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)

- 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 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), N must be at once singular, and plural, which is impossible.

(4)
• 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).

(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 HP Serg 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 HP Serg 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 of problems puzzled people down the ages . . .
   b. That pile of problems puzzled people down the ages . . .

[Other Structure (1) ]

• Perhaps the Relative is modifying one (which is singular):
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):

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):

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’

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

I wish I could ignore *them*.

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

I wish I could ignore *them*. (them=’problems’)

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:

a. the most impressive goals that have ever been scored here
   *the goals that have ever been scored here

b. *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

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 [Δi deserves urgent attention]]
   b. one of those problems which, [we think [Δi deserves urgent attention]]
• Examples involving non-subject relatives can also be found:
  (23) a. This is one of those numbers (that) you can add Δi to itself, to get an interesting result.
   b. He is one of those people (who) you should leave Δi strictly to himself,
   c. He is one of those patients (who) you can’t understand Δi until you have met his mother.
• Bare relatives are possible:
  (24) This is one of those problems [we think [Δi deserves urgent attention]].
• Examples with pied-piping, and non-finite relative clauses:
  (25) a. He’s one of those people [about whom] even his i best friends have reservations.
   b. He’s one of those candidates [about whose] even his i strongest supporters could be certain.
   c. He may turn out to be one of those musicians [whose] appeal is only clear when you actually see him, 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 bothers me
   b. those problems that really bother me
  • Other quantity words do not allow the construction:
   (28) of the problems that bothers 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, [that Δag 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. \( \neg \exists x[\text{problem}(x) \land \text{fixes}(x, x) \land \text{bothers}(x, \text{me})] \)

(31) a. No problems that fix themselves are bothering me.
   b. \( \neg \exists X[\text{problem}^*(X) \land \text{fix}^*(X, X) \land \text{bother}^*(X, \text{me})] \)
   c. \( \neg \exists X[\text{problems}(X) \land \text{fix}(X, X) \land \text{bother}(X, \text{me})] \)

• 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 \( \square \) and whose restrictions are \( \square \):
    – the REL value is unified with the index of the index of the nominal
    – the result is a nominal whose index is \( \square \) and whose restrictions are \( \square \) plus the propositional content of the relative clause.

(32)

\[
\begin{align*}
\text{N} & \quad \text{CONT} \quad \text{INDEX} \quad \square \quad \text{RESTR} \quad \square \cup \{ \square \} \\
\text{N} & \quad \text{CONT} \quad \square \quad \text{INDEX} \quad \square \quad \text{RESTR} \quad \square \\
\text{S}_{\text{rel}} \quad \square & \quad \text{MOD} \quad \text{CONT} \quad \square \quad \text{proposition}
\end{align*}
\]

(33)

\[
\begin{align*}
\text{N} & \quad \text{CONT} \quad \text{INDEX} \quad \square \quad \text{RESTR} \quad \{ \text{problems}(\square) \land \text{bother}(\square, \text{me}) \} \\
\text{N} & \quad \text{CONT} \quad \square \quad \text{INDEX} \quad \{ \text{problems}(\square) \} \\
\text{S}_{\text{rel}} \quad \square & \quad \text{MOD} \quad \text{CONT} \quad \square \quad \text{bother}(\square, \text{me}) \quad \text{that \( \square \) bother me}
\end{align*}
\]

[Normal Partitive one]

• A lexical entry for normal partitive one (as in one of the problems).
One combines with a non-predicative of-PP complement which denotes a plurality \( X \) with restrictions \( R \) . . .

and produces a singular NP whose index \( x \) is an element of the plurality.

\[
\lambda \mathcal{P}. \text{One } x \mid x \in X \land \text{those}_\mathcal{P}(X) \land \mathcal{P}(x)
\]

### 2.2 Proposal

- We have suggested that \textit{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 \textit{one}, adding suitable additional restrictions to the resulting semantics (\( R' \)).

\[
\text{of those problems}
\]

- 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 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:

\[
\begin{align*}
\mathcal{R}' &= \left\{ \begin{array}{l}
\text{QUANTS}\{ \begin{array}{l}
\text{INDEX } y \\
\text{RESTR } \{ \text{partof}(y, X), \text{atomic}(y) \} \\
\text{NUCLEUS } y
\end{array} \} \\
\text{nucleus } p
\end{array} \right. \\
\end{align*}
\]

• In the case of which bothers me:

\[
\begin{align*}
\mathcal{R}' &= \left\{ \begin{array}{l}
\text{QUANTS}\{ \begin{array}{l}
\text{INDEX } y \\
\text{RESTR } \{ \text{partof}(y, X), \text{atomic}(y) \} \\
\text{nucleus } \text{bothers}(y, \text{me})
\end{array} \} \\
\text{nucleus } \text{bothers}(\text{me})
\end{array} \right. \\
\end{align*}
\]

\[
\begin{align*}
\text{a. } &\{ \text{foreach}(y, \text{X} \land \text{atomic}(y), \text{bothers}(y, \text{me})) \} \\
\text{b. } &\{ \text{foreach}(y, \text{X}, \text{bothers}(y, \text{me})) \} \\
\text{c. } &\{ \text{foreach}(y, \text{X}, \text{bothers}(y, \text{me})) \} \\
\end{align*}
\]

(41) one of those problems that bothers me

\[
\begin{align*}
\begin{array}{l}
\text{NP} \\
\text{INDEX } y \\
\text{RESTR } \{ x \in X \text{ those problems}(X), \text{foreach}(y, x \in X \text{ bothers}(y, \text{me})) \}
\end{array}
\end{align*}
\]

\[
\begin{align*}
\begin{array}{l}
\text{NP} \\
\text{INDEX } y \\
\text{RESTR } \{ x \in X \text{ those problems}(X), \text{foreach}(y, x \in X \text{ bothers}(y, \text{me})) \}
\end{array}
\end{align*}
\]

[The Full Entry]
• 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 PP's 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) NP

  N

  [one

  PP

  of those problems

  KindP

  of those problems that bothers me]

  Ref

  [mod N]

  that ∆ bothers me

[Alternative Formulation]
(48) NP

```
(partitive-one-rel
  INDEX ∈ X
  RESTR \{ x ∈ X \mid foreach \{ x ∈ those_problems(X) \}, bothers(x, me) \})

N (one)

PP

KindP

[Alternative Entries (1)]

(49) a potential formulation of the empty ‘kind’ relative-head:

```
PHON ( )
CAT | HEAD
  MOD | CONT
    npro
        INDEX [num pl] RESTR ∈ X

SS | LOC
  CONT
    QUANTS
      foreach
        INDEX RESTR \{ partof(x, X), atomic(x) \} ∪ ∈ X
        NUCLEUS ∈ X

ARG-ST ( REL \{ CONT ∈ X \} )

Relc
```

(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:

```
PHON (one)
SS | LOC
  CONT
    partitive-one-rel
      INDEX [num sk] RESTR \{ x ∈ X \} ∪ ∈ X

ARG-ST ( LOC | CONT )
  npro
      INDEX RESTR ∈ X

PP

KindP

9
2.3 A Problem and a Refinement

- A feature of this analysis is that the singular 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’
- 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) [A 'Mismatch' Relative using the KindP Approach]

(56) 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 \[\mathbb{P}\] to have plural content corresponding to the singular Relative (i.e. similar to (39)/(40a))

(57) [Final Version]
• 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 \( x \) to (58):

\[
\begin{align*}
\text{mod} & \text{ N: } \begin{bmatrix}
\text{index} & x \\
\text{restr} & \emptyset
\end{bmatrix} \\
\text{cont} & \text{ foreach}(x, y \in X \land \text{atomic}(y), \text{bothers}(y, me))
\end{align*}
\]
• The effect is something like:

\[
\begin{align*}
\text{a. one of the most interesting goals that has ever been scored here} \\
\text{b. one of the most ‘that-have-ever-been-scored-here’ interesting goals}
\end{align*}
\]

[Final Version: Partitive one ]

\[
\begin{align*}
\text{ss|loc} & \text{ cont } \begin{bmatrix}
\text{one-part-rell} & \begin{bmatrix}
\text{num} & sg \\
\text{restr} & \emptyset
\end{bmatrix}
\end{bmatrix} \\
\text{arg-st} & \begin{bmatrix}
\text{extra} & \begin{bmatrix}
\text{mod} & \text{ N: } \begin{bmatrix}
\text{index} & x \\
\text{restr} & \emptyset
\end{bmatrix} \\
\text{cont} & \text{ foreach}(x, y \in X \land \text{atomic}(y), \text{bothers}(y, me))
\end{bmatrix}
\end{bmatrix}
\end{align*}
\]
• 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:

\[
\begin{align*}
\text{a. *one of the problems of early adopters who have*has rushed to buy the new models} \\
\text{b. one of the problems of early adopters which have*has been publicised}
\end{align*}
\]
• Notice that nothing prevents the singular Relative Clause complement itself being extraposed 
  (predicted, since it is a complement):

\[
\begin{align*}
\text{a. I managed to solve one of those problems that really bothers me} \\
\text{b. I managed to solved one of those problems that has been annoying me for the last few months}
\end{align*}
\]

[Summary]
• Examples like (63) involve a singular relative clause interpreted as a plural inside the partitive 
  PP.

\[
\begin{align*}
\text{a. one of those problems that really bothers me } \\
\text{b. one of the most impressive goals that has ever been scored here}
\end{align*}
\]
• 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.
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 deter-
  miners 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 extrapo-
  sition)

• But there are some remaining issues and puzzles.

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