Some remarks on approaches of relative clauses with regard to the Minimalist Program
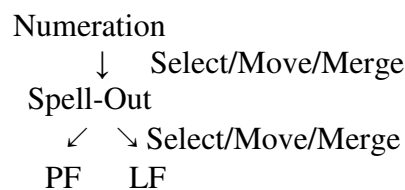Université Sorbonne Nouvelle, Paris 3
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The paper reviews three approaches on relative clauses (RCs) within the framework of Minimalist Program (MP): Head External Analysis (HEA), Head Raising Analysis (HRA) and Matching Analysis (MA). Without discussing all the problems, I am just showing that after the introduction of MP, there must be quite important revisions on all these analyses because of different new problems.

1. Minimalist Program (Chomsky (1995))
The MP model of Chomsky (1995) can be represented as:

$$
\begin{array}{c}
\text{Numeration} \\
\downarrow \quad \text{Select/Move/Merge} \\
\text{Spell-Out} \\
\swarrow \quad \searrow \text{Select/Move/Merge} \\
\text{PF} \quad \text{LF}
\end{array}
$$

The computational system of language (C_{HL}) builds up, in a piece-by-piece bottom-to-up way, the phrase structures from the lexical resources by Select, Merge and Move until Spell-Out, where the output is split into PF and LF. At PF and LF, every symbol must be interpretable (that is, legible and meaningful) respectively in terms of the A-P and C-I systems. A derivation converges which conforms to the Bare Output Conditions, that is, the external (A-P and C-I) conditions imposed from outside; otherwise, it crashes. Lexical elements enter into derivation fully inflected. The principles of economy require least number of symbols, least effort, shortest movement and movement as last resort (i.e. triggered by the need of feature checking).

2. Head Raising Analysis (HEA) vs. MP
The traditional view of HEA (cf. Quine (1960), Ross (1967), Chomsky (1977), Jakendoff (1977), Smits (1988), & Meinunger (2000)) is that, the RC is adjoined to the head noun base-generated outside it. The head noun is selected by an external determiner, which takes scope over the head noun and the RC. There is no representation of the head noun inside the RC. The relativizer or the empty operator moves to [Spec, CP] from inside the RC and there is coindexation between the head noun and the relativizer or the operator:
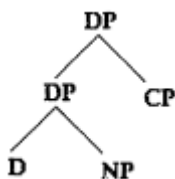
(1) [$_{DP}$ *the* [$_{NP}$ *man*$_i$ [$_{CP}$ *who(m)*$_i$/*Op*$_i$ *that you met* t_i *yesterday*]]]

The restrictive RC and the non-restrictive RC differ in the position of the head (Demirdache 1991:109)

(2) Restrictive RC
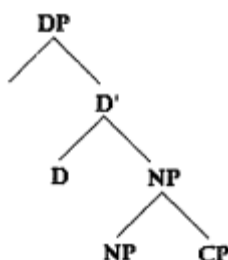
(3) Non-restrictive RC

Reinterpreted in MP, the restrictive RC is formed by merger, before merging with the head noun to form the NP, which will further merge with the determiner if necessary to obtain the final DP. The order of the three mergers is important with regard to the scope of the determiner. If the determiner and the head noun merged first, then the whole DP should have the same semantic type <e>, like proper nouns, which means that the restrictive interpretation would never be possible.

The biggest problem for HEA is the coindexation. According to Chomsky (1995), the coreferential index[1] has no more legal status in the lexicon, so the coindexation can be no more used to guarantee the semantic intersective modification. One possible solution is the φ-feature Agreement between the head noun and the relative pronoun or the empty operator. If this solution seems plausible in case of relative pronoun, we may wonder of what features the empty operator consists if it exists indeed in the lexicon. Given that it has no phonetic/phonological representation, it is similar to empty categories. However, if it is preferable to "minimize the restriction in the operator position" (Chomsky 1995:209), but not the other empty categories, we do not know why there is this Preference Principle for the empty operator unless only out of theory-internal considerations.

3. Head Raising Analysis (HRA) vs. MP
According to HRA (cf. Smith (1964), Brame (1968), Schachter (1973), Vergnaud (1974), Carlson (1977), Kayne (1994) & Bianchi (1999, 2000)), the head noun is base-generated in the RC in its usual position, and then it raises, possibly with the relative pronoun, to an operator position, [Spec, CP] according Kayne (1994), within the RC to be adjacent to the external determiner (if there is one), which selects the CP (Kayne 1994:87):

(4) the [[$_{NP}$ picture] [that [Bill saw [e]]]]

or (*op.cit.*, 90)

(5) the [which picture [C^0 ...
(6) the [$_{CP}$ [$_{DP}$ picture$_i$ [which [e]$_i$]] [C^0 ...

Bianchi (1999) proposes an empty pronoun for *that*-RC or RC with no relativizer (Bianchi 1999:171):

(7) [$_{DP}$ D$_{REL}$ + *the* [$_{CP}$[$_{DP}$ t$_D$ [$_{NP}$ *book*]]$_i$ [$_{CP}$ *that I read* t$_i$]]]

So there is a unified analysis for all types of RCs.

Given that Chomsky (1995) adopted Kayne (1994)'s Linear Correspondence Axiom, which imposes the [adjunct-head-complement] order, and the newest version of the HRA is based on the same theory, the HRA seems to be the best candidate for the "official" analysis on RCs.

[1] Not to confuse this "index" with the "index" in Numeration.

Reinterpreted in MP, the CP is first formed by merger, and then merges with the determiner as its complement. However, since the phrase structure is formed in MP in a step-by-step bottom-to-top way, once the external determiner and the CP are merged

(8)

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            DP
           /\
        the   CP
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(that) Bill saw picture/which picture/Drel picture
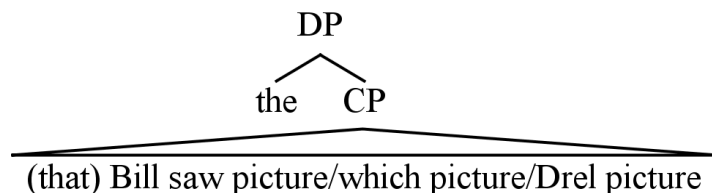
the head noun, with or without the relativizer, cannot move outside the CP, as no empty position is designed according to the Bare Phrase Structure Theory, different from the X-bar theory in P&P. But one question must be answered: why move? Concerning the movement of the head noun with the relativizer, the trigger may be topic-features (Bianchi 1999:191):

(9)
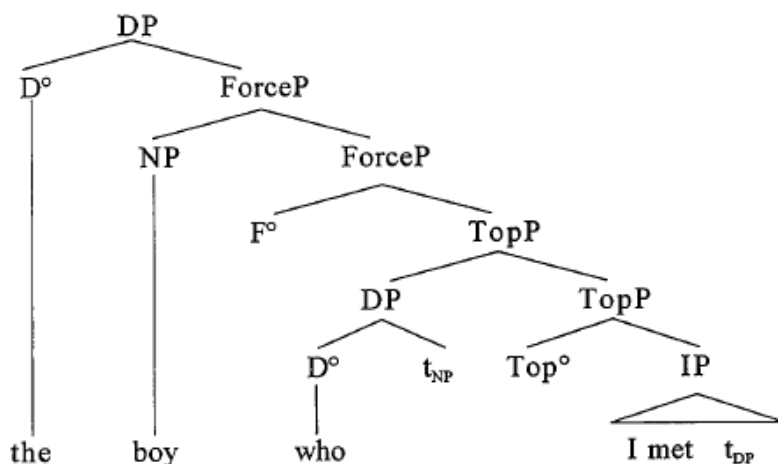
wh-features (cf. Chomsky (1995), Vries (2002)), or focus-features checking (cf. Schachter (1973), Sabel (1998)). As for the raising of the head noun itself, the feature to check may be [definiteness].

The biggest problem for HRA is the following. The MP adopts the Lexicalist Hypothesis, according to which, lexical elements enter into derivation fully inflected (Chomsky (1995)). This creates a paradox in languages with morphological cases, for example, in Akhvakh (Creissels 2007:21, my underlying):

(10) *eq̄-a*   [*lãga*   *r-eχ-ada*]   *ek'wa-su-ga!*
      look_at-IMP   sheep$_{PL}$ NPL-buy-PFV$_{PTCP}$ man-O$_M$-LAT
      'Look at the man who bought sheep!'
(11) *ek'wa-sw-e*   *lãga*   *r-eχ-ari.*
      man-O$_M$-ERG   sheep$_{PL}$ NPL-buy-PFV
      'The man bought sheep.'

If we assume that *ek'wa* 'man' moves from inside the RC, then it must have the ergative case, as in (11), contrary to (10), where it is marked with the lative case; but if *ek'wa* has already inflected for the lative case, it is impossible to determine its thematic role (and its grammatical role) in the RC; the third possibility is still more ridiculous: *ek'wa* has both lative case and ergative case!

Less important is the Case clash (Kayne (1994), Borsley (1997, 2001), Bianchi (2000), Vries (2002)[2]), because the head noun must have the Case of the relativized position and the Case in the matrix. Bianchi (2000) supposes that the external D° bears the matrix Case (and the morphological case if necessary) and copies the feature to the head noun, which then will be spelled out in the right form. However, the solution seems untenable because of the Lexicalist Hypothesis. If the head noun is not spelled out with the right morphological case before its merger with the external D°, this means that it does not enter into derivation fully inflected, which contradicts the Lexicalist Hypothesis. Others problems are raised by Borsley (2001). Vries (2002) presented another solution. In my idea, this problem can be resolved (or bypassed) one way or another, but the morphological case clash seems mission impossible under the Lexicalist Hypothesis.

Similarly, in quite a lot of prenominal RC languages, the relativisation of adjuncts makes the preposition disappear, for example, in Mandarin Chinese:

(12) *lisi   *(zai)   na   suo   xuexiao   dushu*
       Lisi   at   DEM   CL   school   study
       'Lisi studies in that school.'
(13) *lisi (*zai) dushu de   na   suo   xuexiao*
       Lisi at   study   COMP   DEM   CL   school
       'the school where Lisi studies'

If the absence of *zai* 'at' makes (12) ungrammatical, its presence in (13) makes the RC out. If the head noun *xuexiao* 'school' raises from inside the RC, then why must the preposition be "deleted" accordingly? Even if it is possible to argue that *zai* never enters into derivation, the problem remains as to how to determine the thematic role of the noun in question. Personally, I see no satisfactory solution to this dilemma in MP.

4. Matching Analysis (MA) vs. MP

According to MA (cf. Lees (1960), Chomsky (1965), Munn (1994), Sauerland (1998, 2003), Cresti (2000) & Citko (2001)), the RC is adjoined to the external head noun while in the RC there is an internal head noun as the complement of the relativizer or the empty operator. The internal head noun, with the relativizer or the operator, raises to [Spec, CP]. Finally, the internal head noun is deleted under identity:

(14) [$_{DP}$ *the* [$_{NP}$ *picture*$_i$ [$_{CP}$ [*Op/which/that* ~~*picture*$_i$~~]$_j$ *you see* t$_j$]]]

The advantage of MA is that it follows more closely the copy theory of movement than HEA and HRA, in that the relation between the two heads is not established by movement but by copy. However, the coindexation is still used to guarantee the "identity" of the two heads. This raises the same question as in HEA, for the coreferential index is not a legal element in the lexicon according to MP. A second problem concerning "identity" is to what extent the two heads should be identical so that one of them can be deleted. According to Citko (2001:138):

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[2] According to my own reading, there seems to be a terminological misunderstanding in the controversy between Kayne (1994), Borskey (1997, 2001) and Bianchi (2000). Kayne (1994:155, note 15) mentioned actually the **Case** clash. Borsley (1997), not satisfied by his solution, insisted that HRA could not resolve the problem of **Case** clash, however, sometimes in terms of "overt **Case** marking" (e.g., p638). Bianchi (2000), as a reply to Borsley (1997), presented her solution for the "**Case** slash" (p129), but with reference to "overt **Case** marking" as well (e.g., p129). Finally, Borsley (2001) attacked again the problem with new arguments, and with a disconcerting confusion: 13 occurrences of "**Case**" and 7 of "**case**", among which a wrong quotation from Bianchi (2000): "**case**-marked" (Borsley 2001:5) instead of "**Case**-marked" (Bianchi 2000:129).

(15)deletion is less strict than movement with respect to identity of features, and ... total identity is not required for deletion to be possible.

and according to Cresti (2000:155):

(16)What accounts for the reconstruction, then, is a kind of ellipsis which targets material that "matches" the external head of the relative, according to certain LF criteria

So here it seems more adequate to talk about "aboutness" than "identity". However, according to *certain* LF criteria, the deletion is not impossible in (17), but it is clear that it is just impossible:

(17)*The author of* Oliver Twist, *[whom ~~Charles Dickens~~] I admire [~~whom Charles Dickens~~] very much*

It seems that the identity problem may belong both to PF and to LF. Most importantly, the Lexicalist Hypothesis makes the aboutness identity impossible, as showed above for HRA: for languages with morphological cases and for languages with prepositions "deleted" in RCs, because in both cases, there is neither PF identity nor LF identity. Actually, this problem exists for all analyses which establish the coreference directly between the external semantic representation of the head noun and its internal semantic representation, because of the introduction of the Lexicalist Hypothesis. As we have said, we see no satisfactory solution actually.

In conclusion, RCs, which have always been a field of debates and contradictions, are not better analysed within MP. The three main approaches, HEA, HRA & MA, are all problematic vis-à-vis the newest version of Generative Grammar. The elimination of index in MP makes the HEA to find new explanation for semantic intersection in RCs and the adoption of the Lexicalist Hypothesis raises new problems for HRA and MA.

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