

# The source of *wh*-morphology in questions and relative clauses

Radek Šimik

This paper proposes a solution to three related phenomena: (i) an asymmetry in scopal behavior of *wh*-phrases in questions and relatives, (ii) a symmetry between resumption (in Czech, Hebrew, and Greek relatives) and *wh*-relatives (in English), and (iii) a symmetry between gaps (as opposed to resumptives) and *that*-relatives. I make an explicit proposal concerning the fine-structure of operator DPs and argue that *wh*-morphology in questions and relatives is indicative of DP-internal quantification.

## 1. Introduction

This paper gives an account of certain unexpected behaviors concerning relative clauses and questions in English and languages which make use of resumptive pronouns (Czech, Hebrew, and Greek).

Firstly, the English *wh*-pronoun *which* does not have the same scopal properties in questions and relative clauses:

- (1) a. Which book should every student read?       $(\exists > \forall; \forall > \exists)$   
b. the book which every student should read       $(\exists > \forall; * \forall > \exists)$

The question in (1a) has two possible readings: an individual reading (there is a book *x* such that every student should read *x*) and a pair-list reading (for every student there is a (different) book that they should read). The relative clause in (1b), on the other hand, only has the individual reading.

The pair-list reading, however, is preserved when a different type of relative clause is used, namely a *that*-relative (null operator relative):

- (2) the book that every student should read       $(\exists > \forall; \forall > \exists)$

For a more detailed discussion, see sections 2.1 and 2.2.

Secondly, there are other examples showing that *wh*-relatives in English have a more limited distribution than *that*-relatives (see 2.3). For instance, only *that*-relatives are allowed to function as a comparison class for superlatives:

- (3) *Borat* is the most boring film that/\*which I've ever seen.

The picture becomes even more interesting when we take resumption into consideration (section 2.4). I will show that the relative pronoun *which* patterns with resumptive pronouns, whereas the null operator in *that*-relatives patterns with gaps in all relevant respects.

In the analysis I employ a version of head-raising for relative clauses (e.g. Bianchi 1999), combined with the theory of movement and resumption of Boeckx (2003). From a more general perspective, I adopt the idea that both interfaces (LF and PF, including the insertion of phonological/morphological forms) make a maximal use of syntactic information. While for LF this idea has generally been accepted within the minimalist inquiry, the effect of syntactic configurations for PF has been subject to much dispute. Here, I adopt the approach that lexical (phonological/morphological) insertion takes place after the syntactic derivation (advanced by Halle & Marantz 1994; for an interesting alternative see Caha 2007, this volume).

These general considerations lead us to the core proposal of this paper. I argue that quantification is a relation of narrow syntax and is therefore expected to have not only semantic but also morphological consequences:

- (4) *wh*-morphology (in English) is licensed by DP-internal quantification in its spell-out position.

In other words, a *wh*-feature gets morphologically visible if it (or the associated NP) is operated on by a DP internal quantifier in the position where this *wh*-feature is supposed to be spelled-out (e.g. in SpecCP). The abstract *wh*-feature itself is indicative of an operator-variable relation in syntax. Thus, it still comes as natural that its presence triggers *wh*-movement. The absence of *wh*-morphology in some apparent *wh*-movement (operator movement) cases (e.g. in *that*-relatives) is then explained by the fact that there is no DP-internal quantification involved.

The article consists of two main sections. Section 2 discusses the data and reveals the relevant empirical pattern. Section 3 proposes a syntactic solution to this pattern. Section 4 is the conclusion of this paper.

## 2. Data

This section presents the following facts: 2.1 *wh*-questions involving *wh*-object and a universally-quantified subject may yield three different interpretations; 2.2 in certain (comparable) relative clauses one of the interpretations is unavailable; 2.3 this seems to generalize to the unavailability of narrow scope readings in the given class of relatives; 2.4 equivalent phenomena have been observed for relatives involving resumptive pronouns; the subsection 2.5 gives a summary.

### 2.1. Three interpretations of *wh*-questions

It is a well-known fact (see e.g. Chierchia 1993; Aoun & Li 2003) that *wh*-questions in which a universal quantifier in the subject position c-commands the *wh*-trace in the object position yield three possible interpretations: an individual interpretation, a pair-list (distributive) interpretation, and a functional interpretation. The readings may be exemplified by giving possible answers to the question in (5).

- (5) Which man did every woman invite?
- |  |              |
|--|--------------|
| a. Paul.   | [individual] |
| b. Mary invited Paul, Ann invited Steve, Jane invited Mark, etc. | [pair-list]  |
| c. Every woman invited her husband.                              | [functional] |

At least to some extent, the ambiguity may be seen as following from scopal interactions between the constituents *every woman* and *which man*. Thus, the individual reading (5a) is derived when the *wh*-phrase is interpreted scopally specifically ( $wh > \forall$ ), whereas the readings in (5b) and (5c) are derived from the opposite scope ( $\forall > wh$ ). Under a variant of the copy-theory of movement, the scope ambiguities are generated automatically (there is a copy of *which man* in the complement position of *invite*) and thus we do not have to postulate quantifier raising in this case.<sup>1</sup> In fact, a solution based on quantifier raising seems undesirable because we would have to account for its unavailability in questions where the Q-*wh* positions are inverted (see Chierchia 1993 for discussion):

- (6) Which man invited every woman?

Question (6) has only the individual reading, presumably because there is no licit LF representation where  $\forall > wh$ . Without going into details, I will assume here that the universal quantifier in questions can stay in-situ at LF (or at least does not raise high enough so as to take scope over the subject).

## 2.2. *Wh*-relatives lack the pair-list reading

A more intricate state of affairs can be observed in relative clauses. While *that*-relatives produce exactly the same pattern as questions, *wh*-relatives disallow the pair-list reading; observe the contrast between (7) and (8).

- (7) The man **that** every woman invited, namely...
- Paul.
  - Paul in case of Mary, Steve in case of Ann, etc.
  - her husband.
- (8) The man **who** every woman invited, namely...
- Paul.
  - \*Paul in case of Mary, Steve in case of Ann, etc.
  - her husband.

In the preceding section I suggested that pair-list readings and functional readings may both be attributed to the fact that the universal quantifier scopes over the *wh*-phrase. However, *wh*-relatives bar only one of these narrow-scope readings, namely the pair-list reading. Thus, there must be an additional difference between the syntactic representation of the two. Consider the following example:

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<sup>1</sup> Technically, the universal quantifier enters into a scope-relation either with the variable produced by the *wh*-movement or with a default existential closure, which binds (a part of) this variable and is located somewhere in the sub-subject domain (VP).

- (9) Q: Which book did everyone read?  
A: His own book.

Following Chierchia (1993) and others, I suggest that the functional reading, illustrated by a question-answer pair in (9), is represented as follows. The *wh*-phrase *which book* denotes a functional variable  $f(x)$  from individuals to individuals, e.g. *x's own book*, i.e. a function, which assigns individuals to books of their own. The functional variable is bound by the *wh*-operator and therefore what we really ask about is the identity of the function and not of the individual himself. The argument of this function  $x$ , an individual variable, is bound by the universal quantifier.

In order to keep the functional and pair-list reading apart, I do not take the pair-list reading to be a subcase of a functional reading (cf. Engdahl 1986) and will further assume that it is a simple case of narrow scope reading, where no functional variable is in play.

Now, we can reformulate our problem in the following terms: the narrow-scope reading is barred in relatives if a *wh*-determiner is used unless there is a functional variable present. This problem will be resolved by the analysis proposed below (see section 3.5 in particular).

For the sake of completeness, I should mention that the *wh*-determiner in relative clauses is not the only trouble-maker for the pair-list reading. As noted by Honcoop (2000), the same effect is observed in relative clauses with an indefinite external determiner.<sup>2,3</sup> These are his examples (Honcoop 2000:170–171):

- (10) Which book did every politician read?  
a. individual reading (everybody read a specific b)  
b. pair-list reading (X read b1, Y read b2, etc.)  
c. functional reading (X read X's b, Y read Y's b, etc.)
- (11) There is a (certain) book that [/which] every politician read, namely...  
a. individual reading  
b. \*pair-list reading  
c. functional reading

The following example (one of my own) shows that the same holds for indefinite (bare) plurals:

- (12) There are books that/which every politician read, namely...  
a. individual reading  
b. \*pair-list reading  
c. functional reading

Obviously, (11) and (12) are not reducible to the constraint associated with the *wh*-determiner because the same effect arises when a *that*-relative is used, as in Honcoop's examples. I believe that it is descriptively adequate to say that relatives with an indefinite external determiner, e.g. (11), pattern with *wh*-relatives with a definite external determiner, e.g. (8), as opposed to *that*-relatives with a definite external determiner, e.g. (7). More evidence is given in the following section.

<sup>2</sup> Honcoop attributes this property to relative clauses in general (using examples with indefinite determiners). As we see here, this is not the whole truth.

<sup>3</sup> The term 'external determiner' refers to the determiner associated with the surface position of the head.

To the best of my knowledge, there is no explanatory account of this interesting contrast (Honcoop does not discuss the nature of this contrast, focusing on the functional reading and its (un)availability under extraction out of weak islands). At this point, I do not have an explanation of my own. In the following section, however, I will use this kind of relatives in order to emphasize the empirical generalization.

### 2.3. When narrow scope is barred

The preceding sections provided us with the following descriptive pattern:

- (13) a. Which books should every student read? (wh >  $\forall$ ;  $\forall$  > wh)  
 b. ... the books (that) every student should read ( $\exists$  >  $\forall$ ;  $\forall$  >  $\exists$ )  
 c. ... the books which every student should read ( $\exists$  >  $\forall$ ; \* $\forall$  >  $\exists$ )  
 d. ...  $\emptyset$  books that/which every student should read ( $\exists$  >  $\forall$ ; \* $\forall$  >  $\exists$ )

Questions pattern with *that*- or *0*-relatives<sup>4</sup> and *wh*-relatives pattern with relatives with an indefinite external determiner. In the present section we provide some more evidence in favor of the descriptive generalization for relative clauses in (13b–d).

Carlson (1977) observed that there are some relative clauses which force a definite external determiner and at the same time cannot involve a *wh*-determiner. These kinds of relative clauses have a special interpretation and denote e.g. amounts, degrees, or kinds. They have further been discussed e.g. in Safir (1982), Heim (1987), and most recently and very extensively in the work by Alexander Grosu (see Grosu 2002 for overview and references). Summarizing this literature would lead us far astray. I will provide here only a number of cases which support the generalization in (13).

The relevant cases, respectively illustrated below, are the following: (i) relativization out of *there*-constructions, i.e. maximalizing relativization in the sense of Grosu & Landmann (1998); (ii) predicate relativization; (iii) cases where the relative clause forms a comparison class to a superlative contained in the head; (iv) some cases of relativization of objects of idioms.

(14) Let us play with the/\* $\emptyset$  cards that/\*which there are on the table.

(15) Peter is not the/\*an idiot that/\*which we took him for.

(16) Anna Karenina is the/\*a best book that/\*which I've ever read.

(17) The/\*a headway that/\*which we made yesterday is astonishing.

Putting any alternative partial explanations aside (e.g. that superlative DPs cannot be headed by an indefinite determiner anyway<sup>5</sup>), we may ask what the examples (14) through (17) have in common. Notably, they all involve an indefinite or non-specific (and plausibly both) DPs in

<sup>4</sup> I suppose English *that*-relatives and *0*-relatives behave alike in the relevant respects and therefore I do not always give examples of both.

<sup>5</sup> By the way, we may reverse the explanation: a superlative DP must have a definite determiner because it always involves some kind of a relative clause, or more neutrally, a comparison-class which may be analyzed as a (reduced) relative clause. This seems to be a natural conclusion taking into account that the only indefinite superlatives are so-called 'elatives', which lack a comparison-class (*she is a most beautiful young woman*).

the target of relativization. The existential construction in (14) is the best-known instance of a context observing definiteness effects. Predicates as in (15) denote properties and as such must be expressed by indefinite DPs. The comparison class in (16) talks about (any) books specified only by the fact that I read them. Objects in idiom structures, as in (17), mostly do not have referential qualities, rather they are semantically fully dependent on the verb that heads them. From this perspective, they are non-specific.

A standard treatment of indefinites (dating back to Heim 1982; Kamp 1981) is that they lack any quantificational power and represent ‘open’ properties which are to be ‘closed’ by a c-commanding quantifier. Here I will make the rather common assumption that the quantifiers which quantify over the indefinite DPs in (14) through (17) are closely related to the verbal projection and are therefore rather low in the structure. If we were to express this in terms of scope, we could say that these quantifiers obligatorily take narrow scope.

To sum up, a *wh*-determiner and an indefinite relative external determiner force a wide-scope reading of the relative head within the relative clause. This state of affairs calls for explanation.

#### 2.4. Resumptives

In the preceding sections I discussed a rather mysterious property of *wh*-determiners (as opposed to ‘null operators’) in English relative clauses and I concluded that it forces a wide-scope reading. Before I turn to the analysis, I will show that there is another relativization strategy with exactly the same consequences for interpretation, namely resumption. It is well-documented in the literature (e.g. Sharvit 1999; Bianchi 2004) that resumptive pronouns force a specific reading on the relative head within the relative clause. To keep the picture nice and tidy, I will use analogous data to the ones presented above.

Czech is one of the languages where a resumptive pronoun bearing a structural Case (accusative for our purposes) alternates with a gap. Observe the following examples, which are analogous to the ones in (15) through (17) (there is no analogy to (14) because Czech lacks existential constructions and standard examples of definiteness effects).<sup>6</sup>

- (18) a. \*Petr není takový idiot, co ho za něj měli.  
 Petr is not such idiot COMP him for him(RES) had.3PL  
 ‘Peter is not the idiot who they took him for’  
 b. Petr není takový idiot, za jakého ho měli.  
 Petr is not such idiot for who(REL.PRON.) him had.3PL  
 ‘Peter is not the idiot (that) they took him for’
- (19) a. Anna Karenina je nejlepší kniha, co jsem (\*ji) kdy četl.  
 Anna Karenina is best book COMP AUX.1SG her(RES) ever read  
 ‘Anna Karenina is the best book that/which I’ve ever read’
- (20) a. ten hold, co jsme (\*ho) vzdali padlým vojákům  
 the tribute COMP AUX.1PL him(RES) paid dead soldiers  
 ‘The tribute that we paid to the dead soldiers’

<sup>6</sup> Unfortunately, I did not find a felicitous example with a structural accusative for the case of predicate relativization. Thus, there is no minimal pair available as in the other two cases. Still, the relevant contrast may be observed between resumptives and another kind of gap relativization, as illustrated in (18).

Example (18) shows that predicate relativization cannot involve resumption; (19) makes the same point for comparison-class relatives, and (20) for the relativization of (non-specific) objects of idioms. All of these contexts require a gap in the target of relativization.

The situation is similar in the case of interacting quantifiers. While gap relatives enable a narrow reading of the head within the relative clause, resumptive pronouns always force a wide scope with respect to a universal quantifier.<sup>7,8</sup>

- (21) Přemýšlel jsem o těch knížkách, co by každý student měl přečíst.  
 thought AUX about the books COMP AUX every student had read  
 ‘I thought about the books that every student should read.’  
 ( $\exists > \forall$ ;  $\forall > \exists$ )

- (22) Přemýšlel jsem o těch knížkách, co by je každý student měl přečíst.  
 thought AUX about the books COMP AUX them(RES) every student had read  
 ‘I thought about the books which every student should read.’  
 ( $\exists > \forall$ ;  $*\forall > \exists$ )

There is one more thing to check in order to get a near-perfect analogy between resumptive pronouns and *wh*-determiners in English, more precisely an analogy concerning their syntactic and semantic behavior. At the beginning of section 2.2 we saw that *wh*-determiners disallow the pair-list reading but keep the functional reading intact, presumably when the syntactic context allows this reading. As expected, the functional reading is available also with resumptive pronouns.

- (23) Ta žena, co (ji) každý muž pozval, byla jeho manželka.  
 the woman COMP her(RES) every man invited was his wife  
 ‘The woman every woman invited was his wife.’

Sharvit (1999: section 3.2), following the observations of Doron (1982), gives analogous examples from Hebrew.

- (24) Ha-iSa Se kol gever hizmin (ota) hayta iSt-o.  
 the-woman COMP every man invited her(RES) was wife-his  
 ‘The woman every woman invited was his wife.’

The examples above show that both resumptive pronouns and gaps can be read functionally in Czech and Hebrew. Importantly, resumptives (as opposed to gaps) do not allow pair-list readings, exactly as English *wh*-determiners (see Sharvit 1999 for relevant data).

<sup>7</sup> Judging these sentences may be rather delicate for some speakers since there are other things playing a very important role, namely information structure, coded by constituent order in Czech (which is quite free in Czech, a permutation of the three constituents in the relative clause yields six felicitous orders, each of which seems to have a slightly different reading). Nevertheless, there is a contrast between resumption and gaps.

<sup>8</sup> Ourania Sinopoulou (review) informs me that the same pattern is observed in Greek gap/resumptive relatives. On the other hand, the functional reading with resumptive pronouns is less readily available than in Czech or Hebrew (see (23)/(24) below). At the moment, I have nothing to say about this fact.

### 2.5. Summary

The main goal of this section was to show that *wh*-determiners (as opposed to ‘null operators’) in English relative clauses have identical semantic consequences as resumptive pronouns in Czech and Hebrew (and presumably resumptive pronouns in general). These semantic effects may be designated as specificity or wide scope effects; in particular, English *wh*-determiners and resumptive pronouns in Czech and Hebrew force a specific/wide scope reading of the relative head within the relative clause. The picture gets more complicated when we consider English questions, in which the *wh*-determiners freely allow for scope ambiguities. The next section is devoted to solving this contrast.

### 3. Analysis

This section is organized as follows. First I will outline a theory of displacement, as proposed by Boeckx (2003), who captures resumption in terms of stranding (section 3.1). Section 3.2 discusses the head-raising analysis and provides a rather straightforward but novel argument in its favor. Section 3.3 contains the actual proposal regarding the structure of *wh*-phrases (operator phrases) in questions and relative clauses. In section 3.4 I go through the structures under discussion one-by-one and show how the proposed analysis works for the data that have been discussed. Section 3.5 discusses relative clauses involving the functional reading of the operator phrase and provides a syntactic representation yielding the desired semantics. Section 3.6 briefly deals with appositive relativization and Greek relative clauses.

#### 3.1. Movement and resumption as stranding

I adopt a minimalist account of displacement, as proposed in Boeckx (2003).<sup>9</sup> In his theory, movement is represented as a chain containing one or more copies. A chain is unambiguously defined by a set of *occurrences* in the technical sense of Chomsky (2000:115), where an occurrence of  $\alpha$  is the sister of  $\alpha$ . To give a simple example, the structure in (25a) contains a chain defined by the set in (25b);  $\langle x_n \rangle$  will be the notation of an unpronounced copy where  $n$  is the identification of a chain (copies with the same  $n$  belong to one chain).

- (25) a. [<sub>CP2</sub> who<sub>1</sub> did Peter say [<sub>CP1</sub>  $\langle$ who<sub>1</sub> $\rangle$  that he [<sub>VP</sub> loves  $\langle$ who<sub>1</sub> $\rangle$ ]]]?  
 b. CH(*who*) = {C1', C2', V} = {did, that, loves}

On the standard assumption that *did* as well as *that* in (25a) appears in C, they are the sisters of the matrix and intermediate SpecCP positions (ignoring bar-levels). Thus, a standard example of successive cyclic A-bar movement produces a chain defined by a set of three occurrences in this case. Furthermore, every chain contains a *strong occurrence* (designated by \*), corresponding to a head containing an EPP-feature. The major point of Boeckx's proposal is that a chain can have one strong occurrence at maximum: the *Principle of Unambiguous Chains* (PUC). The chain in (25b) is therefore properly restated in (26).

- (26) CH(*who*) = {did\*, that, loves}

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<sup>9</sup> An important part of Boeckx's proposal concerns the locality of movement. This matter is rather marginal for the reasoning here so I am not going to discuss it and refer the reader to the original literature.

A strong occurrence bears PF-relevant information, in the sense of pronouncing the copy defined by this occurrence. Thus, a chain containing two strong occurrences would crash (at least) at PF. The ungrammatical question in (27a) involves the chain in (27b).

- (27) a. \*Who did Peter say who that he loves?  
 b. \*CH(*who*) = {did\*, that\*, loves}

In my proposal I extend an idea which is rather implicit in Boeckx (2003). The strong occurrence (EPP) is not only information for PF but also serves to LF. Namely, the copy defined by the strong occurrence has to be semantically ‘relevant’ for the interpretation of the chain. Semantic relevance can be defined in terms of a contribution to the meaning of the XP involved in the chain. For example, a *wh*-movement yields a chain CH(DP), where the DP involved is interpreted as an open variable (and not as a referring expression); scrambling yields a chain in which a DP is interpreted as referentially/scopally specific; contrastive-focus movement creates a presupposition of alternatives to the DP involved.

Note that successive cyclic movement (as in (25) and (27)) is in accord with this approach since the intermediate copy does not contribute anything to the meaning of the chain. In fact, a contrary state of affairs would force us to conclude that every intermediate movement changes the interpretation of the chain, which is intuitively nonsensical. Note that I do not claim that the intermediate copy is not present at LF, e.g. for the purposes of scope and/or binding (arguably, it can be bound and it can bind). Of course, this is a semantic contribution in a sense, however, only with respect to other elements in the structure.<sup>10</sup>

Let us now see what such an assumption gives us. Boeckx notes that there seems to be a correlation between the availability of resumption and (perhaps long) scrambling within a language. Note that resumption and scrambling also share the basic semantics: they produce specific readings.<sup>11</sup> Translated into the theory of chains just outlined, we can represent scrambling as a chain CH(DP) which is interpreted as specific at LF. Such a chain is defined by a strong occurrence located somewhere higher than the subject position. Now, because this chain has been ‘closed up’ by a strong occurrence, it cannot be ‘meaningfully’ extended anymore (it cannot contain another strong occurrence). But this is exactly what needs to be done in the case of relativization, which arguably involves a chain containing a (strong) occurrence in SpecCP; in other words, there must be a relative operator related by a movement-like relation with the base position (the position of the argument variable). These assumptions yield the following representation of resumptive relative clauses (to be modified below):

- (28) NP<sub>HEAD</sub> [CP-REL whP<sub>2</sub> [... [D <whP<sub>2</sub>>]<sub>1</sub> [... <[D [whP]]<sub>1</sub>> ...]]

The relative operator is generated as a ‘big DP’, for our purposes an operator whP headed by an abstract determiner D. This structure undergoes scrambling and produces a chain, call it

<sup>10</sup> See Rizzi (2006) for a compatible view. He claims that “Intermediate positions are not assigned special interpretive properties; nevertheless, they are visible at the interface level [...]” (p. 107).

<sup>11</sup> Ourania Sinopoulou (review) points out that Greek may be a problem for the present assumption (namely that scrambling is a prerequisite for resumption) since the availability of scrambling in Greek has been questioned. Furthermore, even if Greek DPs can scramble, the semantic effects of such a process is unclear since also indefinite DPs can be involved (Alexiadou 1997; 1999). I believe that the present analysis is saved if such scrambled indefinite DPs in Greek outscope a universal quantifier in subject.

CH<sub>1</sub>(DP).<sup>12</sup> Because this chain already contains a strong occurrence, it cannot be extended any further. But there is a strategy that can save our derivation/representation. When the D-layer is stranded and only whP moves we create another chain, CH<sub>2</sub>(whP). We end up with a structure involving two separate chains, each containing one strong occurrence, as required by the PUC. Thus, stranding is one of the strategies of ‘disambiguating chains’ (in Boeckx’s terminology), i.e. avoiding chains with more than one strong occurrence.<sup>13</sup>

In this section I set the theoretical background which accounts for displacement phenomena and their semantic effects in general. The following section will give the background for analyzing relative constructions in terms of movement of the relative head.

### 3.2. Head-raising for relative clauses

I adopt a version of head-raising analysis for relative clauses which most closely resembles the one of Bianchi (1999; 2004). (29b) provides a simplified analysis of an English restrictive relative clause in (29a). For the purposes of illustration, the clause involves a zero complementizer and a zero relative determiner:

- (29) a. the woman I love  
 b. [DP the [CP-REL woman<sub>1</sub> [TP I love <woman<sub>1</sub>>]]]

The NP head of the relative clause *woman* is generated in the argument position within the relative clause and then it is ‘raised’ to SpecCP, its ‘surface position’. The whole CP is selected by an external determiner *the*.

The head-raising analysis has mostly relied on arguments based on reconstruction phenomena, i.e. examples where the DP/NP head of the relative clause (along with its subparts) must be interpreted within the relative clause itself (for a nice overview of the relevant discussion and references see Bianchi 2002a; 2002b). Here, I am not going to discuss this in detail. Let me just provide a novel argument in favor of the raising analysis, one which does not rely on reconstruction (for other arguments of the non-reconstruction kind see Zwart 2000).

Since Chomsky (1977) it has been standard to treat relative clauses and questions alike because both arguably involve *wh*-movement. If this is correct then we have an empirical point where the head-external and head-raising analyses make different predictions. The head-external analysis predicts that the *wh*-movement in relative clauses is like *wh*-movement of simple *wh*-phrases in questions (like *Who did you meet?*). The head-raising analysis predicts the opposite — the *wh*-movement in relatives should resemble the *wh*-movement of complex *wh*-phrases (like *Which man did you meet?*). There is a well-known test where the complexity of a *wh*-phrase appears to play a role, namely extraction out of weak islands. Note that only complex *wh*-phrases are fully felicitous if extracted out weak islands.

- (30) a. Which book do you wonder whether I read yesterday?  
 b. ??What do you wonder whether I read yesterday?

<sup>12</sup> I will make no strong claims about what projection is targeted (below I label it ‘XP’). As far as I can see, this is a non-trivial and plausibly language-specific issue. For Czech, this movement could correlate with clitic-movement—perhaps a movement to a Topic projection.

<sup>13</sup> The other strategy is agreement (in a technical sense) between two strong occurrences. Note that this requires the PUC to have a subcondition. I do not need to use this here.

Importantly, *wh*-movement in both kinds of relative clauses that we have discussed patterns with the movement of complex *wh*-phrases.

- (31) a. The book which you wondered whether I read yesterday  
 b. The book that you wondered whether I read yesterday

Some people argue that this is not a DP-complexity matter but rather a semantic/pragmatic effect called ‘D-linking’ (cf. Pesetsky 1987). I believe these two views are not incompatible; it has been argued that D-linking may semantically be represented as an existential presupposition, which in turn may stem from the presence of an NP in syntax (cf. Reinhart 1992).<sup>14</sup>

The syntactic argument may be supported by a lexical/morphological one. Namely, if relative clauses involve a full NP in the target of relativization then we expect the *wh*-word (if it is used at all) to resemble an interrogative *wh*-word from complex *wh*-phrases. In Czech, this is indeed the case. Note that if we use the *wh*-word normally occurring in simple *wh*-phrases, it leads to ungrammaticality.

- (32) a. Kterému vtipu jste se smáli?  
 which joke AUX REFL laugh  
 ‘Which joke did you laugh about?’  
 b. Čemu jste se smáli?  
 what AUX REFL laugh  
 ‘What did you laugh about?’
- (33) Ten vtip, kterému/\*čemu jsme se smáli...  
 the joke which / what AUX REFL laugh  
 ‘The joke that we laughed about’

The situation in English is more intricate. Even though it makes use of interrogative *wh*-forms for expressing relativization, the relation between interrogative and relative pronouns is not as straightforward as in Czech. Consider the following paradigm.

- (34) a. **Who** did you invite?  
 b. **What** did you read?
- (35) a. **Which** student did you invite?  
 b. **Which** book did you read?
- (36) a. The student **who** we invited cannot come  
 b. The book **which** we read is not bad

It is often noted that the head-raising analysis makes a wrong prediction concerning the morphological form of the [+human] relative pronoun; the *wh*-determiner heads a full NP and thus one can expect it to match the interrogative pronoun in complex interrogative *wh*-phrases. However, note that the same objection holds against the head-external analysis as well. If the

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<sup>14</sup> There will be more non-terminological use of ‘D-linking’ in this paper (see the following section). For the sake of completeness, let me refer to yet another analysis of D-linking, which was pointed out to me by Ourania Sinopoulou (review), namely Hirose (2003).

*wh*-determiner in relatives does not head an NP, we expect it to surface in the same way as in questions with simple *wh*-phrases. This is indeed the case for [+human] heads but it fails to account for all the others since *which* can never stand without an NP in questions.

English morphology therefore does not seem to provide good grounds for deciding the raising vs. external matter. For both analyses, there are more or less plausible technical solutions.

### 3.3. *Head-raising as another instance of stranding and generalized 'big DP'*

Let us now turn to the main proposal of this paper. Note that it is just a small (rather technical) step from the structure proposed in (28) for resumptive relatives to a head-raising structure. Observe the following derivation.

(37) [<sub>CP-REL</sub> NP<sub>3</sub> [<sub>wh</sub> <[NP]<sub>3</sub>>]<sub>2</sub> [<sub>XP</sub> ... [D <[<sub>wh</sub> [NP]]<sub>2</sub>>]<sub>1</sub> [<sub>TP</sub> ... <[D [<sub>wh</sub> [NP]]]<sub>1</sub>> ...]]]

A full DP is generated in the argument-/theta-position. The first movement step is a case of scrambling, as discussed above, let us say to a position above the subject, which gives us the scopal specificity w.r.t. a universal quantifier in subject position (thus, XP may be a segment of TP (a case of adjunction) or perhaps a functional layer above TP, plausibly TopP). It is followed by operator (*wh*-) movement to the CP domain, stranding the D-layer. The last step of a resumptive RC derivation is the movement of the head NP to some higher layer within the CP domain, stranding the *wh*-layer.<sup>15</sup> Note that the reasoning concerning the D-stranding above naturally applies to the *wh*-stranding and thus gives a strong semantic motivation for this step. We saw that the resumptive pronoun is stranded because a further movement of the whole DP would yield an illicit chain (a chain with two strong occurrences). I also said that a strong occurrence must have consequences for semantic interpretation. From the analysis in (37) it follows that the *wh*-position in the CP domain is also a strong occurrence (because of the stranding) and therefore it should be an LF interpretable position. In fact, this brings us to the standard semantic analysis of relative clauses where a *wh*-operator in the SpecCP position creates a predicate of the <e, t> type out of an expression denoting a truth value (cf. Heim & Kratzer 1998). Stranding of the *wh*-layer thus follows naturally. The moved NP then intersects (by the rule of predicate modification) with the RC-predicate created by the *wh*-movement.

Now, let us move further on and try to generalize the 'big DP' approach to all relatives involving specificity effects. We should mention that a big DP structure has already been proposed for the so-called D-linked *wh*-phrases in questions (cf. Rullmann & Beck 1998). The presence of a D-projection above the whP seems to be a virtual necessity for some languages, which display definite morphology on *wh*-words (e.g. French or Italian). Therefore, it seems natural to say that there is an equivalent underlying structure even for English interrogative *wh*-phrases that are specific. However, we still need to account for the fact that *wh*-phrases in questions do not have to be interpreted specifically, as opposed to *wh*-phrases in relative clauses. And in fact, as we saw in the descriptive sections above, if we want to obtain the same interpretive possibilities in relatives as in questions, we must not use a *wh*-phrase.

<sup>15</sup> An analogous structure (not involving the scrambling step) is proposed by Bianchi (1999 and her subsequent work) and Zwart (2000).

I propose the following structure for operator phrases<sup>16</sup> whose involvement in the structure yields *wh*-relatives, *that*-relatives, and *wh*-questions respectively:

(38) *Wh*-relatives  
[D [wh [NP]]]

(39) *That*-relatives  
[wh [NP]]

(40) Questions  
[Q [wh [NP]]]<sup>17</sup>

The operator phrase in *wh*-relatives obtains the same structure as the one yielding a resumptive pronoun (cf. (37)). The operator phrase in *that*-relatives does not contain the D-layer and therefore is not confined to be interpreted specifically (or be licensed in a higher position than subject). The operator phrase in questions has essentially the same structure as the one in *that*-relatives; the only difference is the Q-quantifier, which binds the *wh*-variable. Presumably, its only function is to conform to the bijection principle according to which every variable needs to be bound by exactly one quantifier and every quantifier needs to bind exactly one variable. If the literature is right on the point that *wh*-phrases are interpreted as variables in *wh*-questions (thus providing the space for possible answers), then the Q-quantifier is purely formal and has no semantic import (it only allows a licit open-variable interpretation of an XP). Nevertheless, I will argue that it has morphological consequences.

To sum up, we get a desirable difference between *wh*-relatives on the one hand and *that*-relatives and questions on the other: the presence/absence of the D-projection above the whP. If the projection is present, the operator phrase is to be interpreted specifically (in some languages resulting in scrambling). If the projection is absent, scope ambiguities arise.

Let us now turn to the explanation regarding the presence of the *wh*-morphology in *wh*-relatives and its absence in *that*-relatives. Note that I treat quantification (of Q and D for our purposes) as a relation in narrow syntax. I have already suggested that apart from having a clear semantic import (specificity), quantified expressions (NPs) are also sensitive to some syntactic processes (scrambling). Under the general view of language faculty which I briefly touched upon in the introduction, we expect quantification to have some PF (morphological) consequences as well. I propose the following principle concerning the realization of *wh*-morphology:

(41) *wh*-morphology must be licensed by DP-internal quantification in its spell-out position.

In other words, there must be a quantifier in the upper DP-layers which c-commands the *wh*-projection in the position where it is expected to be realized (e.g. in SpecCP). Technically, this is achieved by any mechanism that relates heads within an extended projection (e.g. overt/covert head-movement). Such an approach gets support from the fact that there are a number of quantifying indeterminate DPs which involve *wh*-morphology:

<sup>16</sup> I will use the ‘operator phrase’ as a convenient term covering all kinds phrases which *wh*-move to SpecCP in questions and relative clauses. Note that I accept the head-raising analysis and the operator phrase is therefore a full DP also in relative clauses.

<sup>17</sup> An equivalent structure would hold for simple *wh*-words (like *what* in English), where the NP position would be a set of abstract  $\phi$ -features, potentially determining the form of the *wh*-word.

- (42) a. who-ever, what-ever, which-ever, where-ever, when-ever, how-ever, etc.  
 b. \*every-who, \*every-what, \*every-which, every-where, \*every-when, \*every-how, etc.  
 c. \*some-who, some-what, \*some-which, some-where, \*some-when, some-how, etc.
- (43) ně-kdo, ně-co, ně-který, ně-kde, ně-kdy, ně-jak, etc.  
 some-who, some-what, some-which, some-where, some-when, some-how

Some of these non-interrogative *wh*-words seem quite productive (as in (42a)); some are quite exceptional (42b); some involve semantic shifts (42c). The Czech examples in (43) display a productive pattern (analogous to (42a)) where an existential quantifier expressed by the prefix *ně-* unexceptionally selects a *wh*-word.

An approximate analysis of the productive pattern in (42a) may be as follows (I ignore word-order complications):

- (44) [ever [wh- [(NP)]]]

The (universal/definite) quantifier *ever* heads a *wh*-phrase and arguably quantifies over it, cf. Tsai (1994). We can see that the structure in (44) is identical to (38), i.e. the one proposed for *wh*-relatives. Importantly, there is also a syntactic parallel between these two, since the quantifiers in (42a) (as opposed to free choice DPs like *anyone*) necessarily involve a relative clause, namely a free relative:

- (45) a. I am ready to meet whoever \*(comes to the party).  
 b. I am ready to meet anyone (who comes to the party).

Note that in the light of the principle (41), it is the quantifier itself, i.e. *ever* in English or *ně-* in Czech, which forces the *wh*-morphology to be realized.

If the arguments above are on the right track, we have another reason to accept the big DP for *wh*-relatives: not only is it needed for deriving the correct semantics but also the *wh*-morphology, which arises because of the interaction with the c-commanding quantifier, an abstract definite determiner.

What happens in *that*-relatives? As I proposed in (39), they involve a *wh*-projection as well. In the preceding section we saw that this projection enables the operator DP to raise into a SpecCP position where it semantically transforms the proposition into a predicate. However, this *wh*-projection is not headed by a quantifier of the (38)/(44) type and therefore it does not get morphologically realized.

For questions, represented in (40), it seems straightforward that the Q-quantifier bears the responsibility for realizing the *wh*-morphology. From this it follows that in languages where no *wh*-morphology is present (i.e. where *wh*-words are morphologically identical to indefinites, e.g. in Chinese or Japanese), there is no DP-internal Q-quantifier and indefinites are quantified at distance, presumably through unselective binding from the C-position (Cheng 1997).

Note that this analysis of *wh*-phrases in questions can be made compatible with the big DP analysis for D-linked *wh*-phrases, as suggested above. On the assumption that a variable may

be quantified over (modified) more than once (as argued for e.g. by Kratzer 2005),<sup>18</sup> then nothing seems to prevent us from assigning the D-linked *wh*-phrases the following structure.

- (46) Questions with D-linked *wh*-phrases  
[D [Q [wh [NP]]]]

Below I show that this structure neatly explains some phenomena related to resumption in questions.

### 3.4. Applying the analysis

In this section I show that the analysis proposed above derives the correct results for all kinds of constructions discussed.

First, consider the structural difference between resumptive relatives of the Czech/Hebrew type ((47a) is identical to (37)) and *wh*-relatives of the English type (47b).

- (47) a. [<sub>CP-REL</sub> NP<sub>3</sub> [wh <[NP]<sub>3</sub>>]<sub>2</sub> [<sub>XP</sub> ... [D <[wh [NP]]<sub>2</sub>>]<sub>1</sub> [<sub>TP</sub> ... <[D [wh [NP]]]<sub>1</sub>> ...]]]  
b. [<sub>CP-REL</sub> NP<sub>2</sub> [D [wh <[NP]<sub>2</sub>>]]<sub>1</sub> [<sub>TP</sub> ... <[D [wh [NP]]]<sub>1</sub>> ...]]

Note that the underlying representation of the *wh*-phrase and the resumptive pronoun is identical (as proposed) in the argument position. The difference is in the missing movement (scrambling) in the case of English *wh*-relatives. The absence of a scrambling type of movement in English is hardly surprising. Consequently, there is nothing to strand in the lower position and the whole complex D-*wh*-NP moves directly to SpecCP. Note that the motivation for this movement lies in the *wh*-projection (it is a *wh*-chain), the D-layer is simply pied-piped along. Next, as the NP moves in order to become the argument of the sentential predicate, the *wh*-projection is stranded (together with D), exactly as in (47a).

Now, we can see that the *wh*-projection is headed by a quantifying D-head in (47b) but not in (47a). This configuration, in connection with the principle (41), gives us the correct result as for the morphological realization of the CP-domain: while resumptive relatives are introduced by an invariable complementizer, *wh*-operator relatives are introduced by a pronominal-like *wh*-determiner (possibly reflecting  $\phi$ -features of the NP which it heads). It follows straightforwardly that *wh*-pronominals should be complementary with resumptive pronouns. As far as I know, this seems to hold for (restrictive) relative clauses but it does not hold for questions. Sharvit (1999: 594ff.) gives a Hebrew example of a question, given in (48), where a gap after *wh*-movement may alternate with a resumptive pronoun. It is significant that if the resumptive pronoun is present the pair-list reading disappears (and the functional is retained), exactly as in corresponding relative clauses (recall the discussion in section 2.4).<sup>19</sup>

- (48) Ezyo            iSa        kol        gever    hizmin    (ota)?  
      which-FEM.(SG) woman every man    invited her(RES-3SG.FEM)  
      ‘Which woman did every man invite?’

<sup>18</sup> Kratzer argues that a class of quantifiers modifies the properties of the set denoted by the variable (determiners) and another class determines its referential/quantificational properties (true quantifiers). This would require a more detailed specification of the bijection principle.

<sup>19</sup> I remain silent about the problem why some languages use resumption only in relatives but not in questions (as in Slavic languages). De Vries (2002) has an account of this but he fails to note that resumption in questions is actually attested in some languages so his account turns out to be too restrictive.

How can we explain the double  $\varphi$ -feature marking in Hebrew resumptive questions, given our current analysis? In fact, it follows straightforwardly from the structure proposed in (46). Consider the following derivation.

(49)  $[_{CP-Q} [Q [wh [NP]]]_i [_{TP} \dots [D <[Q [wh [NP]]]_i>] \dots]]$

Suppose that as the D-linked *wh*-phrase moves to SpecCP it leaves its (structurally highest) D-layer behind, similarly as in the cases described above. The stranded D is realized as a resumptive pronoun but the *wh*-word in SpecCP is still headed by a Q-quantifier which renders the *wh*-morphology active. If the *wh*-morphology in the given language obligatorily displays  $\varphi$ -features (as in Hebrew) then the result is expected.<sup>20</sup>

Let us return to a question involving a non-D-linked *wh*-phrase, i.e. the representation in (40)— $[Q [wh [NP]]]$ . We correctly predict that no resumptive pronoun surfaces, as in English:

(50)  $[_{CP-Q} [Q [wh [NP]]]_i [_{TP} \dots <[Q [wh [NP]]]_i> \dots]]$

The last case to discuss is represented by English *that*-relatives or by gap relatives with an invariant complementizer in Czech, i.e. the ‘poorest’ structure, given in (39) —  $[wh [NP]]$ . The derivation looks as follows:

(51)  $[_{CP-REL} NP_2 [wh <[NP]_2>]_i [_{TP} \dots <[wh [NP]]]_i> \dots]]$

Because the *wh*-projection is not headed by a quantifier, the *wh*-morphology remains unrealized. As a consequence, the CP-domain contains an invariant complementizer.<sup>21</sup>

To sum up, I argued that the grammar provides us with the following fine-structured operator DPs:

- (52) a.  $[wh [NP]]$  gap-relatives introduced by an invariant complementizer  
 b.  $[D [wh [NP]]]$  gap-relatives introduced by a pronominal, or resumptive relatives  
 c.  $[Q [wh [NP]]]$  gap-questions  
 d.  $[D [Q [wh [NP]]]]$  questions with resumptives or *wh*-words with definite morphology

The following sections extend the analysis in order to account for the behavior of relatives which involve the functional reading of the operator phrases and some phenomena concerning appositive relative clauses.

### 3.5. Functional readings

So far, my analysis addressed only the distinction between the individual and the pair-list reading. I argued that the difference between these two is basically one of scope: in the

<sup>20</sup> The derivation in (49) provides us with another prediction: if a language marks D-linking directly on the *wh*-word (as in Romance languages), it follows that the D-layer moves up with the *wh*P and consequently there should be no resumptive pronoun. This could be tested on a language which allows both resumption and definiteness marking on *wh*-expressions. I am not aware of such a language.

<sup>21</sup> This result is slightly blurred by the fact that in some Slavic languages (Czech, Polish) the invariant complementizer, being different from a declarative complementizer, has a *wh*-form, namely *co* ‘what’. This suggests that the principle (41) could be restated in terms of  $\varphi$ -features (or  $\varphi$ -marked *wh*-words).

individual reading the operator phrase receives a (scopally) specific interpretation; the pair-list reading, on the other hand, is derived by interpreting the operator phrase in its narrow-scope position, which is impossible if the D-head is present.

As suggested in section 2.2, relatives involving a functional reading are ambivalent in a way: semantically, they behave like relatives with the pair-list reading because the individual variable is bound by a universal quantifier in the subject position, however, from the morphological viewpoint, they may resemble relatives with the individual reading, i.e. they allow resumptives and *wh*-operators. How can this seeming paradox be resolved?

Recall the standard semantic analysis of the functional reading: the NP is reinterpreted as a function which relates individuals with individuals. So *which man* (as in example (55) below) is interpreted as a function which relates men with some other individuals, e.g. their wives. Then what we really ask about or what we relativize (generally, what is bound by the *wh*-operator) is the function and not the individual variable, which in turn remains available for being bound by the universal quantifier. How can we implement this semantic analysis in the syntax? Apparently, there is more structure involved in the functional reading than in the individual or pair-list readings. I propose that the structure of an operator phrase which is assigned the functional reading is as follows:

(53) [D<sub>ARG</sub> [wh [F [NP]]]]

I suggest that F is a functional head which transforms the NP into a function (from individuals to individuals). D<sub>ARG</sub> is then the individual variable which serves as the argument for the function FP (assuming, as above, that the *wh*-projection is semantically vacuous). A derivation of a relative clause involving the operator phrase in (53) looks as follows:

(54) [CP-REL [F [NP]]<sub>2</sub> [wh <[F [NP]]<sub>2</sub>>]<sub>1</sub> [TP ...  $\forall_i$  ... [D<sub>i</sub> <[wh [F [NP]]]<sub>1</sub>>]...]]

The structure in (54) is a representation of a relative clause, illustrated e.g. in (7c), here repeated as (55).

(55) the man that every woman invited, namely her husband

Note that the D<sub>ARG</sub>, which represents here the individual variable, is stranded in its base position and is thus available for the binding by the universal quantifier. The functional operator phrase raises into SpecCP and ‘opens’ the proposition which subsequently takes the FP as its argument. This relative clause derivation is parallel to the one proposed in 3.4.

Now, note that nothing in principle prevents us from assuming that the function (functional variable) FP may be specific. The structure of a specific functional operator phrase looks as follows:

(56) [D<sub>ARG</sub> [D<sub>SP</sub> [wh [F [NP]]]]

In (56) D<sub>SP</sub> refers to a determiner with specificity features. I assume that the resulting D<sub>SP</sub> ‘inherits’ the functional reading and still requires the presence of an argumental D. The structures below show how a resumptive relative and a *wh*-relative involving the functional operator phrase are derived:

- (57) a.  $[_{CP-REL} [F [NP]]_3 [wh <[F [NP]]_3>]_2 [_{XP} \dots [_{D_{SP}} <[wh [F [NP]]]_2>]_1 [_{TP} \dots \forall_i \dots D_{ARG_i} <[_{D_{SP}} [wh [F [NP]]]_1 > \dots]]]$   
 b.  $[_{CP-REL} [F [NP]]_2 [_{D_{SP}} [wh <[F [NP]]_2>]]_1 [_{TP} \dots \forall_i \dots D_{ARG_i} <[_{D_{SP}} [wh [F [NP]]]_1 > \dots]]]$

The structures above are underlying representations of the examples (23) and (8c) respectively, both repeated in (58):

- (58) a. Ta žena, co (ji) každý muž pozval, byla jeho manželka.  
 the woman COMP her(RES) every man invited was his wife  
 ‘The woman every woman invited was his wife.’  
 b. the woman who every woman invited, namely her husband

Again, the structures in (57) are completely parallel to those in (47), section 3.4. The individual variable is in both cases bound by the universal quantifier and the specific function yields the same desired morphological results: a resumptive pronoun in (57/58a) and a *wh*-phrase in (57/58b).

In this section we resolved the seeming paradox of functional reading by assuming that the function within the operator phrase may be specific (a ‘big DP’) or non-specific (a ‘bare’ *whP*). Crucially, the specificity of the function does not tamper with the narrow reading of the individual variable, an argument of this function.

### 3.6. Appositive relativization

In this section I address some relevant differences between restrictive and appositive relativization in English and Greek. The defining difference between restrictive and appositive relatives is that the relative clause does not semantically intersect with the head in appositives. Rather, the relative clause only ‘specifies’ the meaning of the head and the *wh*-operator functions as a pronominal anaphor. That is why some appositive relative clauses can be paraphrased as separate sentences containing an anaphoric pronoun. Consider the following paraphrases:

- (59) a. Mary, who I met a year ago, is a good friend of mine.  
 b. Mary is a good friend of mine. I met her a year ago.

This property of appositive relative clauses, namely its affinity to coordination, has been reflected in some analyses, starting with Emonds (1979) and recently proposed by de Vries (2006), who treats appositive relatives as a case of apposition, which in turn is analyzed in terms of ‘specifying coordination’ (see also Koster 2000, who introduced the ‘colon phrase’ as a subcase of coordination).

Let us assume that an analysis based on coordination is on the right track. In such an account we need to capture the fact that the *wh*-phrase is actually a pronominal anaphor. Pronouns are usually analyzed as D-heads (or some reduced DPs). I suppose (with de Vries 2006) that appositive relatives can be represented as a kind of free relative represented as a DP (see also Caponigro 2000), containing a full DP head (again a version of raising), which is anaphorically related to an external head. The external head and the appositive relative are

related by a coordinating head &: and the internal NP head is deleted (if it is identical with the external one).<sup>22</sup>

(60) [D [NP<sub>i</sub>]] &: [D [CP-REL [D [wh [NP<sub>i</sub>]]]<sub>i</sub> [TP ... <[D [wh [NP]]]<sub>i</sub>> ...]]

Note that we end up with a double DP layer at the left periphery of the relative clause: the highest (possibly abstract) D creates a nominal out of a CP and the head in SpecCP has a DP status for reasons discussed above: it behaves as a pronominal anaphor. This structure makes a correct prediction concerning English appositives, which are obligatorily introduced by a *wh*-determiner.<sup>23</sup>

(61) Mary, who/\*that/\*0 I met a year ago, is a good friend of mine.

The reason for this is that the *wh*-projection in SpecCP is obligatorily quantified over by a DP-internal determiner. The principle (41) takes care of the correct morphological realization.

I also make a prediction concerning resumption in appositives. If the relation between the external nominalizing D-head and the internal relative DP-head in SpecCP is as close as some authors assume (Bianchi 1999 argues that the lower D incorporates into the external D), we expect that some interactions between the external D and the relative head in SpecCP are in principle possible. Now, suppose that there is a language which makes use of resumption in appositives. In our approach, this means stranding of the D layer in a scrambling position. We end up with a ‘bare’ whP in SpecCP and therefore the *wh*-morphology should be unrealized. However, there is still an adjacent quantifier, namely the external D, which may, under a slight stretching of the principle (41), cause the visibility of the *wh*-morphology. If this is a correct assumption, we predict the existence of languages where (φ-marked) relative *wh*-operators are compatible with resumptive pronouns in appositive relatives but not in restrictive relatives.

Indeed, Alexopoulou (2006) reports the predicted state of affairs for Greek. Greek has two ways of forming restrictive relative clauses: either there is a relative pronoun in SpecCP, which is then obligatorily associated with a gap (62a), or there is an invariant complementizer, which is associated either with a gap (in structural Cases) or with a resumptive pronoun (in non-structural Cases) (62b). Note that a combination of a relative and resumptive pronoun is ungrammatical in Greek restrictives. The examples come from Alexopoulou (2006:pp. 68–70).

- (62) a. To pedi tu opiu (\*tu) zitises danika ine o yos  
 the kid the who.GEN his.GEN(RES) asked.2SG loan-money is the.NOM son.NOM  
 mu.  
 my  
 ‘The kid you asked to borrow money from is my son.’
- b. To pedi pu \*(tu) danises lefta ine o yos mu.  
 the kid COMP it.GEN lent.2SG money is the.NOM son.NOM my  
 ‘The kid you lent money to is my son.’

<sup>22</sup> Note that this analysis straightforwardly accounts for the fact that appositive relatives may have a full NP head:

(i) Da Vinci Code, which book I’ve read several times, was written by Dan Brown.

<sup>23</sup> As pointed out by Mark de Vries to me, other Germanic languages (Danish, Swedish) have a weaker condition for appositive relatives: as opposed to restrictives, the CP-domain must be phonologically realized, i.e. a complementizer is sufficient. I have no explanation for this state of affairs.

In appositive relatives, however, the relative pronoun can be combined with a resumptive pronoun. Furthermore, resumptive pronouns are obligatory even in structural Cases.

- (63) O        Petros,        ton        opio/pu        \*(ton)        agapo        poli,        me  
       the.NOM Petros.NOM the.ACC    who.ACC/comp him(RES) love.1SG a lot    me.ACC  
       ehi        stenahorisi.  
       has.3SG upset  
       ‘Petros, whom I love a lot, has upset me.’

Notably, Greek can use the invariant complementizer *pu* in appositives, too, which suggests that the relation between the external D and the operator phrase in SpecCP is somewhat weaker than predicted. Still, the contrast between Greek restrictives and appositives can be straightforwardly accounted for by the analysis proposed.

To sum up, the anaphoric properties of relative and resumptive pronouns in appositive relative clauses lead us to postulate an obligatory D-head on top of the operator phrase (an obligatory ‘big DP’ in appositives). This in turn gives us the correct results concerning the morphological realization of these pronominals: they must be overt, either as *wh*-determiners in English or as resumptive pronouns in Greek. Apart from that, I make a correct prediction about the co-occurrence of relative and resumptive pronouns in appositives, as opposed to restrictives.

#### 4. Conclusion

In this paper I argued that operator phrases involving overt *wh*-morphology should be analyzed as phrase-internally quantified expressions. In questions, *wh*-phrases are invariably headed by a DP-internal question-operator and therefore the *wh*-morphology always gets morphologically visible. In relative clauses the relative-operator phrase is subject to referential variability. If specific operator phrases are represented as ‘big DPs’, i.e. *wh*-phrases headed by a specific head D, then the visibility of *wh*-morphology in these cases follows. Non-specific operator phrases, on the other hand, lack the quantificational D-layer and the *wh*-morphology remains unrealized.

The analysis also accounts for some less frequent phenomena, like resumption in questions (Hebrew), or obligatory resumption in appositive relatives, as opposed to restrictive relatives (Greek). Furthermore, I proposed an explicit syntactic analysis of functional readings in questions and relative clauses and showed why functionally-read operator phrases may behave like specific operator phrases morphologically and at the same time like non-specific ones from the semantic viewpoint.

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Radek Šimík  
University of Groningen  
[r.simik@rug.nl](mailto:r.simik@rug.nl)  
<http://www.let.rug.nl/p250477/>

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