'Mismatch' Relatives

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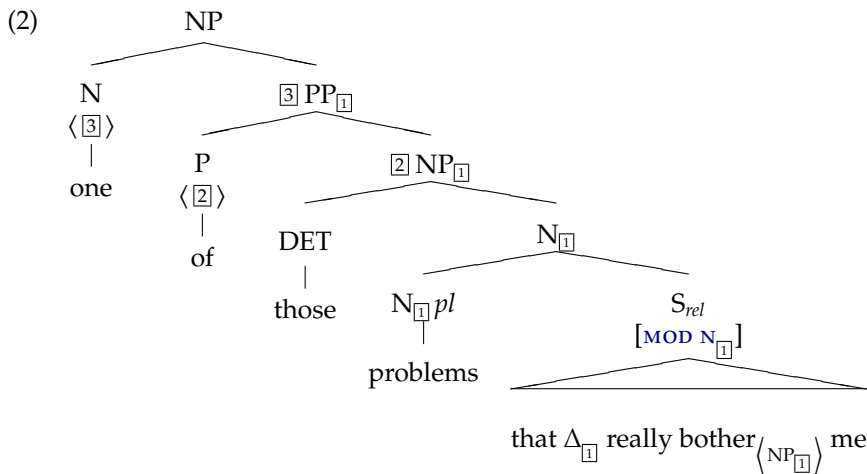
1 Phenomenon

- (1) is a perfectly normal example of a restrictive relative in a partitive NP, for which (2) is a plausible representation:

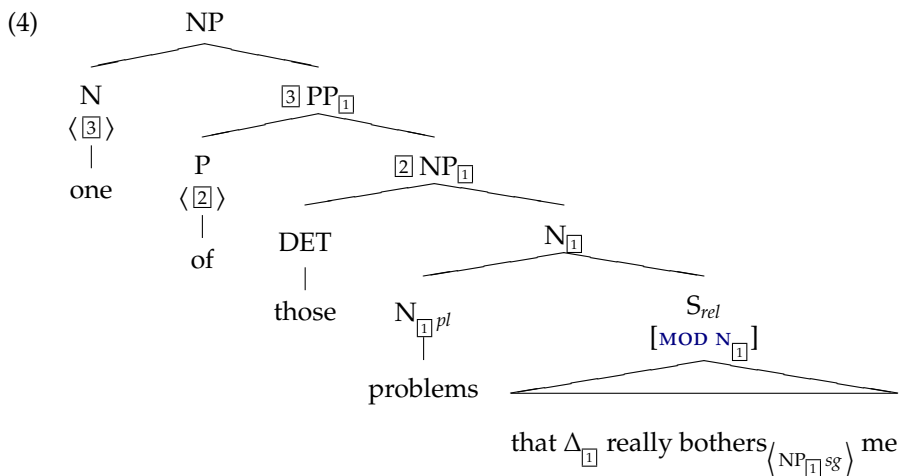 (1) This is *one of those problems that really bother me*.

- I assume that the quantity word *one* is the nominal head which selects a non-predicative PP complement headed by *of* (Kim (2002), Flickinger (2008), Kim and Sells (2008)); I assume the analysis of relative clauses essentially as in Sag (1997).

- I assume indices are collections of features, including a NUMBER feature.

(2)

```
                      NP
            _____
          N                      3 PP_1
        ⟨ 3 ⟩            _____
          |             P                2 NP_1
         one          ⟨ 2 ⟩        _____
                        |         DET              N_1
                       of          |         _____
                                 those     N_1 pl          S_rel
                                    |                  [MOD N_1]
                                 problems        _____
                                            that Δ_1 really bother⟨NP_1⟩ me
```

- However, alongside (1), we also find examples like (3), which involve an agreement 'mismatch' between the Relative and the nominal it appears to modify:

  (3) This is *one of those problems that really bother*s *me*.

- In (3) *bothers* is singular (requires a singular subject), which means the relative clause must be singular (adjunct of a singular nominal). So in (4), 1 must be at once *singular*, and *plural*, which is impossible.

(4)

```
                      NP
            _____
          N                      3 PP_1
        ⟨ 3 ⟩            _____
          |             P                2 NP_1
         one          ⟨ 2 ⟩        _____
                        |         DET              N_1
                       of          |         _____
                                 those     N_1 pl          S_rel
                                    |                  [MOD N_1]
                                 problems        _____
                                            that Δ_1 really bothers⟨NP_1 sg⟩ me
```

[A Common Phenomenon]

- Examples like (3) are very common – in fact more common than examples that show 'normal' agreement, even in writing. Searching google books for *one of the things that bother(s) me* gives about 5860 results for the mismatch form *bothers*, compared to 698 for *bother*).

- Some examples from the BNC are given in (5).

[Examples]

(5) a. Dr Hemingway and colleagues [. . .] have also found one of the *genes* that *makes* malaria-transmitting mosquitoes resistant to pesticides such as DDT.   [AKD/871]

b. This generation of vipers has again bitten one of the *hands* that *was* stretched out in blessing it.   [B1J/1984]

c. They raised one of the *questions* that *has* been consistently debated.

d. He will try to train one of *the dogs* that *has* been brought in today.

e. This outstanding work [. . .] is one of the best *books* on economics and sustainable development that *has* ever been published.

f. The Cullen report is widely recognised as one of the most excellent *reports* that *has* ever been produced on matters that affect industrial safety.   [HHX/19354]

g. It was, and remains, one of the best *goals* that *has* ever been scored at Carrow Road. . . [Edward Couzens-Lake, *Norwich City in the Eighties*, Amberley Pub., Stroud, 2015]

- The 'mismatch' construction seems to pose a fundamental problem for existing theories of agreement (e.g. in HPSG Pollard and Sag (1994), Kathol (1999), Wechsler and Zlatić (2003), . . .).

- There is evidence for a similar construction in at least Maltese, Spanish, and Dutch.

- The construction has sometimes been mentioned in the literature (e.g. Huddleston and Pullum (2002:p506), Pinker (2014:p250)) and in some prescriptive grammars (e.g. Burchfield (2004:p30,550)). de Hoop et al. (n.d.) is a formal analysis of a similar construction in Dutch.

- Arnold and Lucas (2016) suggest an HPSG analysis for the construction.
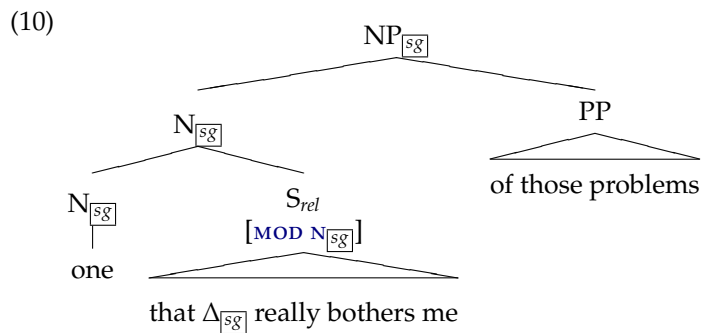
[Some Non-solutions to the Problem]

- Arnold and Lucas (2016) provide a relatively detailed discussion of the construction, and consider (and reject) a number of potential approaches.

  - ('acceptable ungrammaticality')
  - pretending that the NP *those problems* is singular. . .
  - analysing the PP *of those problems* as singular. . .
  - pretending that the Relative is really plural. . .
  - exploiting the difference between CONCORD and INDEX agreement . . .
  - using something like the 'restriction' operator of LFG (Kaplan and Wedekind, 1993). . .
  - reducing the mismatch to one of the other more familiar agreement mismatches. . .
  - assigning a different structure from that in (4). . .

[Other Agreement Mismatches]

- 'Respecification' (Huddleston and Pullum (2002:p354); also Maekawa (2015), and other cases of in Pollard and Sag (1994:Ch2))

(6) [That ten days we spent in Florida] was fantastic.

(7) [Whoever's dogs are running around outside] is in big trouble.

(8) [The hash browns at table nine] is getting impatient/are getting cold.

- Pseudo-partitives (measure phrases)

(9) a. That $pile_{sg}$ of $problems_{pl}$ that has_{sg} puzzled people down the ages. . .
b. That $pile_{sg}$ of $problems_{pl}$ that $have_{pl}$ puzzled people down the ages. . .
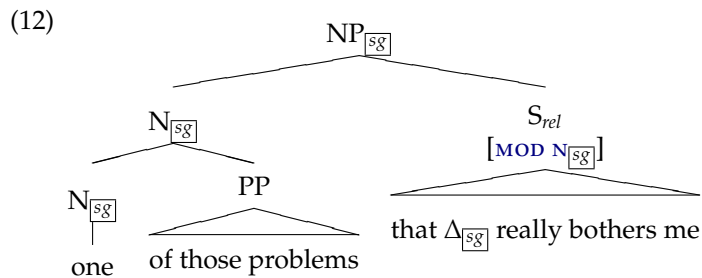
[A Different Structure (1)]

- Perhaps the Relative is modifying *one* (which is singular):

(10)

N$_{\boxed{sg}}$ ... NP$_{\boxed{sg}}$ ... PP ... of those problems ... N$_{\boxed{sg}}$ ... S$_{rel}$ [MOD N$_{\boxed{sg}}$] ... one ... that $\Delta_{\boxed{sg}}$ really bothers me

(11) This is one (that really bothers me) of those problems

[A Different Structure (2)]

- Perhaps the Relative is modifying *one of those problems* (which is singular):

(12)

NP$_{\boxed{sg}}$ ... N$_{\boxed{sg}}$ ... S$_{rel}$ [MOD N$_{\boxed{sg}}$] ... that $\Delta_{\boxed{sg}}$ really bothers me ... N$_{\boxed{sg}}$ ... PP ... one ... of those problems

(13) This is one of those problems (and it really bothers me).

- Neither of these structures can be right.

- They will give the wrong semantics: the semantics involves one of a collection of *problems that bother me* (not a set of problems, one of which bothers me)

[The Relative Attaches 'Low' (1)]

- Consider the interpretation of the pronoun *them* in (14):

(14) This is one of those problems that really bothers me.
I wish I could ignore *them*.

  - *Them* = 'the problems that really bother me'
  - *Them* ≠ 'the problems'

(15) This is one (that really bothers me) of those problems.
I wish I could ignore *them*.   (*them*='problems')

(16) This is one of those problems (and it really bothers me).
I wish I could ignore *them*. (*them*='problems')

(17) This is a problem that really bothers me. #I wish I could ignore *them*.

- The mismatch construction introduces a plurality of 'problems that bother me' into the discourse (not just a plurality of problems).

- This requires the Relative to attach 'low' (i.e. to *(those) problems*)

[The Relative Attaches 'Low' (2)]

- Superlative adjectives create contexts which permit NPIs like *ever* in their scope:

(18) a. the most impressive goals that have ever been scored here
      b. *the goals that have ever been scored here

(19) a. one of the most impressive goals that have ever been scored here
      b. *one of the goals that have ever been scored here

- NPIs are permitted in 'mismatch' relatives in the same way

(20) a. one of the most impressive *goals* that *has* ever been scored here
      b. *one of the *goals* that *has* ever been scored here

3

- The Relative is interpreted attached 'low' – somehow in the scope of the superlative, like other modifiers of the downstairs noun (i.e. *problems*) .

[The Relative Clause is Normal, and Singular]

- There are no restrictions on the kind of relative clause that is possible in the mismatch construction.

- Relatives involving *which* and other relative pronouns are possible:

  (21) a. This is one of those *problems* which really *bothers* me.
        b. She is one of those *people* who really *annoys* me.

- The relativized NP need not be a 'top-level' subject:

  (22) a. one of those *problems* that [we think [Δ_i *deserves* urgent attention]]
        b. one of those *problems* which$_i$ [we think [Δ_i *deserves* urgent attention]]

- Examples involving non-subject relatives can also be found:

  (23) a. This is one of those *numbers* (that) you can add Δ_i to *itself$_i$* to get an interesting result.
        b. He is one of those *people* (who$_i$) you should leave Δ_i strictly to *himself$_i$*.
        c. He is one of those *patients* (who$_i$) you can't understand Δ_i until you have met *his$_i$* mother.

- Bare relatives are possible:

  (24) This is one of those *problems* [we think [Δ_i *deserves* urgent attention]].

- Examples with pied-piping, and non-finite relative clauses:

  (25) a. He's one of those *people* [about whom$_i$] even *his$_i$* best friends have reservations.
        b. He's one of those *candidates* [about whose$_i$ electoral prospects] not even *his$_i$* strongest supporters could be certain.
        c. He may turn out to be one of those *musicians* [whose$_i$ appeal] is only clear when you actually see *him$_i$* live.

  (26) a. His sister had married one of the first *merchants* [to establish *himself* as a plantation owner in Virginia].
        b. The Weisswurst is one of those *sausages* [intended to be eaten without *its* skin].

[*One* is Critical]

- The presence of *one* is crucial to the construction:

  - The construction is impossible without *one*:
    (27) a. *those problems that really bother**s** me
          b. those problems that really bother   me
  - Other quantity words do not allow the construction:

  (28) $\left\{\begin{array}{c} \text{*Two} \\ \text{*Some} \\ \text{*Many} \\ \text{*All} \\ \text{*None} \end{array}\right\}$ of the problems that bother**s** you have been solved.

[Summary]

- Partitive *one* seems to license a singular relative clause modifying a plural partitive;

  (29) This is one of those *problems$_{pl}$* [that Δ_{sg} really *bothers* me].

- What we would like is a way of 'pluralising' the relative – but this is *difficult*. . .

[Semantics of Plurality]

- Singular vs plural is not just a morphosyntactic matter (e.g. Kamp and Reyle (1993), Winter and Scha (2015) and references there);

- We have to distinguish plural individuals from ordinary singular ones (cf. the way indices are treated in HPSG)

- We have to distinguish plural predicates from ordinary singular ones:

(30) a. No problem that fixes itself bothers me.
     b. $\neg\exists x[problem(x) \wedge fixes(x,x) \wedge bothers(x,me)$

(31) a. No problems that fix themselves are bothering me.
     b. $\neg\exists X[problem^*(X) \wedge fix^*(X,X) \wedge bother^*(X,me)$
     c. $\neg\exists X[problems(X) \wedge fix(X,X) \wedge bother(X,me)$

- Singular relatives involve singular indices *and* singular predicates – it's not enough to 'change the indices': 'pluralizing' a relative poses a serious formal challenge.
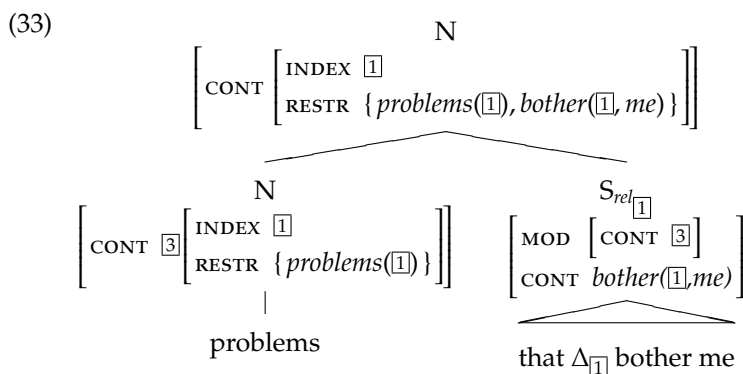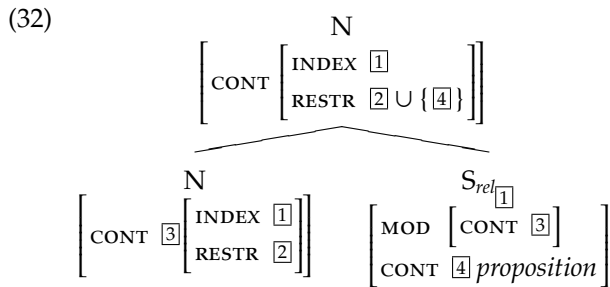
2 Analysis

[**Desiderata**]

- We want the analysis to be:
  - Precise;
  - Formalised;
  - If possible, conservative – compatible with existing theory and analyses;
- Suggestion: partitive *one* can license a singular relative clause.

2.1 Background

[**The Semantics of (Normal) Relatives**]

- Sag (1997)'s constructional analysis:
  - A relative clause is a clause with a REL value – the referential index of the relative pronoun;
  - when a relative clause modifies a nominal whose index is $\boxed{1}$ and whose restrictions are $\boxed{2}$:
    - the REL value is unified with the index of the index of the nominal
    - the result is a nominal whose index is $\boxed{1}$, and whose restrictions are $\boxed{2}$ plus the propositional content of the relative clause.

(32)
$$
\begin{array}{c}
\text{N} \\
\left[\text{CONT} \begin{bmatrix} \text{INDEX} & \boxed{1} \\ \text{RESTR} & \boxed{2} \cup \{\boxed{4}\} \end{bmatrix} \right]
\end{array}
$$

$$
\begin{array}{cc}
\text{N} & \text{S}_{rel\boxed{1}} \\
\left[\text{CONT } \boxed{3} \begin{bmatrix} \text{INDEX} & \boxed{1} \\ \text{RESTR} & \boxed{2} \end{bmatrix} \right] &
\left[\begin{matrix} \text{MOD} & [\text{CONT } \boxed{3}] \\ \text{CONT} & \boxed{4} \text{ proposition} \end{matrix} \right]
\end{array}
$$

(33)
$$
\begin{array}{c}
\text{N} \\
\left[\text{CONT} \begin{bmatrix} \text{INDEX} & \boxed{1} \\ \text{RESTR} & \{problems(\boxed{1}), bother(\boxed{1}, me)\} \end{bmatrix} \right]
\end{array}
$$

$$
\begin{array}{cc}
\text{N} & \text{S}_{rel\boxed{1}} \\
\left[\text{CONT } \boxed{3} \begin{bmatrix} \text{INDEX} & \boxed{1} \\ \text{RESTR} & \{problems(\boxed{1})\} \end{bmatrix} \right] &
\left[\begin{matrix} \text{MOD} & [\text{CONT } \boxed{3}] \\ \text{CONT} & bother(\boxed{1}, me) \end{matrix} \right] \\
| & \\
\text{problems} & \text{that } \Delta_{\boxed{1}} \text{ bother me}
\end{array}
$$

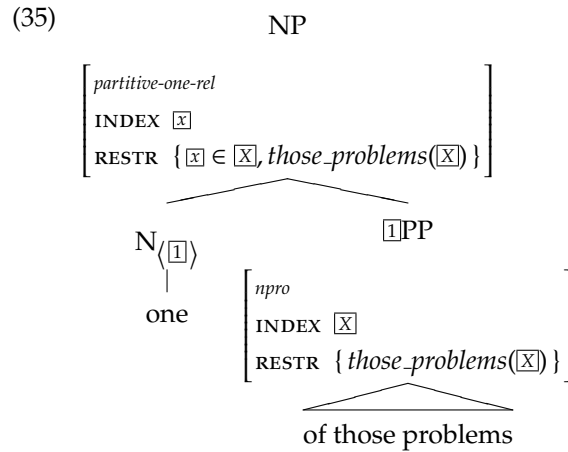[**Normal Partitive *one***]

- A lexical entry for normal partitive *one* (as in *one of the problems*).

(34)
$$
\begin{bmatrix}
\text{SS} \mid \text{LOC} & \begin{bmatrix} \text{CONT} & \begin{bmatrix} \textit{one-part-rel} \\ \text{INDEX} & \boxed{x}\begin{bmatrix} \text{NUM} & sg \end{bmatrix} \\ \text{RESTR} & \left\{\boxed{x} \in \boxed{X}\right\} \cup \boxed{R} \end{bmatrix} \end{bmatrix} \\[2em]
\text{ARG-ST} & \left\langle \begin{bmatrix} & PP_{of} \\ \text{LOC} \mid \text{CONT} & \begin{bmatrix} \textit{npro} \\ \text{INDEX} & \boxed{X} \\ \text{RESTR} & \boxed{R} \end{bmatrix} \end{bmatrix} \right\rangle
\end{bmatrix}
$$

- *One* combines with a non-predicative *of*-PP complement which denotes a plurality $\boxed{X}$ with restrictions $\boxed{R}$, …
- and produces a singular NP whose index $\boxed{x}$ is an element of the plurality.
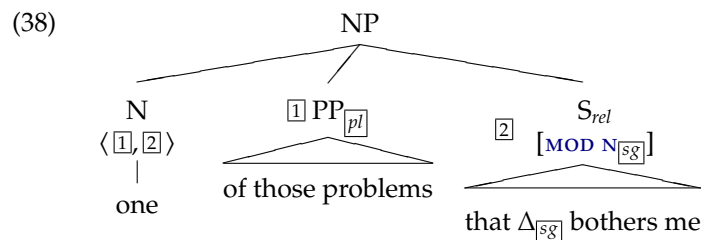
(35)

$$
\text{NP}
$$

$$
\begin{bmatrix}
\textit{partitive-one-rel} \\
\text{INDEX} & \boxed{x} \\
\text{RESTR} & \{\, \boxed{x} \in \boxed{X},\, \textit{those\_problems}(\boxed{X})\,\}
\end{bmatrix}
$$

$$
\text{N}_{\langle \boxed{1} \rangle}
$$
$$
\mid
$$
$$
\text{one} \qquad \begin{bmatrix} \textit{npro} \\ \text{INDEX} & \boxed{X} \\ \text{RESTR} & \{\, \textit{those\_problems}(\boxed{X})\,\} \end{bmatrix}
$$

$$
\boxed{1}\,\text{PP}
$$

of those problems

(36) $\lambda \mathcal{P}.One\ x[x \in X \wedge \textit{those\_problems}(X) \wedge \mathcal{P}(x)]$

2.2 Proposal

- We have suggested that *one* can also license a singular relative clause.

- The easiest way to capture this is to treat the relative clause as an (optional) complement of *one*, adding suitable additional restrictions to the resulting semantics ($\boxed{R'}$):

(37)
$$
\begin{bmatrix}
\text{SS} \mid \text{LOC} & \begin{bmatrix} \text{CONT} & \begin{bmatrix} \textit{partitive-one-rel} \\ \text{INDEX} & \boxed{x}\begin{bmatrix} \text{NUM} & sg \end{bmatrix} \\ \text{RESTR} & \left\{\boxed{x} \in \boxed{X}\right\} \cup \boxed{R}\ \cup \boxed{R'} \end{bmatrix} \end{bmatrix} \\[3em]
\text{ARG-ST} & \left\langle \begin{bmatrix} & PP_{of} \\ \text{LOC} \mid \text{CONT} & \begin{bmatrix} \textit{npro} \\ \text{INDEX} & \boxed{X} \\ \text{RESTR} & \boxed{R} \end{bmatrix} \end{bmatrix},\ \begin{bmatrix} & Relc \\ \text{REL} & \left\{\boxed{y}\right\} \\ \text{LOC} & \begin{bmatrix} \text{CONT} & \boxed{p} \end{bmatrix} \end{bmatrix} \right\rangle
\end{bmatrix}
$$

(38)
$$
\text{NP}
$$

$$
\begin{array}{ccc}
\text{N} & \boxed{1}\,\text{PP}_{\boxed{pl}} & \boxed{2}\ \ S_{rel} \\
\langle \boxed{1}, \boxed{2} \rangle & & [\text{MOD N}_{\boxed{sg}}] \\
\mid & & \\
\text{one} & \text{of those problems} & \text{that } \Delta_{\boxed{sg}} \text{ bothers me}
\end{array}
$$

- The problem now is to combine the content of the Relative (e.g. propositional content) with the content of the PP.

- This cannot be done directly (because the Relative is an open predication over singular entities, potentially containing other predicates over the same singular entities, and the PP denotes a plurality)

- We want a way to 'pluralize' the Relative.

- A solution is to 'distribute' the interpretation of the relative clause across the parts of the plurality $\boxed{X}$ denoted by the PP, by means of a condition that every atomic part of the plurality X satisfies the propositional content of the relative clause...

- The restriction we add is that every atomic part y of the plurality X should satisfy the proposition expressed by the Relative:

(39)
$$\boxed{R'} = \left\{ \begin{bmatrix} \text{QUANTS} & \left\langle \begin{bmatrix} \textit{foreach} \\ \text{INDEX} & \boxed{y} \\ \text{RESTR} & \{ \textit{partof}(\boxed{y},\boxed{X}), \textit{atomic}(\boxed{y}) \} \end{bmatrix} \right\rangle \\ \text{NUCLEUS} & \boxed{p} \end{bmatrix} \right\}$$

- In the case of *which bothers me*:

(40) a.
$$\left\{ \begin{bmatrix} \text{QUANTS} & \left\langle \begin{bmatrix} \textit{foreach} \\ \text{INDEX} & \boxed{y} \\ \text{RESTR} & \{ \textit{partof}(\boxed{y},\boxed{X}), \textit{atomic}(\boxed{y}) \} \end{bmatrix} \right\rangle \\ \text{NUCLEUS} & \textit{bothers}(\boxed{y},\textit{me}) \end{bmatrix} \right\}$$

   b. { *foreach*($\boxed{y}$, $\boxed{y} \in \boxed{X} \wedge$ *atomic*($\boxed{y}$), *bothers*($\boxed{y}$,*me*)) }

   c. { *foreach*($\boxed{y}$, $\boxed{y} \in \boxed{X}$, *bothers*($\boxed{y}$,*me*)) }

(41) one of *those problems* that *bothers* me

(42)
$$\begin{bmatrix} \textit{partitive-one-rel} \\ \text{INDEX} & \boxed{x} \\ \text{RESTR} & \{ \boxed{x} \in \boxed{X}, \textit{those\_problems}(\boxed{X}), \textit{foreach}(\boxed{y}, \boxed{y} \in \boxed{X}, \textit{bothers}(\boxed{y}, \textit{me})) \} \end{bmatrix}$$

(43)
<div align="center">NP</div>

$$\begin{bmatrix} \textit{partitive-one-rel} \\ \text{INDEX} & \boxed{x} \\ \text{RESTR} & \{ \boxed{x} \in \boxed{X}, \textit{those\_problems}(\boxed{X}), \textit{foreach}(\boxed{y}, \boxed{y} \in \boxed{X}, \textit{bothers}(\boxed{y}, \textit{me})) \} \end{bmatrix}$$

N $\langle \boxed{1}, \boxed{2} \rangle$ | one

$\boxed{1}$ PP$_{\boxed{pl}}$
$$\begin{bmatrix} \textit{npro} \\ \text{INDEX} & \boxed{X} \\ \text{RESTR} & \{ \textit{those\_problems}(\boxed{X}) \} \end{bmatrix}$$
of those problems

$\boxed{2}$ S$_{rel}$ [MOD N$_{\boxed{y}}$]
$$\begin{bmatrix} \text{CONT} & \textit{bothers}(\boxed{y}, \textit{me}) \end{bmatrix}$$
that $\Delta_{\boxed{y}}$ bothers me

[The Full Entry]

(44)

$$
\left[
\begin{array}{l}
\text{SS}\,|\,\text{LOC} \quad \text{CONT} \quad
\left[
\begin{array}{l}
\textit{partitive-one-rel} \\
\text{INDEX } \boxed{x}\!\left[\text{NUM } sg\right] \\[2ex]
\text{RESTR } \left\{\boxed{x} \in \boxed{X}\right\} \cup \boxed{R} \;\cup\;
\left\{
\left[
\begin{array}{l}
\text{QUANTS } \left\langle
\left[
\begin{array}{l}
\textit{foreach} \\
\text{INDEX } \boxed{y} \\
\text{RESTR } \left\{\textit{partof}(\boxed{y},\boxed{X}),\ \textit{atomic}(\boxed{y})\right\}
\end{array}
\right]
\right\rangle \\[2ex]
\text{NUCLEUS } \boxed{p}
\end{array}
\right]
\right\}
\end{array}
\right] \\[12ex]
\text{ARG-ST } \left\langle
\overset{\textit{PP}_{of}}{
\left[
\text{LOC}\,|\,\text{CONT}
\left[
\begin{array}{l}
\textit{npro} \\
\text{INDEX } \boxed{X} \\
\text{RESTR } \boxed{R}
\end{array}
\right]
\right]
},\
\overset{\textit{Relc}}{
\left[
\begin{array}{l}
\text{REL } \left\{\boxed{y}\right\} \\
\text{LOC } \left[\text{CONT } \boxed{p}\right]
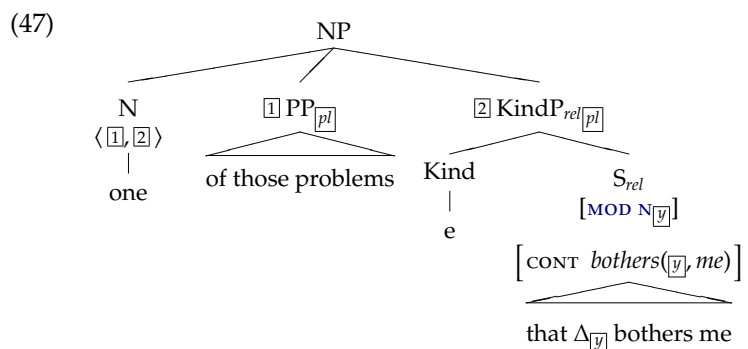\end{array}
\right]
}
\right\rangle
\end{array}
\right]
$$
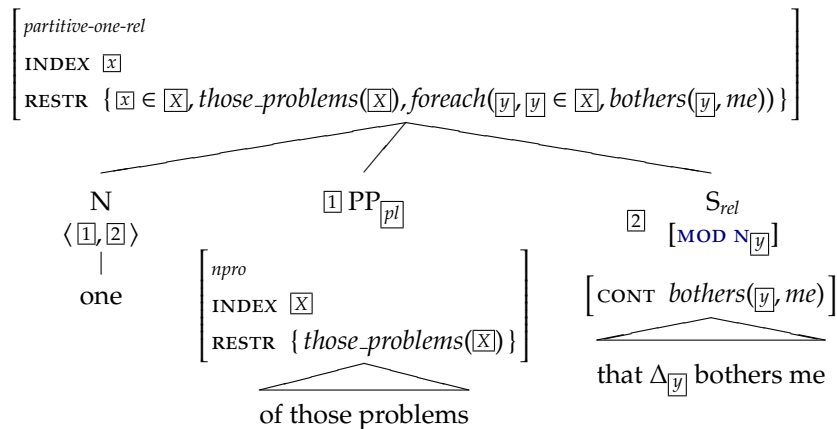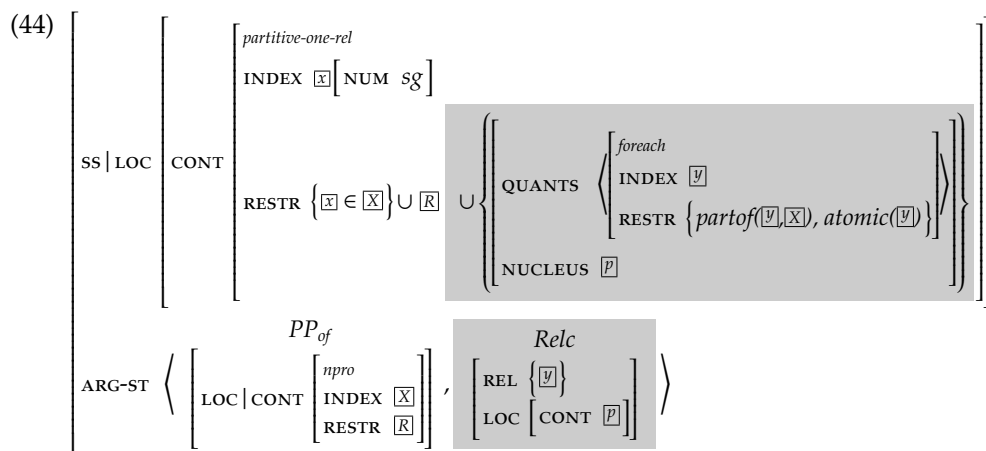
- In words: partitive *one* takes a plural PP and (optionally) a singular relative clause; it combines the restrictions on the PP with the condition that every atomic element in the PPs denotation must satisfy the proposition expressed by the relative clause.

- This treats the Relative as completely singular throughout, and gets the right interpretation:

(45) a. This is one of those problems that really bothers me.
      b. This is one of a set (plurality) of problems, each of which bothers me.

(46) This is one of those problems that really bothers me. I wish I could ignore *them*. (*them*='the problems each of which bothers me')
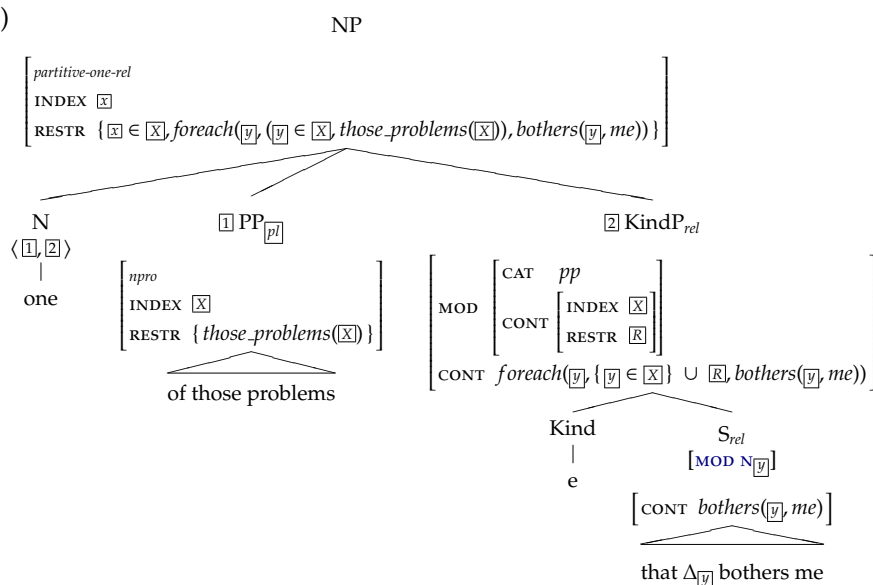
[An Equivalent Alternative]

- Another way of thinking about this construction might be that it involves a (covert) 'kind' – the kind of thing that consists of individuals that satisfy the propositional content of the relative clause – e.g. the plurality each of whose individual parts bothers me.

- An observationally equivalent formulation could introduce a phrasal node denoting such a kind, and a (phonetically empty) head to license it (e.g. Kind and KindP – see (49)).

- But the distribution of this phrase must still be constrained by the presence of *one* – see (51) and (49).
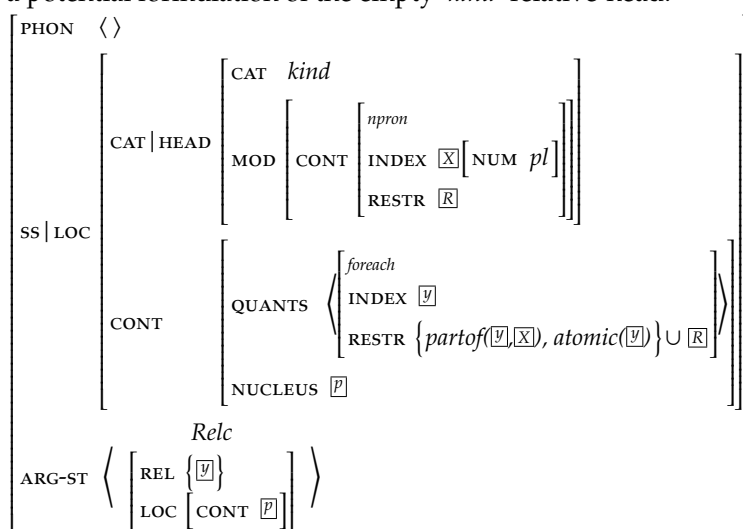
[Alternative formulation]
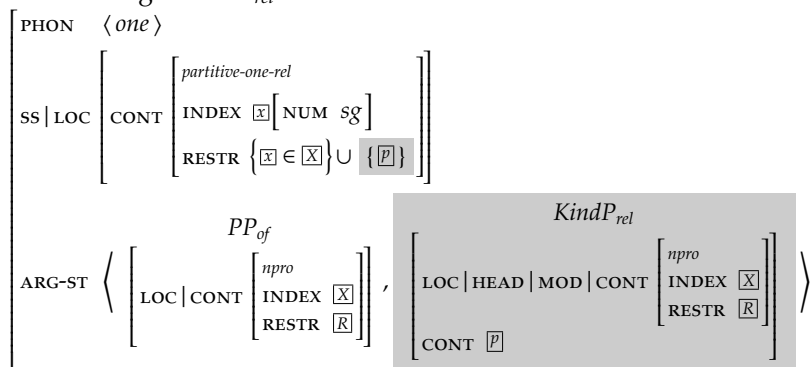
(47)

[Alternative Formulation]

(48)

$$NP$$

$$\begin{bmatrix} \textit{partitive-one-rel} \\ \text{INDEX } \boxed{x} \\ \text{RESTR } \{\boxed{x} \in \boxed{X}, \textit{foreach}(\boxed{y}, (\boxed{y} \in \boxed{X}, \textit{those\_problems}(\boxed{X})), \textit{bothers}(\boxed{y}, me))\} \end{bmatrix}$$

N $\langle \boxed{1}, \boxed{2} \rangle$
|
one

$\boxed{1}$ PP$_{\boxed{pl}}$
$$\begin{bmatrix} \textit{npro} \\ \text{INDEX } \boxed{X} \\ \text{RESTR } \{\textit{those\_problems}(\boxed{X})\} \end{bmatrix}$$

of those problems

$\boxed{2}$ KindP$_{rel}$
$$\begin{bmatrix} \text{MOD} \begin{bmatrix} \text{CAT} & pp \\ \text{CONT} \begin{bmatrix} \text{INDEX } \boxed{X} \\ \text{RESTR } \boxed{R} \end{bmatrix} \end{bmatrix} \\ \text{CONT } \textit{foreach}(\boxed{y}, \{\boxed{y} \in \boxed{X}\} \cup \boxed{R}, \textit{bothers}(\boxed{y}, me)) \end{bmatrix}$$

Kind
|
e

S$_{rel}$
[MOD N$_{\boxed{y}}$]
$[\text{CONT } \textit{bothers}(\boxed{y}, me)]$

that $\Delta_{\boxed{y}}$ bothers me

[Alternative Entries (1)]

(49) a potential formulation of the empty '*kind*' relative-head:

$$\begin{bmatrix} \text{PHON} & \langle \rangle \\ \text{SS} \mid \text{LOC} \begin{bmatrix} \text{CAT} \mid \text{HEAD} \begin{bmatrix} \text{CAT} & \textit{kind} \\ \text{MOD} \begin{bmatrix} \text{CONT} \begin{bmatrix} \textit{npron} \\ \text{INDEX } \boxed{X}[\text{NUM } pl] \\ \text{RESTR } \boxed{R} \end{bmatrix} \end{bmatrix} \end{bmatrix} \\ \text{CONT} \begin{bmatrix} \text{QUANTS} \left\langle \begin{bmatrix} \textit{foreach} \\ \text{INDEX } \boxed{y} \\ \text{RESTR } \{\textit{partof}(\boxed{y}, \boxed{X}), \textit{atomic}(\boxed{y})\} \cup \boxed{R} \end{bmatrix} \right\rangle \\ \text{NUCLEUS } \boxed{p} \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} \left\langle \begin{bmatrix} \textit{Relc} \\ \text{REL } \{\boxed{y}\} \\ \text{LOC} [\text{CONT } \boxed{p}] \end{bmatrix} \right\rangle \end{bmatrix}$$

(50) a. which bothers me
       b. 'which$_X$ are such that [every one of them]$_y$ bothers me'

[Alternative Entries (2)]

(51) *one* selecting a KindP$_{rel}$:

$$\begin{bmatrix} \text{PHON} & \langle \textit{one} \rangle \\ \text{SS} \mid \text{LOC} \begin{bmatrix} \text{CONT} \begin{bmatrix} \textit{partitive-one-rel} \\ \text{INDEX } \boxed{x}[\text{NUM } sg] \\ \text{RESTR } \{\boxed{x} \in \boxed{X}\} \cup \{\boxed{p}\} \end{bmatrix} \end{bmatrix} \\ \text{ARG-ST} \left\langle \begin{bmatrix} PP_{of} \\ \text{LOC} \mid \text{CONT} \begin{bmatrix} \textit{npro} \\ \text{INDEX } \boxed{X} \\ \text{RESTR } \boxed{R} \end{bmatrix} \end{bmatrix}, \begin{bmatrix} KindP_{rel} \\ \text{LOC} \mid \text{HEAD} \mid \text{MOD} \mid \text{CONT} \begin{bmatrix} \textit{npro} \\ \text{INDEX } \boxed{X} \\ \text{RESTR } \boxed{R} \end{bmatrix} \\ \text{CONT } \boxed{p} \end{bmatrix} \right\rangle \end{bmatrix}$$

2.3 A Problem and a Refinement

- A feature of this analysis is that the singlar relative is not treated as a real modifier of the partitive PP.

- But this means we have no account of the possibility of NPIs in the Relative – recall:

(52) a. one of the most impressive *goals* that *has ever* been seen here
     b. one of the most impressive goals that have *ever* been seen here
     c. *one of the goals that have *ever* been seen here

- We need a way of getting the Relative into the scope of the superlative, most likely as a complement of *-est*, or similar, cf.

(53) a. This is the *most* interesting [*that we could ever hope for*].
     b. *This is the interesting [that we could ever hope for].

- Extraposition provides an existing (and independently motivated) technique.

[**Extraposition**]

- Kiss (2005) extraposition is a semantic relation – an extraposed phrase is interpreted 'downstairs'

- Approaches involving an 'EXTRAP' list which is passed around (Pollard and Sag (1994:p386), Keller (1995), Van Eynde (1996), Bouma (1996), Kim and Sag (2005), Kay and Sag (2012), Crysmann (2013)), with variations as to the contents of the list.

- I will assume a version of the latter.

[**A Simple Example**]

(54)
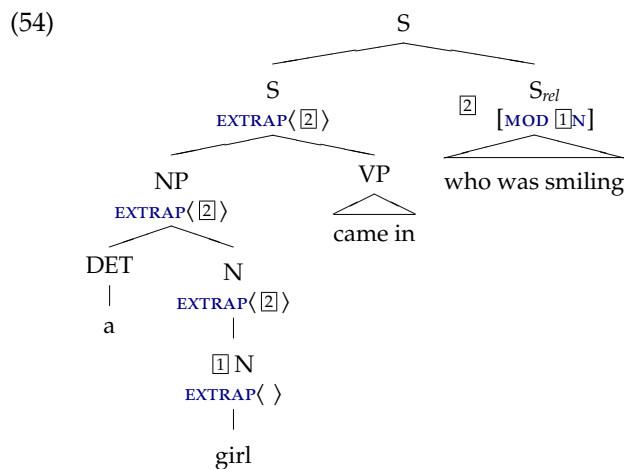
- Elements of the EXTRA list are passed down the tree to a point where they can be interpreted as complements or adjuncts;

- Instead of being realised locally, a complement or adjunct can be placed on the EXTRA list, and passed up the tree, to be realised later.

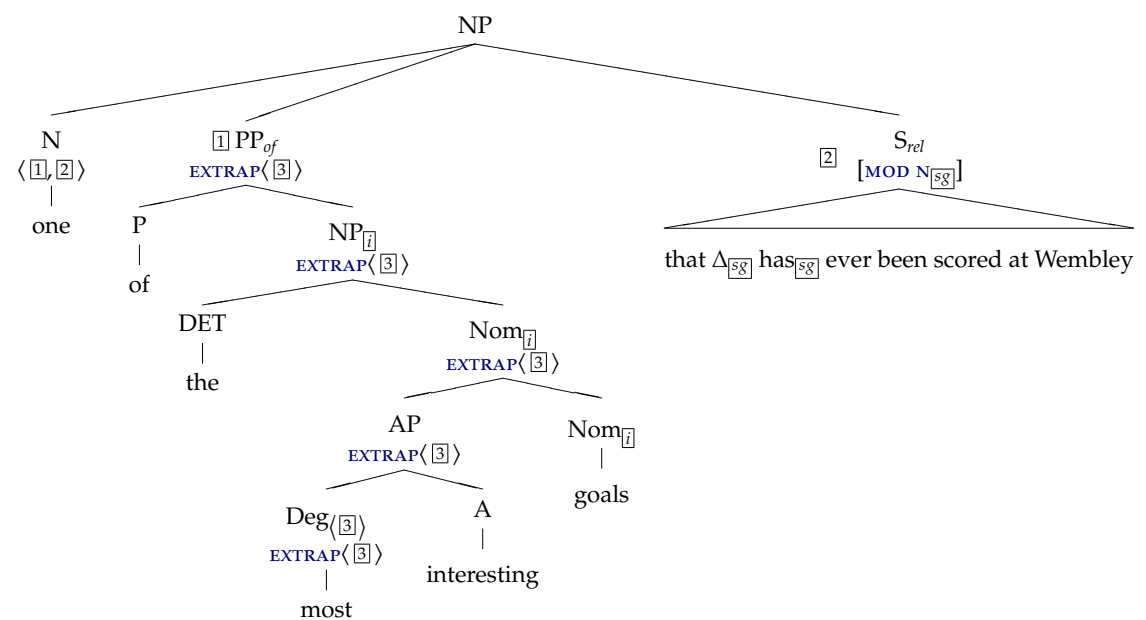[**A Superlative with a Normal Plural Relative**]

(55)

NP

NP
EXTRAP⟨3⟩

N
⟨1⟩
one

1 PP$_{of}$
EXTRAP⟨3⟩

P
of

NP$_{[i]}$
EXTRAP⟨3⟩

DET
the

Nom$_{[i]}$
EXTRAP⟨3⟩

AP
EXTRAP⟨3⟩

Deg$_{⟨3⟩}$
EXTRAP⟨3⟩
most

A
interesting

Nom$_{[i]}$
goals

3 S$_{rel}$
[MOD N$_{[pl]}$]

that Δ$_{[pl]}$ have$_{[pl]}$ ever been scored at Wembley
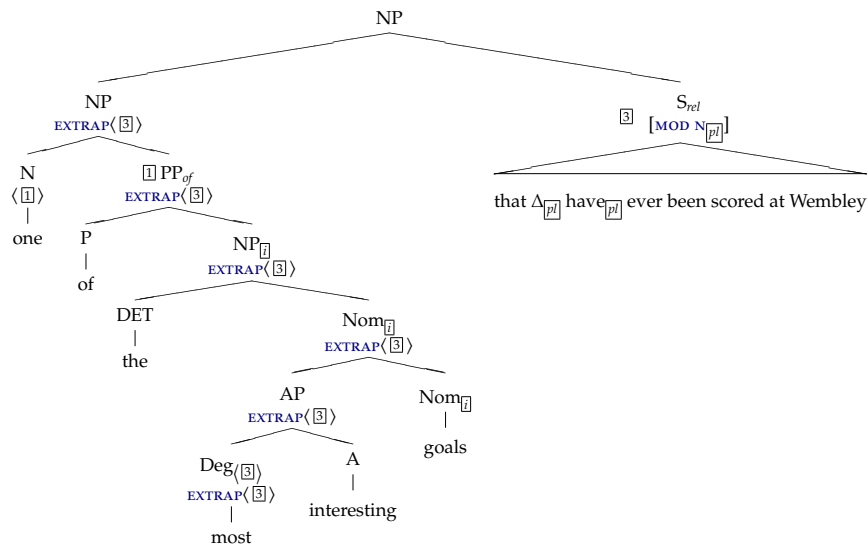
[A 'Mismatch' Relative using the KindP Approach]

(56)

NP

N
⟨1,3⟩
one

1 PP$_{of}$
EXTRAP⟨3⟩

P
of

NP$_{[i]}$
EXTRAP⟨3⟩

DET
the

Nom$_{[i]}$
EXTRAP⟨3⟩

AP
EXTRAP⟨3⟩

Deg$_{⟨3⟩}$
EXTRAP⟨3⟩
most

A
interesting

Nom$_{[i]}$
goals

3 KindP$_{rel}$ $_{[pl]}$

S$_{rel}$
[MOD N$_{[sg]}$]

that Δ$_{[sg]}$ has$_{[sg]}$ ever been scored at Wembley
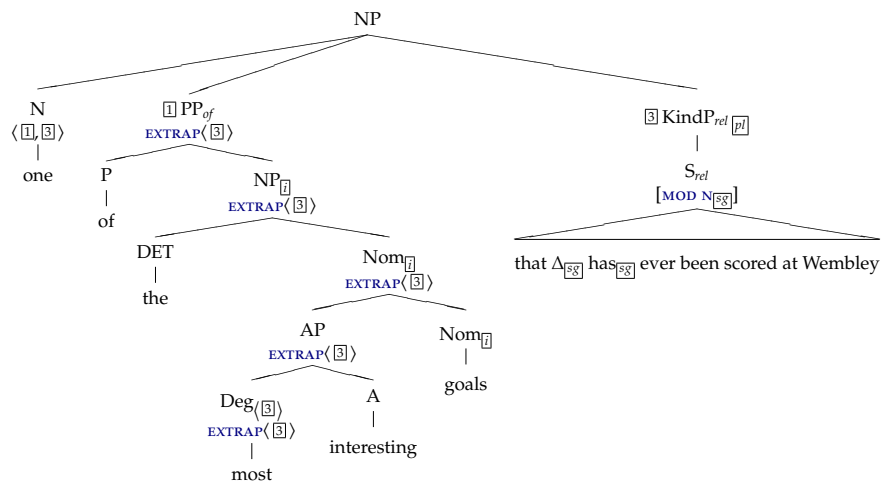
- But we do not need to use the 'KindP' approach, we just need to pass the 'pluralized' content down the extraposition path, i.e. set 3 to have plural content corresponding to the singular Relative (i.e. similar to (39)/(40a))

(57)

NP

N
⟨1,2⟩
one

1 PP$_{of}$
EXTRAP⟨3⟩

P
of

NP$_{[i]}$
EXTRAP⟨3⟩

DET
the

Nom$_{[i]}$
EXTRAP⟨3⟩

AP
EXTRAP⟨3⟩

Deg$_{⟨3⟩}$
EXTRAP⟨3⟩
most

A
interesting

Nom$_{[i]}$
goals

2 S$_{rel}$
[MOD N$_{[sg]}$]

that Δ$_{[sg]}$ has$_{[sg]}$ ever been scored at Wembley

[Final Version]

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- Instead of adding the 'pluralized' content of the singular relative to the interpretation of *one*, ...

- We pass the pluralized content of the relative clause into the *of*-PP;

- That is, we set ③ to (58):

(58)
$$\begin{bmatrix} \text{MOD} & N: \begin{bmatrix} \text{INDEX} & \boxed{X} \\ \text{RESTR} & \boxed{R} \end{bmatrix} \\ \text{CONT} & foreach(\boxed{y}, \boxed{y} \in \boxed{X} \wedge atomic(\boxed{y}), bothers(\boxed{y}, me)) \end{bmatrix}$$

- The effect is something like:

(59) a. one of the most interesting goals that has ever been scored here
    b. one of the most 'that-have-ever-been-scored-here' interesting goals

[Final Version: Partitive *one*]

(60)
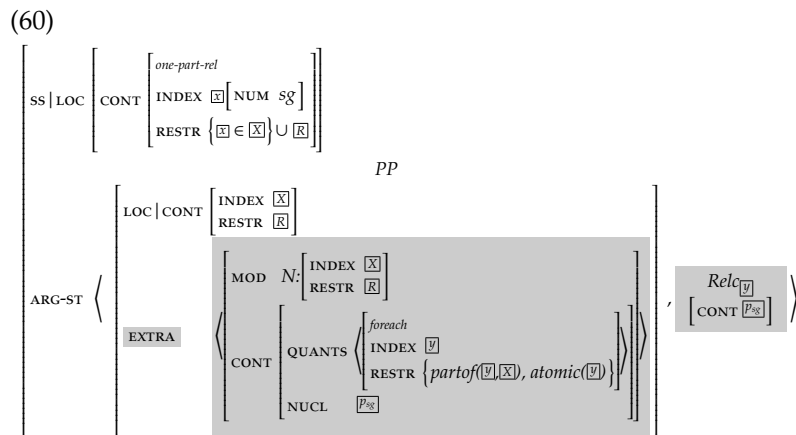
- In words: partitive *one* permits a singular relative clause to be interpreted as a plural relative that has been extraposed from the partitive PP.

- Notice that the Relative that is passed downwards is specified as modifying the index of the PP (the index *X*), hence it can only be interpreted as a modifier of the downstairs noun or a complement of the associated superlative:

(61) a. *one of the problems of early *adopters* who have/*has rushed to buy the new models
    b. one of the *problems* of early adopters which have/has been publicised

- Notice that nothing prevents the singular Relative Clause complement itself being extraposed (predicted, since it is a complement):

(62) a. I managed to solve one of those problems$_{pl}$ [that$_{sg}$ has$_{sg}$ been annoying me for the last few months] yesterday. $\Rightarrow$
    b. I managed to solved one of those problems$_{pl}$ ___ yesterday [that$_{sg}$ has$_{sg}$ been annoying me for the last few months]

[Summary]

- Examples like (63) involve a singular relative clause interpreted as a plural inside the partitive PP.

(63) a. one of *those problems* that really *bothers* me
    b. one of the most impressive *goals* that *has* ever been scored here

- A plausible analysis can be constructed using familiar apparatus:

  - partitive *one* is permitted to select an optional singular relative clause complement
  - which corresponds to an extraposed complement or adjunct from inside the partitive PP,
  - which is interpreted as applying to all the ordinary individuals in the denotation of the PP.

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3   Discussion, Issues

- But some other words allow are similar to *one*, at least for some speakers (from the BNC):

(64) a. *another* of those *volcanoes* which *was* thought to be extinct until something nasty happened.   [ASR/837]
b. *another* of those *chores* which *is* easier to carry out during post-production editing. . . [CBP/901]
c. an individual programme fitted for *each* of *those* who *is* going on.   [ASY/1463]

- There are also a number of constructions that include partitive *one*:

(65) a. At least one of the *problems* that *bothers* me has been solved.
b. More than one of the *problems* that *bothers* me has been solved.
c. Every one of the *problems* that *bothers* me has been solved.
d. Not one of the *problems* that *bothers* me has been solved.
e. Not a single one of the *problems* that *bothers* me has been solved.

- Why are the following not permitted?

(66) a. *Fewer than one of the *problems* that *bothers* me has been solved.
b. *Less than one of the *problems* that *bothers* me has been solved.

[Non-distributives]

- The quantity word *one* allows a singular adjunct to be interpreted distributively over the elements of the plural in the partitive NP.

- The construction should be impossible with relative clauses involving predicates that can only be applied to pluralities (not ordinary singular individuals):

(67) a. *He sleeps in separate beds.   (vs. They sleep in separate beds.)
b. ???one of those *people* who *sleeps* in separate beds

(67b) is bad, but not as bad as it should be, and consider:

(68) a. *She is numerous.   (vs. They are numerous.)
b. one of those crazy *people* who *is* so numerous on demonstrations these days

(69) a. *He meets every week.   (vs. They meet every week.)
b. one of the *people* who meet*s* every week to discuss semantics

[Selected Relatives]

- A potential object to the analysis is that it involves treating a Relative Clause as a complement (Relatives are prototypically Adjuncts)

- There are other cases of heads selecting complements that are normally Adjuncts:

(70) a. I worded the letter *(carefully).
b. The management has treated Sandy *(contemptuously).
c. This book reads *(easily).

- Cleft constructions are often analysed as involving a kind of Relative, which might be selected by *be*, in the case of *it*-clefts:

(71) It was the president [(that) they were talking about].

[German *diejenige(n)*]

- In German, the *diejenige* class of determiners (Walker (2017)):

(72) a. diejenige (Frau)   *(die dort steht)
the+that woman who there stands
'the very woman who is standing there'
b. Ich habe diejenige (Frau)   bewundert, *(die dort steht).
I   have the+that woman admired   who there stands.
'I have admired the very woman who is standing there.'

[Superlatives]

- Relative clauses associated with superlative adjectives are complements of the superlative:

(73) a. This is the best [(that) we could hope for at present].
    b. *This is the [(that) we could hope for at present].

[**Some uses of English Demonstratives**]

(74) a. *Those came.
    b. Those [who had something useful to say] came.

(75) a. The/*Those poor will not be able to take advantage of this proposal.
    b. The/Those poor [who live locally] will not be able to take advantage of this proposal.

- In Partitives there is some kind of requirement for a relative clause if the upstairs determiner is definite (e.g. Stockwell et al. (1973), Reed (1996)):

(76) a. *The/??those/??these three of the children (are playing in the garden).
    b. The/those/these three of the children [that we were talking about] (are playing in the garden).

[**Sub-trigging**]

- Free choice items are allowed in modal environments, but not in sentences with episodic interpretations:

(77) a. *Any student signed the petition.
    b. Any student could/might have signed the petition.

- They can also be licensed by Relative Clause (and other Adjuncts):

(78) Any student [who went to the meeting] signed the petition.

(79) a. The students are successful.   (specific, not generic)
    b. The students who work hard are successful   (can be generic)

- Potentially, (some of) these effects could be captured by having special versions of the determiners that select the relatives (etc).

4 Conclusion

- A little studied, but relatively common, construction of English (and other languages) where a singular relative is interpreted as plural;

- It poses a challenge to any theory of agreement that takes morphosyntactic and semantic aspects of agreement seriously – in particular HPSG;

- The challenge can be met using only existing apparatus (complement selection and extraposition)

- But there are some remaining issues and puzzles.

References

Arnold, Doug and Lucas, Christopher. 2016. One of Those Constructions that Really Needs a Proper Analysis. In Doug Arnold, Miriam Butt, Berthold Crysmann, Tracy Holloway King and Stefan Müller (eds.), *Proceedings of the Joint 2016 Conference on Head-driven Phrase Structure Grammar and Lexical Functional Grammar, Polish Academy of Sciences, Warsaw, Poland*, pages 43–63, Stanford, CA: CSLI Publications.

Bouma, Gosse. 1996. Extraposition as a Nonlocal Dependency. In *Proceedings of Formal Grammar 96*, pages 1–14, Prag.

Burchfield, R. W. 2004. *Fowler's Modern English Usage*. Oxford: Oxford University Press, revised 3rd edition edition.

Crysmann, Berthold. 2013. On the locality of complement clause and relative clause extraposition. In Heike Walker, Manfred Sailer and Gert Webelhuth (eds.), *Rightward Movement in a Comparative Perspective*, Linguistik Aktuell/Linguistics Today, No. 200, pages 369–396, Benjamins.

de Hoop, Helen, Hogeweg, Lotte and Ramacher, Stefanie. n.d. Singular Agreement in 'Special' Partitive Constructions, unpublished ms.

Flickinger, Dan. 2008. Transparent Heads. In Stefan Müller (ed.), *The Proceedings of the 15th International Conference on Head-Driven Phrase Structure Grammar*, pages 87–94, Stanford, CA: CSLI Publications.

Huddleston, Rodney and Pullum, Geoffrey K (eds.). 2002. *The Cambridge grammar of the English language*. Cambridge: Cambridge University Press.

Kamp, H. and Reyle, U. 1993. *From Discourse to Logic*. Dordrecht: Kluwer Academic Publishers.

Kaplan, Ronald M. and Wedekind, Jürgen. 1993. Restriction and correspondence-based translation. In *Proceedings of the 6th Conference of the Association for Computational Linguistics European Chapter*, pages 193–202, Utrecht University.

Kathol, Andreas. 1999. Agreement and the Syntax-Morphology Interface in HPSG. In Robert D. Levine and Georgia Green (eds.), *Studies in Contemporary Phrase Structure Grammar*, pages 209–260, Cambridge: Cambridge University Press.

Kay, Paul and Sag, Ivan A. 2012. Cleaning Up the Big Mess: Discontinuous Dependencies and Complex Determiners. In Hans C. Boas and Ivan A. Sag (eds.), *Sign-based Construction Grammar*, CSLI Lecture Notes, No. 193, pages 229–256, Stanford, CA: CSLI Publications.

Keller, Frank. 1995. Towards an Account of Extraposition in HPSG. In *Proceedings of the 7th Conference of the EACL*, pages 301–306, Dublin, student Session.

Kim, Jong-Bok. 2002. On the structure of English partitive NPs and agreement. *Studies in Generative Grammar* 12, 309–338.

Kim, Jong-Bok and Sag, Ivan A. 2005. English Object Extraposition: A Constraint-Based Approach. In Stefan Müller (ed.), *The Proceedings of the 12th International Conference on Head-Driven Phrase Structure Grammar, Department of Informatics, University of Lisbon*, pages 192–212, Stanford, CA: CSLI Publications.

Kim, Jong-Bok and Sells, Peter. 2008. *English Syntax: An Introduction*. Stanford, CA: CSLI Publications.

Kiss, Tibor. 2005. Semantic Constraints on Relative Clause Extraposition. *Natural Language and Linguistic Theory* 23(2), 281–334.

Maekawa, Takafumi. 2015. 'Agreement mismatch' between sort/kind/type and the determiner. In Stefan Müller (ed.), *Proceedings of the 22nd International Conference on Head-Driven Phrase Structure Grammar, Nanyang Technological University (NTU), Singapore*, pages 136–156, Stanford, CA: CSLI Publications.

Pinker, Steven. 2014. *The Sense of Style: the Thinking Person's Guide to Writing in the 21st Century*. London: Allen Lane.

Pollard, Carl J. and Sag, Ivan A. 1994. *Head-Driven Phrase Structure Grammar*. Chicago: University of Chicago Press.

Reed, Ann. 1996. Partitives, existentials, and partitive determiners. In Jacob Hoeksema (ed.), *Partitives: Studies on the Syntax and Semantics of the Partitive and Related Constructions*, pages 143–178, Berlin, New York: Mouton de Gruyter.

Sag, Ivan A. 1997. English Relative Clause Constructions. *Journal of Linguistics* 33(2), 431–484.

Stockwell, R., Schachter, P. and Partee, B. 1973. *The Major Syntactic Structures of English*. USA: Holt, Rinehart, Winston.

Van Eynde, Frank. 1996. An HPSG Treatment of *it*-Extraposition without Lexical Rules. In G. Durieux, W. Daelemans and S. Gillis (eds.), *CLIN VI. Papers from the Sixth CLIN Meeting*, pages 231–248, University of Antwerp, Center for Dutch Language and Speech.

Walker, Heike. 2017. *The syntax and semantics of relative clause attachment*. PhD thesis, Johann Wolfgang Goethe-Universität.

Wechsler, Stephen and Zlatić, Larisa. 2003. *The Many Faces of Agreement*. Stanford, CA: CSLI Publications.

Winter, Yoad and Scha, Remko. 2015. Plurals. In Shalom Lappin and Chris Fox (eds.), *The Handbook of Contemporary Semantic Theory*, pages 77–113, Oxford: Blackwell, second edition.