Three Theories of Relative Clauses

1 The Competing Proposals

1.1 The Head External Analysis

- ubiquitous but of unclear origins.


- the head NP originates outside the relative clause CP.
- The relative clause CP involves A'-movement of a relative operator, which may be overt or covert.

(1) the book [_{CP} Op_{t} which_{t} John likes_{t}] 

- I am assuming that the relative clause CP is adjoined to the head NP and the two combine semantically via intersective modification. This is a common assumption for restrictive relative clauses (but see Bach and Cooper (1978)).
- The site of attachment is independent of the choice of the head external analysis - the analysis is equally compatible with a higher adjunction site for appositive relative clauses (cf. Demirdache (1991)).

- Often the relationship between the head NP and the relative pronoun is indicated by co-indexing them. Unclear why this is needed (at least for restrictive modification) once we have a way to interpret structures like the above.

- Since the head NP is never inside the relative clause CP, it cannot be reconstructed into a relative clause-internal position.

1.2 The Head Raising Analysis

- originally proposed by Brame (1968), Schachter (1973), and Vergnaud (1974).

- Recent versions include Åfarli (1994), Kayne (1994), and Bianchi (1999) among others.

The central idea: the head NP originates inside the Relative Clause CP.

(2) the [book] [_{CP} [Op/which_{t} John likes_{t}]]

- The final structural position of the head NP varies in different instantiations of the head raising analysis.
- since the head NP originates inside the relative clause CP, it is possible to reconstruct it inside the relative clause and interpret it in a relative clause-internal position.
1.3 The Matching Analysis

- originally proposed in Lees (1960), Lees (1961), and Chomsky (1965).

- clarified and extended by Uli Sauerland (cf. Sauerland (1998), Sauerland (2003), among other). His version is sketched below.

- corresponding to the external head there is a corresponding internal head which is phonologically deleted under identity with the external head.

- But the internal head and the external head are not part of a movement chain.

(3) the [book] [CP [Op/which book] John likes t]

- The matching analysis can be seen as halfway between the head external analysis and the head raising analysis.

The above instantiation assumes that the relative clause-internal representation of the external head is deleted under identity in the [Spec,CP] of the relative clause. An alternative was pursued under the unbounded deletion analysis of Grimshaw (1975) and Bresnan (1976) which allows for in-situ deletion of the head NP.

2 Some Arguments for the Head Raising Analysis

The following arguments tell us that information about the external head is available inside the relative clause CP.

Since both the head raising analysis and the matching analysis make information about the external head available inside the relative clause CP, these arguments will not in general differentiate between the head raising and the matching analyses.

A question that is relevant here is: does the external head have to have a relative clause internal representation, or is it is enough to say that it is possible for the external head to have a relative clause internal representation? The larger question is whether the grammar permits more than one analysis for relative clauses e.g. head external as well as raising, or raising as well as matching.

2.1 A Primitive Argument

Headed relative clauses do not allow internal heads.

(4) a. * The book [[which book] [Matt wrote t]]
   
   b. * The artist [[[which artist]’s writings] [Paula admires t]]

Unadorned, the head external analysis predicts that (4) should be grammatical.

The closest that I have seen to an explanation is a proposal that having an internal head be overt might cause a binding theoretic violation. But both heads are NPs and it is not clear that they themselves participate in binding theory.

There also seems nothing wrong with such cases semantically except perhaps redundancy, which shouldn’t lead to sharp ungrammaticality - it doesn’t in correlatives. Removing this redundancy does not improve matters.

(5) * The [rolling pin] [[which metal object] [Robert uses t]] was made by Alessi.

The absence of an internal head follows directly in a head raising/matching analysis.
2.2 Idioms

The logic behind the argument from ‘idioms’ for a raising analysis goes as follows:

(i) idiom appears only as part of a larger expression (cf. 6-9a vs. b).
(ii) But the idiom is able to felicitously appear as the head NP of a relative clause where the position it is associated with inside the relative clause (its trace) is part of the larger expression it needs to appear with (cf. 6-9c).

(6) (attributed to Brame 1968 ms., ex. 35 from Schachter 1973)
   a. We made headway.
   b. * (The) headway was satisfactory.
   c. The headway that we made was satisfactory.

(7) (ex. 36 from Schachter 1973)
   a. She’s keeping careful track of her expenses.
   b. * (The) careful track pleases me.
   c. The careful track that she’s keeping of her expenses pleases me.

(8) (ex. 37 from Schachter 1973)
   a. Lip service was paid to civil liberties at the trial.
   b. * I was offended at (the) lip service.
   c. I was offended by the lip service that was paid to civil liberties at the trial.

(9) (attributed to George Bedell, fn. 15 from Schachter 1973)
   a. He solved the problem in a clever way.
   b. The clever way in which he solved the problem impressed me.
   c. *The clever way impressed me.

Under a head external analysis, given the unacceptability of the examples in (6-9b), the acceptability of the examples in (6-9c) is unexpected and vice versa.

The raising analysis is able to explain these facts parsimoniously. Idioms need to appear in a particular environments as shown by the examples in (6-9a) and the unacceptability of the examples in (6-9b). The examples in (6-9c) are acceptable because the idiom appears in the relevant environment at some point in the derivation (minimally point of Merge, maybe also at LF).

2.2.1 Lexical Assumptions

The argument from idioms is based on an assumption about how idioms are interpreted/stored in the lexicon, namely that the domain of special meaning is local.

In other words, two elements which can be arbitrarily far apart from each other in a structure at the point of Merger cannot be given a special meaning.

The alternative requires stipulating that the special meaning of the idiom is available if

- (i) its parts are merged in a certain local configuration ‘ID’, or
- (ii) a part of the idiom is the External Head of a relative clause and the A'-moved phrase involved in the formation of this relative clause and the remaining parts of the idiom were merged in the local configuration ‘ID’.

Allowing for statements like (ii) would require enriching the representational power of the lexicon considerably.

2.2.2 Some Problem Cases

Given the above discussion, one might expect that relative clauses may only have idiom heads if the heads are licensed relative clause internally.

But this is not the case.

(10) idiom head licensed externally:
    a. He solved the problem in a clever way that impressed me.
    b. We made headway that was sufficient.
    c. *John pulled the strings that got Bill his job. (from McCawley (1981))

- These cases are problematic if the raising analysis is the only analysis available for relative clauses.
- They are, however, less problematic under the Head External analysis. Under the Head External analysis, the special meaning of the idiom will be licensed at the point of Merge e.g. by being merged as the object of make in (10b).

- Certain questions still remain open. Consider (10b) where headway needs to be given a semantic denotation that can be modified by *that was sufficient. Providing such a denotation seems non-trivial but the task of providing such a denotation is independent of the current discussion. This can be seen by the fact that exactly the same issues arise in We have made sufficient headway.

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Once appropriate assumptions about the denotation of the idiom head have been made, the matching analysis becomes an option for (10). Following Sauerland (1998)/Sauerland (2003), the identity between the external head and its relative-clause internal representation is established at LF and it is plausible that the identity is established not with the literal form of the idiom, but with whatever its semantic representation is.

2.2.3 Overall Thrust

- idiom licensed relative clause internally:
  - $\sqrt{\text{head raising, \text{*matching/head external}}$

- idiom licensed relative clause externally:
  - $\sqrt{\text{matching/head external, \text{*head raising}}$

Note though that argument from idioms does not rule out any of the analyses across the board. All it says that particular analyses cannot be at play in particular examples.

2.3 Subcategorization

Larson (1985): headed relative clauses containing a trace in adjunct position, but neither a relative adverb or a stranded preposition, are grammatical only if the head of the relative clause is a bare-NP adverb.

(11) (from Larson 1985) (Roumyana Izvorski p.c.)
  a. the way [Op that you talk $t_j$]
  b. *the manner/fashion [Op that you talk $t_j$]
  c. You talk that way.
  d. *You talk that manner/fashion.

The well-formedness of the operator-variable chain in (11a) depends upon what the head NP is. Information about the head NP is required internal to the relative clause.

Under a head raising or a matching analysis, the ill-formedness of (11b) directly follows from the ungrammaticality of (11d).

This explanation is not directly available under the head external analysis and Larson, who is assuming the head external analysis, has to introduce a feature-transmission mechanism which makes the relevant information about the head NP available internal to the relative clause.

Like the argument from idioms, does not rule out the external head analysis in general.

2.4 Binding Theory Evidence

The following data is taken to show that for the purposes of binding theory the head of the relative clause behaves as if it was in its (lowest) trace position inside the relative clause.

(12) (exs. 42a, 43a from Schachter 1973)
  a. The portrait of himself that John, painted is extremely flattering.
  b. The interest in each other that John and Mary, showed was fleeting.

(13) *The opinion of him that John, has is favorable.
    (compare with: The opinion of himself that John, has is favorable.)

(14) (exs. 41b, 42b from Schachter 1973)
  a. *The opinion of John that he, thinks Mary has is unfavorable.
  b. *The portrait of John that he, painted is extremely unflattering.

The head external analysis makes the wrong prediction with respect to (12-14). It predicts that (12) should be ungrammatical and (13) and (14) should be grammatical.

The actually observed pattern of (un)grammaticality can be explained under the raising analysis if the external head is interpreted at LF in its trace position.
2.4.1 The Idiom Connection

All the binding theory examples below are cases where like in the ‘idiom’ cases (paint a portrait of, show an interest in, have a (Adj) opinion of) it is plausible that at LF the head NP forms a unit at LF with relative-clause internal material.

This might explain why we get reconstruction of the head NP into the relative clause for binding purposes. The argument from binding theory can thus be seen as a special case of the argument from idioms – one that shows that when the head raising analysis is forced, we also get binding theory reconstruction effects.

2.4.2 Picture NPs confound

Reinhart and Reuland (1991)/Reinhart and Reuland (1993) (also Heycock (1999):555-556) have argued that anaphors in picture NP’s are systematically exempt from Condition A of the binding theory. If we accept their argument, (12) can no longer be used to motivate reconstruction.

Further, there are instances where anaphors in picture NP’s can take as their antecedent NP’s that are clearly non-local.

(15) The rock star said that his wife would not identify [which pictures of himself] she had defiantly sent to the tabloids. (ex. 17 from Safir (1999))

2.4.3 Implicit Arguments confound

Similarly, the argument for reconstruction based on the existence of Cond. B and Cond. C in (13) and (14) respectively can also be defused. It can be argued that these external heads involve an implicit PRO, which is controlled by the subject of the relative clause (cf. 16).

(16) a. *The PRO, opinion of him, that John has is favorable.
   b. *The PRO, portrait of John, that he painted is extremely unflattering.

This is sufficient to trigger a Cond. B effect in (13) and a Cond. C effect in (14b).

Note that according to the implicit argument line (14a) should not be a Cond. C violation. This is so because the implicit PRO subject of opinion will be controlled by Mary and not by he. Munn (1994) and Safir (1999) do not find (14a) ungrammatical.

→ reconstruction not required to explain Cond. B/C effects.

2.4.4 Some more binding data and an overview

Reconstruction for Condition C is in general not forced.

(17) a. In [[pictures of Al] which he lent to us], he is shaking hands with the president. (from Munn 1994 via Safir 1999)
   b. the [[pictures of John] [he, likes tj]] (from Sauerland (1998))

The cases where we do find Condition C effects are cases where the head raising analysis is forced for independent reasons - say idioms.

(18) *The [[headway on Mary’s project] [she made tj]] pleased her boss. (from Sauerland (1998))

2.5 Variable Binding Effects

2.5.1 A First Pass

Quantifiers inside a relative clause are able to bind a pronoun embedded in the external head of the relative clause.

Moreover a relative clause internal is able to bind a pronoun embedded in the external head only if it would have been able to bind the relevant pronoun, were the external head replaced in the relative clause internal gap.

(19) (a-c.i are 70a-c from Safir 1999)
   a. i. [[The picture of his mother] that every soldier kept __ wrapped in a sock] was not much use to him.
      ii. Every soldier kept [a picture of his mother] wrapped in a sock.
   b. i. John generally has [[an opinion of his book] that every novelist respects __].
      ii. Every novelist respects [John’s opinion of his book].
   c. i. ??John generally has [[an opinion of his book] that __ is useful to every author].
      ii. ??John’s opinion of his book] is useful to every author.

(also noticed for Norwegian by Áfarli (1994) and Italian by Bianchi (1999))

The above paradigm receives a straightforward explanation if we assume that the external head of the relative clause can be interpreted in the position of the relative clause internal gap.
Such an explanation is unavailable under the head external analysis and the matching analysis (what would we do with the pronoun in the external head).

These facts from variable binding thus support the head raising analysis. Like many of the other tests, they do not rule out the head external analysis or the matching analysis elsewhere.

2.5.2 Sharvit (1999)'s cases

Sharvit (1999) analyzes cases where a quantifier inside a relative clause is able to bind not just a variable inside the head NP of its relative clause but further away:

(20) a. [The picture of his mother] that every soldier kept __ wrapped in a sock] was not much use to him.

b. The [picture of himself] that everybody likes t_j]] is gracing his homepage.

It is clear that reconstructing the head NP to a position inside the relative clause will not explain how the relative clause internal QP can bind a variable in the QP.

One alternative would be to allow for QR out of the relative clause to a position from where binding was possible as is sometimes assumed for inverse linking.

Sharvit (1999) objects to such a solution on the grounds that it violates island conditions on movement. Instead she proposes a rule that combines semantic reconstruction and the formation of a complex quantifier to get the right scope and binding.

Irrespective of the mechanism we choose to handle (20), the mechanism will make it unnecessary to reconstruct the head NP into the relative clause just to get variable binding right.

2.5.3 A Stronger Argument

Support for the proposal that the external head reconstructs - support that is not compromised by Sharvit (1999)'s observations - is provided by Safir (1999)'s observation that the external head of a relative clause displays a pattern of variable binding that mirrors the one found with non-wh quantifiers in the operator phrases of relative clauses.

For non-wh quantifiers in the operator phrases of relative clauses, Safir finds the following pattern:

(21) a. QP is a complement/possessor (ex. 39a-c from Safir 1999)
   i. [*cP [...QP_j]_j [Pron_...t_j...]]
      *I respect [any writer] [whose depiction of everyone_j] he will object to t_j.
      (assuming reconstruction, this is a secondary SCO violation)
   ii. [cP [...QP_j]_j [t_j...Pron_...]]
      *I respect [any writer] [whose depiction of everyone_j] t_j will offend him.
   iii. [*cP [...QP_j]_j [...Pron_...t_j...]]
      *I respect [any writer] [whose depiction of everyone_j] his mother surely wouldn’t recognize t_j.
      (assuming reconstruction, this is a secondary WCO violation)
   iv. [cP [...QP_j]_j [t_j...[Pron_...]]
      *I respect [any writer] [whose depiction of everyone_j] t_j will offend his mother.

Since the QP is a complement/possessor, hence it must be introduced by cyclic merger (i.e. merge after move) (cf. Lebeaux 1990, Chomsky 1993). Hence reconstruction effects do not surface.

b. QP is an adjunct (ex. 40a-c from Safir 1999)
   i. [cP [...QP_j]_j [Pron_...t_j...]]
      *Can you think of a single politician [whose picture in any civil servant’s office] he is truly proud of t_j?
   ii. [cP [...QP_j]_j [t_j...Pron_...]]
      There is at least one politician [whose picture in any civil servant’s office] t_j shows he is a Republican.
   iii. [cP [...QP_j]_j [...Pron_...t_j...]]
      *I can think of several politicians [whose picture in any civil servant’s office] his job depends upon t_j.
   iv. [cP [...QP_j]_j [t_j...[Pron_...]]
      There is at least one politician [whose picture in any civil servant’s office] t_j shows that his boss is a Republican.

Since the QP is an adjunct, it can be introduced by countercyclic merger (i.e. merge after move) (cf. Lebeaux 1990, Chomsky 1993). Hence reconstruction effects do not surface.
The same pattern emerges with the external heads of relative clauses.

(22) __ indicates the relative clause internal gap (= ex. 66 from Safir 1999)

a. QP is a complement
   i. * [EH-QP] [CR [Pron, ...]]
      *[Pictures of anyone] [which he displays prominently] are likely
to be attractive ones.
   ii. [EH-QP] [CR [...Pron ...]]
      [Pictures of anyone] [which put him in a good light] are likely
to be attractive ones.
   iii. ? [EH-QP] [CR [[...Pron ...]]]
      ?[Pictures of anyone] [that his agent likes...] are likely to be attractive.
   iv. [EH-QP] [CR [[...Pron ...]]]
      [Pictures of anyone] [that please his agent] are likely to be attractive.

b. QP is a possessor (= ex. 68 from Safir 1999)
   i. * [EH-QP] [CR [Pron, ...]]
      *[Anyone’s pictures] [which he displays prominently] are likely
to be attractive ones.
   ii. [EH-QP] [CR [...Pron ...]]
      [Anyone’s pictures] [which put him in a good light] are likely
to be attractive ones.
   iii. ? [EH-QP] [CR [[...Pron ...]]]
      ?[Anyone’s pictures] [that his agent likes...] are likely to be attractive.
   iv. [EH-QP] [CR [[...Pron ...]]]
      [Anyone’s pictures] [that please his agent] are likely to be attractive.

c. QP is an adjunct (= ex. 67 from Safir 1999)
   i. [EH-QP] [CR [Pron, ...]]
      [Pictures on anyone’s shelf] [which he displays prominently] are likely
to be attractive ones.
   ii. [EH-QP] [CR [...Pron ...]]
      [Pictures on anyone’s shelf] [which put him in a good light] are likely
to be attractive ones.
   iii. ? [EH-QP] [CR [[...Pron ...]]]
      ?[Pictures on anyone’s shelf] [that his agent likes...] are likely
to be attractive.

iv. [EH-QP] [CR [[...Pron ...]]]
   [Pictures on anyone’s shelf] [that please his agent] are likely
to be attractive.

This complicated set of facts receives a straightforward explanation if we assume
that the external head is reconstructed into the relative clause internal gap posi-
tion.

Semantic accounts of reconstruction (e.g. Sharvit 1999) do not extend to the
paradigm in (22) where the displaced constituent contains a quantifier.

Further, if the semantic account could somehow be extended to handle cases like
(22a, b) on a parallel with cases where the displaced constituent contains a pro-
noun, it would still not explain why the pattern of ungrammaticality found with
complements and possessors (22a, b) is not found with adjuncts (22c). In the ab-
scence of reconstruction, the relative clause internal environment is identical in
(22a-c). An approach that does not relate the external head (or a relative clause-
internal counterpart) via movement to the relative clause internal gap is unable
to use Lebeaux’s proposal to distinguish between complements and adjuncts.

- The argument based on Safir’s examples is compatible with the head raising
analysis and the matching analysis. Unlike most of the preceding arguments, it
is incompatible with the availability of the head external analysis. If the head
external analysis were a possibility, we would not find the correlations that we
do in (22).

2.6 Amount Relatives and Scope Reconstruction

The existence of amount readings provides another reason for assuming a relative
clause-internal representation of the external head.

In (23), for independent reasons, we do not wish to entertain a variable following
there be (cf. Carlson (1977), Heim (1987), Grosu and Landman (1998)).

(23) (from Heim 1987:33, also see Carlson 1977)
   The very few books that there were on his shelves were all mysteries.
   LF. The very few $d$ that there were $d$ many-books on his shelves were all
   mysteries.

Under the head raising analysis, it is postulated that the external head of the
relative clause is reconstructed in its trace position and the abstraction is over a
Reconstruction in amount readings can take the head NP below another scope bearing element thus producing scope reconstruction effects.

(24) (exs. from Sauerland 1998:54a, b)
   a. No linguist would read the many books Gina will need for vet school.
      possible reading: need > many
   b. Mary shouldn’t even have the few drinks that she can take.
      possible reading: can > few

(25) a. I am worried about the twenty five people likely to come for dinner tomorrow.
    possible reading: likely > 25 people (Heim p.c.)
   b. I telephoned the [two patients] [that every doctor will examine]. (l > 2 )
      (vs. I telephoned two [patients] [that every doctor will examine], (*l > 2 )) (from Bianchi (1999))

A head external analysis is unable to derive the relevant readings of (24) and (25). A head raising analysis (and presumably the matching analysis) has more success since it provides us with a way of putting the external head under the scope of a relative clause-internal operator.

An analysis that employs semantic reconstruction could also work but I do not know any worked out proposal that takes this line.

- We see therefore that the derivation of amount readings requires a head raising, or a matching, analysis. The existence of amount readings does not, however, provide evidence against the existence of the head external analysis elsewhere.

3 The Structure Proposed for the Raising Analysis

3.1 The Structure: First Version

(26) the book which John likes

\[
\text{DP} \quad \text{NP} \quad \text{CP} \\
\text{the} \quad \text{book} \quad [\text{which } t_j] \\
\text{CP} \quad \text{C'} \quad \text{IP} \\
\text{C'} \quad \text{+rel} \quad \text{John likes } t_j
\]

This proposal is similar to the structure proposed in Kayne (1994). The innovation is that in (26), the NP book ends up outside the CP. In this structure, which John likes forms a constituent that excludes book. This is in contrast to Kayne’s proposal (cf. 27).

(27) the book which John likes

\[
\text{DP} \quad \text{CP} \\
\text{the} \quad \text{DP} \quad \text{CP} \\
\text{NP} \quad [\text{which } t_j] \quad \text{C'} \quad \text{IP} \\
\text{C'} \quad \text{+rel} \quad \text{John likes } t_j
\]

There seems to be evidence that which John likes does form a constituent. For one, it can be co-ordinated.

(28) the picture [which Bill liked] and [which Mary hated]
   (ex. 49 from Borsley (1997), also see Bianchi (2000):132)

(29) the [picture of his] [which every freshman likes] and [which every sophomore dislikes]
   (ex. 25 from Bhatt (1999):18)
### 3.2 Some Problems

The head raising analysis as sketched faces two primary problems. Both problems are related to the step where the head NP moves out of the relative clause CP and adjoins to it.

- **Unbounded Possessor Extraction**: the movement in question is an unorthodox one which involves extractions of unboundedly deeply embedded possessors.

   
   a. the \([\text{[NP student]}_t \text{CP } \text{which } \text{t}_j\text{ CP C}_n \text{[Jonah likes } \text{t}_j]]\)
      Pronounced: ‘the student who Jonah likes’
   
   b. the \([\text{[NP student]}_t \text{CP } \text{which } \text{t}_j\text{'s brother} C}_o \text{[Jonah likes } \text{t}_j]]\)
      Pronounced: ‘the student whose brother Jonah likes’
   
   c. the \([\text{[NP student]}_t \text{CP } \text{which } \text{t}_j\text{'s brother}'s friend} C}_o \text{[Jonah likes } \text{t}_j]]\)
      Pronounced: ‘the student whose brother’s friend Jonah likes’

- **Projecting Movement**: the second problem relates to the nature of the landing site of the problematic movement. When the head NP moves out of the relative clause CP, it is an instance of a projecting movement i.e. an instance of movement where the moving phrase and not the target projects.

   See Chomsky (1995):4.4.2/Chomsky (1998):5:pg. 51 where it is built into the derivational mechanism that in cases of movement, it is always the target that projects.

### 3.3 The Matching Analysis as an alternative

For the above reasons, it has been proposed that the relationship between the head NP and the complement of the relative operator is one of matching (and deletion) and not actual movement i.e. the matching analysis.

However, there are two arguments against adopting the matching analysis as a standalone analysis for relative clauses.

#### 3.3.1 The Argument from Deletion

Ellipsis is typically optional. However the deletion of the internal head is obligatory.

This argument is not that strong. It relies on the assumption that the process by which the internal head is deleted is the kind of elliptical deletion that we are used to elsewhere e.g. VP-ellipsis.

As Kennedy (2000) argues convincingly, there is at least one other domain where we find an obligatory elliptical process with exactly the properties that we need for the matching analysis of relative clauses. This domain is comparative deletion.

(31) (exs. 1a, 3a from Kennedy 2000)

   a. The galaxy contains more stars than the eye can see.
   
   b. *The galaxy contains more stars than the eye can see stars.

   The analysis that Kennedy (2000) proposes from comparative deletion is shown in (32).

(32) The galaxy contains more stars than \([\text{[NP stars]}_t \text{CP the eye can see} \text{stars}]]\)

   There is \(A’\)-movement within the comparative. Unlike ordinary \(A’\)-movement where the head of the chain is pronounced, in comparative deletion, both copies are deleted under identity with the CP-external stars. Kennedy calls this kind of deletion ‘movement deletion’ as opposed to ‘ellipsis deletion.’

   Movement deletion differs from ellipsis deletion in two important ways.

   (i) it is obligatory – if it is possible, it is necessary.

   (ii) it is also local unlike ellipsis deletion which can be non-local.

(33) a. Comparative Deletion, Movement Deletion, Only local resolution:

   Now that the remodeling has been completed, the space station is longer than it used to be, and it is wider than it is \([\text{AP } \text{local resolution: AP = } \text{wide}, \text{ contradictory}]]\).

   b. VP Ellipsis, Ellipsis Deletion, Non-local resolution possible:

   Jones didn’t meet all the people she wanted to, but I bet she liked the ones she did.

   local resolution: \(did = \text{liked}, \text{ tautological}]]\)

   non-local resolution: \(did = \text{met}, \text{ informative}]]\)
The fact that the deletion of the relative clause-internal chain in relative clauses is obligatory and that the external head is the one that is overtly realized fits the pattern found with comparative deletion. The locality effects found with comparative deletion are also present in relative clauses.

(34) John studies marsupials and I study every kind of mammal that is found in Australia.  
(cannot be used in a situation where I only study marsupials.)

• The objections raised against the matching analysis based on deletion do not hold once we recognize the properties of movement deletion.

3.3.2 The Argument from Interpretation

The second argument against the Matching Analysis also springs from a property of ellipsis and this is a property of ellipsis that stays constant whether we have movement deletion or ellipsis deletion.

The property is that in ellipsis, while only one phrase is pronounced, both phrases are interpreted. In contrast, in relative clauses we find cases where the head NP seems to be interpreted wholly relative-clause-internally:

(35) The headway that John made was impressive.

As we saw earlier, such cases are best explained by a head raising analysis.

• If the arguments from interpretation hold up, we can conclude that there are at least some cases where we need the head raising analysis and where a matching analysis is unavailable.

However, we cannot conclude that a matching analysis is not available in general. In fact, there are certain cases where the raising analysis in inapplicable and the matching analysis is the only analysis available.

3.4 Fixing the Problems for the Raising Analysis

3.4.1 The Problem of Projecting Movement

Two ways of handling the problem of projecting movement.

• The first way questions the assumption that it is always the target of movement that projects. Iatridou, Anagnostopoulou, and Izvorski (2000) point to the fact that free relatives whose wh-word is nominal are themselves nominal (Bresnan and Grimshaw (1978), Groos and van Riemsdijk (1981)). They suggest that free relatives and relative clauses could be instances of projecting movement. It is plausible that the grammar does not rule out projecting movement across the board. Whether it is the target or the moving phrase that projects may be determined by selectional restriction of the immediately higher node. For example, if the immediately higher predicate selects for a question CP, projecting the wh-phrase would cause a category clash. Iatridou, Anagnostopoulou, and Izvorski (2000) suggest that when there are no such restrictions, the category of the moved element may be able to determine the category of the projected phrase. Relative clauses are arguably such an environment. They are not directly selected for by a higher head. Further, it may actually be necessary for them to be ‘nominal’ in order to combine with the head NP by intersective modification if the discussion in Iatridou, Anagnostopoulou, and Izvorski (2000) about the crosslinguistic availability of intersective modification is on the right track.

In a related discussion in Bhatt (1999), I have argued that projecting movement of the sort that I am proposing takes place very generally:

(36) reduced relatives as involving projecting movement out of AP, PP, AspP, and IP respectively.

a. the [xp [xp firemen] [dp ti available]]

b. the [xp [xp books] [xp ti on the table]]

c. the [xp [xp girls] [asxp ti constructing the robot]]

d. the [xp [xp man] [xp ti to fix the sink]]

• The other way of handling the problem of projecting movement re-examines the need for projecting movement. The empirical observation was that we needed a raising analysis where the relative clause formed a constituent that excluded the NP head. A projecting movement is not the only way to satisfy this requirement. An alternative phrase structure that satisfies this requirement is proposed in Bianchi (2000).

(37) [dp the [xp [xp Picture] [xp C tv [xp [dp which tvxp X' [dp Bill liked ti]]]]]]

(ex. 15 from Bianchi 2000:130, Bianchi does not specify the nature of X')

Bianchi’s modification gives us the right tree geometry but not the right order, at least in Norwegian (Afarli 1994) and Hindi.
a. Norwegian (ex. 23c from Áfarli 1994:88)
   Det huset der som John bor
   ‘the house where John lives’

b. Hindi
   vo tasvīr jo ki Bill-ko pasand hai
   Dem picture Rel Comp Bill-Dat like Prs
   ‘that book which Bill likes’

The modified version of Bianchi’s structure is shown in (39).

(39) \[
\text{DP} \{\text{XP} [\text{picture}] \{\text{R} : X^o \{\text{DP} \text{ which } t_{x \text{P}} \text{ } t_{x \text{P}} \text{ which } t_{x \text{P}} \text{ Bill liked } t_j \}}\}\]

3.4.2 The Problem of Unbounded Possessor Extraction

The problem simply put seems to be that in deriving examples like (40) by a raising analysis, we need to postulate a very unusual extraction.

(40) the [[\text{XP} [\text{student}] \{[\text{R} : X^o \{\text{DP} \text{ which } t_{x \text{P}} \text{ which } t_{x \text{P}} \text{ which } t_{x \text{P}} \text{ Jonah likes } t_j \}}\}]]

Pronounced: ‘the student whose brother’s band Jonah likes

My amendment is inspired by Áfarli (1994)’s analysis of Norwegian relative clauses. He argues that relative clauses in Norwegian can be divided into two classes depending upon whether they involve a Raising Analysis or not.

In particular, he argues that relative clauses that involve an overt relative pronoun (der-relatives) are not derived by the Raising analysis, while relative clauses that do not involve an overt relative pronoun (som-relatives) are derived by the Raising analysis.

(41) (ex. 28 from Áfarli 1994:89)
   a. der-relative
      Det av husa der Jon bor
      that of houses-the Rel Jon lives
      ‘the house where Jon lives’
   b. som-relative
      Det av husa som Jon bor
      that of houses-the SOM Jon lives
      ‘the house where Jon lives’

(som-relatives show reconstruction effects, der-relatives do not.)

While Áfarli’s proposal for Norwegian does not carry over fully to English (something that is noted in passing by him), I believe that his insight is essentially correct: the raising analysis may not be available for certain kinds of relative clauses in English.

In particular, it may be ruled out across the board in cases which involve complex pied-piping i.e. cases where anything larger than the Relative Phrase moves to [Spec,CP]. The Raising analysis would be unavailable in such cases for the simple reason that the ‘head externalization’ movement in such cases would involve an illegitimate movement.

Based on Áfarli’s discussion and the discussion in this paper, the difference between English and Norwegian can be stated as follows: English allows extraction of the complement of all relative operators, while Norwegian allows only for the extraction of the complement of the null operator.

Áfarli (1994) also notes that the data from English wh-relatives with respect to the availability of a head raising analysis is not as clear as that from Norwegian wh-relatives, which clearly rule out a head raising analysis. He speculates that in a language like English where the relative pronoun and a complementizer never appear together, the possibility of a reanalysis of the pronoun as a complementizer cannot be ruled out - though we would probably need to assume some complementizer agreement: who would be the [+human] relative C°, which the [-human] relative C°, and that / φ the unmarked relative C°.

References
