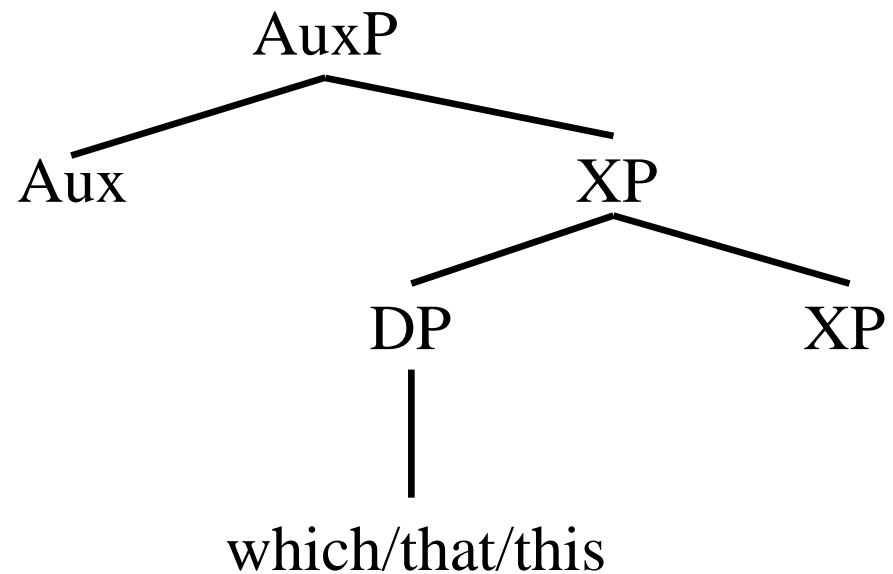
c. It was thought that he would produce a thought provoking chapter, and this he certainly has ___.

<div align="right">(J. B. Cullingworth (ed.), <i>British Planning: 50 years of Urban
and Regional Policy</i>, Continuum International, 1999, p. 13)</div>

One might try to accommodate the data by allowing the complement of an auxiliary to have a DP realized as *which* or *that* adjoined to it, as in (29).

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(29)

```
                    AuxP
                   /    \
                 Aux     XP
                        /   \
                      DP     XP
                      |
              which/that/this
```

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It is also not clear how one could ensure that a demonstrative introduced in such a structure is fronted. In other words, it is not clear how an example like the following, with or without *sing*, could be excluded:

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It is also not clear how one could ensure that a demonstrative introduced in such a structure is fronted. In other words, it is not clear how an example like the following, with or without *sing*, could be excluded:

(31) *Kim will that/this (sing).

Within the SLASH approach, it is possible to assume that certain positions allow a 'dishonest gap' (Webelhuth 2008), one whose LOCAL value and SLASH value do not match.

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(32)

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$$\begin{bmatrix} \text{LOCAL VP} \\ \text{SLASH \{NP\}} \end{bmatrix}$$

Conclusion: Filler–gap mismatches are problematic for Internal Merge but no problem for SLASH.

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(33) Pa   ddyn werthodd   Ieuan y ceffyl iddo   **fo**?
     which man   sell.PAST.3SG Ieuan the horse to.3SGM he
     'Which man did Ieuan sell the horse to?'

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     'Which man did Ieuan sell the horse to?'

There is evidence that such examples involve the same mechanism as examples with a gap (Willis 2011, Borsley 2013).

One suggestion is that rather than being deleted, the lower X is (somehow) turned into a pronoun (McCloskey 2006).

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This approach also suggests that the filler should be pronominal when there is an RP, but it does not have to be.

Another suggestion is that when there is an RP, there is a gap somewhere near the RP.

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Willis (2011) proposes that a PP whose head has an RP as its object may have a coindexed operator in its specifier position which undergoes A′-movement.

(34)

PP

DP_i   P'

P   RP_i
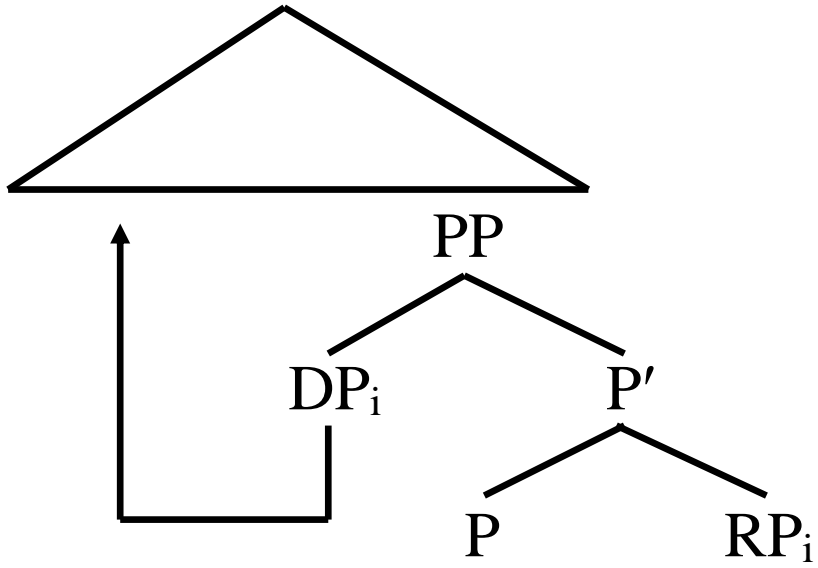
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(35) a. Who with?
     b. What about?
     c. Who for?

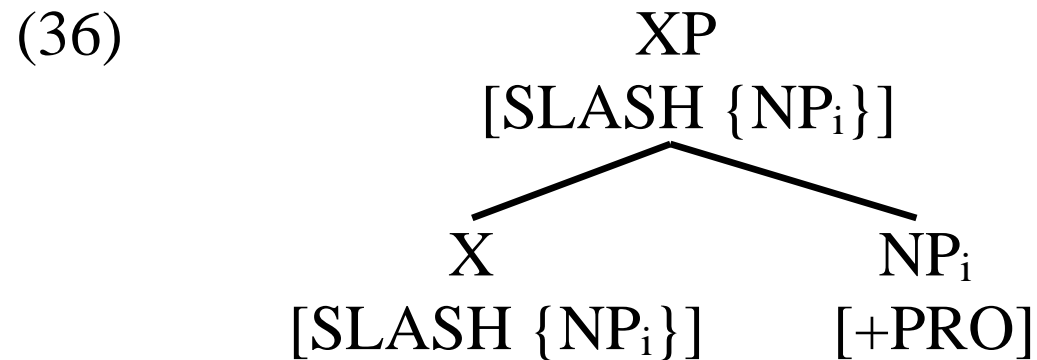This involves a structure without independent motivation.

In English, examples like the following seem to provide some support for a Spec PP analysis:

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     c. Who for?

Welsh does not have examples like this.

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(36)

$$
\begin{array}{c}
\text{XP} \\
[\text{SLASH } \{NP_i\}]
\end{array}
$$

$$
\begin{array}{cc}
\text{X} & \text{NP}_i \\
[\text{SLASH } \{NP_i\}] & [+\text{PRO}]
\end{array}
$$

The pronominal argument may be an ordinary pronoun (Borsley 2010, 2013) or one with a non-empty SLASH value (Crysmann 2012, 2016).

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(36)

$$XP$$
$$[SLASH \{NP_i\}]$$

$$X \qquad\qquad NP_i$$
$$[SLASH \{NP_i\}] \qquad [+PRO]$$
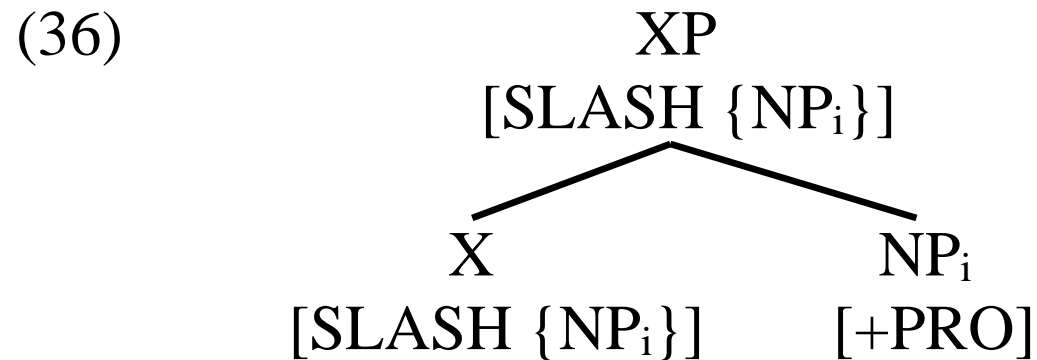
The pronominal argument may be an ordinary pronoun (Borsley 2010, 2013) or one with a non-empty SLASH value (Crysmann 2012, 2016).

Conclusion: The similarities and differences between gaps and RPs are problematic for Internal Merge but no problem for SLASH.

General conclusion: Movement/Internal Merge is less able than SLASH to accommodate the full range of unbounded dependency phenomena.

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See Borsley (2012).

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- Movement/Internal Merge is less able than SLASH to accommodate the full range of unbounded dependency phenomena.

REFERENCES

Aoun, J. and Y-H. A. Li (2003). *Essays on the representational and derivational nature of grammar: The diversity of* wh-*constructions.* Cambridge, MA: MIT Press.

Arnold, D. and R. D. Borsley (2010). Auxiliary-stranding relative clauses. In S. Müller (ed.), *Proceedings of the HPSG10 Conference.* Stanford, CA: CSLI Publications, 80–100.

Bender, E. (2002). Review of R. Martin, D. Michaels and J. Uriagereka (eds.), *Step by step: Essays on Minimalist syntax in honor of Howard Lasnik*, Cambridge, MA: MIT Press. *Journal of Linguistics* 38, 432–439.

Borsley, R. D. (2001). What do prepositional complementizers do? *Probus* 13, 155–171.

Borsley, R. D. (2006). Syntactic and lexical approaches to unbounded dependences. *Essex Research Reports in Linguistics* 49, 31–57.

Borsley, R. D. (2010). An HPSG approach to Welsh unbounded dependencies. In S. Müller (ed.), *Proceedings of the HPSG10 Conference*. Stanford, CA: CSLI Publications, 47–67.

Borsley, R. D. (2012), Don't move!, *Iberia* 4.1, 110-139.

Borsley, R. D. (2013). On the nature of Welsh unbounded dependencies. *Lingua* 133, 1–29.

Chomsky, N. (1995a). Bare phrase structure. In G. Webelhuth (ed.), *Government and Binding Theory and the Minimalist Program.* Oxford: Blackwell, 383–439.

Chomsky, N. (1995b). *The Minimalist Program.* Cambridge, MA: MIT Press.

Chomsky, N. (2000). Minimalist inquiries: The framework. In R. Martin, D. Michaels and J. Uriagereka (eds.), *Step by step: Essays on Minimalist syntax in honor of Howard Lasnik.* Cambridge, MA: MIT Press, 89–155.

Chomsky, N. (2002). *On nature and language*. Cambridge: Cambridge University Press.

Crysmann, B. (2012). Resumption and islandhood in Hausa. In P. de Groote and M-J. Nederhof (eds.), *Formal Grammar. 15th and 16th International Conference on Formal Grammar, FG 2010 Copenhagen, Denmark, August 2010, FG 2011 Lubljana, Slovenia, August 2011*, volume 7395 of Lecture Notes in Computer Science, pages 50–65, Springer.

Crysmann, B. (2016). An underspecification approach to Hausa resumption, *Proceedings of the Joint 2016 Conference on Head-driven Phrase Structure Grammar and Lexical Functional Grammar*, 194-214.

Culicover, P. W. and R. Jackendoff (2005). *Simpler syntax*. Oxford: Oxford University Press.

Ginzburg, J. and I. A. Sag (2000). *Interrogative investigations: The form, meaning and use of English interrogatives*. Stanford, CA: CSLI Publications.

Kayne, R. S. (1999). Prepositional complementizers as attractors. *Probus* 11.1, 39–73.

Lappin, S., R. D. Levine and D. E. Johnson (2000). The revolution confused: A response to our critics. *Natural Language & Linguistic Theory* 18, 873–890.

Levine, R. D., and I. A. Sag (2003), Some empirical issues in the grammar of extraction, in S. Mueller (ed.). *Proceedings of the HPSG03 Conference*, 236–256, Stanford: CSLI Publications.

McCloskey, J. (2002). Resumption, successive cyclicity and the locality of operations. In S. D. Epstein and T. D. Seeley (eds.), *Derivation and explanation in the Minimalist Program*. Oxford: Blackwell, 184–226.

McCloskey, J. (2006). Resumption. In M. Everaert and H. van Riemsdijk (eds.), *The Blackwell companion to syntax*. Oxford: Blackwell, 94–117.

Müller, S. (2013). Unifying everything: Some remarks on Simpler Syntax, Construction Grammar, Minimalism and HPSG. *Language* 89, 920–950.

Newmeyer, F. J. (2003). Review article on Chomsky, *On nature and language*; Anderson and Lightfoot, *The language organ: Linguistics as cognitive physiology*; and Bichakjian, *Language in a Darwinian perspective*. *Language* 79, 583–599.

Pollard, C. and I. A. Sag (1994), *Head-driven Phrase Structure Grammar*, Chicago: University of Chicago Press

Postal, P. M. (2003). (Virtually) conceptually necessary. *Journal of Linguisics* 39, 599–620.

Sag, I. A. (1997). English relative clause constructions. *Journal of Linguistics* 33, 431–484.

Sag, I. A. (2010). English filler–gap constructions. *Language* 86, 486–545.

Webelhuth, G. (2008). A lexical-constructional approach to 'movement mismatches'. Presented at the Fifth International Conference on Construction Grammar, The University of Texas at Austin, September 26–28, 2008.

Willis, D. W. E. (2011). The limits of resumption in Welsh *wh*-dependencies. In A. Rouveret (ed.), *Resumptive pronouns at the interfaces*. Amsterdam: John Benjamins, 189–222.