An Unmediated Analysis of Relative Clauses*

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1. Introduction

This paper deals with the analysis of restrictive relative clauses (henceforth relative clauses). In this paper, I will argue that a consideration of the forms that relative clauses take suggests an alternative to the current consensus analysis, an alternative which has roots in the transformational literature of the 1970s and has been adopted in some current transformational analyses. The body of the paper will assume an informal basically constraint-based non-derivational approach to syntax; a formalization in terms of LFG (Lexical-Functional Grammar; for overviews see Bresnan 2001, Dalrymple 2001, Falk 2001) appears in the appendix.

The standard view of relative clause constructions is that they consist of three parts: the head[1], the relative pronoun, and the clause.

(1) the word processor which Bill prefers *e*
head relative pronoun clause

This view holds the relative pronoun to be the central component of this construction, as it serves to link the other two elements of the construction: it is coreferential (or coindexed) with the head, and it has a grammatical function (and in transformational accounts originates) in the clause. The relation between the head and the position[2] in the clause is indirect, mediated anaphorically by the relative pronoun. We will refer to this as the **anaphorically mediated** analysis of relative clauses.

Anaphorically mediated analyses of this kind represent a broad consensus in syntax, one which transcends disagreements about theoretical framework. From this perspective, it is very odd that there is an alternative form for relative clauses in English, one in which there is no relative pronoun:

(2) the word processor (that) Bill prefers *e*
head clause

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[1]The noun, or NP, which is modified by the relative clause is commonly called the head of the relative clause construction, terminology which will be followed here. This use of the term "head" is transparently related to other uses of the term, although it is obviously not to be taken literally in the sense of X̄ head.

[2]I use the term *position* here in a theory-neutral fashion, without any commitment to the existence of a position in the constituent structure. From the perspective of LFG, this can be thought of as position in the f-structure.

The existence of this kind of relative clause suggests a direct relation between the head and the in-clause position, what we might refer to as an **anaphorically unmediated** analysis. Yet, since Chomsky (1977) the standard analysis of this kind of relative clause has been an anaphorically mediated analysis, in which the mediating element is an unexpressed pronominal element.

This paper will argue for an anaphorically unmediated analysis of relative clauses. In §2 I will present new typologically based arguments for an anaphorically unmediated analysis and in §3 I will revisit some old arguments. This is followed with an analysis in §4. Finally, in §5 I return to what is standardly taken to be the paradigm case of relative clauses, the ones with relative pronouns. I will show that they also should be analyzed as anaphorically unmediated, and provide an explanation for the existence of this form of relative clause.

For the sake of style, I will drop the word "anaphorically" for the rest of this paper, and simply refer to "mediated" and "unmediated" analyses. The intention remains that the mediating element is an anaphoric element.

2. Typology

2.1. *Wh* Constructions

Relative clauses are one example of a class of constructions that has been referred to variously in the literature as *wh* movement (Chomsky 1977), long-distance dependencies (Bresnan 2001), unbounded dependencies (Pollard and Sag 1994), and Ā dependencies (Chomsky 1981), among other names. We will refer to them here as *wh* constructions.

What typifies *wh* constructions is that a single element has more than one function, potentially in distant clauses. Consider, for example, the following *wh* question.

(3) Who were you told that computer industry experts claim uses the TextMangler wordprocessor?

In this sentence, the DP *who* functions both as the question word in the main clause and as the subject of *use* two clauses down in the sentence. *Wh* constructions are fundamentally constructions of multifunctionality.[3]

Wh constructions face what might be thought of as a realizational problem. If an element has two different grammatical functions, potentially in different clauses, in which position is it expressed overtly? Assuming some notion of economy, it is unlikely to be expressed in both positions. In principle, one would expect that either the higher or the lower position should be available for realizing the multifunctional element. And this is exactly what we find: some languages choose the structural position of the lower function, some choose the structural position of the higher function, and some allow either.

[3]The familiar transformational analysis in terms of movement of the *wh* element is one way to formalize this multifunctionality, but it is not the only way. Alternative formalizations of multifunctionality, such as direct reference to grammatical functions, are not notational variants of movement since they do not express everything that movement expresses, such as a direction to the multifunctionality. In §3 we will see that the distinction between movement and direct expression of multifunctionality is empirically significant.

(4) Mandarin (low position only) (Huang 1982: 371)
Zhangsan xiangzin shei mai-le shu?
Zhangsan believe who bought books
'Who does Zhangsan believe bought books?'

(5) Egyptian Arabic (low position only) (Kenstowicz and Wahba 1983: 263)
a. Fariid ḥatt ʔeeh ʕala l- tarabeeza.
Fariid put what on the- table
'What did Fariid put on the table?'
b. Fariid ḥatt kitaab miin ʕala l- tarabeeza.
Fariid put book who on the- table
'Whose book did Fariid put on the table?'
c. Fariid ḥatt kitaab Mona ʕala ʔeeh.
Fariid put book Mona on what
'What did Fariid put Mona's book on?'

(6) English (high position only)
Which word processor do you think Bill uses?

(7) Kikuyu (either position) (Bergvall 1983: 247)
a. Oɣweʃiːria Goɣe oiɣirɛ mahɛirɛ keŋaŋi oː?
you.think Ngũgĩ said they.gave crab who
'Who do you think Ngũgĩ said they gave a crab to?'
b. Noo oɣweʃiːria Goɣe oiɣirɛ mahɛirɛ keŋaŋi?
FOC.who you.think Ngũgĩ said they.gave crab
'Who do you think Ngũgĩ said they gave a crab to?'

The low realization of the *wh* element has often been viewed as a somewhat exotic construction in which the *wh* does not "undergo (overt) *wh* movement" and is realized in-situ. From the perspective I am adopting, this is a misunderstanding of the nature of the construction: both high and low positions are in place for one of the functions of the *wh*: they are simply in-situ for different functions. Nevertheless, because of its familiarity, I will retain the term "in-situ" for the low realization construction.

For our purposes, the in-situ construction is important because it provides valuable information about the nature of *wh* constructions. While the "moved" construction, as in English, provides evidence for one function of the *wh* element, the in-situ construction provides evidence of the other one.

2.2. Internally Headed Relative Clauses

The "in-situ" construction associated with relative clauses is what is often referred to as the internally headed relative clause (IHRC).

(8) a. Dogon (Culy 1990: 21)
[Kandɔw nyan gɛ tɛgɔ] nɛ yu gaw
just fire granary burn.PSTNARR.3SG.DEF in millet a lot to.
exist.3SG
'There was a lot of millet in the granary that the fire just burned.'

b. Imbabura Quechua (Cole 1982: 49)
[Wambra wagra- ta randi- shka] ali wagra- mi.
boy cow- ACC buy- NMNL good cow- FOC
'The cow which the boy bought is a good cow.'

c. Lai (also called Haka Chin) (Kathol 2000: 141)[4]
[Lawthlawpaa vok rool ʔa peek mii] ka m̥uʔ.
farmer pig food 3SG give.II REL 1SG see
'I saw the pig which the farmer gave food to.' or 'I saw the food which the farmer gave to the pig.'

d. Mooré (Culy 1990: 76)
[Yãmb sẽn yã dao ninga zamẽ wã] bee ka.
2PL AUX saw man INDEF yesterday DEF be there
'The man that you saw yesterday is here.'

e. Navajo (Platero 1974: 214)
[[[Hastiin łééchąą'í yiztał] nisin] ní-
man dog 3.PERF.3.kick IMPFC.1.think IMPFC.3.say-
(n)ę́ę] nahał'in.
REL IMPFC.3.bark
'The dog which he said he thought the man kicked is barking.'

As with in-situ questions, the internally headed relative clause is an alternative solution to the realization problem.

What is notable about IHRCs is the insight they provide into the nature of relative clauses. They show a direct connection between the external head position and the in-clause position: the choice of where to realize the relativized element is limited to these two positions. Agreement provides evidence that there is a direct connection. For example, in Dogon the verb agrees with the subject. If the relativized element is the subject of both the verb inside the relative clause (where it appears) and of the larger clause in which the relative construction is embedded (where it does not appear), both verbs must agree with it (Culy 1990: 83–84):

[4]The verb form in this example has the morphological gloss II. The literature on Lai verbs refers to two alternating verb stems as form I and form II. If the subject were relativized, form I would be used instead. This is not the place to analyze exactly what these two forms are, but from the information in Kathol and VanBik (2001), it appears that Lai has a voice system similar to the Philippine languages, which is reflected morphologically by these verb forms.

(9) a. Ya [[yaan pilli wɛn] gɔ] Moti boliya.
yesterday women White see.NPST.PL DEF Mopti go.PSTNARR.3PL
'The women who saw the White yesterday went to Mopti.'
b. Ya [[yaan pilli wɛ] gɔ] Moti boliya.
yesterday women White see.NPST DEF Mopti go.PSTNARR.3PL
'The women who the White saw yesterday went to Mopti.'
c. *Ya [[yaan pilli wɛn] gɔ] Moti boli.
yesterday women White see.NPST.PL DEF Mopti go.PSTNARR
'The women who saw the White yesterday went to Mopti.'

This shows that the relativized element is syntactically associated with both positions. Crucially, IHRCs provide no evidence for a relative pronoun, or for a mediated analysis of the relative clause construction.

It is instructive to consider what an in-situ mediated structure would look like. Consider (8e). Under the non-mediated analysis, 'dog' is both the head of the construction and the clause-internal relativized element. In English it is realized in the position of the head, and in Navajo in the clause-internal position. However, under a mediated analysis, the head position is not part of the same functional unit (or chain) as the clause-internal position. Instead, the clause-internal position is linked to the mediating relative pronoun. Under the mediated analysis, one would expect an in-situ relative clause to look not like the IHRC in (8e), which we can schematize as (10a), but rather like (10b).

(10) a. The [that he said he thought the man kicked dog] is barking.
b. The dog [(that) he said he thought the man kicked which] is barking.

Structures like (10b) appear not to exist, at least not in this form. (10b) resembles a resumptive pronoun construction (for competing LFG analyses, see Falk 2002 and Asudeh 2004), but resumptive pronouns crucially are not *wh* relative pronouns but ordinary personal pronouns. Resumptive pronoun relative clauses thus also provide no reason to accept a mediated analysis.

We conclude, therefore, that in-situ constructions provide evidence against the mediated analysis of relative clauses. They suggest very strongly that the correct analysis is the unmediated analysis.

2.3. Pronoun-less Relative Clauses Cross-Linguistically

The existence of pronoun-less relative clauses in English is not a quirk. Relative clauses which appear to be unmediated (with or without an invariant relative particle/ complementizer) are quite widely attested.[5]

(11) a. Hebrew
meabed hatamlilim še Bill maadif
the.word.processor COMP Bill prefers
'the word processor that Bill prefers'

[5]All the examples other than the Hebrew come from Keenan and Comrie (1979).

b. Japanese
Watasi wa sono otoko ga tataita inu o miru.
I TOP that man NOM struck dog ACC see
'I see the dog that the man struck.'

c. Maori
te taane i patu- a e te wahine
the man PST hit- PASS by the woman
'the man who was hit by the woman'

d. Korean
hyənsik- i kɨ lä- lɨl ttäli- n maktäki
Hyensik- NOM the dog- ACC beat- REL stick
'the stick with which Hyensik beat the dog'

e. Persian
John mard- i râ ke zan zad mišenâsad.
John man- the ACC COMP woman hit knows
'John knows the man who the woman hit.'

f. Swedish
Jag har en bror, som talar tyska.
I have a brother REL speaks German
'I have a brother who speaks German.'

g. Yoruba
iṣu ti mo ra lana naa
yam REL I buy yesterday that
'that yam that I bought yesterday'

In fact, as shown by Maxwell (1979) for the 49 languages in the database of Keenan and Comrie (1979), languages with pronoun-less relative clause constructions are quite common. In some languages, such as Toba Batak and Japanese, these are the only kind of relative clause, while in others, such as Spanish and Czech, relative-pronoun relatives also exist.

The cross-linguistic distribution of relative-pronoun-less relative clauses is significant. If a mediated analysis were the right analysis of relative clauses, relative-pronoun-less constructions would be at best a highly marked construction. The fact that they are more common cross-linguistically than relative-pronoun relative clauses indicates that an unmediated analysis is called for.

3. Earlier Arguments Revisited

While mediated analyses of relative clauses are much more common in the literature, unmediated analyses have appeared as well. The earliest analyses proposed a mediated analysis for relative clauses with relative pronouns but an unmediated analysis (deletion in the relative clause) for non-relative pronoun relatives. This ceased to be the standard analysis when Chomsky (1977) proposed a deleted relative pronoun (in more recent work, an empty operator) in the non-relative pronoun construction.

The alternative analysis in transformational theory, one which treats all relative clauses with an unmediated analysis, is what is generally referred to as the raising

analysis. The first appearance of this analysis in the literature is Schachter (1973: 31–35), who proposed the following underlying structure for relatives (where Δ indicates an empty position, *e* in more modern notation):

(12) $_{\text{Nom}}[\ _{\text{Nom}}[\Delta]\ \text{S}]$

The relativized NP then raises from the S into the empty position in the structure.

The unmediated analysis (under the guise of the raising analysis) was developed in Vergnaud (1974), and has been revived by Kayne (1994). While various arguments have been given over the years for an unmediated analysis, the most compelling one comes from the behavior of idiom chunks, as in the following examples from Hulsey and Sauerland (2006: 114).

(13) a. Mary praised the headway that John made.
b. I was shocked by the advantage that she took of her mother.

Vergnaud (1974: 57) provides a similar example from French, using the French equivalent of the idiom *take part in*.

(14) Il est surpris de la part que Jean a prise aux débats.
he is surprised of the part that John has taken at.the debates
'He is surprised at the part that John took in the debates.'

In anybody's theory of idioms, idiom chunks like *headway*, *advantage*, and *part* are licensed by being the object of *make*, *take*, and *prendre*, respectively. Schematically (and abstracting away from specific theoretical frameworks), the mediated analysis provides the following analyses of these sentences:

(15) a. Mary praised the headway [that John made REL.PRON]
b. I was shocked by the advantage [that she took REL.PRON of her mother]
c. Il est surpris de la part [que Jean a prise REL.PRON aux débats]

The idiom chunks are not the objects of the licensing verbs in these cases; the relative pronouns are, and the idiom chunks appear in positions in which they are not licensed. This kind of anaphoric relation does not normally allow for idiom chunks:

(16) a. *Mary always praises headway when John makes it.
b. *I was shocked by the advantage when I saw her take it of her mother.

Under the unmediated analysis, on the other hand, the idiom chunks are correctly licensed:

(17) a. Mary praised the *x* [that John made *x*]; *x*=headway
b. I was shocked by the *x* [that she took *x* of her mother]; *x*=advantage
c. Il est surpris de la *x* [que Jean a prise *x* aux débats]; *x*=part

This provides a strong argument in favor of the unmediated analysis.

Previous versions of the unmediated analysis have been based on a derivational model of syntax: the head is taken to originate in the relative clause and move to its surface position. I am proposing a non-derivational account, in which the relativized element serves two functions (or, in a structure-based theory, occupies two positions) simultaneously. The idiom chunk facts provide evidence to distinguish the derivational from the non-derivational account. Consider the following example.[6]

(18) Mary never made the headway that had been expected of her.

In this case, the verb of which *headway* is the surface object is the licensing verb. For a derivational raising analysis, the D-structure is (18a), while for a non-derivational multifunctionality analysis it is (18b).

(19) a. [Mary never made [the e [UNEXPR.SUBJ had expected headway of her]]]
b. Mary never made the x [that x had been expected of her]; x=headway

The raising analysis provides the wrong account of this case, while the non-derivational multifunctional analysis has *headway* as the object of the licensing verb *made* here as well. The idiom-chunk evidence facts thus provide evidence not only for an unmediated analysis, but for a simultaneous (rather than derivational) implementation.

A less convincing argument comes from the binding of reflexive anaphors (examples from Hulsey and Sauerland 2006: 115):

(20) a. I saw the picture of himself that John liked.
b. Mary discovered the book about himself that Bob wrote.

In these cases, the DP containing *himself* must be directly associated with the object position inside the relative clause for the coreference to be grammatical; such an association is provided by the unmediated analysis but not by the mediated analysis.[7] On the other hand, if the binding of reflexives in picture noun phrases is not governed by syntactic principles (e.g. if the reflexives in picture NPs are logophors), this argument does not go through.

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[6] I would like to thank Joan Bresnan (p.c.) for pointing this example out to me. Bresnan also notes that similar issues arise in pseudoclefts such as the following:
(i) What we have to make is more headway!
Here the object of *make* is *what*, not *headway*. I do not have anything to say about this case, as I do not have an analysis of pseudoclefts. It is possible that this should be taken as evidence for the direction that an analysis of pseudoclefts should go.

[7] On the other hand, Hulsey and Sauerland claim that (i) is grammatical:

(i) Which is the picture of John$_i$ that he$_i$ likes?

If (i) is grammatical, it looks like a Condition C violation under an unmediated analysis, and something needs to be said about it. However, the grammaticality of (i) is questionable; native speakers I have asked do not accept it on the coreferential reading.

4. The Unmediated Analysis

4.1. Basics

On the basis of the old arguments from idiom chunks and anaphoric binding and the new arguments from the in-situ construction and the widespread distribution of relative-pronoun-less relatives, I take it that an unmediated analysis of relative clauses is the correct one.[8] In this section, I will develop an informal version of an unmediated analysis of relative clauses, both internally headed and externally headed. (For a formalized version within the theoretical framework of LFG, see the appendix.) As will become clear shortly, the analysis is not entirely straightforward, and could be construed as evidence against an unmediated analysis. Given the evidence that has been presented in the previous sections, I would consider this to be a mistake. The evidence for an unmediated analysis is clear; the challenge is to find the right descriptive tools to get the details right.

The core of an unmediated analysis of relative clauses is that the relativized element has two functions: whatever function the nominal phrase has in the larger sentence and its function within the relative clause. (While it is convenient to speak of the head of the construction as the element that has these two functions, it is actually the larger nominal phrase of which the relative clause is an adjunct. The "head" is not an independent element.) We can represent this informally as follows.

(21) a. The trip to Mars that I booked leaves on Tuesday.

b. $[_x\ [_y$ The trip to Mars $[_z$ that I booked]] leaves on Tuesday]

$y = \begin{cases}\text{subject of } x \\ \text{object of } z\end{cases}$

$z =$ adjunct of y

However, this is not quite accurate. A closer look reveals that the entities that fill the two functions of "subject of x" (the larger nominal phrase) and "object of z" (the in-clause element) do not have identical content.

The first difference is that the adjunct z (i.e. the relative clause itself) is part of the subject of x but not part of the object of z. The object of z is *trip to Mars*, not *trip to Mars that I booked*. Since making the relative clause part of the in-clause element would result in infinite recursion, I assume that mechanisms can be hypothesized to exist that would prevent it. However, whether the relative clause is excluded from the in-clause element by some general mechanism or by explicit stipulation, the result is that while there is, appropriately, a direct relation between the larger nominal phrase and the in-clause element, they are not identical.

The next problem is case marking. In most languages, the relativized element always has the appropriate case for the position (head or in-clause) in which it is realized. There is no requirement that the same case be appropriate for the other

[8] Borsley (1997) ostensibly presents arguments against an unmediated analysis. However, he argues not against just any unmediated analysis but the specific analysis proposed by Kayne (1994), under which the head of the relative construction occupies the [SPEC, CP] position of the relative clause, rather than the N position of a higher NP. The analysis to be presented here is sufficiently different from Kayne's so as not to be subject to Borsley's objections.

position. This is true for both externally headed relatives and internally headed ones. In the case of internally headed relative clauses, the relative clause itself can be marked for case.

(22) a. Hebrew
externally headed
accusative head, nominative in-clause
Kaniti et ha- sefer še hicxik otxa.
I.bought ACC DEF- book that made.laugh you
'I bought the book that made you laugh.'

b. Diegueño (Gorbet 1977)
internally headed
inessive head, accusative (Ø suffix) in-clause
Tənay 'waː 'wuːw- pu- L^{y} 'čiyawx.
yesterday house I.see- DEF- INESSIVE I.sing.IRR
'I'll sing in the house I saw yesterday.'

This is a problem because a single element with multiple functions (a chain in the Principles and Parameters tradition or a structure-shared element in LFG) is usually thought to have the same case everywhere. In this construction, however, the entities that bear the two grammatical functions are not completely identical; as we have already seen, one of them includes the relative clause and the other does not. It is thus not a chain or a completely structure-shared element. We hypothesize that the lack of complete identity allows the lack of case connectivity.[9]

The most important element that is not shared is the "definiteness" feature.[9] This is not overtly visible in the case of externally headed relatives, as there is a gap in the position in the relative clause, and thus no overt indication of (in)definiteness. However, internally headed relative clauses, in which the construction and the internal head can be independently marked for definiteness, clearly show that the head (or rather, the larger nominal phrase) and the in-clause position have different values for definiteness.

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[9]Other treatments of case are also attested. Culy (1990: 268) discusses Cuzco Quechua case attraction, under which the larger nominal phrase can, for some speakers, be marked with the case of the in-clause element in both internally- and externally-headed relative clauses. In the following examples, the larger nominal is the subject of the sentence, and the in-clause element is object; the relative clause construction is marked accusative.

(i) a. Internally-headed
Warma riku- sqa- y- ta hamu- nqa.
girl see- NMNL- 1- ACC come- 3.FUT
'The girl I saw will come.'

b. Externally-headed
Riku- sqa- y warma- ta hamu- nqa
see- NMNL- 1 girl- ACC come- 3.FUT
'The girl I saw will come.'

[9]The term "definiteness" may not be entirely felicitous. The term is typically used in LFG to refer to features relating to syntactic elements relating to the reference of a nominal, often (though not always) expressed by a determiner. Since the definite and indefinite articles are typically used for this purpose, definiteness has become the standard term. However, not every feature value relates to "definiteness" in the semantic sense.

Perhaps the most common pattern is that there is definiteness marking on the larger nominal phrase but not on the internal head. This can be seen in the Diegueño example (21) above. Further examples are the following.

(23) Dogon[10] (Culy 1990: 20)
Iye kekeginɛ ya yaana poñ lagɔ agiya.
today crazy.person yesterday woman large.OBJ hit.PST.DEF catch.PST.3PL
'Today they caught the crazy person who hit a large woman.'

(24) Tibetan (Keenan 1985: 161)
Peemɛ thep khii- pa the nee yin.
Peem.ERG book.ABS carry- PART the.ABS I.GEN be
'The book Peem carried is mine.'

Since all nominal elements other than case appear on the internal head and not on the larger nominal phrase, this raises suspicion that definiteness is specifically a property of the larger nominal phrase and not of the internal head.

Other languages have a determiner marking a definiteness value on the internal head that does not express the definiteness of the larger nominal phrase. In Bambara, there normally are no determiners, but there is a special determiner[11] marking the internal relative head.

(25) Bambara (Keenan 1985: 162)
Tye ye ne ye so min ye san.
man PST I PST horse REL see buy
'The man bought the horse which I saw.'

This suggests that there is a special definiteness[12] value, which I will call REL, for the clause-internal element. More striking are languages like Lakhota and Mooré, in which two determiners are in evidence, one for the larger nominal phrase, and another one (indefinite) marking the internal head.

(26) Lakhota (Williamson 1987: 171)
a. Mary owíža wą kaǧe ki he ophewathų.
Mary quilt a make the DEM I.buy
'I bought the quilt that Mary made.'

[10]In this example, the determiner *gɔ* cliticizes onto the verb form *lagi*.

[11]It is not called a determiner in the literature, but it is a functional head in the nominal system (it appears finally in the nominal phrase, and Bambara is a head-final language), so determiner appears to be a reasonable hypothesis as to its category.

[12]It may be better to say that definiteness in the semantic sense is irrelevant within the relative clause, and what is involved is a special syntactically specified marking. Since this marking substitutes for the usual definiteness marking and in some of the languages under discussion takes the form of the marking for indefinite nominals, I take it that from the syntactic perspective what is being marked here is definiteness.

b. Mary owįža wą kağa cha he ophewathų.
Mary quilt a make INDEF DEM I.buy
'I bought a quilt that Mary made.'

c*. Mary owįža ki kağe ki he ophewathų.
Mary quilt the make the DEM I.buy
'I bought the quilt that Mary made.'

(27) Mooré (Culy 1990: 76)
Yãmb sẽn yã dao ninga zamẽ wã bee ka.
2PL AUX saw man INDEF yesterday DEF be there
'The man that you saw yesterday is here.'

Williamson argues that the indefinite marking on the internal head is semantically motivated.

From the syntactic perspective, then, the in-clause element, although the same entity as the larger nominal phrase, is not feature-identical to it. This means that the analysis of relative clauses, although unmediated, will not involve a simple *wh* dependency between the head position and the in-clause position. Instead, the relative clause must contain a modified version of the larger nominal phrase. The rule/principle licensing relative clauses specifies that the definiteness value of the larger nominal phrase is replaced by the special REL value. This modified version lacks the relative clause adjunct (perhaps by independent principle) and gets its own case-marking. These are the only differences between the two functional positions.

Expressing this formally presents some challenges. In the first place, a theoretical framework is required that allows the selective exclusion of features from one or more functions that a multifunctional element serves (or alternatively, partial feature sharing). For the purpose of the semi-formal analysis presented here, I will assume that this is possible.[13] The other problem is that the constraint licensing the multifunctionality needs to be able to incorporate this exclusion of features, while at the same time specifying the two functions of the element. Specifying the two functions in a general constraint is problematic, as the in-clause function could be any grammatical function in any clause within the relative clause. This difficulty is compounded in those varieties of LFG in which the constraint proceeds from the position of the in-clause function (inter alia Bresnan 1995, Falk 2007), from where it may not be possible to ascertain that what is involved is a relative clause (with partial sharing) rather than an interrogative (with complete sharing). I therefore hypothesize that instead of simply specifying that some element somewhere in the relative clause is a modified version of the larger nominal phrase, the relative clause rule specifies this modified version as the "operator" of the relative clause. The operator can then be linked to the in-clause position as a simple *wh*-dependency.

[13] In the LFG analysis provided in the appendix, the restriction operator is used to achieve this effect.

(28) Relative clause operator
The operator $\mathscr{O}$ of a clausal adjunct to a nominal phrase (NP or DP) $\mathbb{N}$ is identical to the nominal phrase except for definiteness; $\mathscr{O}$ has a REL value for definiteness, regardless of the definiteness of $\mathbb{N}$.

The functional representation of the English sentence (20a) is as follows.

(29) $[_x\ [_y$ The trip to Mars $[_z$ that I booked]] leaves on Tuesday]

$$y = \begin{cases} \text{subject of } x \\ \text{definiteness} = \text{REL} \begin{cases} \text{operator of } z \\ \text{object of } z \end{cases} \end{cases}$$

$z =$ adjunct of y

Similarly, the Lakhota example (25a) will have the following functional representation.[14]

(30) $[_x\ [_y\ [_z$ Mary owįža wą kağe] ki he] ophewathų]
Mary quilt a make the DEM I.buy

$$y = \begin{cases} \text{object of } x \\ \text{definiteness} = \text{REL} \begin{cases} \text{operator of } z \\ \text{object of } z \end{cases} \end{cases}$$

$z =$ adjunct of y

The difference between English and Lakhota is the source of (most of) the content of y: the head position in English and the in-clause position in Lakhota.

The operator element that is hypothesized here (see Falk 2001 for an LFG account) serves as an intermediate step in the flow of information between the in-clause and out-of-clause portions of the relative clause construction. It provides a locus for the grammar to express the relation between the larger nominal phrase and the in-clause element, independently of the specific in-clause function. It does not turn this into a mediated analysis in the sense defined here: the operator is not a pronominal element which is coreferential with the head. There is no anaphoric mediation, and the relation between the head and the in-clause position remains direct and unmediated. While the operator element is being proposed here as a formal convenience, it will transpire (in §5) that it has syntactic consequences.

4.2. Other kinds of internally-headed relative clauses

4.2.1. Choctaw

IHRCs in Choctaw are discussed by Broadwell (1985a, 1985b). Choctaw IHRCs differ from relative clauses in other languages in two important ways: they do not constitute islands for *wh* extraction, and they are marked by switch reference markers.

[14] For consistency, I am assuming that the internal head has the definiteness feature value [REL]. Williamson argues that it is indefinite. Nothing hinges on this.

(31) a. Joyce- at John- at ofi aa-ipa nota- ma
Joyce- NOM John- NOM dog table under- ACC
aa- pisa- tok- ma chopa- tok.
LOC- see- PST- DIFF.SUBJ buy- PST
'Joyce bought the dog John saw under the table.' or
'Joyce bought the table John saw the dog under.'

b. Katommah Joyce- at John- at ofi
where Joyce- NOM John- NOM dog
aa- pisa- tok- ma chopa- tok.
LOC- see- PST- DIFF.SUBJ buy- PST
'Where did Joyce buy the dog John saw.' (i.e. where did John see it?)

While this is not the place for a complete analysis of the Choctaw construction, Broadwell's basic conclusion seems well-founded. Broadwell analyzes Choctaw relatives as being clauses rather than nominal phrases. The presence of clausal marking (switch reference) rather than nominal marking (definiteness, case, nominalizing suffix) supports such an analysis. Sentence (30a) would be more accurately rendered:

(32) Joyce bought [John saw the dog under the table].

In more conventionally structured languages, like English, this would not be grammatical. Presumably the syntax-semantics mapping in Choctaw allows such sentences to be interpreted.

If this analysis is correct, Choctaw IHRCs are not *wh* constructions; this could be the reason for their non-islandhood. In Falk (2009), it is proposed that in-situ constructions in some languages are not *wh* constructions. The proposal was based on in-situ questions, but since IHRCs are in-situ constructions as well, it stands to reason that non-*wh* IHRCs also exist. Choctaw thus fills a typological gap.

4.2.2.Lai

Relative clauses in Lai, both internally headed and externally headed, present an interesting problem because they are not unbounded *wh* constructions (Kathol 2000).

(33) a. Externally headed
Vok rool ʔa pee mii lawthlawpaa ka mu̥ʔ.
pig food 3SG give.I REL farmer 1SG see
'I saw the farmer who gave food to the pig.'

b. Internally headed
Lawthlawpaa vok rool ʔa pee mii ka mu̥ʔ.
farmer pig food 3SG give.I REL 1SG see
'I saw the farmer who gave food to the pig.'

The relative element is always, as in these examples, in the main clause of the relative clause. Lai has no unbounded constructions.

Despite the fact that Lai relative clauses are different from familiar *wh* constructions, an analysis comparable to the one proposed here can be hypothesized.

Following the brief comments in fn 4, I assume that verbal morphology marks one of the arguments of the verb as the pivot (in the sense of Falk 2006a); form 1 marks the subject as the pivot. The relative marker *mii*, which is a nominal element outside of the relative clause adjunct, designates the containing NP as being the adjunct's pivot. There is no operator, as there is no *wh* construction, but the functional relations are very similar to those of conventional relative clauses.

5. Relative clauses with relative pronouns

We return now to the form of relative clause which the standard mediated analysis takes to be the basic form: the one with a relative pronoun. All the evidence for an unmediated analysis of relatives without relative pronouns points to an unmediated analysis even when a relative pronoun is present.

(34) a. Mary praised the headway which John made.
b. I was shocked by the advantage which she took of her mother.

(35) a. I saw the picture of himself which John liked.
b. Mary discovered the book about himself which Bob wrote.

In other words, contrary to the conventional wisdom, the relative "pronoun" is not a pronominal element which is coreferential with the head and mediates the relation between the head and the in-clause position.

If the relative pronoun is not truly pronominal, the question arises as to why relative pronoun constructions exist. To answer the question, consider the distribution of relative constructions in English non-finite clauses.

(36) a. a word processor [to mangle the text]
b. *a word processor [which to mangle the text]

(37) a. a word processor [to hate with a passion]
b. *a word processor [which to hate with a passion]

(38) a. a word processor [to crash the computer with]
b. *a word processor [which to crash the computer with]
c. a word processor [with which to crash the computer]

In infinitival relatives in English, relative pronouns are restricted to what since Ross (1967) have been referred to as "pied-piping" contexts: contexts in which the operator is only part of the relativized element. If there is no pied-piping (relativizing subjects, objects, or even obliques with preposition stranding) the relative pronoun is not allowed.

The pattern that we find in English infinitival relatives can also be found in other languages. For example, the variety of Norwegian described by Taraldsen (1978) has relative clauses with and without relative pronouns. (The relative complementizer in Norwegian is *som*.)

(39) a. Mannen som ser urolig på oss, er sikkert svensk.
the.man REL see uneasily at us is surely Swede
'The man that is looking uneasily at us is surely a Swede.'

b. *Mannen hvilken/hvem ser urolig på oss, er sikker svensk.
the.man which/who sees uneasily at us is surely Swede
'The man who is looking uneasily at us is surely a Swede.'

(40) a. Mannen som du ser der borte, må komme fra Sverige.
the.man REL you see there away must come from Sweden
'The man that you see over there must come from Sweden.'

b. *Mannen hvilken/hvem du ser der borte, må komme fra Sverige.
the.man which/who you see there away must come from Sweden
'The man who you see over there must come from Sweden.'

(41) a. Mannen som du snakker om, ser nervøs ut.
the.man REL you speak about sees nervous out
'The man that you are talking about looks nervous.'

b. Mannen om hvilken / ?hvem du snakker, ser nervøs ut.
the.man about which / ?who you speak sees nervous out
'The man about whom you are talking looks nervous.'

c. *Mannen hvilken/hvem du snakker om, ser nervøs ut.
the.man which/who you speak about sees nervous out
'The man who you are talking about seems nervous.'

(42) Jeg hjalp en dame hvis datter vi traff på fjellet.
I helped a lady whose daughter we met in the.mountain
'I helped a lady whose daughter we met in the mountains.'

A similar pattern can be seen in Malay (Keenan and Comrie 1977: 71), where subject and object relatives use the relative complementizer *yang* but oblique relatives (which involve obligatory pied-piping) use a relative pronoun.[15]

(43) a. Ali bunoh ayam yang Aminah sedang memakan.
Ali kill chicken REL Aminah PROG eat
Ali killed the chicken that Aminah was eating.

b. *perempuan yang Ali beri ubi ketang itu kapada
woman REL Ali gave potato the to
'the woman that Ali gave the potato to'

c. *perempuan kapada yang Ali beri ubi ketang itu
woman to REL Ali gave potato the
'the woman to that Ali gave the potato'

d. perempuan kapada siapa Ali beri ubi ketang itu
woman to who Ali gave potato the
'the woman to whom Ali gave the potato'

[15]According to Keenan and Comrie the relative pronoun construction is stylistically awkward, and speakers prefer to paraphrase the sentence, but it is judged grammatical.

Several of the languages surveyed by Maxwell (1979) display the same distribution: relative pronouns are only used in constructions involving pied piping. There thus appears to be a relationship between relative pronouns and pied-piping.

In order to understand the structure of relative clauses with relative pronouns, we need to consider the similar *wh* interrogative construction,[16] such as (3) above, repeated here.

(44) Who were you told that computer industry experts claim uses the TextMangler wordprocessor?

As in the relative clause construction, the *wh* interrogative construction has an operator, in this case *who*. The operator of the interrogative functions as the focus of the question, a discourse-related function:

(45) $[_w\ [_x$ Who] were you told $[_y$ that computer industry experts claim $[_z$ uses the TextMangler wordprocessor]]]

$x = \begin{cases}\text{operator of } w \\ \text{focus of } w \\ \text{subject of } z\end{cases}$

It is also possible for the focus of the question to be a larger constituent which includes the operator; i.e. "pied piping" is possible.

(46) a. With which wordprocessor did they say that Bill struggled?

b. $[_w\ [_x$ With $[_y$ which wordprocessor]] did they say $[_z$ that Bill struggled]]

$y =$ operator of w

$x = \begin{cases}\text{focus of } w \\ \text{oblique of } z\end{cases}$

I state the constraint that licenses *wh* interrogatives in English as follows:

(47) *Wh*
A constituent in specifier of CP bears a discourse-related function. It or some subconstituent thereof is a *wh* operator.

Under the analysis proposed in this paper, relative clauses have an operator (usually unexpressed) which is partially identical to the larger nominal phrase. This is licensed by (27) above. Nothing that has been said prevents this operator from being expressed overtly as a *wh* element.[17] If it is, (46) will specify that it has a discourse-

[16]The discussion here is based on the LFG analysis of Falk (2001).

[17]The discussion here assumes that relative pronouns are always *wh* elements; i.e. related to interrogatives. They are obviously not always identical to interrogatives: English *which* as a relative provnoun has different properties that *which* as an interrogative. It has been argued (Vaillette 2000, Falk 2002) that Modern Hebrew has relative pronouns which are identical to anaphoric pronouns. Nothing prevents lexical items that are identical to anaphoric pronouns from having a *wh* feature, although this appears to be unusual.

related function (topic in the case of relative clauses). Since, unlike interrogative operators, the relative operator is not referential, the lexicon of the language needs to provide lexical *wh* elements that are not referential, but otherwise all the elements are already present to allow *wh* relatives.

(48) a. The trip to Mars which I booked leaves on Tuesday.

b. $[_x\ [_y$ The trip to Mars $[_z\ [_w$ which] I booked]] leaves on Tuesday]

$$y = \begin{cases} \text{subject of } x \\ \text{definiteness} = \text{REL} : w = \begin{cases} \text{operator of } z \\ \text{topic of } z \\ \text{object of } z \end{cases} \end{cases}$$

$z =$ adjunct of y

The *wh* relative is thus a near-equivalent of the non-*wh*-relative.

The advantage of a *wh* relative is that it is more flexible, in that, like the *wh* interrogative, it allows for pied-piped constructions:

(49) a. the theory {which/that/∅} I had doubts about
b. the theory about which I had doubts

This is because the operator can be a subpart of the discourse-function element (46); in (48b) the topic is *about which* but the operator is *which*.

(50) $[_v \ldots [_w$ the theory $[_x\ [_y$ about $[_z$ which]] I had doubts]] …]

$$w = \begin{cases} \text{some function of } v \\ \text{definiteness} = \text{REL} : z = \text{operator of } x \end{cases}$$

$$y = \begin{cases} \text{topic of } x \\ \text{oblique argument of } x \end{cases}$$

What we have seen above is evidence that the primary purpose of relative-pronoun relative clause constructions is to allow pied piping. In some languages (including finite relative clauses in English) they have been (not surprisingly) generalized to other relative clauses, but this appears to be an extension of their primary raison d'être.

It should be noted that under this analysis, the existence of *wh* relatives is a consequence of the operator element proposed for relative clauses. While the operator in non-*wh* relatives is an abstract element with no overt realization, an operator can be included in a fronted *wh* phrase. The operator in relative clauses was originally proposed as a formal necessity, a way of expressing the relation between the head and the in-clause function; the fact that its existence is exploited to allow for relative-pronoun relative clauses is a fortuitous piece of evidence confirming the analysis.

The Hebrew construction may have developed from a resumptive pronoun construction.

6. Conclusion

It has been argued in this paper that relative clauses should be analyzed without a mediating relative pronoun. Such an analysis accounts for the existence of internally headed relative clauses as the in-situ variety of the construction, and for the widespread occurrence of relative clauses with no relative pronoun. The use of a relative pronoun is made available as a result of the formal properties of the construction, but the relative pronoun is not a true pronoun. The purpose of the relative pronoun is to make the construction more flexible by allowing pied-piping constructions. We have also seen that non-*wh* construction relative clauses exist; in particular, Choctaw fills a typological gap by having in-situ relative clauses in which there is no syntactic link with the head of the relative clause construction.

7. Appendix: Formal LFG Analysis

Standard analyses of relative clauses in LFG (e.g. Dalrymple 2001, Falk 2001) are mediated, with a pronominal element ([PRED 'PRO']) functioning as topic of the relative clause. In light of the arguments in this paper, such analyses are untenable.

The unmediated analysis is implemented in LFG in terms of structure sharing.

(51)
$$\begin{bmatrix} \vdots & \vdots \\ \text{PRED} & \text{'...'} \\ \vdots & \vdots \\ \text{ADJ} & \left\{ \begin{bmatrix} \vdots & \vdots \\ \text{GF} & [\ 1\ ] \\ \vdots & \vdots \end{bmatrix} \right\} \end{bmatrix}$$

As discussed in the body of this paper, the structure sharing is incomplete.

My proposal is that the information flow between the larger nominal and the in-clause function is mediated by an OPERATOR (or OPER)[18] at the root of the relative clause. This OPER is partially identical to the containing f-structure, in both externally headed and internally headed relatives. This can be achieved formally through the use of the restriction operator (Kaplan and Wedekind 1993), which will exclude the sharing of DEF and ADJ. The f-structure of the English sentence (20a) with an externally headed relative clause, repeated here as (51a), is (51b), and the phrase structure rule required is (51c).[19] For clarity, the shared elements are shown in normal type in the f-structure position associated with the c-structure position in which they actually occur, and grayed-out in other f-structure positions. This notation replaces the usual curved line.

(52) a. The trip to Mars that I booked leaves on Tuesday.

[18]The name OPER is used in Falk (2001). Other names have been used in the LFG literature, such as Q for interrogative operators RELPRO for relative operators in Kaplan and Bresnan (1982) and Dalrymple (2001).

[19]The f-structures and phrase structure rule annotations include the feature [WHPATH], motivated by Falk (2009). The proposal there is that a *wh* path is delimited by values of this feature, with the top f-structure bearing the value [+TOP] and others bearing the value [−TOP].

b.

$$\begin{bmatrix}
\text{SUBJ} & \begin{bmatrix}
\text{DEF} & + \\
\text{PRED} & \text{`trip } \langle(\uparrow \text{OBL}_{\text{Goal}}\ \text{OBJ})\rangle\text{'} \\
\text{OBL}_{\text{Goal}} & \begin{bmatrix}\text{PCASE} & \text{OBL}_{\text{Goal}} \\ \text{OBJ} & [\text{PRED } \text{`Mars'}]\end{bmatrix} \\
\text{ADJ} & \left\{\begin{bmatrix}
\text{WHPATH} & [+\text{T}] \\
\text{OPER} & \begin{bmatrix}\text{DEF} & \text{REL} \\ \text{PRED} & \text{`trip } \langle(\uparrow \text{OBL}_{\text{Goal}}\ \text{OBJ})\rangle\text{'} \\ \text{OBL}_{\text{Goal}} & \begin{bmatrix}\text{PCASE} & \text{OBL}_{\text{Goal}} \\ \text{OBJ} & [\text{PRED } \text{`Mars'}]\end{bmatrix}\end{bmatrix} \\
\text{SUBJ} & [\text{“I”}] \\
\text{PRED} & \text{`book } \langle(\uparrow \text{SUBJ})(\uparrow \text{OBJ})\rangle\text{'} \\
\text{TENSE} & \text{PAST} \\
\text{OBJ} & \begin{bmatrix}\text{DEF} & \text{REL} \\ \text{PRED} & \text{`trip } \langle(\uparrow \text{OBL}_{\text{Goal}}\ \text{OBJ})\rangle\text{'} \\ \text{OBL}_{\text{Goal}} & \begin{bmatrix}\text{PCASE} & \text{OBL}_{\text{Goal}} \\ \text{OBJ} & [\text{PRED } \text{`Mars'}]\end{bmatrix}\end{bmatrix}
\end{bmatrix}\right\}
\end{bmatrix} \\
\text{TENSE} & \text{PRES} \\
\text{PRED} & \text{`leave } \langle(\uparrow \text{SUBJ})\rangle\text{'} \\
\text{ADJ} & \{[\text{“on Tuesday”}]\}
\end{bmatrix}$$

c.

$$\begin{array}{l}
\text{NP} \rightarrow \text{NP} \qquad\qquad\qquad\qquad\quad \text{CP} \\
\qquad\quad \uparrow{=}\downarrow \qquad\qquad\qquad\quad \downarrow \in (\uparrow \text{ADJ}) \\
\qquad\qquad\quad (\downarrow \text{OPER}) \setminus \text{DEF} = \uparrow \setminus \text{DEF} \setminus (\text{ADJ} \quad \in \quad) \\
\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\quad \rightarrow{=}\downarrow \\
\qquad\qquad\qquad\qquad\quad (\downarrow \text{OPER DEF}) = \text{REL} \\
\qquad\qquad\qquad\qquad\quad (\downarrow \text{WHPATH}) = [+\text{T}]
\end{array}$$

Similarly, the Lakhota example (25a) will have the following f-structure.

(53) a.

$$\begin{bmatrix}
\text{SUBJ} & [\text{“I”}] \\
\text{PRED} & \text{`buy } \langle(\uparrow \text{SUBJ})(\uparrow \text{OBJ})\rangle\text{'} \\
\text{OBJ} & \begin{bmatrix}
\text{DEF} & + \\
\text{PRED} & \text{`quilt'} \\
\text{ADJ} & \left\{\begin{bmatrix}
\text{OPER} & \begin{bmatrix}\text{DEF} & \text{REL} \\ \text{PRED} & \text{`quilt'}\end{bmatrix} \\
\text{WHPATH} & [+\text{T}] \\
\text{SUBJ} & [\text{“Mary”}] \\
\text{PRED} & \text{`make } \langle(\uparrow \text{SUBJ})(\uparrow \text{OBJ})\rangle\text{'} \\
\text{OBJ} & \begin{bmatrix}\text{DEF} & \text{REL} \\ \text{PRED} & \text{`quilt'}\end{bmatrix}
\end{bmatrix}\right\}
\end{bmatrix}
\end{bmatrix}$$

b. $\text{DP} \rightarrow$ CP ($\downarrow \in (\uparrow \text{ADJ})$; $(\downarrow \text{OPER}) \backslash \text{DEF} = \uparrow \backslash \text{DEF} \backslash (\text{ADJ} \underset{\rightarrow}{\in} =\downarrow)$; $(\downarrow \text{OPER DEF}) =_c \text{REL}$; $(\downarrow \text{WHPATH}) = [+\text{T}]$) DP ($\uparrow = \downarrow$)

As for *wh* relatives, they are licensed by the same phrase structure rule that licenses *wh* questions. Following Falk (2001), this is (ignoring for the moment the possibility of pied piping):

(54) $\text{CP} \rightarrow$ XP ($(\uparrow \text{DF}) = \downarrow$; $(\uparrow \text{OPER}) = \downarrow$; $(\uparrow \text{OPER PRONTYPE}) =_c \text{WH}$) C′ ($\uparrow = \downarrow$)

This results in the following:

(55) a. The trip to Mars which I booked leaves on Tuesday.

b.
$$\begin{bmatrix}
\text{SUBJ} & \begin{bmatrix}
\text{DEF} & + \\
\text{PRED} & \text{‘trip } \langle (\uparrow \text{OBL}_{\text{Goal}}\ \text{OBJ}) \rangle \text{’} \\
\text{OBL}_{\text{Goal}} & \begin{bmatrix} \text{PCASE} & \text{OBL}_{\text{Goal}} \\ \text{OBJ} & [\text{PRED } \text{‘Mars’}] \end{bmatrix} \\
\text{ADJ} & \left\{ \begin{bmatrix}
\text{WHPATH} & [+\text{T}] \\
\text{OPER} & \begin{bmatrix} \text{DEF} & \text{REL} \\ \text{PRED} & \text{‘trip } \langle (\uparrow \text{OBL}_{\text{Goal}}\ \text{OBJ}) \rangle \text{’} \\ \text{OBL}_{\text{Goal}} & \begin{bmatrix} \text{PCASE} & \text{OBL}_{\text{Goal}} \\ \text{OBJ} & [\text{PRED } \text{‘Mars’}] \end{bmatrix} \end{bmatrix} \\
\text{TOPIC} & \begin{bmatrix} \text{DEF} & \text{REL} \\ \text{PRED} & \text{‘trip } \langle (\uparrow \text{OBL}_{\text{Goal}}\ \text{OBJ}) \rangle \text{’} \\ \text{OBL}_{\text{Goal}} & \begin{bmatrix} \text{PCASE} & \text{OBL}_{\text{Goal}} \\ \text{OBJ} & [\text{PRED } \text{‘Mars’}] \end{bmatrix} \end{bmatrix} \\
\text{SUBJ} & [\text{“I”}] \\
\text{PRED} & \text{‘book } \langle (\uparrow \text{SUBJ})(\uparrow \text{OBJ}) \rangle \text{’} \\
\text{TENSE} & \text{PAST} \\
\text{OBJ} & \begin{bmatrix} \text{DEF} & \text{REL} \\ \text{PRED} & \text{‘trip } \langle (\uparrow \text{OBL}_{\text{Goal}}\ \text{OBJ}) \rangle \text{’} \\ \text{OBL}_{\text{Goal}} & \begin{bmatrix} \text{PCASE} & \text{OBL}_{\text{Goal}} \\ \text{OBJ} & [\text{PRED } \text{‘Mars’}] \end{bmatrix} \end{bmatrix}
\end{bmatrix} \right\}
\end{bmatrix} \\
\text{TENSE} & \text{PRES} \\
\text{PRED} & \text{‘leave } \langle (\uparrow \text{SUBJ}) \rangle \text{’} \\
\text{ADJ} & \{[\text{“on Tuesday”}]\}
\end{bmatrix}$$

Pied-piped constructions are licensed by a slight revision to the PS rule.

(56) CP → XP (↑ DF) =↓ (↑ OPER) = (↓ GF*) (↑ OPER PRONTYPE) =$_c$ WH C′ ↑=↓

This analysis of relative clauses raises some interesting questions for LFG. One of them relates to the OPER function. It is not clear how OPER fits into the general LFG set of grammatical functions. While it is clearly related to the grammaticized discourse functions, it appears to be somewhat different from them.

Another question relates to the lack of case connectivity in relative clauses. This lack of case connectivity has some interesting parallels in the LFG literature, which includes other constructions with elements which appear to be related through structure-sharing but do not have the same case. For example, Asudeh (2004: 129) argues against a structure-sharing analysis of resumptive pronouns (as proposed by Falk 2002) in part on the grounds of lack of case connectivity. Similarly, Dalrymple and King (2000: 90) argue that the relationship between the SUBJ of a *tough* predicate and the element in the subordinate clause in a *tough* construction cannot be one of structure sharing because the two elements have different cases. In both of these cases, an anaphoric analysis is proposed instead. In the present situation, this would be unfortunate; as we have seen, the evidence is for an unmediated analysis, not one with a relative pronoun. However, since (unlike Icelandic raising constructions discussed by Andrews 1982), the shared structures are not identical in relative clauses, there is no reason to expect the case to be identical. It can either be explicitly excluded (with the restriction operator), or we can adopt the proposal of Falk (2006b). Under this proposal, case is not an f-structure feature value. Instead, every argument-taking predicate projects a grammatical-marking structure (g-structure), where case is realized in the form of an attribute that takes the argument as its value. Since the head and the in-clause element are not identical, they are distinct f-structure elements and would project distinct g-structures. I leave the question open here. I also leave open the question of whether the solution for relative clauses will also work for resumptive pronouns (in relative clauses) and *tough* constructions. In any case, lack of case connectivity is a weaker argument for an anaphoric analysis than it has generally been thought to be.

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