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Relative Clauses and the Theory of Phrase Structure
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Remarks
and
Replies

Relative Clauses and the Theory of Phrase Structure

Robert D. Borsley

Kayne (1994) proposes a restrictive theory of phrase structure in which asymmetrical c-command invariably maps into linear precedence. One of its implications is that there are no right-adjunction structures, either base-generated or derived. Among other things, this means that traditional analyses of relative clauses must be rejected. Kayne proposes an alternative analysis, in which the ''head'' is raised out of the relative clause. The analysis faces a variety of problems and needs numerous additional mechanisms to achieve observational adequacy. Thus, it seems that relative clauses cast serious doubt on Kayne's theory.

Keywords: relative clauses, phrase structure, antisymmetry, Kayne

1 Introduction

Kayne (1994) proposes a restrictive theory of phrase structure in which asymmetrical c-command invariably maps into linear precedence. More precisely, he proposes that a terminal node a precedes another terminal node b if and only if there is some nonterminal node A dominating a and some nonterminal node B dominating b such that A asymmetrically c-commands B. This proposal is embodied in the Linear Correspondence Axiom (LCA). One of its implications is that there are no right-adjunction structures, either base-generated or derived. This means that various widely assumed analyses must be rejected. One of the most notable is the traditional analysis of relative clauses in which they are right-adjoined to N' or NP, as in either (1) or (2).
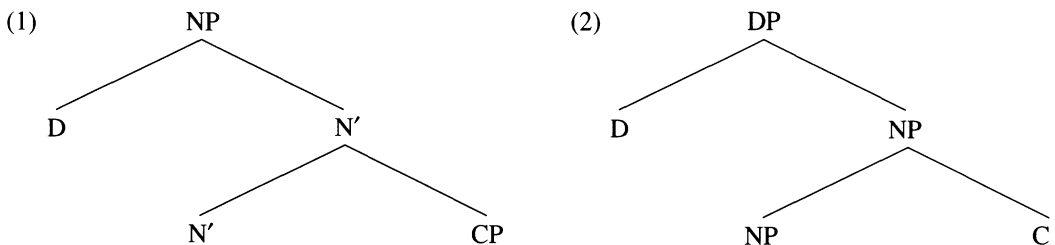
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629

(1) involves the assumption that nominal phrases are NPs. (2) involves the more recent assumption that they are DPs. Kayne presents an alternative approach to relatives, both restrictive and non-restrictive, that is compatible with his theory of phrase structure. In this article I will argue that his approach faces some serious problems. I will show that it needs numerous additional mechanisms to achieve observational adequacy. This suggests that it is not a viable analysis. Kayne notes that his analysis of relative clauses is "by far the most natural analysis" within his theory (1994:91), and he observes that the only alternative analysis within the theory is one in which a relative clause is a complement of N (1994:155 n. 17). The latter is not a very plausible alternative. Thus, if I am right that Kayne's analysis of relatives is untenable, then his theory of phrase structure in turn appears questionable.

The article is organized as follows. In sections 2 and 3 I consider Kayne's accounts of non-*wh*-relatives and *wh*-relatives, respectively. In section 4 I consider his proposals about "extraposed" relatives. In section 5 I look at nonrestrictive relatives. Finally, in section 6 I summarize the article.

2 Non-*Wh*-Relatives

English restrictive relatives fall into two broad types: those that contain a *wh*-word (*wh*-relatives) and those that do not (non-*wh*-relatives). In this section I will focus on the latter. They fall into two subtypes: those that contain *that* (*that*-relatives) and those that do not (zero relatives). I will concentrate on the former.

Kayne's analysis of non-*wh*-relatives is quite simple. He proposes that they involve a D with a CP complement and movement of an NP to [Spec, CP], which for him is a position adjoined to CP. Thus, the nominal phrase in (3) derives from (4) and has the superficial structure in (5).

An obvious question about this analysis is whether there is any independent evidence for the basic structure. Kayne suggests (1994:154 n. 7) that Italian examples like (6) (from Rizzi 1982:85) provide such evidence.

(3) the picture that Bill liked

(4)

(5)

```
                    DP
                   /  \
                  /    \
                 D      CP
                 |     /  \
                 |    /    \
               NPᵢ          CP
                |           /\
                |          /  \
                |         /    \
               the    picture   that Bill liked tᵢ
```
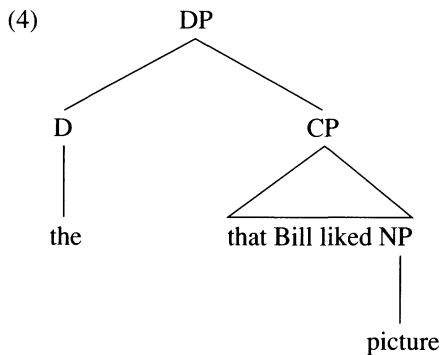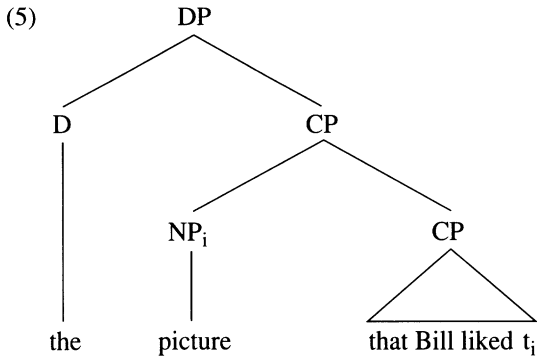
(6) l' aver   lui   affermato. . .
    the to-have he/him affirmed

Similar examples are found in Spanish (see Plann 1981). Moreover, a variety of languages seem to have Ds with a finite CP complement. One is Polish, which provides examples like (7).

(7) To, że   Maria jest tutaj jest tajemnicą.
    that COMP Maria is   here is   secret
    'That Maria is here is a secret.'

Thus, the basic structure in (4) seems at first to be quite well motivated. However, examples like (6) and (7) have a quite different interpretation from that of a nominal phrase containing a relative clause, which has the same kind of interpretation as a simple nominal phrase with no relative clause. Thus, *the person who studies language* has much the same interpretation as *the linguist*. One might suggest that the different interpretations result from the fact that there is no movement to [Spec, CP] in (6) and (7), so that these examples differ at S-Structure from the structure that Kayne assumes for a nominal phrase containing a relative clause. Interestingly, however, Polish has examples like (7) in which the CP complement involves *wh*-movement. Consider (8), for instance.

(8) To,   kogo   Maria widziała jest tajemnicą.
    that-NOM who-ACC Maria saw   is   secret
    'Who Maria saw is a secret.'

Again we find a quite different interpretation from that of a nominal phrase containing a relative clause. It is doubtful, then, whether examples like (6) and (7) provide any support for Kayne's analysis.

A notable feature of the analysis is that it involves an NP-trace in a position where one would expect a DP. If *like* can have an NP-trace as its complement, one would expect it to allow an overt NP as its complement, as in (9).

(9) *Bill liked picture.

It has been claimed (see, e.g., Stowell 1991 and Longobardi 1994) that NPs are inherently predicative and not referential. If this is right, one would not expect any sort of NP, overt or empty, in a DP position.[1]

If non-*wh*-relatives really involved an NP-trace in a DP position, some mechanism would be required to allow this while ruling out examples like (9). However, there are grounds for thinking that non-*wh*-relatives involve a DP-trace, as is normally assumed. Notice first that the trace can be coindexed with a pronoun provided the pronoun does not c-command it. Thus, the trace and the pronoun can be coindexed in (10) but not in (11).

(10) the man that t thought he saw a UFO

(11) the man that he thought t saw a UFO

This is just like a DP-trace in a *wh*-question, as (12) and (13) illustrate.

(12) Who t thought he saw a UFO?

(13) Who did he think t saw a UFO?

Second, the trace in a non-*wh*-relative can control a PRO subject, as (14) illustrates.

(14) the man that t tried PRO to fool everybody

Again, this is just like a DP-trace in a *wh*-question.

(15) Who t tried PRO to fool everybody?

Third, the trace in a non-*wh*-relative can license a parasitic gap (pg), as (16) illustrates.

(16) the book that Bill criticized t without reading pg

Once more, this is just like a DP-trace in a *wh*-question.

(17) Which book did Bill criticize t without reading pg?

Finally, the trace in a non-*wh*-relative must occupy a Case-marked position. Thus, examples like (18) and (19) are ungrammatical.

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[1] An anonymous referee has pointed out to me that there are other contexts in which an empty member of some category is possible but an overt member is not. For example, there are contexts in which a CP-trace can appear but an overt CP cannot, as (i)–(ii) illustrate.

(i)   That he might be wrong, he didn't think of.
(ii) *He didn't think of that he might be wrong.

However, this is rather different from the situation in Kayne's analysis of *that*-relatives. The CP-trace in (i) is in a position in which both overt DPs and DP-traces can appear, as (iii)–(iv) show.

(iii) He didn't think of that problem.
(iv) That problem, he didn't think of.

CPs, like DPs, are typical arguments (see, e.g., Chomsky 1981:102). Thus, what we have here is a context in which both overt and empty members of one argument category are possible but only empty members of another argument category. What we have in Kayne's analysis of *that*-relatives is a context in which both overt and empty members of an argument category (DP) can appear and (under certain conditions) empty members of a predicative category.

(18) *the man that it was arrested t

(19) *the man that it seemed t to know the answer

This is just like the DP-trace in a *wh*-question.

(20) *Which man was it arrested t?

(21) *Which man did it seem t to know the answer?

All these similarities suggest that non-*wh*-relatives contain a DP-trace.

If non-*wh*-relatives contain a DP-trace, it must be a DP that is moved. Island phenomena provide independent evidence for this conclusion. If non-*wh*-relatives involved movement of an NP and if NPs are nonreferential, one would not expect a non-*wh*-relative to allow extraction from a weak island such as an infinitival *wh*-complement or a factive complement (see Cinque 1990 and Rizzi 1990). In fact, however, such extraction is perfectly acceptable.

(22) the book that we wondered how to afford

(23) the book that we regretted that John read

Thus, it seems clear that we have movement not of an NP but of a DP.

If non-*wh*-relatives involve movement of a DP, then within Kayne's general approach they will have a DP in [Spec, CP]. If they do, it will be a DP with an empty D. It looks, then, as if the S-Structure representation of (3) must be not (5) but (24).

(24)
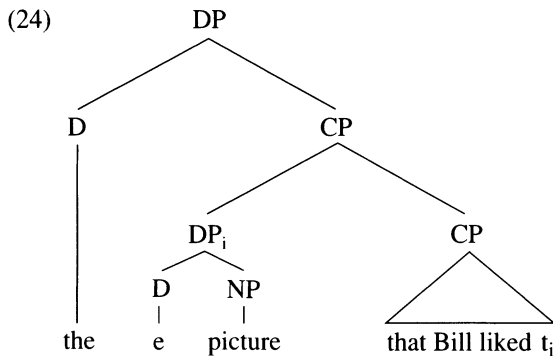
If non-*wh*-relatives involve a DP with an empty D in [Spec, CP], two questions arise. First, why is a DP with an empty D possible here but not elsewhere, for example, in (25) and (26)?

(25) *Bill liked [$_{DP}$ e [$_{NP}$ picture]].

(26) *[$_{DP}$ e [$_{NP}$ picture]] annoyed Bill.

One might suggest that an NP must be in a certain relation to a certain type of D. Within a more traditional analysis, one might suggest that an NP must be the sister of an appropriate D. Within Kayne's analysis, one might suggest that it must be governed by such a D, and Kayne appears

to propose this (see 1994:90).[2] It is doubtful, however, whether this is a viable proposal. The NP in (24) is governed by the lower D. This being so, Relativized Minimality will presumably prevent the higher D from governing it.

A further problem for this proposal arises from Kayne's approach to attributive adjectives. He proposes that (27) has the structure in (28).[3]

(27) the yellow book

(28) the [$_{CP}$[$_{AP}$ yellow]$_i$ [$_{CP}$ C^0 [$_{IP}$[$_{NP}$ book] [$_{IP}$ I^0 t$_i$]]]]

Here, the attributive adjective *yellow* appears in [Spec, CP] and the NP *book* appears in subject position. It is generally assumed that a head does not govern the subject of a CP complement. If it did, one would expect the subject of a *that*-clause complement of a verb to have objective Case, but of course it does not, as (29) shows.

(29) *John believes (that) him left.

Presumably, then, the NP in (29) is not governed by the D. Thus, it seems doubtful whether the requirement that an NP must be governed by an appropriate D is a viable way of ruling out (25) and (26) while allowing (24).

The second question that arises if non-*wh*-relatives involve a DP with an empty D in [Spec, CP] is, what ensures that the D is empty? In other words, what rules out examples like (30)?

(30) *the the picture that Bill liked

An anonymous referee suggests that one might try to rule out such examples with a filter. Any such filter would be essentially ad hoc. Moreover, it is far from clear what might be proposed. A filter ruling out two adjacent overt Ds will not work because adjectives can intervene between the D and what for Kayne is a fronted constituent in [Spec, CP]. Thus, a successful account must allow examples like (31), while ruling out examples like (32).

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[2] Such a constraint will obviously not be available if one assumes with Chomsky (1993:6) that government is a relation that should be dispensed with.

[3] Notice that this analysis involves an NP in [Spec, IP]. Somehow this must be allowed here but not in a normal [Spec, IP]. Notice also that a DP must be prevented from appearing in [Spec, IP] here, given the ungrammaticality of (i).

(i) *the yellow the book

Some mechanism is also needed to prevent movement of an AP to [Spec, CP] out of a clause with a finite verb, to rule out examples like (ii).

(ii) *the yellow book is

It is also necessary to make movement to [Spec, CP] obligatory with some adjectives (e.g., *utter*) and to prevent it with others (e.g., *asleep*), given data like the following:

(iii) a. an utter impossibility
      b. *The impossibility was utter.
(iv) a. The girl was asleep.
      b. *the asleep girl

(31)   the awful picture that Bill liked

(32) *the awful the picture that Bill liked

It is hard to see how a filter could handle the data. Instead of a filter, one might propose a constraint requiring every D of a certain kind to be associated (in some sense) with a single NP. However, it is not clear what form the association could take. We have seen that a D will not necessarily govern the associated NP, given Kayne's assumptions. Moreover, it is not clear which Ds would be subject to such a constraint. Not all overt Ds could be subject to it, given examples like (6)–(8). Thus, this approach seems no more promising than a filter.[4]

Another problem shows up in languages with overt Case marking such as Polish. (33) involves the Polish counterpart of a *that*-relative.

(33) Widziałem tego   pana,   co   zbił ci   szybę.
     saw-1SG   the-ACC man-ACC what broke your-SG glass-ACC
     'I saw the man who broke your glass.'

The important point here is that the D and the NP have the same Case. We find a different situation in examples like (8), repeated here.

 (8) To,   kogo   Maria widziała jest tajemnica.
     that-NOM who-ACC Maria saw   is   secret
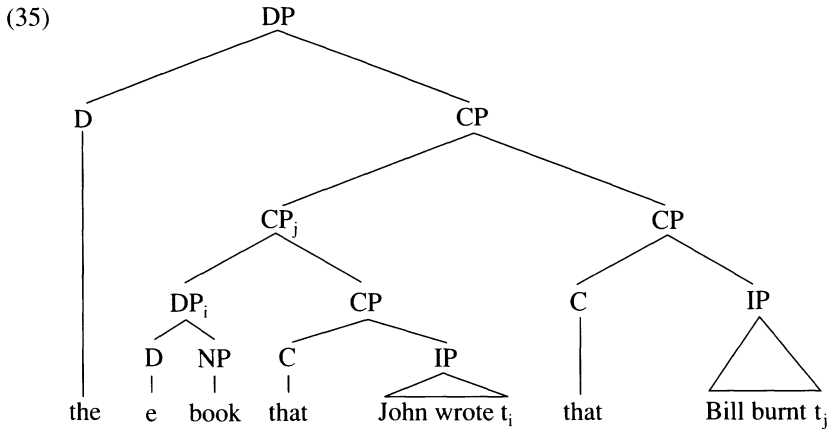   'Who Maria saw is a secret.'

Here, the D and the phrase in [Spec, CP] have different Cases, but this example presumably has the same basic structure as (32), given Kayne's assumptions. Thus, Kayne's analysis requires a mechanism to ensure agreement between a D and a constituent in [Spec, CP] in a relative clause structure that will not apply where a D has an ordinary CP complement.

An important fact about restrictive relatives, which Kayne (1994) mentions in a number of places, is that they can be ''stacked''; that is, more than one can have the same ''head.'' (34) shows that this is true of *that*-relatives.

(34) the book that John wrote that Bill burnt

Kayne (1994:92) refers to examples like this and suggests that they involve the movement of an NP containing a relative clause to [Spec, CP]. He is apparently assuming that *book that John wrote* is an NP containing a relative clause. Within his approach, however, there is no obvious way that it could be. One might propose that it is a CP with a DP in [Spec, CP], as it would be in *the book that John wrote,* given my earlier arguments. Thus, one might propose the structure in (35).

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[4] An anonymous referee has suggested to me that the emptiness of the lower D would be ensured if movement took place from the lower D to the higher D. It is not clear what would ensure such movement. Moreover, it would not be a typical case of head movement since it would be movement of the head of a specifier and not movement of the head of a complement.

(35)

```
                              DP
                _____
               D                               CP
               |                  _____
               |               CP_j                           CP
               |         _____              _____
               |       DP_i              CP            C            IP
               |      /\           _____         |           /\
               |     D   NP      C          IP         |          /  \
               |     |    |      |         /\          |         /    \
              the    e   book   that   John wrote t_i   that     Bill burnt t_j
```

This structure has one very odd feature: the verb *burnt* has a CP-trace as its complement. Notice that *burnt* does not allow an overt CP complement.

(36) *Bill burnt that John wrote a book.

Thus, one would not expect a CP-trace as its complement.

If examples like (34) really involved a CP-trace in a DP position, some mechanism would be necessary to allow this while ruling out examples like (36). There is evidence, however, that the second trace in examples like (34) must be a DP-trace. It is the same as the evidence showing that the single trace in a simple *that*-relative must be a DP. First, this trace can be coindexed with a pronoun provided the pronoun does not c-command it.

(37) the book that John wrote that persuaded everyone that they should read it

(38) the book that John wrote that it persuaded everyone that they should read

Second, it can control a PRO subject.

(39) the book that John wrote that managed PRO to fool everyone

Third, it can license a parasitic gap.

(40) the book that John wrote that Bill criticized t without reading pg

Finally, it must be in a Case-marked position.

(41) *the book that John wrote that it was criticized t

(42) *the book that John wrote that it seemed t to be selling well

It seems, then, that the second trace in examples like (34) must be a DP. If so, *book that John wrote* must be a DP of the form shown in (43).

(43)

```
                    DP
            _____
           D                   CP
           |            _____
           |          DP_i              CP
           |         /    \        _____
           D        D      NP     C           IP
           |        |      |      |          /  \
           |        |      |      |         /____\
           e        e    book   that    John wrote t_i
```
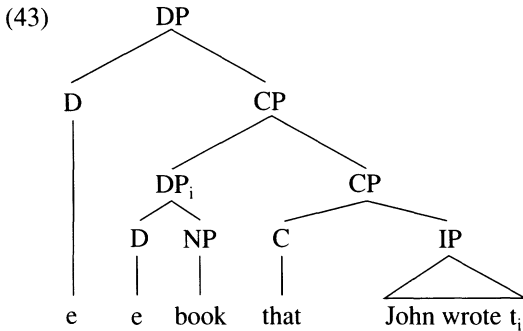
Notice that we now have two empty Ds, and we need some mechanism to ensure that they are both empty.

One further feature of Kayne's analysis should be noted, namely, that it is incompatible with the fairly standard view that an overt complementizer cannot cooccur with a filled [Spec, CP] in English. I will return to this matter in section 3.

Thus, Kayne's analysis of *that*-relatives faces a variety of problems, and its viability is in doubt.[5]
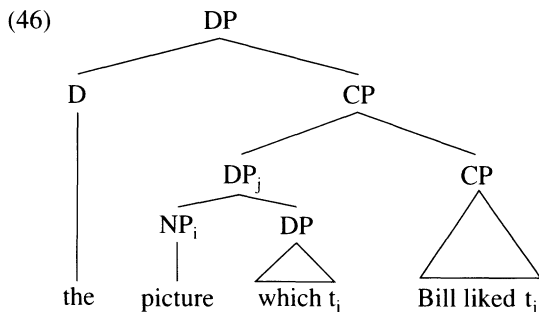
3 *Wh*-Relatives

Turning now to *wh*-relatives, consider the following examples:

(44) the picture which Bill liked
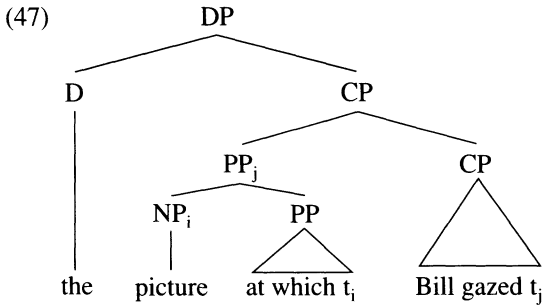
(45) the picture at which Bill gazed

Kayne proposes that *wh*-relatives also involve a D with a CP complement and that they involve movement of a DP or a PP to [Spec, CP] and movement of an NP to either [Spec, DP] or [Spec, PP]. Within this approach, (44) and (45) have the structures shown in (46) and (47).

(46)

```
                    DP
            _____
           D                   CP
           |            _____
           |          DP_j              CP
           |         /    \            /  \
           |       NP_i    DP         /____\
           |        |      /\        /      \
           |        |     /__\      /_____\
          the    picture which t_i  Bill liked t_j
```

(47)

```
                          DP
                  ┌────────┴──────────┐
                  D                    CP
                  │            ┌───────┴────────┐
                  │          PPⱼ                CP
                  │      ┌────┴────┐         ╱──────╲
                  │    NPᵢ         PP       ╱        ╲
                  │      │      ╱─────╲    ╱──────────╲
                 the  picture at which tᵢ  Bill gazed tⱼ
```

An obvious question here is, why does the NP move? Kayne (1994:90) suggests in connection with a related French example that NP undergoes movement in order to be governed by the higher D, an idea referred to in section 2. One problem with this proposal is that the NP is already governed by a D before movement if relative pronouns are Ds, as Kayne (1994:89) proposes. Another problem arises from Kayne's approach to attributive adjectives. As noted in section 2, the idea that an NP must be governed by a D seems incompatible with this approach.[6]

Kayne notes (1994:155 n. 15) that *wh*-relatives in languages with overt Case marking pose an interesting problem for his approach. In such languages the NP may differ in Case from the *wh*-word. Kayne refers to Russian. The situation is the same in Polish, which provides examples like (48).

(48) Widziałem tego   pana,   który   zbił   ci   szybę.
     saw-1SG   the-ACC man-ACC who-NOM broke your-SG glass-ACC
     'I saw the man who broke your glass.'

Kayne suggests that the NP in such an example receives its Case from the higher D. On the face of it, however, it should also receive Case from its trace, as moved constituents normally do. The trace will be nominative in agreement with the D *który,* of which it is a complement. Thus, if the NP did inherit Case from its trace, a Case conflict would arise. It appears, then, that some mechanism is needed to prevent the NP from inheriting Case from its trace in this situation.

A notable feature of this analysis is that the *wh*-phrase and the following clause do not form a constituent, as they are standardly assumed to do. This being so, an example like (49) is potentially problematic since it will apparently involve conjuncts that are not constituents.

(49) the picture which Bill liked and which Mary hated

One might suggest that such an example involves conjoined CPs within which a deletion process has occurred. This would delete the first part of a constituent in [Spec, CP] under identity with

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[6] An anonymous referee has suggested to me that Kayne may be claiming that NP undergoes movement because D must govern an NP. As noted earlier, not all Ds could be subject to such a constraint, given examples like (6)–(8). Thus, this approach seems less promising than the one considered in the text.

the first part of a preceding constituent in [Spec, CP]. I know of no independent motivation for such a deletion process. This situation, then, poses another problem for Kayne's analysis.[7]

I noted in section 2 that Kayne's analysis of *that*-relatives is incompatible with the standard view that an overt complementizer cannot cooccur with a filled [Spec, CP] in English. The ungrammaticality of examples like (50) is standardly seen as evidence for such a constraint.

(50) *the picture which that Bill liked

Given Kayne's analysis of *that*-relatives, it is necessary to say that what is impossible is an overt complementizer and a [Spec, CP] containing a *wh*-phrase. Kayne (1994:156 n. 18) suggests that this may be because the LF movement of N to D, which he assumes to be a feature of DPs, is "somehow blocked" when the N is the specifier of a phrase in [Spec, CP]. It is hard to see how it could be. Thus, this looks like a problem area.

Like *that*-relatives, *wh*-relatives allow "stacking," as in (51).

(51) the book which John wrote which Bill burnt

Here, on Kayne's assumptions, *book which John wrote* must be in [Spec, DP], and the simplest assumption is that it is a CP. *Book which* must be a DP in [Spec, CP], and *book* must be an NP in [Spec, DP]. The structure of (51), then, is (52).

(52)

$[_{DP}$ the $[_{XP}[$picture$]_i$ $[_{CP}[$which $t_i]_j$ $[_{DP}$ Bill liked $t_j]]]]$

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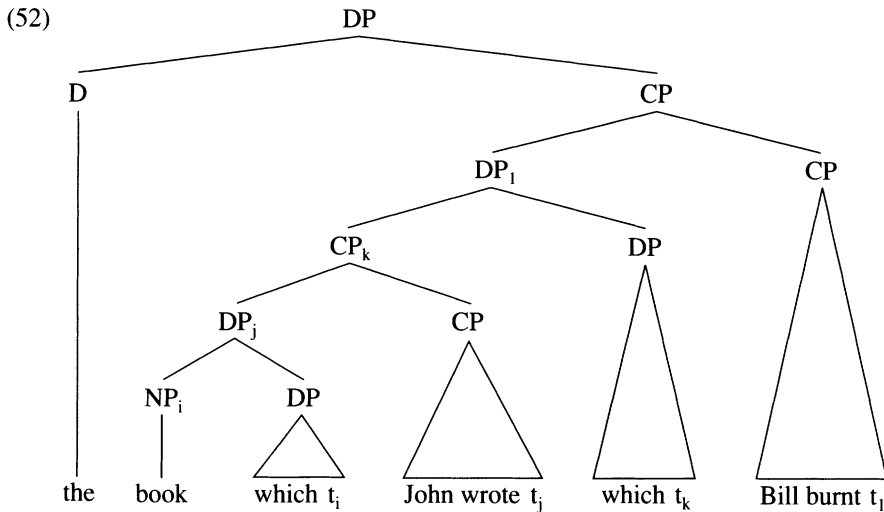
[7] Ian Roberts has pointed out to me that examples like (49) would pose no problem if the DP in a relative clause were raised to the specifier position of some additional functional category between D and C—in other words, if structures like (i) existed.

(i) $[_{DP}$ the $[_{XP}[$picture$]_i$ $[_{CP}[$which $t_i]_j$ $[_{DP}$ Bill liked $t_j]]]]$

It may be that Kayne's analysis can be made to work if functional categories are freely available. I assume, however, that independent motivation is required for such categories. If so, the prospects are not very good.

A notable feature of this structure is that the second *which* has a CP-trace as its complement. Interrogative *which* cannot have an overt CP as its complement, as (53) illustrates.

(53) *Which that John was here did Bill believe?

Thus, relative *which* is quite different from interrogative *which*. Any analysis must recognize differences between relative and interrogative *wh*-words, but one might well feel that the differences should be minimized. Thus, a further objection to Kayne's analysis may arise here.

4 "Extraposed" Relatives

A notable fact about relative clauses is that they can appear somewhere to the right of the associated "head," as (54) and (55) illustrate.

(54) A man came into the bar who we knew in school.

(55) I saw a man on Monday who looked like Chomsky.

Traditionally, this is seen as the result of an extraposition process. This view is incompatible with Kayne's theory of phrase structure. Hence, he proposes a different approach, namely, that the phenomenon is the result of a leftward movement process that leaves behind or "strands" the relative clause. Thus, (54) and (55) have the following schematic structures:

(56) [A man]$_i$ came into the bar [t$_i$ who we knew in school].

(57) I saw [a man]$_i$ on Monday [t$_i$ who looked like Chomsky].

Kayne compares this proposal with Sportiche's (1988) proposal that "floating" quantifiers in examples like (58) are not the result of a rightward movement process but are left behind by the movement of the subject to the left.

(58) Les garçons ont   tous lu   ce   livre.
      the boys   have all   read this book
      'The boys have all read this book.'

I will argue that this approach faces serious problems.

   One problem is that a D and the following NP do not form a constituent given Kayne's analysis of relative clauses. Kayne proposes that the indefinite article is not a D but a quantifier, which forms a constituent with the following NP. Thus, he assumes something like the following structure before "stranding":

(59) [$_{CP}$[$_{DP}$[$_{QP}$ a man]$_i$ who t$_i$]$_j$ we knew t$_j$ in school]

Given this analysis, the grammaticality of (54) and (55) apparently poses no problem. Kayne notes, following Ziv and Cole (1974), that an extraposed relative clause is questionable with a definite NP. He gives the following example:

(60) ??The man just walked in who we knew at high school.

He suggests that such examples are dubious because the D and the following NP do not form a

constituent. Some would feel that the contrast between (54) and (60) reflects semantic and prag-matic factors and not different constituent structures (see, e.g., Rochemont and Culicover 1990), but it could be that different constituent structures are responsible.

A notable feature of this analysis is that it involves the assumption that a relative pronoun can have a QP-trace as its complement. As (61) illustrates, interrogative *who* cannot have an overt QP complement—evidence of another contrast between relative and interrogative pronouns.

(61) *Who a man came into the bar?

An important fact about ''extraposed'' relatives is that they normally appear in sentence-final position. Within Kayne's analysis, this fact appears to require that all other sentence constitu-ents must move to positions before subject and object, in other words, to positions outside the VP. Thus, (54) and (55) must in fact have something like the following structures:

(62) [A man]$_i$ [came]$_j$ [into the bar]$_k$ [$_{VP}$[t$_i$ who we knew in school] t$_j$ t$_k$].

(63) [I]$_i$ [saw]$_j$ [a man]$_k$ [on Monday]$_l$ [$_{VP}$ t$_i$ t$_j$ [t$_k$ who looked like Chomsky] t$_l$].

Such structures raise an obvious question: where do the various constituents move to? Assuming Chomsky's (1993) conception of clause structure, one might propose that the verb moves to Agr$_S$ like verbs in French. If it did, however, one would expect verbs to move to C^0 in interrogatives and to be followed by the negative particle, as in French. But, of course, English is not like French in this regard, as the following examples illustrate:

(64) *Read John the book?

(65) *John read not the book.

(66) Aime-t-il Marie?
likes   he Marie
'Does he like Marie?'

(67) Jean (n') aime pas Marie.
Jean NEG like NEG Marie
'Jean doesn't like Marie.'

It seems, then, that verbs cannot move to Agr$_S$ in English. One might propose instead that the verb moves to T. However, if it did, one would expect verbs to precede manner adverbs as French infinitives do. Again, English is not like French.

(68) *He lost completely his head.

(69) Perdre complètement la tête est dangereux.
lose   completely   the head is dangerous
'Completely losing one's head is dangerous.'

It seems, then, that verbs cannot move to T in English. Within the conception of clause structure developed by Chomsky (1993), the only other position outside VP to which verbs could be moved is Agr$_O$. Interestingly, Johnson (1991) has argued that verbs move to Agr$_O$ in English. It may

be, then, that it is possible to assume that verbs move out of VP in English. However, within Chomsky's (1993) framework, there are no positions between Agr_O and VP to which other constituents of VP such as PP complements (e.g., *into the bar* in (54)) and PP adjuncts (e.g., *on Monday* in (55)) might move. Notice that a single position will not do because it is possible for a complement and an adjunct to cooccur.

(70) A man came into the bar on Monday who we knew in school.

It seems, then, that Kayne's approach requires a significantly more complex conception of clause structure than that assumed by Chomsky (1993), which is already quite complex.

A further problem arises with PP complements and PP adjuncts: it is not clear why they should move out of VP. In the case of verbs and objects it is plausible to suppose that movement takes place for feature-checking reasons, but it is not standardly assumed that PPs have features to be checked.

Ensuring that all sentence constituents move out of VP is not sufficient to achieve the right results in this area. This is because there are cases—as in typical raising sentences like (71)—where a subject moves through some intermediate position.

(71) One man seemed [t to [t know the truth]].

Here, as the traces indicate, the surface subject originates within the subordinate VP and moves first to the subordinate subject position and then to the main-clause subject position. Given such derivations, some mechanism is necessary to prevent the stranding of a relative clause in the intermediate position, giving rise to cases like (72).

(72) *One man seemed who knew the truth to be late.

Ian Roberts has suggested to me that this will be ruled out by whatever rules out preposition stranding in [Spec, CP], as in (73).

(73) *Who$_i$ did you think [[to t$_i$]$_j$ John talked t$_j$]?

Notice, however, that this example involves Ā-movement, whereas (72) involves A-movement. A-movement can strand a quantifier in an intermediate position, as (74) illustrates.

(74) Les enfants ont   tous été   aperçus par les voisins.
      the children have all   been seen   by the neighbors
      'The children have all been seen by the neighbors.'

Here, the subject originates as the object of *aperçus* on standard assumptions. Thus, it is not obvious that whatever rules out (73) will also rule out (72).[8]

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[8] Kayne proposes (1994:121) that a relative clause can be stranded by A-movement only in a non-Case position. This will not rule out examples like (72). Moreover, it is not clear in what sense a stranded relative clause could be in a Case-marked position. If it is within a DP, the DP and not the relative clause is in a Case-marked position.

A notable feature of Kayne's analysis of *wh*-relatives is that the NP and the following *wh*-phrase form a constituent. This being so, one might wonder why (75) is not possible with the structure indicated.

(75) *[A man who]$_i$ walked in [t$_i$ we knew in school].

Kayne suggests (1994:167 n. 15) that such examples are ungrammatical because they involve improper movement, movement from an Ā-position to an A-position. They clearly do involve such movement on Kayne's assumptions. However, so does (76).

(76) [A man]$_i$ walked in [t$_i$ [that we knew in school]].

On Kayne's assumptions, this is just like (75). In both cases a constituent is moved from [Spec, CP] to [Spec, IP]. Thus, if (75) is a case of improper movement, this should be too. The fact that it is not raises another problem for Kayne's analysis.[9]

5 Nonrestrictive Relatives

Kayne (1994) claims that nonrestrictive relatives have the same overt syntax as restrictive relatives but differ at LF, where the IP in the relative clause is moved to the specifier position of the higher DP. Thus, a nominal phrase containing a nonrestrictive relative clause has the following structure at LF:[10]

(77) [$_{DP}$ IP$_i$ [D^0 [$_{CP}$ NP [C^0 t$_i$]]]]

I will argue that this analysis cannot be maintained.

Problems arise from a fundamental fact about nonrestrictive relatives, highlighted for example

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[9] It may well be that (54) is also a case of improper movement. (54) involves movement from [Spec, DP] to [Spec, IP]. It has been argued (see, e.g., Szabolcsi 1983) that D is similar to C. If so, [Spec, DP] is presumably an Ā-position. Consider also the following example:

(i) [A man]$_i$ walked in [[t$_i$ at whom] [everyone gazed]].

This involves movement from [Spec, PP] to [Spec, CP]. Kayne (1994:25) suggests that an interrogative *wh*-phrase can appear in [Spec, PP] at LF, and Chung, Ladusaw, and McCloskey (forthcoming) propose that examples like (ii) involve an interrogative *wh*-phrase in [Spec, PP] in S-Structure.

(ii) John was talking but I don't know who to.

If we assume that an interrogative *wh*-phrase must be in an appropriate Ā-position at either LF or S-Structure, these proposals suggest that [Spec, PP] is an Ā-position and hence that (i) involves improper movement.

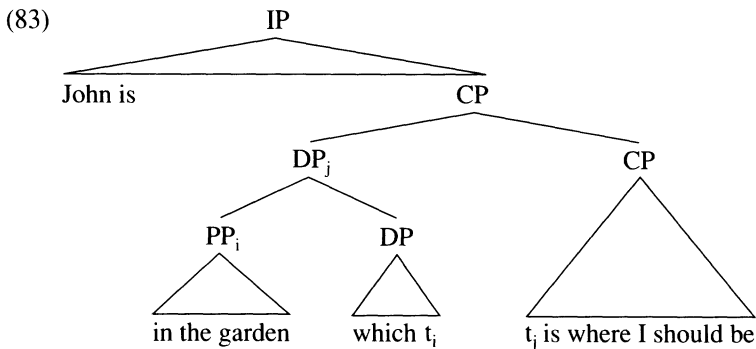[10] Examples like (i) appear to pose a problem for this analysis.
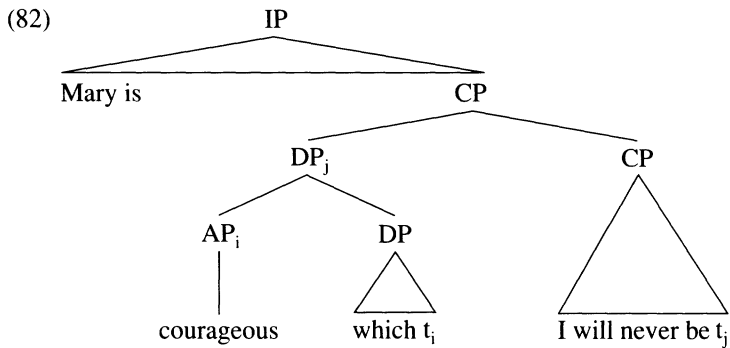
(i) John's picture, which Bill liked

Here, on standard assumptions, *John* or *John's* is in the specifier position of the higher DP. If it is, it is not clear how the relative IP can be moved there in LF. However, Kayne (1994:26) proposes that possessive NPs appear within the specifier position of a phrase that is the complement of D. On this analysis, there seems to be no problem here.

by Jackendoff (1977)—namely, that the antecedent of the relative pronoun need not be a DP but can be an AP, a PP, a VP, or a clause.[11] The following examples illustrate:

(78) Mary is courageous, which I will never be.

(79) John is in the garden, which is where I should be.

(80) Mary has resigned, which John hasn't.
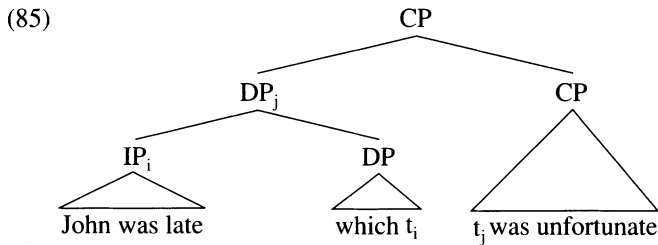
(81) John was late, which was unfortunate.

If we try to extend Kayne's approach to restrictive relatives to these examples, something like the structures in (82)–(85) will result.

(82)

```
                    IP
         _____
        Mary is                  CP
                        _____
                     DP_j                 CP
                   _____               /    \
                 AP_i    DP            /      \
                  |     /  \          /_____\
             courageous which t_i    I will never be t_j
```

(83)

```
                    IP
         _____
        John is                  CP
                        _____
                     DP_j                 CP
                   _____               /    \
                 PP_i    DP            /      \
                /  \    /  \          /_____\
          in the garden which t_i  t_j is where I should be
```

(84)

```
                          IP
        _____/_____
       /                                      \
   Mary has                                    CP
                            _____/_____
                           /                                          \
                         DP_j                                          CP
               _____/_____                          _____/_____
              /                      \                        /              \
            VP_i                      DP                      /                \
             |                    ___/\___                   /_____\
          resigned              which t_i                    John hasn't t_j
```

(85)

```
                          CP
        _____/_____
       /                                      \
     DP_j                                       CP
  _____/_____                         _____/_____
 /              \                       /              \
IP_i             DP                    /                \
_/\_          __/\__                  /_____\
John was late  which t_i              t_j was unfortunate
```

In these structures, *which* has an AP-trace, a PP-trace, a VP-trace, and an IP-trace as its complement. As (86)–(89) illustrate, interrogative *which* does not allow overt members of these categories as its complement—evidence of yet another difference between relative and interrogative pronouns.

(86) *Which courageous is Mary?

(87) *Which in the garden is John?

(88) *Which resigned has Mary?

(89) *Which John was late was unfortunate?

Notice also that (90)–(92) have ordinary CPs in positions where one would expect an AP, a PP, and a VP, and are therefore ungrammatical.[12]

(90) *Mary is that I will never be courageous.

(91) *John is that in the garden is where I should be.

(92) *Mary has that John hasn't resigned.

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[12] One might propose that these CPs are embedded in a DP with an empty head. On this analysis, (78)–(81) would have DPs in positions where one would expect an AP, a PP, and a VP. Given this, examples like (i)–(ii) would involve A-movement out of DP.

(i) John was sent to Manchester, which I have never been.

(ii) John is likely to be late, which I am not.

Manzini (1992) argues that A-movement is impossible out of a DP. Thus, this is a problematic assumption.

Thus, we need some mechanism to allow a relative CP but not an ordinary CP as the complement of *be* and *have*. It seems, then, that nonrestrictive relatives pose further serious problems for Kayne's proposals.

6 Conclusions

I have now considered the main elements of Kayne's analysis of relative clauses and highlighted a variety of problems. In particular, I have shown that numerous additional mechanisms are needed to achieve observational adequacy. At least the following mechanisms seem to be needed:

(93) a. A mechanism to allow DPs with an empty D in [Spec, CP] in a relative clause but not elsewhere
   b. A mechanism to prevent an overt D in a DP in [Spec, CP] in a relative clause
   c. A mechanism to ensure movement of NP within a DP or PP in [Spec, CP] in a relative clause
   d. A mechanism to allow some but not other overt phrases to appear in [Spec, CP] followed by an overt C
   e. A mechanism to ensure that all sentence constituents are moved out of VP
   f. A mechanism to prevent the stranding of a relative clause in an intermediate position
   g. A mechanism to allow some but not other cases of movement from an Ā-position to an A-position
   h. A mechanism to allow a relative CP but not an ordinary CP as the complement of *be* and *have*

Mechanisms are also needed to ensure the correct realization of Case in relative clause constructions, and to allow coordination examples like (49). It is obviously possible that independently motivated principles will be found to do some of this work, but it seems most unlikely that such principles will be found in all cases.

At the end of his book, Kayne remarks, "To a significant extent, the LCA-based theory of syntax proposed here allows us to have the all too infrequent pleasure of seeing the theory choose the analysis" (1994:132). If the arguments of this article are sound, the analysis that his theory chooses for relative clauses is unsatisfactory. If this is the case, the obvious conclusion is that there is something wrong with the theory.

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