

Remarks and Replies

The Raising Analysis of Relative Clauses: A Reply to Borsley

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Borsley (1997) criticizes the raising analysis of relative clauses revived by Kayne (1994) in the framework of antisymmetry theory. Most of his remarks concern the analysis of English headed relative clauses. This article presents a revised version of Kayne's proposal that provides an answer to these criticisms. It is argued that the raising approach is indeed tenable and that the analysis of this empirical domain is fully consistent with the restrictiveness of the antisymmetry theory.

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Borsley (1997) criticizes the raising analysis of relative clauses revived by Kayne (1994) in his antisymmetry framework. Specifically, he argues that the analysis is defective in various respects and requires "numerous additional mechanisms to achieve observational adequacy" (p. 630). These additional mechanisms strike him as implausible or ad hoc; therefore, he concludes that Kayne's analysis is untenable and, since it is the only approach to relative clauses consistent with the antisymmetry framework, there must be something wrong with the framework itself.

Though Borsley raises a number of interesting objections, he does not point out any decisive counterexample to the raising proposal. Here I will argue that a refinement of Kayne's (1994) analysis provides an answer to these objections. Since Borsley deals primarily with English (though a comparative perspective is essential to Kayne's discussion), I will also focus largely on English data; I will present some comparative evidence as it bears on specific points of the argumentation.

The article is organized as follows. Section 1 discusses Borsley's remarks on the syntax of the relative determiner and the NP "head" in the raising structure; section 2 discusses stacking, coordination, and extraposition; section 3 examines a specific problem in the syntax of nonrestrictive relatives; section 4 contains some concluding remarks.

Most of the arguments in section 1 are drawn from my doctoral dissertation. I wish to thank Adriana Belletti, Pier Marco Bertinetto, Richard Kayne, Jan Koster, Rita Manzini, Jean-Yves Pollock, and Luigi Rizzi for crucial help during its elaboration. I also wish to thank two anonymous *LI* reviewers for comments and criticisms, which I have not been able to address fully within the limits of a reply article. Of course, all errors are my responsibility.

1 The Syntax of Relative Determiners

Many of Borsley's objections to Kayne's analysis of relative clauses center on the status of relative pronouns. In the raising analysis the relative clause is selected by an external D^0 , and the "head" is a nominal constituent that directly raises from the trace position to [Spec, CP].

(1) [_{DP} the [_{CP}[picture]_i [that [_{IP} Bill liked t_i]]]]

Kayne proposes that in relative clauses like (1), which lack an overt relative pronoun, the raised nominal constituent does not include a D^0 head; instead, it is simply an NP. This does not hold for *wh*-relatives featuring an overt relative pronoun. For these, Kayne proposes the following derivation: The nominal constituent generated in the trace position is a relative DP [_{DP} *which* NP], headed by a relative D^0 . This DP moves to [Spec, CP], and then the NP category raises to the specifier (Spec) of the DP itself.¹

(2) [_{DP} the [_{CP}[_{DP}[_{NP} picture] [_{DP} which t_i]] [_{IP} Bill liked t_i]]]

Borsley presents numerous objections to both (1) and (2); I will consider them in turn.

As for (1), he argues that the assumption of a raised nominal constituent lacking the DP level is untenable. In fact, the constituent is generated in an argument position, and there is wide consensus that only the DP projection—not NP—can act as an argument (see, e.g., Stowell 1989, Longobardi 1994). Empirically, he shows that the empty category in (1) acts as a DP-trace with respect to a number of tests, namely, binding, licensing of parasitic gaps, and weak islands.

This objection is sound. Therefore, let us assume that the relative "head" in (1) is introduced by an empty relative D^0 .

(3) [_{DP} the [_{CP}[_{DP} D^0 picture]_i [_{CP} that Bill liked t_i]]]

With respect to this representation, Borsley raises the following questions:

- How is the empty D^0 licensed?
- Why isn't it licensed in nonrelative arguments?
- What is the relation between the external D^0 and the NP?

¹ The analysis in (2) is very close to the one originally proposed by Vergnaud (1982:chap. 5), developing earlier proposals in Vergnaud 1974. Anticipating the minimalist conception of derivation, Vergnaud argues that restrictive relatives are derived by a generalized transformation that adjoins the relative clause to a dummy NP; within the relative clause, the "head" has moved to Comp and the NP is extracted and raised to the dummy NP position, leaving behind the *wh*-feature. After raising, the NP "head" is merged with the matrix determiner by another generalized transformation. This is essentially equivalent to (2), modulo the DP hypothesis. There remains one important difference: for Vergnaud, the "head" does not stop in Comp; instead, it raises to a matrix position. Rephrasing this idea in minimalist terms, this step must be triggered by the need to check a strong feature. A viable hypothesis is that the NP "head" moves to the Spec of a strong Agr⁰ head associated with the external D^0 , as shown in (i).

(i) [_{DP} the [_{Agr_{DP}} [_{NP} picture] [_{Agr_D} [_{CP}[_{DP} which t_i] [_{IP} Bill liked t_i]]]]]]

See Bianchi 1999:78–79, 200–203 for discussion of this analysis.

It must be pointed out that none of Borsley's objections concerns the specific hypothesis that the "head" originates within the relative clause. Vergnaud justifies this hypothesis on the basis of evidence concerning the relativization of idiom chunks and predicate nominals (Vergnaud 1974:56–68, 1982:sec. 5.2). See Bianchi 1999:43–45, 50–53 for a reconsideration of this evidence in the current framework.

Concerning the first question, it is possible to take advantage of a specific aspect of the raising structure (3), namely, the fact that the raised relative DP is covered by only one segment of CP, given the adjunct status of specifiers (Kayne 1994:22–27), and hence is not included in the CP barrier; furthermore, the relative D^0 is immediately c-commanded by the external D^0 , so that there is no intervening head for the purposes of Relativized Minimality. Thus, the external D^0 and the empty relative D^0 turn out to be in a strictly local configuration, and they can establish a licensing relation. Specifically, let us assume that the empty relative D^0 is licensed through abstract incorporation to the external D^0 .²

(4) [_{DP} D_{Rel} + the [_{CP}[_{DP} t picture]_i [_{CP} that Bill liked t_i]]]

The hypothesis that empty morphemes are licensed through incorporation is extensively argued for by Pesetsky (1995). Here I wish to propose a somewhat different implementation of this hypothesis (for detailed reasoning behind this proposal, see Bianchi 1999:chap. 6).

Let us assume that before Spell-Out the terminal symbols dominated by functional heads are not concrete morphemes, but sets of syntactic features (Halle and Marantz 1993), or better, feature structures (as characterized in Pollard and Sag 1987, 1994). After a functional head F_1 incorporates to a host F_2 , an operation of *unification* can apply to combine F_1 and F_2 into a single feature structure. In the morphophonological branch of the derivation, this feature structure is spelled out as a single morpheme; since the trace of the incorporated head F_1 is not spelled out in its original position, in the resulting PF F_1 appears to have been deleted. (Note that in order to be unified, F_1 and F_2 must be consistent: namely, they cannot specify different atomic values for the same attribute or path (Pollard and Sag 1987:36), though they need not both be specified for the same features.)

I propose that this mechanism of “deletion by incorporation” takes place in (4). In fact, the external D^0 and the relative D^0 both share the Agr-features of the NP “head” *picture*; furthermore, let us assume that the relative D^0 is underspecified with respect to the feature of definiteness,³

² A reviewer asks whether in (i) the noun preceding the possessive could be taken to incorporate to the relative D^0 , as in Longobardi’s (1994) analysis of (ii).

- (i) [_{DP} la [_{CP}[_{DP} fotografia sua]_i [che abbiamo distrutto t_i]]]
 the photo his that (we) have destroyed
 ‘the photo of his that we destroyed’
- (ii) [_{DP} casa_N [mia [t_N]]]
 home mine
 ‘my home’

There are actually important differences between the two structures: first, in (ii) but not in (i) the noun raised to the left of the possessive acquires referential uniqueness; second, in (i) but not in (ii) the possessive is necessarily focused. Therefore, I wish to propose that in (i) the noun has not raised to D^0 ; instead, *sua* here is an instance of a strong possessive form in the sense of Cardinaletti (1998). On her analysis, a strong possessive lies in the base position, [Spec, NP]; in Italian the noun necessarily raises to its left by incorporating to a functional head below D^0 , as shown in (iii).

- (iii) [_{DP} il [_{YP} libro [_{NP} suo [t_N di sintassi]]]] (Cardinaletti 1998:66–73)
 the book his on syntax
 ‘his book on syntax’

³ See Bianchi 1999:80–86 for discussion. On the Case feature, see footnote 12 below.

so that it is consistent with either an indefinite or a definite external D^0 . It follows that the two determiners have fully consistent feature structures. After incorporation of the relative D^0 , unification applies; the resulting feature structure is spelled out as an ordinary determiner, and the relative D^0 seems to be deleted.

It is interesting to rethink from this perspective the condition on recoverability of deletion, according to which the relative pronoun can be deleted only if its feature content can be inferred from the antecedent (see Chomsky and Lasnik 1977, Cinque 1982). Recoverability is here replaced by the weaker condition of feature consistency for unification: though the host D^0 need not contain all the features of the incorporated relative D^0 , the two cannot have inconsistent feature specifications.

This proposal implies that “deletion” cannot occur unless the determiner is incorporated to a host whose feature structure is consistent with its own. For instance, an empty determiner cannot be licensed when it is locally related to a lexical head.

(5) *Bill liked [_{DP} *e* [_{NP} picture]]. (Borsley’s (25))

This answers the second of Borsley’s questions.

The deletion-by-incorporation hypothesis is supported by the observation that in pied-piping contexts the empty relative D^0 is not licensed.

- (6) a. the man with whom you’re sure to have a good time
 b. *the man with (that) you’re sure to have a good time (Kayne 1984:65)

According to Kayne (1994:89), (6) has the following derivation: the PP [*with* [*whom* [*man*]]] is pied-piped to [Spec, CP] and subsequently the NP raises to [Spec, PP].

(7) [_{DP} the [_{CP}[_{PP}[_{NP} man] [_{PP} with [_{DP} whom *t*]]]_i] [_{CP} $C^0 \dots t_i \dots$]]



In this structure the relative D^0 cannot incorporate to the external D^0 because the preposition intervenes; therefore, we correctly predict that it cannot delete.

Now, what triggers the incorporation of the relative D^0 in (4)?

Intuitively, the deletion by incorporation of a terminal symbol seems to be determined by economy considerations, since the resulting representation can be considered more economical at least with respect to the morphophonological interface. In order to implement this idea, I propose the following economy principle:

(8) *Economy of Representation*

Incorporate a functional head to a host whose feature structure is consistent with its own.

Note that principle (8) does not *select* an optimal step in a derivation (like, e.g., Collins’s (1997) Minimality or Ura’s (1995) Economy Condition on Derivation); instead, it actually *triggers* a step that leads to a more economical representation.⁴ This is closer to the conception of economy

⁴ However, like Collins’s and Ura’s conditions, (8) is a local constraint (in the sense of Collins 1997:4), and as such it may avoid the complexity problems arising from global economy, discussed by Collins (1997) and by Johnson and Lappin (1997:283–294). A full discussion of these issues would lead us too far afield.

in Chomsky and Lasnik 1993:65–66, whereby, for instance, Full Interpretation triggers the movement rule of expletive replacement. On the other hand, this economy principle cannot override other general syntactic constraints (e.g., Relativized Minimality in (7)). Consequently, this principle makes deletion obligatory whenever possible.⁵

As a matter of fact, (8) is equivalent to the Doubly Filled Comp Filter (Chomsky and Lasnik 1977:446), which triggers the application of a deletion rule. In Bianchi 1999:198–200, I propose a novel account of Doubly Filled Comp Filter effects in relative clauses based on principle (8).

Let us now turn to Borsley's third question, concerning the relation between the external D^0 and the NP "head." It is essential to the raising analysis that these two categories come to be adjacent, so that they look like a constituent. However, Borsley argues, this strictly local relation is not independently justified. It is unclear why the NP "head" would have to be governed by the external D^0 if it is already governed by the relative D^0 from the very beginning of the derivation. On the other hand, in Kayne's analysis there are some relative structures where the NP "head" does not raise to a position that is governed by the external D^0 . These are attributive adjectives, for which Kayne (1994:97–101) proposes the analysis in (9).

(9) [_{DP} the [_{CP}[yellow]_j [_{C⁰} [_{IP}[book] [_{I⁰} t_j]]]]]

In this structure what raises to [Spec, CP] is not the "head," but the predicative category headed by the adjective. Borsley concludes that there is no necessary relation between the external D^0 and the NP "head" and therefore that an essential step of the raising derivation remains unjustified.

I propose that the raising of the NP "head" is triggered by the feature-checking requirements of the external D^0 . As already mentioned, the external D^0 is endowed with ϕ -features, which must plausibly undergo checking. Furthermore, it is clear that, though selecting the relative CP, the external D^0 is a nominal determiner, which must bind the open position of a noun in LF;⁶ in this respect—as Borsley points out—it differs from the "clausal determiner" introducing argument clauses, as in the Polish example (10).

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

The different functions of nominal and clausal determiners can be implemented by assuming that they bear different categorial features to be checked: nominal determiners bear an N-feature, whereas clausal determiners plausibly bear a C-feature.

⁵ An anonymous reviewer asks whether principle (8) would not block multiple representation of the same features in PF, as in *la ragazza* 'the-FEM.SG girl-FEM.SG'. There are two possibilities here. The first is that the relevant ϕ -features are syntactically realized on one head only, and the other instances are the result of morphological agreement; this will be proposed for the Case feature in the discussion around (14). The second possibility is to assume that there are two Agr heads: a lower Agr_N that morphologically selects N (in the sense of Roberts 1993:43–44), and a higher Agr_D that is morphologically selected by D. Thus, N incorporates to Agr_N and Agr_D incorporates to D. After morphologically selected incorporation, the two Agr heads are no longer free to incorporate to one another; instead, they are spelled out on two distinct heads, the determiner and the noun.

⁶ It is necessary to assume that the relative D^0 does not bind the open position of its NP complement. See Bianchi 1999:80–81 for discussion.

In sum, the external D^0 of the relative structure is endowed with ϕ - and categorial features that must be checked in a local relation with a [+N] phrase. Let us consider how this requirement can be met. Consider first a simple DP structure like (11).

(11) [_{DP} the [_{NP} picture]]

In this structure NP must check the N-feature of D^0 . But according to Chomsky's (1995:178) definition, the two categories are not in a proper checking configuration. This leads to the assumption that the categorial feature of D^0 is weak, and checking takes place in LF.

However, I wish to suggest a different point of view. We can think of the N-feature of D^0 as a selectional feature. In the pre-minimalist framework, selectional (subcategorization) requirements are satisfied in D-Structure; in minimalist terms, we may assume that they are satisfied by Merge. In fact, as soon as D^0 is introduced in the derivation, it is merged with the NP category that satisfies its selectional N-feature. Suppose, then, that Merge creates a proper checking configuration for selectional features. This amounts to saying that a selectional feature is checked by an element included in the minimal domain of the relevant head, rather than in its checking domain. Thus, in (11) the N-feature is checked as soon as D^0 is merged with NP (and the ϕ -features too may perhaps be checked as free riders). Note that in this way, the selectional feature is checked as soon as it is introduced in the derivation: hence, it complies with Chomsky's (1995:233) definition of a strong feature.

Now consider the raising relative structure. Here the nominal D^0 is merged with a CP category that cannot satisfy its selectional N-feature. As this feature is strong, it immediately triggers the raising of a [+N] category to a position falling in the minimal domain of D^0 .⁷ I adopt Manzini's (1994) definition of minimal domain.

(12) The *minimal domain* of a head X includes all categories that are immediately dominated by, and do not immediately dominate, a projection of X.

Note that the relation of domination is defined only for whole categories, and not for segments. Given the adjunct status of specifiers, this definition entails that the specifier of a category XP falls, not in the minimal domain of the head X, but in the minimal domain of the immediately higher head.

Let us reconsider the structures proposed in (4) and (7). In (4) the relative D^0 incorporates to the external one, and the minimal domain of the latter is extended, including the NP complement of the incorporated head (see Chomsky 1995:180). In (7), instead, the NP 'head' raises to the Spec of the pied-piped PP, where it is covered by only one segment of PP and one segment of CP; by definition (12), it falls in the minimal domain of the external D^0 .⁸ Thus, in all these structures the NP 'head' is included in the minimal domain of the external D^0 and checks its selectional N-feature.⁹

⁷ On the violation of the Strict Cycle Condition, see Bianchi 1999:78.

⁸ The same holds in (2), where NP is covered by one segment of DP and one of CP.

⁹ An alternative analysis consistent with the standard view of checking is to have the NP 'head' raise to the Spec of an Agr head associated with the external D^0 , as mentioned in footnote 1; see Bianchi 1999:78–79, 200–203.

As for (9), it is necessary to assume that the [+N], [+V] adjectival category raised to [Spec, CP] is able to check the selectional (and ϕ -) features of the external D^0 .¹⁰ The analysis in (9) is supported by the observation that in languages like Romanian the clitic definite determiner can cliticize either to the noun head or to the first pronominal adjective (Giusti 1994). In Kayne's approach this can be reduced to alternatively incorporating either N^0 or A^0 to the external D^0 from [Spec, CP].

- (13) a. omul bătrîn
man-the old
b. [_{DP} N^0 + D^0 [_{CP}[_{NP} t_N]_i [_C⁰ [_{IP} t_i [_I⁰ AP]]]]]]
c. bătrînul om (Giusti 1994:242)
old-the man
d. [_{DP} A^0 + D^0 [_{CP}[_{AP} t_A]_j [_C⁰ [_{IP} NP [_I⁰ t_j]]]]]]
'the old man'

To summarize the preceding discussion, I have argued that

- A relative ‘head’ is always generated as a DP introduced by a relative D^0 .
- The relative D^0 can be deleted by abstract incorporation to the external D^0 . In this way, PF deletion is reduced to a standard syntactic process—incorporation—that is subject to well-known constraints.
- The external D^0 bears a strong selectional feature that triggers the raising of a [+N] category to a position within the D^0 's minimal domain.

Besides the general questions discussed above, Borsley raises one about languages with overt Case marking. As shown in the Polish example (14) (Borsley's (48)), the NP ‘head’ shares the Case of the external D^0 , and not that of the relative D^0 .

- (14) Widziałem [_{DP} tego [_{CP}[_{DP}[_{NP} pana] [_{DP} który t_j]_j [_I⁰ zbił ci szybę]]].
saw-1SG the-ACC man-ACC who-NOM broke your glass-ACC
'I saw the man who broke your glass.'

Borsley argues that the configuration in (14) should give rise to a Case clash, because the NP ‘head’ would receive accusative Case from the external D^0 and nominative Case from its trace.

With respect to this problem I assume—following Giusti (1993)—that being Case-marked is a property of the D^0 position; N^0 morphologically agrees with the D^0 by which it is governed (or in whose minimal domain it is included).¹¹ With this assumption, the configuration in (14)

¹⁰ On the other hand, in (9) it is not possible to license PF deletion of a relative D^0 : in fact, the ‘head’ is too distant from the external D^0 for incorporation to take place. I assume that in reduced relatives the adjectival category is predicated of a nominal projection lower than DP: see Zamparelli 1995:20–23 for relevant discussion.

Note also that, according to Cinque (1994:92–95), the reduced relative analysis must not be extended to adjectives that cannot occur in predicative position, such as *utter*.

¹¹ This hypothesis is supported by the observation that in languages like Russian, the Case assigned to a DP can be realized on the determiner only, whereas NP realizes the genitive Case assigned by the determiner itself (see Babby 1987, Franks 1994).

is unproblematic: the external D^0 bears the accusative Case assigned to it by the matrix verb, and the relative D^0 bears the nominative Case assigned to it within the relative clause. As the NP ‘‘head’’ comes to be governed by the external D^0 , in the morphophonological component the Case feature of this D^0 is copied into it, and it is spelled out in the accusative form.¹²

In conclusion, the proposed modification of Kayne’s (1994) raising analysis provides an answer to the objections reviewed so far. The crucial point is that the external D^0 of the relative structure must be allowed to interact with the Spec of its CP complement, allowing the incorporation of the relative D^0 and establishing a checking relation with the NP ‘‘head.’’ Apart from this, no special machinery seems to be required, and the analysis is restrictive enough so as not to overgenerate illicit structures.

2 Stacking, Coordination, and Extraposition

Let us turn to other problems Borsley raises that are more directly related to the phrase structure of relative clauses. The phenomena to be discussed—stacking, coordination, and extraposition—are so complex that an exhaustive discussion exceeds the limits of this article. The limited aim of this section is to answer Borsley’s objections to Kayne’s proposals, leaving an overall evaluation of these proposals for future research.

As a preliminary step, I wish to assume a different analysis for the *wh*-relative, based on Rizzi’s (1997) ‘‘split CP’’ hypothesis. In Bianchi 1999:190–197, I argue in detail that the NP ‘‘head’’ cannot move to the Spec of the relative D^0 , as in (2). The *wh*-relative is instead derived as follows: first, the relative DP targets the Spec of a functional head of the Comp system below C^0 (whose nature need not concern us here); then, the NP ‘‘head’’ is extracted from this position and raises to [Spec, CP].

- (15) [_{DP} the [_{CP} [_{NP} picture] [_{C⁰} [_{XP} [_{DP} which t_{NP}]_i] [_{X⁰} [_{IP} Bill liked t_i]]]]]]]

- (i) poslednie pjat’ butylok (Babby 1987:92)
last-NOM five-NOM bottles-GEN
‘the last five bottles’

¹² In some languages like Ancient Greek and Latin, a relative D^0 that is assigned a structural Case within the relative clause can be attracted to the Case of the external D^0 .

- (i) ἄνδρες ἄξιοι τῆς ἐλευθερίας ἧς κέκτησθε (Harbert 1982:245)
men worthy the-GEN freedom-GEN which-GEN (you) possess
‘men worthy of the freedom which you possess’

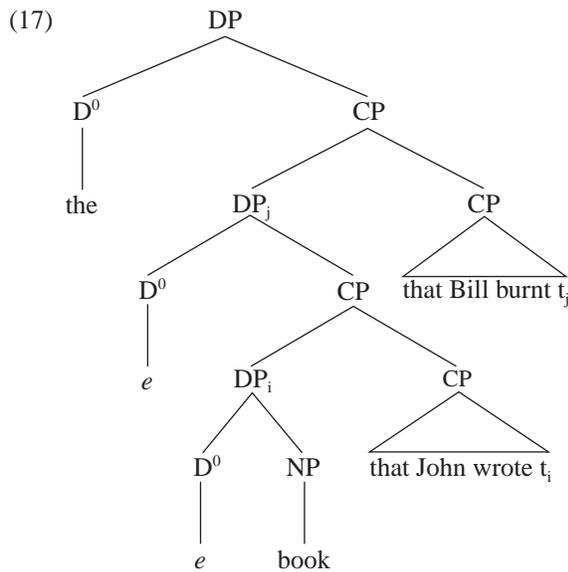
This too seems to be an instance of ‘‘copying’’ a Case feature under government by the external D^0 . It can be assumed that the structural Case feature of the relative D^0 has already been checked and erased by the time it reaches [Spec, CP] (see Bianchi 1999:94–96). Similarly, in (4) the relative D^0 has already checked its internal Case by the time it incorporates to the external D^0 .

Borsley (1997:635) points out that in the Polish example (10) the external D^0 does not agree in Case with the *wh*-phrase in the Spec of its complement. As suggested above, the clausal determiner of (10) has a selectional C-feature and only enters a checking relation with the complement clause; therefore, no agreement/checking relation with the *wh*-phrase in [Spec, CP] is expected.

This modification of Kayne's analysis provides an answer to various objections raised by Borsley. Let us consider first the phenomenon of stacking, exemplified in (16).

- (16) a. the book that John wrote that Bill burnt (Borsley's (34))
 b. the book which John wrote which Bill burnt (Borsley's (51))

Borsley correctly argues that stacking requires a recursion of the raising structure whereby the "head" of the outer relative clause is a DP including the inner relative clause. For instance, the structure of (16a) should be as in (17) (Borsley's (43)).



The problem with this structure, Borsley observes, is that it has two empty determiners, and it must be ensured that they are both obligatorily empty. Given the previous discussion, I propose that this is the effect of a double abstract incorporation: the lower relative D^0 of DP_1 incorporates to the higher D^0 of DP_j , which selects the inner CP, and the resulting complex head incorporates to the highest external D^0 *the*; both steps are triggered by the economy principle (8).

The structure for (16b) is more complex. The internal DP is initially as in (18).

- (18) $[_{DP_2} \text{ which } [_{CP_1} [_{IP_1} \text{ John wrote } [_{DP_1} \text{ which book}]]]]]$

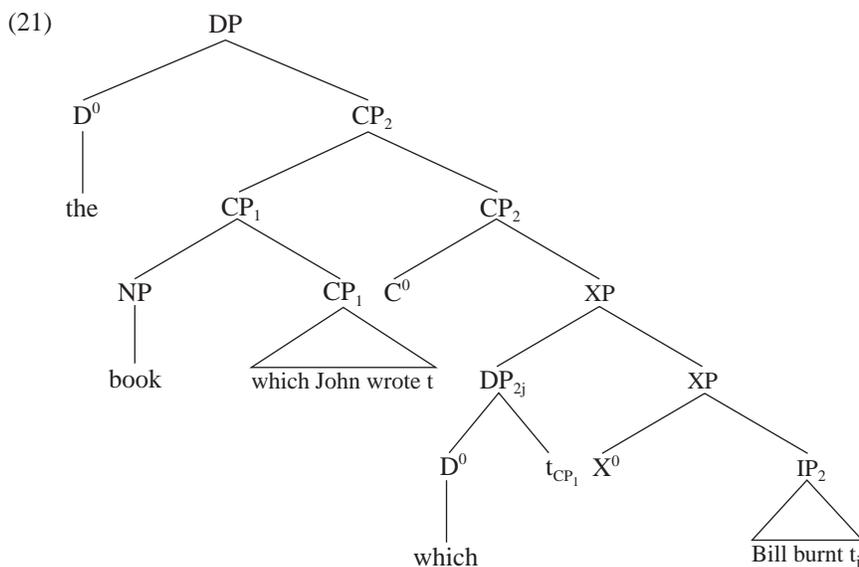
The derivation proceeds as follows: The lowest relative DP_1 raises to the Comp system of the inner relative clause, where the NP $[_{NP} \text{ book}]$ strands its relative D^0 *which*.

- (19) $[_{DP_2} \text{ which } [_{CP_1} [_{NP} \text{ book}]] [_{XP_1} [_{DP_1} \text{ which } t_i] [_{IP_1} \text{ John wrote } t_i]]]]]$

The relative DP_2 , including the inner relative clause CP_1 , is embedded in the outer relative clause CP_2 and raises to the Comp system of the latter.

- (20) $[_{DP} \text{ the } [_{CP_2} [_{XP} [_{DP_2} \text{ which } [_{CP_1} \text{ book which John wrote } t_i]]] [_{IP_2} \text{ Bill burnt } t_j]]]]]$

As a final step, the relative CP_1 moves to the left of the relative D^0 *which*. The resulting structure is shown in (21).



Note that in (21) the NP [_{NP} *book*] originating within CP_1 has reached a position that falls in the minimal domain of the highest external D^0 , so that the required checking relation is ensured.

Borsley objects that in (18)–(21) the relative *which* of DP_2 has a CP complement, but interrogative *which* cannot have an overt CP as its complement.

(22) *_{[DP} Which [_{CP} that John was here]] did Bill believe? (Borsley's (53))

Note however that in (22) *which* is a nominal determiner taking as a complement an argument CP; hence, its selectional properties cannot be satisfied by any [+N] category (recall the discussion around (10)–(11)). This is what is wrong with (22). If interrogative *which* instead selects a relative CP, its features can be checked by the raised “head.”

(23) _{[DP} Which [_{CP} book_i [_{CP} that John wrote t_i]]]_j did Bill burn t_j?

A second problem Borsley raises involves coordination of two relative clauses.

(24) the picture [which Bill liked] and [which Mary hated] (Borsley's (49))

(25) the picture [that Bill liked] and [that Mary hated]

In Kayne's (1994) analysis, the coordinated strings are not even constituents: in fact, in (24) the relative D^0 *which* must have the NP “head” in its Spec (cf. (2) above), and in (25) the C^0 *that* must have the relative NP in its Spec (cf. (1) above).

Note that the problem concerning (24) does not arise under the analysis of the *wh*-relative proposed in (15): (24) involves the coordination of two XPs with across-the-board extraction of the NP “head” from [Spec, XP]. However, the problem still holds for the coordination of *that*-relatives in (25).

A solution to this problem comes from the null operator analysis of across-the-board gaps proposed by Munn (1992) as modified by Kayne (1994:59). Kayne adopts Munn's hypothesis that the gap in the second conjunct is bound by a null operator; this operator lands in the Spec of the second conjunct CP₂. The first conjunct CP₁ is in the Spec of the conjunction head, and the second conjunct CP₂ is in complement position.

(26) [_{&P}[CP₁ . . . t . . .] [_{&P} and [CP₂ Op_i [CP₂ . . . e_i . . .]]]]

Example (25) can be assumed to involve the coordination of two CPs that are complements to the external D⁰: the Spec of the first conjunct contains the relative DP, and the Spec of the second conjunct contains the null operator.

(27) [_{DP} the [_{&P}[CP_i[_{DP} picture]_i [that Bill liked t_i]] [_{&P} and [CP₂ Op_j [that Mary hated t_j]]]]]

A third problem that Borsley discusses extensively involves relative clause extraposition. The phenomenon is exemplified in (28) (Borsley's (54)).

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

The standard analysis takes the extraposed relative clause to be right-adjoined to VP or IP; but this is inconsistent with antisymmetry, which excludes right adjunction on principled grounds. Within the raising analysis, Kayne (1994:117–126) proposes that extraposition is the result of leftward movement of the ‘head,’ which strands the relative clause in the base position.¹³

(29) [_{QP} A man]_j came into the bar [t_j who we knew in school].

Borsley raises three main objections against this hypothesis. In the remainder of this section I will first address them and then review two further problems raised by Buring and Hartmann (1997) and Rochemont and Culicover (1997), which constitute a more radical challenge to the stranding analysis. In the end I will leave open the question of how the analysis can be developed to account for these problematic data.

First, in (29) the extracted QP must have originated as a complement to the relative D⁰; therefore, it is necessary to generate a complex DP in which the QP is selected by the relative D⁰.

(30) [_{DP} wh [_{QP} a [_{NP} man]]]

Borsley objects that this structure is never overtly realized: the indefinite article cannot follow another determiner.¹⁴ But actually, the structure is overtly attested with numerals (as in *which two books*). This suggests that the structure in (30) is licit, but the underlying indefinite determiner cannot be spelled out.

¹³ On the clause-final position of the extraposed clause, see the discussion above (38).

¹⁴ Another objection is that *who* is never followed by an overt QP complement (Borsley 1997:641). We can take *who* to be the spell-out of a relative D⁰ whose [+animate] QP complement has been extracted (cf. Kayne 1994:154, n. 12). Similarly, the Italian D⁰ *qualche* ‘some’ takes the ‘pronominal’ form *qualcuno* (lit. some-one) when its NP complement is extracted by partitive *ne* cliticization (see Moro 1997:157ff.).

This problem can be solved if we adopt the conception of functional heads proposed in section 1. According to that proposal, functional morphemes are the spell-out of abstract sets of features. From this perspective, the indefinite determiner is the spell-out of a Q^0 dominating the feature [singular]. Comparison of (29) and (30) suggests the following generalization: in (29), where Q^0 is spelled out, it is ungoverned; in (30), where it is not spelled out, it is governed by D^0 .

This is the same generalization that I observed with respect to deletion of the relative D^0 in section 1. Therefore, I propose that the same mechanism of abstract incorporation is at work here. Specifically, in (30) the [singular] Q^0 incorporates to D^0 and thus gets deleted; in (29), on the contrary, incorporation is impossible, and Q^0 must be spelled out as an independent morpheme.¹⁵

Note in passing that this hypothesis also accounts for the ‘‘regeneration’’ problem for German split topicalization: after split topicalization has taken place, an indefinite determiner is regenerated in front of a topicalized singular NP (Van Riemsdijk 1989).

- (31) a. Er kann sich noch [keinen [(**einen*) Wagen]] leisten.
 he can himself yet no (**a*) car afford
 ‘He cannot afford a car yet.’
 b. [Einen Wagen] kann er sich noch [keinen *e*] leisten.
 a car can he himself yet no(ne) afford
 ‘A car, he cannot afford yet.’

Borsley’s second objection against the stranding analysis concerns the clause-final position in which the relative clause is stranded. On the one hand, the extraposed relative follows all the verbal complements and modifiers; in (29), for instance, it follows the locative PP. On the other hand, the relative clause cannot be stranded in the intermediate position of a chain.

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

These observations raise two problems. First, in order to explain the clause-final position, it is necessary to assume that both the verb and its complements or modifiers obligatorily move to the left of the stranded relative; but the landing site and the trigger of these movements are unclear. Second, the ban against stranding in an intermediate chain link sharply opposes relative clause extraposition to another instance of stranding, namely, quantifier floating (see Sportiche 1988).

Concerning the second problem, a possible approach emerges if we slightly revise the structure in (29). Under the assumption that an argument must be a DP (see the discussion above (3)), the stranded relative must be introduced by a null external D^0 that allows extraction of the QP ‘‘head.’’

- (33) [_{QP} A man]_j came into the bar [_{DP} *e* [_{CP} *t*_j who we knew in school]].

¹⁵ Deletion by incorporation is impossible if Q^0 dominates a numeral. This suggests that, contrary to the number value singular/plural, the specific cardinality value conveyed by numerals must be expressed by an independent morpheme.

The restriction to the clause-final position may then be related to the licensing requirements of this empty D^0 . This hypothesis is supported by the parallelism between extraposition and a ‘splitting’ construction of French that is commonly analyzed as involving the leftward movement of a DP subconstituent, leaving an empty category in front of the stranded DP.

- (34) *Combien a-t-il consulté* [_{DP} *e de livres*]?
 how much has he consulted of books
 ‘How many books did he consult?’

Besides extracting *combien*, it is possible to front the whole *wh*-phrase, and in this case the past participle agrees with the fronted phrase.

- (35) [_{DP} *Combien de livres*] *a-t-il consultés*?
 how much of books has he consulted-AGR
 ‘How many books did he consult?’

Assuming Kayne’s (1989) analysis of participial agreement, the *wh*-phrase in (35) must have passed through the Spec of the participial Agr. Note now that the remnant DP cannot be stranded in this intermediate position by extraction of *combien* alone.

- (36) **Combien a-t-il* [_{DP} *e de livres*] *consultés*?
 how much has he of books consulted-AGR

In this respect *combien* extraction patterns with relative clause extraposition (cf. (32)) and differs from quantifier floating.

- (37) *Il les_j a* [*tous e_j*] *consultés t*.
 he them has all consulted-AGR
 ‘He consulted all of them.’

(34) and, under my assumptions, (32) differ from (37) in that they have an empty category in front of the stranded DP.¹⁶ The contrast can be reduced to the hypothesis that this empty category can only be licensed in the base position. Though this constraint recalls the old notion of θ -government, its status in the present syntactic theory is unclear. Whatever the ultimate explanation may be, the important observation is that with respect to the unavailability of intermediate chain positions, extraposition can be assimilated to a structure like (34), for which a stranding analysis is uncontroversial.

As for the relative ordering of the extraposed relative and of verbal complements and modifiers, Kayne (1994:120–122) suggests that the relative clause is stranded in a low non-Case-marked position that can be crossed over by the scrambling of various PPs. Borsley objects that there are not enough available positions for scrambling of the constituents and that the trigger of this scrambling is unclear.

¹⁶ Kayne (1984:48–54) argues that the empty category in (34) is subject to the Empty Category Principle. In (37) the empty category is the complement of the Q^0 *tous* and can be properly governed by it.

An answer to both objections may be found in the theory of prosodically driven reordering of constituents recently proposed by Zubizarreta (1998). Zubizarreta argues that the scrambling of VP-internal constituents can be triggered by the need to obtain a prosodically well formed structure, in which a [+focus] constituent occupies the most deeply embedded position and receives the main sentence stress. The target positions of this scrambling she dubs ‘P-positions.’ Assuming that the extraposed relative is [+focus] (see Rochemont 1986:110–113), the PP complements and modifiers would be moved to its left by prosodic scrambling. This approach is supported by the observation that at least in Italian an extraposed relative can be followed by a PP if this is ‘heavy’ enough.

- (38) ?[_{QP} Che libro]_i hai trovato [_{t_i} che ti serviva per l’esame]
 what book have (you) found that to-you was necessary for the exam
 [_{PP} in quella famosa libreria di Firenze]?
 in that famous bookshop of Florence
 ‘Which book that you needed for the exam did you find in that famous bookshop in Florence?’

Finally, Borsley objects that the stranding of the relative clause seems to involve an instance of improper movement. In (39) the ‘head’ moves from [Spec, CP] of the relative clause (an A-position) to the matrix [Spec, IP] (an A-position).

- (39) [A man]_i walked in [_{CP} _{t_j} [that we knew in school]]. (Borsley’s (76))

Similarly, in the extraposed *wh*-relative (33) the QP ‘head’ extracted from the relative DP moves first to [Spec, CP] in order to establish a checking relation with the external D⁰, and then moves on to the matrix [Spec, IP], as shown in (40).

- (40) [a man]_i . . . [_{DP} D⁰ [_{CP} _{t_i} C⁰ [_{XP} [_{DP} who _{t_i}] [X⁰ . . .]]]]
-

But as argued in connection with (33), in (39)–(40) the extraposed relative clause must be introduced by a null external D⁰, which establishes a checking relation with the NP ‘head’ in [Spec, CP] (see the discussion around (11)–(12)). Given the definition of L-relatedness in Chomsky 1995:196,¹⁷ [Spec, CP] is L-related, since it is in a local relation with the L-features of the external D⁰. With this assumption, no improper movement arises in (39)–(40).¹⁸

Although I have suggested possible solutions to Borsley’s objections, two further problems cast doubt on the stranding analysis. First, extraposed relatives show a nested linear order, in that a relative extraposed from the subject must be to the right of a relative extraposed from the direct object (see Bianchi 1999:272–274 and Rochemont and Culicover 1997 for recent discussion related to the antisymmetry framework).

¹⁷ ‘‘A position is L-related if it is in a local relation to an L-feature.’’

¹⁸ The extraposition example (i) (Borsley’s (75)) is correctly ruled out in the analysis proposed in (15), because NP cannot move to Spec of the relative D⁰, and thus the string *a man who* does not form a constituent.

(i) *[A man who]_i walked in [_{t_j} we knew in school].

- (41) [A man]_i entered [the room]_k last night [t_k that I had just finished painting] [t_i who had blond hair].

In the antisymmetry framework this linear order derives from a structure in which the object-extrapolated relative (or some constituent containing it) asymmetrically c-commands the subject-extrapolated relative (or some constituent containing it). Hence, the two relatives cannot be simply stranded in the base argument positions, given the standard assumption that the base subject position asymmetrically c-commands the base object position.

Second, Buring and Hartmann (1997:8–19) argue on the basis of binding effects that a subject-extrapolated relative is not c-commanded by the preceding objects, contrary to what Kayne’s analysis would predict.

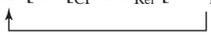
- (42) a. *[A man]_i entered into every room_k last night [t_i who lived in it_k].
 b. [Nobody]_i would ever call her_k before noon [t_i who knows anything about Rosa_k’s weird sleeping habits].

Space constraints make it impossible to address these important issues here; hence, I leave for future research a thorough examination of the extraposition problem.

5 Nonrestrictive Relatives

The last problem that Borsley (1997) discusses concerns nonrestrictive relatives. For these, Kayne (1994) proposes an innovative analysis. He argues that they have the same derivation as restrictive relatives up to Spell-Out; the difference arises in the LF derivation, where the appositive interpretation is obtained by moving the IP constituent of the relative clause out of the c-command domain of the external D⁰.¹⁹

Assuming that the restrictive term of a determiner corresponds to its c-command domain in LF, it follows that the scrambled IP will receive a nonrestrictive interpretation.

- (43) [_{DP} IP [D⁰ [_{CP} DP_{Rel} [C⁰ t_{IP}]]]]
- 

Borsley argues that this analysis cannot account for examples like (44a–b) (his (78) and (81)), appositive constructions where the ‘head’ is an AP or IP.

- (44) a. Mary is [courageous], which I will never be.
 b. [John was late], which was unfortunate.

Borsley regards the possibility of non-DP ‘heads’ as ‘a fundamental fact about nonrestrictive relatives’ (p. 643). But a raising analysis of these examples is problematic: it must be assumed that the non-DP ‘head’ originates as a complement to the relative D⁰ *which*; furthermore, it is unclear which external D⁰ would select the relative CP.

¹⁹ See Bianchi 1999:146–154 for an account of the core properties of appositives within the raising analysis (43).

Kayne (1994:164, n. 71) leaves open the question of whether examples like (44a–b) should receive a raising analysis; some comparative evidence suggests that they probably should not. In the Italian equivalent of (44b) the purported appositive relative clause cannot be introduced by the complementizer *che* or by a simple relative D^0 ; instead, it must be introduced by the relative-like connectors *cosa che* ‘thing that’, *il che* ‘the that’, *la qual cosa* ‘the which thing’.

- (45) Gianni arrivò tardi, il che / la qual cosa fu imbarazzante.
 Gianni arrived late the that / the which thing was embarrassing
 ‘Gianni arrived late, which was embarrassing.’

Similarly, in the French equivalent of (44b) the relative clause is introduced by a pronominal ‘head’ *ce* distinct from the purported clausal ‘head.’

- (46) Jean était en retard, ce qui était embarrassant.
 Jean was late that which was embarrassing
 ‘Jean was late, which was embarrassing.’

Note also that in many languages relative pronouns can be used for cross-sentential anaphora in the so-called *relatif de liaison*. (47) is a representative example.

- (47) . . . whom we name hereafter the Prince of Cumberland: *which honour* must not unaccompanied invest him only . . . (*Macbeth* I.4, 38–40)

Here the relative morpheme is used as an anaphoric determiner. But then, nothing in principle excludes that the same anaphoric use is involved in (44a–b). From this perspective (44a–b) are not relative structures: the relative pronoun is actually an anaphoric pronoun, and the purported appositive relative is a parenthetical clause. Then, these examples are problematic for the raising approach only if this alternative analysis can be excluded, and it can be convincingly argued that they must be true relative structures.

6 Conclusions

In this article I have reviewed Borsley’s (1997) objections against the raising analysis of relative clauses. I have argued that some modifications to the analysis originally proposed by Kayne (1994) provide an answer to these objections. The core of the proposal, however, remains unchanged. This analysis not only has the advantage (from my viewpoint) of being compatible with Kayne’s antisymmetry framework, but also provides original insights into well-known problems in the syntax of relative clauses, for instance, PF deletion and Case attraction of the relative D^0 . I conclude that the adoption of a new theoretical perspective on phrase structure has proven fruitful on the empirical side. Of course, many other empirical domains remain open for future investigation.

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