A View of Free Relatives from Minimalist Grammars*

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1 Introduction

- Free relatives (FRs), e.g. (1):

  (1) John eats [$_{FR}$ what Mary eats].

- FRs involve a long-distance dependency between a wh-word and its gap

- FRs (a) pattern like canonical long-distance dependencies, e.g. wh-movement (b):

  - Unbounded in crossing clauses (2):

    (2) a. John eats [$_{FR}$ what$_i$ Sam thinks [$_{CP}$ that Mary eats t$_i$]].
         b. What$_i$ does Sam think [$_{CP}$ that Mary eats t$_i$]?

  - Island sensitive, e.g. the Complex Noun Phrase Constraint (3):

    (3) a. * John eats [$_{FR}$ what$_i$ Sam heard [$_{NP}$ the claim [$_{CP}$ that Mary eats t$_i$]]].
         b. * What$_i$ did Sam hear [$_{NP}$ the claim [$_{CP}$ that Mary eats t$_i$]]?

  - Parasitic gap licensing (4):

    (4) a. John eats [$_{FR}$ what$_i$ Sam serves t$_i$ [after cooking pg]].
         b. What$_i$ did Sam serve t$_i$ [after cooking pg]?

- What role does a wh-word play at the top of a dependency chain?

  - In wh-questions, its syntactic life is over

- In FRs, the wh-word characterises the constituent, driving further structure building
  * Reprojection

- FRs from the perspective of Minimalist Grammars (MG) (Stabler, 1997, 2011)

  - A formalisation of Chomsky's (1995) Minimalist Program
  - Lexicalist (cf. HPSG, LFG): specify a lexicon, pair words with syntactic features
  - Transformational (cf. GB): long-distance dependencies are mediated by movement
  - Unlike either: structure building and movement are explicitly derivational rather than subject to representational constraints
  - Brings out general problems and questions for the syntax of FRs:
    * How to implement Reprojection when usually the selector projects the head?
    * Hasn't the wh-word exhausted its features by the time it gets to Spec,CP?
    * Case: syncretism, PPs, underspecification

- In outline:

  1. Introduction
  2. The dual role of the wh-word
  3. Traditional analyses
  4. Reprojection
  5. Minimalist Grammars
  6. Reproject
  7. Reusing features
  8. Conclusion

2   The dual role of the wh-word

- The behaviour of a FR is keyed to the wh-word that forms it

  - Category matching
  - Case matching

2.1   Category matching

- Headedness: each phrase has a head — one lexical item inside it that determines its distribution

- FRs formed with *what* distribute as nominals, not clauses

  - The *what*-FR in (5b) patterns with (5a) as the object of *eat*, which selects for nominals, not clauses (5c)
  - This despite the *what*-FR (5b) being string-identical to an indirect question (6)

    (5)   a.   John eats [$_{DP}$ cheese].

  b. John eats [$_{DP}$ what Mary eats].

  c. * John eats [$_{CP}$ whether Mary likes cheese].

(6)   John wonders [$_{CP}$ what Mary eats].

- More generally, FRs distribute with the category of their wh-word (7) (cf. Bresnan and Grimshaw, 1978)

  – FRs formed with *where* look to distribute as PPs rather than DPs (7a)

  – FRs formed with *how* look to distribute as AdvPs (7b)

(7)   a.   i.   Mary put the book [$_{PP}$ on the shelf] / [$_{PP}$ where she keeps it].

          ii.   *Mary put the book [$_{DP}$ the shelf] / [$_{DP}$ what she built].

      b. John speaks [$_{AdvP}$ quickly] / [$_{AdvP}$ how you speak].

- But Caponigro and Pearl (2008, 2009): *where, when, how* are inherently nominal[1]

- Still, there are PP FRs: so-called 'missing Ps' (Larson, 1987; Grosu, 1996)

  – No P-deletion mechanism required for (8b) if the whole of *[$_{PP}$ to whom]* raises to form the FR[2]

(8)   a. I speak [$_{PP}$ to [$_{DP}$ whom you speak to t$_{whom}$]].

      b. (?) I speak [$_{PP}$ [to whom] you speak t$_{to\ whom}$].

      c. * I speak [$_{DP}$ whom you speak to t$_{whom}$] .

      d. * I speak [$_{DP}$ whom you speak t$_{whom}$].

- Cross-linguistic examples of so-called 'missing P' FRs (9):

(9)   a. I'll live in whatever town you live.

      b. Maria hat, [an   was du gedacht hast], auch gedacht. (German)
          Maria has   about what you thought have   also thought
          'Maria thought about what you also thought about.' (Hanink, 2018, p.248)

      c. Pierre s'   est battu [avec qui tu   voulais qu' il sorte   ]. (French)
          Peter self is beaten   with who you wanted that he go-out
          'Peter fought with whom you wanted him to go out.' (Grosu, 1994, p.14)

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[1]*where, when, how* distribute as DP as well as PP (ia). They are base-generated as complement of P, often silent (Emonds, 1976, 1987; McCawley, 1988), and selected for by a null P when distributing as PP (ib), with overt counterparts possible (ii):

(i)   a. Lily adores [$_{DP}$ where this very tree grows [$_{PP}$ Ø$_P$ t$_{where}$]].

      b. Lily napped [$_{PP}$ Ø$_P$ [$_{DP}$ where this very tree grows [$_{PP}$ Ø$_P$ t$_{where}$]]].

(ii) Lily lives [$_{PP}$ near [$_{DP}$ where we have to fly [$_{PP}$ through t$_{where}$] on our way to Vancouver]].

[2]Evidence for the analysis in (8b) rather than (i) comes from cleft constituency tests (ii) (cf. Grosu, 1994, p.94). Whereas there is no DP constituent to target in (iia), the whole PP-FR can be targeted in (iib):

(i)   I speak [$_{PP}$ to [$_{DP}$ whom you speak Ø$_P$ t$_{whom}$]].

(ii) a. * It's [$_{DP}$ whom you speak t$_{whom}$] that I speak [$_{PP}$ to t$_{DP}$].

      b. It's [$_{PP}$ [to whom] whom you speak t$_{towhom}$] that I speak t$_{PP}$.

     d. Soñaba   [con quien tú saliste   ayer   ]. (Spanish)
       I-dreamed with who you went-out yesterday
       'I dreamed about whom you went out with yesterday.' (Grosu, 1994, p.26)

2.2 Case matching

- German FRs (10) must match in case with the wh-word that forms them (van Riemsdijk, 2017, p.6f., exx. 19, 20)

  – (10a) grammatical: the nominative wh-word is the subject of the FR, which is the subject of the sentence

  – (10b) ungrammatical: the wh-word needs to be accusative inside the FR, but the FR as a whole is the nominative subject of the sentence

  (10)   a. [$_{DP_{NOM}}$ Wer$_{NOM}$ nicht stark ist] muss klug   sein.
              who   not   strong is   must clever be.

         'Who is not strong must be clever.'

       b. *[$_{DP_{NOM}}$ { $^{Wen_{ACC}}_{Wer_{NOM}}$ } Gott schwach geschaffen hat] muss klug   sein.
                who   God weak   created   has must clever be.

         'Who God has created weak must be clever.'

  – (11a) grammatical: *nehmen* and *empfehlen* both take accusative

  – (11b) ungrammatical: *nehmen* takes accusative, *vertrauen* dative

  (11)   a. Ich nehme [$_{DP_{ACC}}$ wen$_{ACC}$ du mir empfiehlst].
         I   take   whom you me recommend

         'I take whom you recommend to me.'

       b. * Ich nehme [$_{DP_{ACC}}$ { $^{wen_{ACC}}_{wem_{DAT}}$ } du vertraust].
         I   take   who   you trust

         'I take who you trust.'

- Light-headed relatives (Citko, 2004) always available (12a), and repair mismatches (12b vs. 10b) (van Riemsdijk, 2017, p.16, exx. 19', 20')

  – No case matching required in headed relatives in general

  (12)   a. Der$_{NOM}$, der$_{NOM}$ nicht stark ist, muss klug   sein.
         the   who   not   strong is must clever be.

         'One who is not strong must be clever.'

       b. Der$_{NOM}$, den$_{ACC}$ Gott schwach geschaffen hat, muss klug   sein.
         the   who   God weak   created   has must clever be.

         'One who God has created weak must be clever.'

- Syncretism supports mismatching case

  – (13) grammatical: *was* syncretic for nominative and accusative

  (13) [$_{DP_{NOM}}$ Was$_{ACC}$ du gekocht hast] ist schimmlig.
             What   you cooked have is moldy.

         'What you have cooked is moldy.'

2.3   Summary of matching

- The behaviour of a FR is keyed to the wh-phrase that forms it

- Category of FR = category of wh-phrase

- Case of FR = case of wh-word

    - Modulo syncretism — matching morphophonological, not abstract case

- Dual role for the wh-word both internal and external to the FR

3   Traditional analyses

- Traditional analyses: FRs are like headed relatives, but with some element missing

- Comp vs. Head Hypotheses

    - Comp Hypothesis (14a): null head with wh-phrase in Spec,CP (Groos and van Riemsdijk, 1981; Grosu, 1994)

    - Head Hypothesis (14b): wh-phrase in head position, Spec,CP empty (Bresnan and Grimshaw, 1978; Larson, 1987; Bhatt, 1999; Citko, 2002)

        (14)   a. John eats [$_{DP}$ ∅ [$_{CP}$ what$_i$ [$_{TP}$ Mary eats t$_i$]]] (Comp Hypothesis)
               b. John eats [$_{DP}$ what [$_{CP}$ ∅ [$_{TP}$ he likes __]]] (Head Hypothesis)

- Lots of evidence to favour the Comp Hypothesis:[3]

    - Introduction: a standard long-distance wh-dependency with the wh-word in Spec,CP

    - Complementizers: doubly filled COMP effect in FRs (15a) (Citko, 2008, p. 928)

        (15)   a. John eats what (*that) Mary eats.
               b. John eats the food (that) Mary eats.

- But matching effects favour the Head Hypothesis:

    - The behaviour of a FR is keyed to the wh-word that forms it

    - Don't want to seal off the wh-word inside CP

- The Comp Hypothesis traditionally entails a null head element to head the FR (chiefly Grosu, 1994; more recently Himmelreich, 2017[4]; Hanink, 2018[5])

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[3]See also section 6.2 on extraposition.

[4]Gets category matching by creating the null element out of the wh-word, at the cost of a new operation to do so (Crete-Dep). Still need to add a C selector feature and prevent copying of the [wh] feature — see section 7.4 below. Assumes initially unvalued case features, so Agree still needed for case matching.

[5]German FRs are super light headed. Contextual allomorphy rules delete D or [P-D] span (Merchant, 2015) that heads a relative clause when morphologically identical to material in Spec,CP (modulo the w-form). Gets morphological case and category matching, but at the expense of language-specific deletion rules over spans. Cross-linguistic generality questionable: German *an das, an was* → *an das, an was*, but English *that which* → *what*?

- – Theta Criterion not obviously a necessary assumption; cf. the movement theory of control (Hornstein, 1999)

- Derivational future of the FR determined by the null element...

  - – Why not its own case?
    - ∗ Additional mechanism to enforce case matching
    - ∗ Agree manipulates abstract case features, not morphological case — syncretism
  - – Why not its own category?
    - ∗ Null, CP selecting heads of many categories
    - ∗ Should be oblivious to the category of CP's specifier

- We want the best of both hypotheses

  - – Comp Hypothesis: a vanilla wh-dependency, wh-word in Spec,CP
  - – Head Hypothesis: wh-word characterises the FR, matching effects

4   Reprojection

- Have the moving wh-word itself project the head of FRs

- However, standard stipulation: the selector projects the head

  - – (Collins, 2002, p.55; Pesetsky and Torrego, 2006; Boeckx, 2008, ch. 3; Chomsky, 2008, p. 145; Panagiotidis, 2014, ch. 5)

- Relabeling (Donati, 2006; Cecchetto and Donati, 2011, 2015)

  - – A particular implementation of the reprojection intuition
  - – While usually the selector projects, words are special and always have (re)labeling power
  - – Labeling ambiguity in (16):
    - ∗ C probed for *what*, label C → indirect question
    - ∗ *what* is a word, label D → FR

  (16)
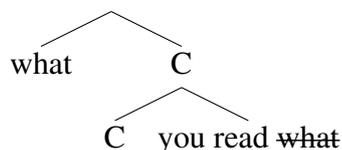
  - – What about phrasal FRs?
    - ∗ PPs (9); *-ever*-FRs[6]

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[6]Cecchetto and Donati (2015), citing Battye (1989), argue that *-ever* wh-phrases are not FRs, but headed relatives: they are compatible with a full relative pronoun, have an absolute use without being relativised, and are compatible with an overt complementizer (i). Citko (2008), on the other hand, argues that *-ever* wh-phrases are FRs: they match for case in Polish, extrapose in German (cf. 28c below), and are *not* compatible with an overt complementizer (ii):

  (i)   John would read whichever book that he happened to put his hands on. (C&D, 2015, p. 52, ex. 31a)

  (ii)   We'll hire whichever man (*that) you recommended to us. (Citko, 2008, p. 931, ex. 56c)

- How are case and category matching enforced?
  * All features of the wh-word checked/valued inside the FR

- How to implement the reprojection intuition in Minimalist Grammars?

5   Minimalist Grammars

- Implementing reprojection in MG clarifies theoretical issues for the syntax of FRs

  1. Stipulations about projection
  2. Feature checking

- Begs new empirical and theoretical questions — chiefly about case

- MGs: Stabler (1997, 2011)

  - Analysis = specify a lexicon, pairing words with ordered lists of syntactic features
  - Structure building licensed by matches between first elements in these lists[7]

- Merge (17): matching selector =X and category X[8]

  (17)   Merge (t1[=X], t2[X]) = $<$ if t1 is lexical, $>$ otherwise.

  t1   t2   t2   t1

- Move (18): matching probe +x and goal -x features[9]

  (18)   Move (t1[+x]) =

  $>$

  $t2^M$ t1

  $\cdots \{t2[\text{-}x]^M \mapsto \varepsilon\} \cdots$

- Two points to note about Merge and Move:

  1. Projection: the selector/probe *t1* projects the head, pointed to by $>$ or $<$, whose remaining features drive further structure building
  2. Resource sensitivity: matching features that license Merge and Move are checked and deleted

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[7]We write *t[f]* when the head of a tree — found by following the headedness arrows $>$ and $<$ down to a leaf node — has a sequence of syntactic features whose first element is *f*, and *t* for that tree with feature *f* erased.

[8]More fully, Merge is licensed by matching category *X* and selector *=X* features on the head of a pair of trees *t1* and *t2*. If the selector *t1* is lexical, it is linearized to the left $<$ and *t2* is called the complement; otherwise *t1* is linearized to the right $>$ and *t2* is called the specifier.

[9]More fully, Move is licensed by matching probe *+x* and goal *-x* features on a tree *t1* containing a subtree *t2*. The probe *t1* takes as a specifier the maximal projection of *t2*, $t2^M$, which is made phonetically null in its original position. Move is also subject to the shortest move constraint, which will not concern us here.

- Illustrating MGs with an indirect question (19): lexicon (20), derivation tree (21), derived tree (22)[10]

  (19) John wonders [$_{QP}$ what Mary eats].

  (20) John :: D   Mary :: D   wonders :: =Q =D V   eats :: =D =D V
        ε :: =V C   ε :: =V +wh Q   what :: D −wh

  (21)

```
                              Merge
                         /            \
                 ε :: =V C            Merge
                                  /          \
                             Merge          John :: D
                          /          \
               wonders :: =Q =D V    Move
                                       |
                                     Merge
                                  /          \
                        ε :: =V +wh Q        Merge
                                          /          \
                                     Merge          Mary :: D
                                  /          \
                        eats :: =D =D V    what :: D -wh
```

  (22)

```
                    <
                /        \
          ε : C          >
                     /        \
                  John         <
                           /        \
                       wonders       >
                                 /        \
                             what          <
                                       /        \
                                      ε          >
                                             /        \
                                          Mary         <
                                                   /        \
                                                eats
```
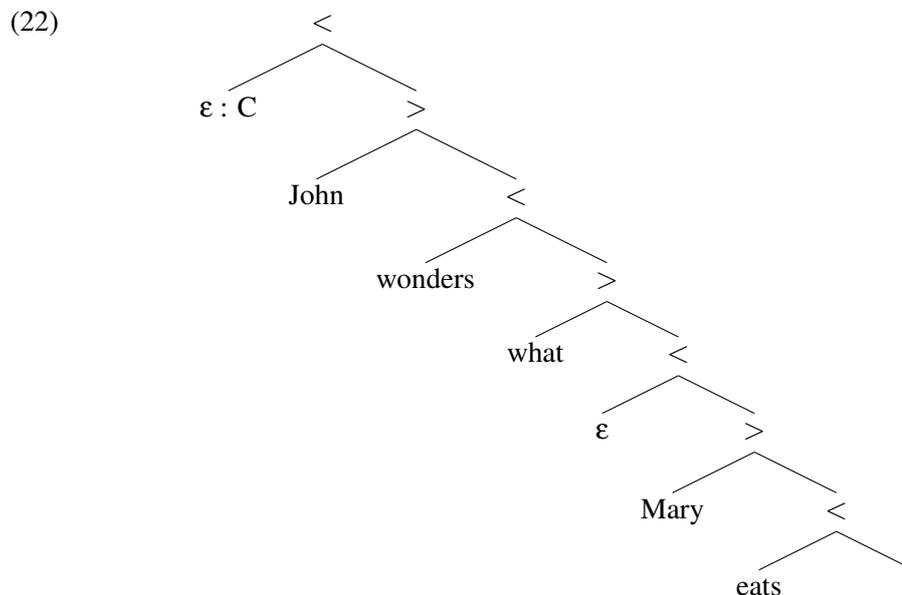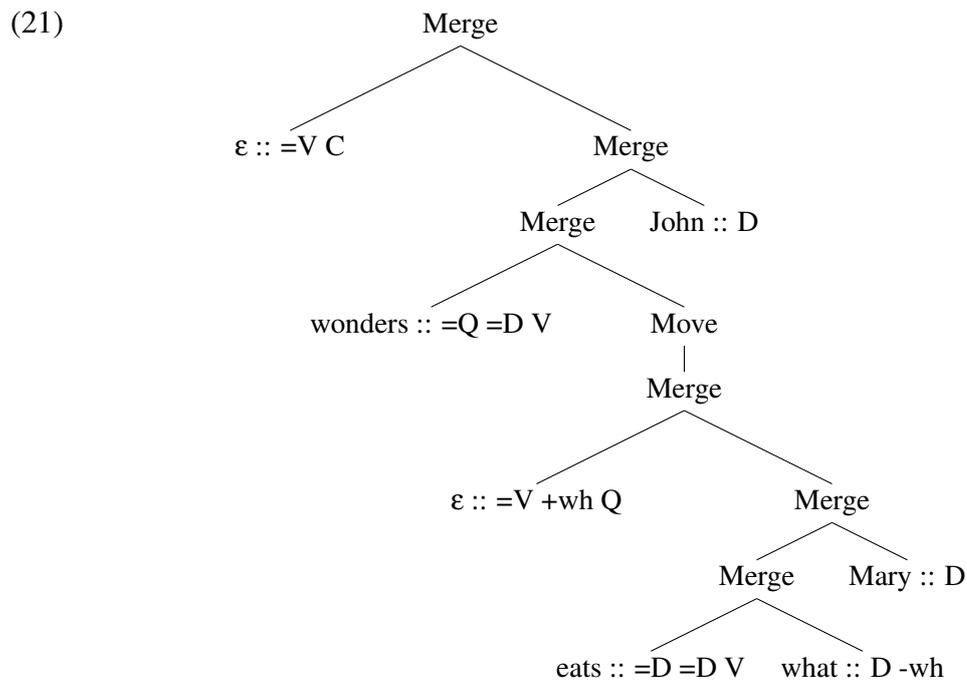
- Null head analysis in MG: ε *:: =Q D*

  – Add a null D head that selects a Q complement to the lexicon in (20)

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[10]Tense layer omitted for brevity. ε stands for phonologically null. *Q* is the category of indirect questions, which *wonder* selects for.

– Merge ε *:: =Q D* with the output of Move in (21)

  ∗ Converts indirect question from Q to D, which *eats* can select as complement

– Requires null, *=Q* lexical items of many categories, e.g. ε *:: =Q P*, ε *:: =Q Adv*

– Nothing enforces category matching between the null lexical item and the wh-word inside the FR

  ∗ Incorrectly predicts mixtures like ε *:: =Q P* and *what* to be grammatical (23):

(23)   *Mary put the book [$_{PP}$ $\emptyset_P$ [$_{QP}$ what$_D$ John built]].

– Nor does anything enforce case matching.

• MG perspective precipitates two issues for syntactic analyses of FRs:

  1. Projection: the probe for Move projects the head
     – Reproject operation
  2. Resource sensitivity: wh-word's features all checked in building the relative clause
     – Reusing features

6   Reproject

• We want Reproject to apply as in (24):

  – Reverse headedness to *what*

  – Delete category feature *Q*, which would otherwise be left unchecked and cause a crash[11]

• General definition of Reproject in (25):

  – Applies to a tree where a reprojection feature **Y* on the specifier *t1* matches the category of the head *t2*

  – Both features are checked

  – Headedness switches to *t1*[12]

(24)   Reproject (>   ) =   <

          what   <   what   <

               $\varepsilon : Q$ . . . ε . . .

(25)   Reproject (>   ) =   <

      t1[*Y]   <   t1   <

          t2[Y]   t3   t2   t3

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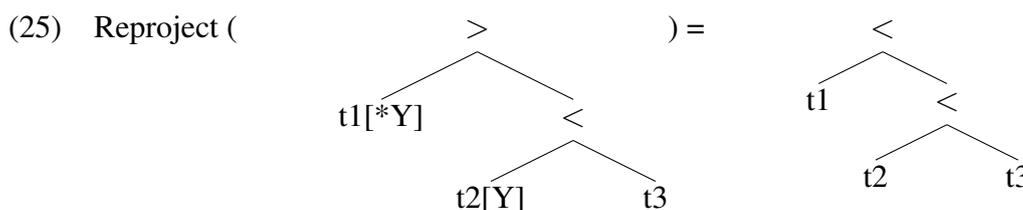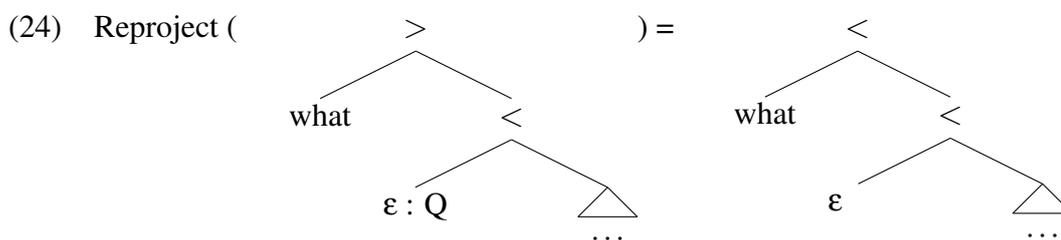
[11]This is a unary operation; cf. Müller's (1999) HPSG schema for free relatives in German.

[12]Wh-clustering (Gärtner and Michaelis, 2010) provides a precedent for Reproject in being triggered by a feature on a specifier rather than a head.

6.1   Triggering Reproject

- Reproject features *Y* maintain symmetric checking — cf. Merge and Move

- Add FR-specific, reprojecting wh-words to the lexicon; e.g. *what :: D -wh *Q.*

- Triggering feature on the wh-word rather than Q

  - State the restrictor restriction: wh-words in FRs must lack a complement (26)

    (26)   *John eats what food Mary eats.

  - Exclude wh-words with both selector and Reproject features,
    e.g. **what :: =N D -wh *Q*

  - By the time ε *:: =V +wh Q* interacts with *-wh*, it would be unable to distinguish
    between a wh-word with or without a complement

- Stronger evidence would be wh-words reprojecting over lexical items other than ε *:: +wh Q*

6.2   Extraposition

- While predominantly distributing with the category of their wh-word, FRs are also a little
  like CPs

- German FRs extrapose (cf. van Riemsdijk, 2017, p.8, exx. 22, 23)

- Headed relatives (27): in situ (27a); or extrapose CP (27b); but not whole DP (27c)

  (27)   a. Der Hans hat [das Geld,   das   er gestohlen hat ,] zurückgegeben.
             the Hans has   the money, which he stolen   has   returned
             'Hans has returned the money that he has stolen.'
         b. Der Hans hat [das Geld   ] zurückgegeben, [das   er gestohlen hat].
             the Hans has   the money   returned   which he stolen   has
         c. * Der Hans hat zurückgegeben, [das Geld,   das   er gestohlen hat].
               the Hans has returned   the money which he stolen   has

- FRs (28): in situ (28a); can't leave wh-word behind (28b); can extrapose whole FR (28c)

  (28)   a. Der Hans hat [was er gestohlen hat], zurückgegeben.
             the Hans has   what he stolen   has   returned
             'Hans has returned what he has stolen.'
         b. * Der Hans hat [was   ] zurückgegeben, [er gestohlen hat].
               the Hans has   what   returned   he stolen   has
         c. Der Hans hat zurückgegeben, [was er gestohlen hat].
             the Hans has returned   what he stolen   has

  - Extraposition treats the whole FR (28c) like it treats the relative clause CP (27b)

- Conclusion: there is some reality to the formed CP, targeted by extraposition

- Our MG analysis can point to the (bolded) Move node in the derivation tree (29)

- Compare Cecchetto and Donati's (2015) relabeling approach, where at no point is there a CP node to manipulate[13]

(29)

```
                        Merge
                       /     \
              ε :: =V C       Merge
                             /     \
                        Merge       John :: D
                       /     \
          eats :: =D =D V     Reproject
                                 |
                               Move
                                 |
                               Merge
                              /     \
                ε :: =V +wh Q        Merge
                                    /     \
                               Merge       Mary :: D
                              /     \
                eats :: =D =D V      what :: D -wh
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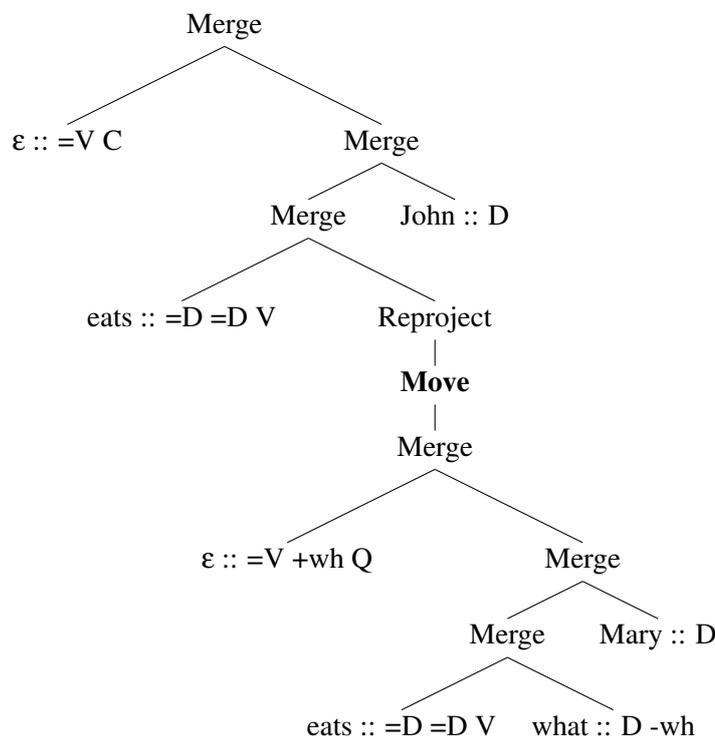
6.3 PP

- Percolation of *-wh* independently required for pied-piping

- Percolate reprojection feature **Q* along with *-wh*

- Reproject (25) then works as desired for category matching in (30), making P the head:

  - cf. the restriction to words on Cecchetto and Donati's (2015) relabeling approach

(30) Reproject (

```
                    >                              <
                  /   \                          /   \
               <        <                     <        <
             /   \     /  \                 /   \     /  \
      to : *Q  whom : ε  ε : Q  △      to : ε  whom : ε  ε  △
                              ...                          ...
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) =
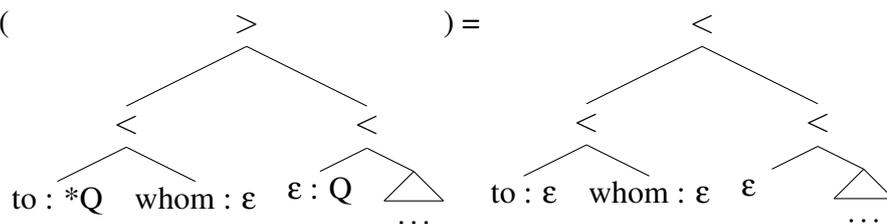
6.4 Problem: a feature-less tree

- The outcome of Reproject (24, 25, 30) has no features[14]

  - *t1* is the head, but all its features have been checked en route to becoming the specifier of *t2*.

- Next section, to resolve this problem: reusing features

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[13]The *re-* part of relabeling is a word's power to provide a label again after movement. The root node in (16) is not *re*-labeled.

[14]To converge, a derivation needs to reach the start category C — see (22).

7   Reusing features

- After Reproject the wh-word is the head, ready to determine how the derivation will proceed

- Structure-building is feature-driven; but the wh-word has exhausted all its features

- We want the wh-word to behave very similarly in the matrix clause to how it did in the relative clause — matching effects

- Reuse its features while allowing for subtle differences

    - An existing innovation, and two new ones

    - How the two new ideas fare with respect to matching effects

- Persistent features

    - An existing innovation (Stabler, 2006)

    - Persistent (underlined $\underline{F}$) category features can be used multiple times — but only consecutively

    - Merge continues to be licensed symmetrically, but $\underline{F}$ doesn't have to delete

    - Implements the movement theory of control (31) (Hornstein, 1999)

    - Same $\underline{D}$ can satisfy multiple =D features and occupy multiple argument positions[15]

        (31)   John wants $t_{John_{\underline{D}}}$ to win.

    - However, persistence in *what :: $\underline{D}$ -wh *Q* does not help for FRs

    - Move triggered by *-wh*, and Reproject triggered by **Q*, apply in between the two desired uses of D: after Merge of *what* with *eats* but before *what* categorises the FR

    - We need *non*-consecutive reuse of features

- Feature recycling

    - Recycle: after Merge in the relative clause, *D* cycles to the end of the feature list

    - i.e. *what : -wh *Q D*

- Feature refreshing

    - Refresh: reach back into the lexicon for a fresh list of features compatible with the morphological form

    - String rather than features being reused

    - Limited to lexical items: *which* but not *which book*, finitely bounded

    - Recall the restrictor restriction (26)

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[15]Persistent features provide a precedent (in MG) for dispensing with the Theta Criterion.

7.1 Category matching

- *what*-FRs distribute as DPs

    - Recycle: after going through the relative clause, recycled *D* is back at the head of *what*'s feature list to serve as the head of the FR

    - *what :: D -wh *Q*, Merge and Recycle → *what : -wh *Q D*, Move → *what : *Q D*, Reproject → *what : D*, Merge → *what : ε*

    - Refresh: *what* unambiguously of category *D*, so refreshing from the lexicon will provide *D* to categorise the FR

- 'Missing P' FRs distribute as PP

    - Recycle/Refresh P

    - But following Frey and Gärtner (2002) in MGs, PPs have different categories as:

        * complement: *P*
        * adjunct: $\approx V$, the category of things that adjoin to V[16]

    - Favours Refresh over Recycle to the extent that (c) and (d) from (9) are good[17]

        * PP is complement to the matrix verb, but a comitative adjunct of the relative clause verb

    (9)   c. Pierre s' est battu [avec qui tu   voulais qu' il sorte   ]. (French)
              Peter self is beaten   with who you wanted that he go-out

              'Peter fought with whom you wanted him to go out.'

          d. Soñaba   [con quien tú   saliste   ayer   ]. (Spanish)
              I-dreamed   with who   you went-out yesterday

              'I dreamed about whom you went out with yesterday.'

7.2 Case matching

- Recycle fine for English case, where FRs (32) can mismatch in case with the wh-word that forms them

    - Recycle generic kase feature, *-k*

    (32)   [$_{DP_{NOM}}$ What$_{ACC}$ John ate t$_{what}$] killed him.

- Recycle also fine for German non-syncretic case:

    - Recycle *-nom* for *wer*, *-acc* for *wem*, etc.

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[16]On this view, tolerable category mismatches in coordination (i) would in fact match for category $\approx V$:

(i)   Sam played [$_{ConjP}$ [$_{AdvP}$ quickly] and [$_{PP}$ with gusto]].

[17]If (i) were headed by *where*, it too would support Refresh over Recycle. But if Caponigro and Pearl (2008, 2009) were on the right track in footnote 1, then (i) involves two separate null prepositions.

(i)   Mary put the book [$_{PP_{comp}}$ where$_{PP_{adj}}$ John eats].

(10) a. [$_{DP_{NOM}}$ Wer$_{NOM}$ nicht stark ist] muss klug   sein.
         who   not   strong is   must clever be.

      'Who is not strong must be clever.'

   b. *[$_{DP_{NOM}}$ { $\begin{matrix} Wen_{ACC} \\ Wer_{NOM} \end{matrix}$ } Gott schwach geschaffen hat] muss klug   sein.
         who   God weak   created   has   must clever be.

      'Who God has created weak must be clever.'

- Syncretic case (13)

  – Recycle underspecified *-nomacc* for *was*?

  – Or Refresh: *was* with *-acc* inside the FR, refreshed with *-nom* for the main clause

    (13)   [$_{DP_{NOM}}$ Was$_{ACC}$ du   gekocht hast] ist schimmlig.
            What   you cooked have   is moldy.

        'What you have cooked is moldy.'

7.3   Category + Case Matching?

- How much reuse in PPs? Reuse just the head P, or also what's inside it?

  – Just P: case checked for embedded environment only

  – P and case: case checked in both embedded and matrix environments

  – P, case and =*D*: would predict that a reused PP could have two DP complements...

- The case of a wh-word complement to an ambiguous P has to satisfy both matrix and relative clause requirements (33) (German) (Hanink 2018, p.280-1, exx. 66-68)

  – *glauben an* + accusative (33a)

  – *zweifeln an* + dative (33b)

  – Case conflict causes ungrammaticality of (33c)

    (33)   a. Maria glaubt   an den$_{ACC}$ Mann.
              Maria believes in the   man

          'Maria believes in the man.'

       b. Maria zweifelt an   dem$_{DAT}$ Mann.
              Maria doubts   about the   man

          'Maria doubts the man.'

       c. * Maria glaubt,   [an { $\begin{matrix} wen_{ACC} \\ wem_{DAT} \end{matrix}$ } du   zweifelst].
              Maria believes in   who   you doubt

- Does syncretism resolve case conflict inside PPs? Schematically (34):

    (34)   ... Verb(=P$_{caseA}$) [$_{FR}$ [P wh-DP$_{caseA/caseB}$]$_i$ ... V(=P$_{caseB}$) t$_i$]

  – indirect object / animate direct object in Spanish (35)

  – *sich setzen* + accusative / *sitzen* + dative in German (36c)[18]

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[18]Though *was* for dative is far from ideal.

(35) Escribí [a   quien viste   ayer   ].
      I-wrote [ACC who   you-saw yesterday
      'I wrote to whom you saw yesterday.' (Grosu, 1994, p.109, ex.140b)

(36) a. Ich setze mich   auf die$_{ACC}$ Bank.
          I   sit   myself on   the   riverbank
          'I'm sitting down on the riverbank.'

      b. Ich sitze auf der$_{DAT}$ Bank.
          I   sit   on the   riverbank
          'I'm sat on the riverbank.'

      c. Ich setze mich, [auf was$_{ACC/DAT}$ mein Bruder schon   sitzt].
          I   sit   myself   on   what   my   brother already sits
          'I'm sitting down on what my brother is already sitting.'

7.4   A-bar features

- Reuse must stop short of *-wh*

  - *-wh* is not available to reuse in wh-moving a FR (37)

    (37) *[$_{DP}$ What John eats] does Mary eat *t*?

  - Reuse based on the non-wh part of the word, assuming decomposition of e.g. German *wer* into wh *w-* + *-er* nominative *D*.

- New, information structure features can be added

  - FRs can embark on other A-bar movements, e.g. topicalisation (38)

    (38) [$_{DP}$ What John eats]$_i$, I eat *t$_i$*.

  - Not reusing a feature, say *-top*, since the wh-word does not undergo topicalisation inside the FR

  - *-top* added after FR fully formed

- The opposite behaviour of *-wh* and *-top* in being active only internal vs. external to the FR tracks the difference between intrinsic vs. optional features (Chomsky, 1995, p. 231).

8   Conclusion

- Matching effects urge a Reprojection analysis of FRs

  - Best of the Comp Hypothesis — wh-word in Spec,CP

  - Without the problems of the Head Hypothesis — how to enforce matching?

- The dual role of the wh-word in FRs

  - At the top of usual long-distance dependencies, a wh-word's syntactic life is over

  - In FRs, the wh-word characterises the constituent, drives further structure building

- Questions brought into focus by looking at FRs from the perspective of MG:

    1. How to implement reprojection, overcoming the stipulation that the selector projects

    2. Reusing features: recycling through the feature list vs. refreshing, reusing the string

- Reproject

    – Triggering Reproject: do wh-words reproject over anything other than ε *:: +wh Q*?

    – Extraposition: derivational reality to CP

    – PP- as well as DP-FRs

- Reusing features

    – (Persistence vs.) Recycle vs. Refresh

- Category matching

    – Recycle: nominal FRs

    – Refresh: complement/adjunct 'missing P' FRs

- Case matching

    – Recycle: generic *-k*, non-syncretic case, underspecified syncretic case

    – Refresh: non-underspecified case

- Case + Category matching

- No reuse of A-bar features

    – Intrinsic *-wh* inside the FR

    – Optional *-top* external to the FR

- Further issues:

    – Tolerable mismatches, case hierarchy (Grosu, 1994, p.108)

    – Possessor/genitive FRs

    – Multiple-wh FRs (Rudin, 2007; Caponigro and Fălăuş, 2018)

    – Super-strong matching, including V (van Riemsdijk, 2017)

    – Transparent FRs (Wilder, 1999; van Riemsdijk, 2006; Grosu, 2016)

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