Split-DPs, generalized EPP and visibility

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We ask why the following statements hold: (i) the EPP feature associated with C is universal, i.e. visibility is needed; (ii) pied-piping is required when an intervener is present in a split-DP construction; (iii) pied-piping is still possible when no intervener is present. Our main claim is that the visibility requirement in the C domain has a functional role: it ensures that an overt signal is made to the effect that the speaker’s utterance should be interpreted as an information question. Second, the nominal in a split-DP construction must sometimes raise to the left field domain to meet interpretability requirements. Finally, syntax is oblivious to when such movement is needed, and so the grammar leaves this as an available option.

1. Introduction

From a minimalist perspective, split-DP constructions like (1a) are interesting because, a priori, it is not clear why the nominal can also pied-pipe as in (1b).

(1)  a.  [CP Combien, as-tu lu [DP de livres]]?
       how-many have-you read of books

       b.  [CP [DP Combien de livres, as-tu lu s e]]
           how-many of books have-you read-AGR
           ‘How many books have you read?’

The reasoning is as follows: the EPP is a general uninterpretable feature requiring visibility to be erased (Chomsky 2000, 2001). Visibility is (minimally) achieved in the split alternative (1a) by movement of the bare operator. Being uninterpretable, the EPP feature is not accessible to the computation once eliminated. Economy should thus block the pied-piping of the nominal in (1b), since it is not required for convergence. Let us call this the Pied-piping puzzle. We will relate the possibility of pied-piping in (1b) to the fact that scopal elements like negation block the relation between the bare operator and the

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stranded nominal in the split alternative, as the contrast of (2) illustrates (cf. Obenauer 1976, 1983, 1994; Rizzi 1990).

(2) a. \[ ?[CP Combien, n’as-tu pas lu [DP c, de livres]]? \]
    how-many Ňe-have-you not read of books

b. \[ [CP [DP Combien de livres], n’as-tu pas lus c,]? \]
    how-many of books Ňe-have-you not read-AGR

‘How many books have you not read?’

We will argue that the full DP raises to avoid a situation where the Logical Form representation cannot be evaluated. In other words, pied-piping in (1b) and (2b) is semantic Last Resort to avoid crashing at LF. Such reasoning seems well motivated for (2b): pied-piping is the only option. However, this does not tell us why pied-piping should also be okay in (1b), where: (i) pied-piping is not the only option, and (ii) pied-piping is arguably the more costly option. To motivate the pied-piping in (1b), we will argue that syntax is blind to the semantic constraints responsible for the contrast of (2). Thus the grammar allows vacuous movement ‘just in case’. In sum, syntax is flexible enough to cater for the needs of semantics. These ideas are implemented within the framework developed in Butler and Mathieu (2004). This ties a Predicate Logic based semantics to a Minimalist syntax.

The paper is organized as follows. Previous solutions to the Pied-piping puzzle are introduced and rejected in section 2. Then we turn to address the paper’s three central questions: in section 3, we ask why (i) the EPP feature associated with C is universal (or in earlier versions of Minimalism, why the C-related D feature is universally strong, Watanabe 1992, Chomsky 1995); in section 4, we ask why (ii) pied-piping is required when an intervener is present; and in section 5, we ask why (iii) pied-piping is still possible when no intervener is present. With section 6 we conclude the paper.

2. Possible Solutions to the Pied-piping Problem

2.1 Distributed deletion

Let us first consider a solution to the Pied-piping puzzle in terms of partial deletion as advocated by Fanselow and Ćavar (2002) (henceforth F&C). Assuming Chomsky’s (1995) approach to movement, where raising of elements in the phrase-marker leaves copies behind which are subsequently deleted, F&C argue that the deletion operation may affect both copies (hence the term ‘distributed deletion’). F&C claim that this is the best way to account for split-XPs.

Under a strict deletion theory of movement, either the upper or the lower copy deletes. F&C argue that a strict theory cannot be correct, as there are
apparent constructions where both copies are pronounced. For example, there are so-called ‘Copy-constructions,’ where both WH-phrases are spelled out (cf. Hiemstra 1986):

(3) \[ \text{Wer} \text{ denkst du denn [\text{Wer} du bist]}? \]

‘Who do you think you are?’

(Fanselow and Čavar 2002:83)

Moreover, certain resumptive pronouns can be viewed as reflecting the failure of copies of movement to delete completely (cf. Pesetsky 1998, Bianchi 1999, Boeckx 2003, among others). For example, Egyptian Arabic (4) illustrates either left-dislocation or relativisation depending on whether or not the complementizer illi ‘that’ is present (cf. Demirdache 1997).1

(4) \text{il-walad} (illi) \text{ Laylaa çsaafit-uh imbarih def-boy (that) Laila see -him yesterday ‘The boy (that) Laila saw him yesterday.’}

(Demirdache 1997:199)

Accepting such evidence, F&C argue that it is entirely feasible for some, but not all, of the upper copy to delete while similarly some, but not all, of the lower copy deletes. Such an idea seems attractive: it offers a unified account of both PP-extraction as in (5a) (Serbo-Croatian) and noun extraction as in (6a) (German).

(5) a. \[ \text{Na jaki Marek dach kocil]? \]

‘On what kind of roof did Marek jump?’

b. \[ \text{Na jaki dach Marek kocil]? \]

‘On what kind of roof did Marek jump?’

(6) a. \[ \text{Bücher habe ich keine gelesen]. \}

‘As for books, I haven’t read any.’

1 Note that Demirdache’s analysis of resumptive pronouns is rather different from Pesetsky’s and Boeckx’s. On her view a resumptive pronoun is the in-situ counterpart of a null-operator.
(7) and (8) give the derivations for (5a) and (6a) respectively:

(7)  
(a) Marek na jaki dach kocił?
(b) Na jaki dach Marek na jaki dach kocił? (movement)
(c) Na jaki (dach) Marek (na jaki) dach kocił? (distributed deletion)

(8)  
(a) Ich habe keine Bücher gelesen.
(b) Keine Bücher habe ich keine Bücher gelesen. (movement)
(c) (Keine) Bücher habe ich keine (Bücher) gelesen. (distributed deletion)

F&C further suggest that in split-DPs, a DP or a PP is split up in cases where its phonetic material is normally linked to at least two different pragmatic features. On the assumption that focus is checked in a specific position, they argue that the two spread elements split up because the feature that they each bear cannot be checked in the same position. One bears a +WH or a +TOP feature and is checked in a higher interrogative position, while the other carries a Focus feature that is checked in a lower focus position. (9) and (10) illustrate the two options.

(9)  
‘On what kind of roof did Marek jump?’

(10)  
[F+TOP Bücher [+TOP] habe ich [F+Foc keine [+Foc gelesen]].
‘As for books, I haven’t read any.’

In cases where full movement is instantiated, the idea behind F&C’s proposal is that there is only one feature involved, namely the +WH feature for the case of (9) and the +TOP feature for the case of (10).
2.2 Remnant movement

Another possible account for the existence of split-DPs is a remnant movement account (see Starke 2001 and Kayne 2002, for a remnant movement approach to split combien constructions). (11) is an abstract representation of what remnant movement may consist of. First, an element X moves out of a constituent. Second, the whole constituent, which now contains an empty element (i.e. the trace of X), raises to its designated position.

(11) \[ Y e_i \] ... X, e_j

Along these lines, Androutsopoulou (1997) argues that in split adjectival constructions in Modern Greek the nominal raises to a topic position (higher than IP) and then the whole complex containing the trace of the nominal raises to its dedicated position.

A variant of the remnant movement approach (à la Poletto and Pollock 2004) would postulate movement to Spec-CP of combien de livres just like the case of the non-split structure, and then subsequent raising of the whole IP. This is illustrated in (12).

(12) Combien [\[IP as-tu lu e_i\]] de livres, e_j e_i ?

There are good reasons to believe that the remnant approach to split-DPs is not on the right track. In the following section, we give arguments against such an approach. The problems identified will also hold for the distributed deletion analysis.

2.3 Problems with these approaches

There are a number of crucial differences between the split variant and the full movement alternative. We identify six main differences that we dub problems: (i) the scope problem; (ii) the agreement problem; (iii) the adjunct problem; (iv) the thematic ranking problem; (v) the reconstruction problem; (vi) the stress problem. Each of these is a problem, since it is unclear how approaches based on either distributed deletion or remnant movement can account for them.

First, Van Geenhoven (1998) shows that the scope of the split nominal in a split-topic construction is fixed. For example, (13a) shows that the indefinite cannot achieve wide scope over negation. Rather than being unambiguous, (13a) is ungrammatical: einige ‘some’, being a positive polarity item, cannot take scope inside negation. On the other hand, (13b) is ambiguous: Schwarze Spinnen ‘black spiders’ can scope either under or above negation.

(13a) einige as-tu lu e_i en moins-de dece e_i ?

(13b) Schwarze Spinnen as-tu lu combien de livres ?
In addition, the split/partial movement construction in (14a) receives only a
pair-list interpretation, while the full movement construction in (14b) receives
both a pair-list and an individual reading.

(14) a. [CP Schwarze Spinnen, hat Lisa im Keller einige e, black spiders has Lisa in-the cellar some
    nicht gesehen].
    ‘As for black spiders, there are some that Lisa has not seen in the
cellar.’

b. Lisa hat im Keller einige schwarze Spinnen nicht
Lisa has in-the cellar some black spiders not
gesehen.
‘Lisa has not seen some black spiders in the cellar.’
‘There are some black spiders that Lisa has not seen in the cellar.’

With split *combien* constructions, scope interaction with universal quantifiers is
also limited. De Swart (1992) notes that the non-split (15) has two distinct
readings in which (i) the universal scopes over the WH-phrase, and (ii) the WH-
phrase scopes over the universal. Reading (i) asks of each person how many
books they read. This is the pair-list reading: ‘John read 3; Mary, 5; Peter, 7.’ Reading (ii) asks for a single number, i.e. ‘how many books are such that
everyone read them?’ This is the individual reading.

(15) [CP [DP Combien de livres], ont-ils tous lus e,]?
    how-many of books have-they all read-AGR
    ‘How many books have they all read?’ (de Swart 1992: 403)
In contrast, the split construction equivalent (16) has only reading (i). De Swart
calls this a scope island: the WH-phrase is incapable of taking wide scope.

(16)  \[ CP \textit{Combien}, \text{ont-ils tous lu [DP e\textsubscript{i} de livres]}? \]
      how-many have-they all read of books
      ‘How many books have they all read?’ \hfill (de Swart 1992:403)

Second, there is a difference in past participle agreement between the split
variant and the full movement version (on French past participle agreement, see
Obenauer 1983, 1994; Kayne 1989; Déprez 1998). This is illustrated in (17). It
must be noted that there is dialect variation with regard to past participle
agreement in French: not every French speaker accepts agreement. However,
what is clear is that no agreement is possible when the WH constituent is split.

(17)  a.  \[ CP [DP \textit{Combien de boites}], as-tu ouvertes e\textsubscript{i}]? \]
      how-many of cans have-you opened-AGR
      ‘How many cans have you opened?’

b.  \[ CP \textit{Combien}, as-tu ouvertes [DP e\textsubscript{i} de boites]]? \]
      how-many have-you opened-AGR of cans
      ‘How many cans have you opened?’

In a split construction, if the nominal were to raise to the specifier of a topic
position (as suggested by Androutsopoulou 1997), then the nominal would have
to go through the Spec of AgroP (or the outer specifier of vP in more recent
versions of Minimalism), movement being cyclic. But we have evidence against
the nominal moving through Spec-AgroP: no agreement shows up, implying
that the nominal does not raise out of the DP. Aware of this problem, Starke
(2001) claims that \textit{combien} is inherently Case-marked in split \textit{combien}
constructions. Generally, inherent Case does not trigger agreement. But this
claim is strongly stipulative: no independent evidence is given for the idea that
\textit{combien} is inherently Case-marked.

Third, on the distributed deletion account, it remains a mystery why some
PPs can split, but not others. In (18b) extraction of the indirect object à \textit{combien}
‘to how many’ is possible, but in (19b) extraction of \textit{en combien} ‘in how many’
is not (we owe this example to Sophie Heyd).

(18)  a.  \[ CP [PP A \textit{combien de personnes}], as-tu écrit e\textsubscript{i}]? \]
      to how-many of people have-you written

b.  \[ CP A \textit{combien}, as-tu écrit [DP e\textsubscript{i} de personnes]]? \]
      to how-many have-you written of persons
      ‘To how many people have you written?’
If the split alternative is simply the equivalent of full movement, full movement being masked by independent processes made available in the grammar, then these contrasts are not expected. The difference between (18b) and (19b) has to do with differences in thematic relations. What raises in (19b) is an adjunct, whereas it is an argument that raises in (18b) (for other contrasts of this sort in split *combien* constructions and an account of these facts, see Mathieu 2004).

Fourth, whereas direct objects can be split freely, as shown in (20b), indirect objects can be split only if no lower ranked noun (e.g. a theme) is present in the sentence. Compare (21b) and (22b) (see Mathieu 2004 for details).
Fifth, reconstruction phenomena provide us with direct evidence that the nominal in a split construction is not in the Comp area. In (23a) coreference between Jean and the pronoun il is possible (the R-expression is in an adjunct), whereas in (23b) it is not. (23b) is a Principle C violation.

(23)  a. \([\text{CP} \ [\text{DP} \ \text{Combien des tableaux que Jean,} ] \]
how-many of-the paintings that Jean
\text{avait achetés}] \) regrette-t-il avoir resold
had bought-AGR regrets-he have-INF resold-AGR
\]?
\]?

b. *\([\text{CP} \ \text{Il,} \ \text{regrette avoir resold} ] \)
he regrets have-INF resold
\[\text{combien des tableaux que Jean, avait achetés}]? \)
how-many of-the paintings that Jean had bought-AGR
\[\text{que Marie avait achetés}]?
that Marie had bought-AGR
\]?

'How many of the paintings that Jean had bought did he regret having sold again?'

As shown by (24), (23b) is ungrammatical because of the coreference indicated by the coindexation of Jean and the pronoun il, not because the question is unavailable independently:

(24) \([\text{CP} \ \text{Il} \ \text{regrette avoir resold} \]
he regrets have-INF resold
\text{combien des tableaux que Marie avait achetés}]?
how-many of-the paintings that Marie had bought-AGR
\]?

'How many of the paintings that Marie had bought does he regret having sold again?'

As shown by (25), in the split version, coreference between Jean and il is impossible. We take this fact to indicate that the nominal complex is not in the Comp area. Rather, it is in-situ below the VP area (see Cecchetto 1999 for arguments of this sort in defense of a non-remnant movement approach to Clitic Right Dislocation).

(25) *\([\text{CP} \ \text{Combien, regrette-t-il, avoir resold} ] \)
how-many regrets-he have-INF resold
\text{des tableaux que Jean, avait achetés}]?
of-the paintings that Jean had bought
‘How many of the paintings that Jean had bought did he regret having sold again?’

Finally, under a remnant movement approach, it is not clear what drives movement of the nominal. It is unlikely that it raises to a topic position (as argued for Greek by Androutsopoulou 1997) because the nominal is clearly not interpreted as ‘presupposed’, ‘given’ or ‘old’. Instead, it introduces a novel variable. A question such as (26) can be answered in the negative.

(26) A. *Combien, as-tu lu de livres?*  
    how-many have-you read of books  
    ‘How many books have you read?’

B. Aucun.  
none.  
‘None.’

To summarize, neither the distributed deletion nor the remnant movement analysis can account for why there are important differences between a full movement and a split variant. One natural way to account for the difference between a split and a non-split construction is in terms of movement of a bare operator with stranding of the restrictive material versus pied-piping. Before we tackle the question of why pied-piping of the nominal should ever be possible on minimalist grounds, we turn to the first main issue of the paper: why the EPP feature associated with C is universal (or in earlier terms, why the C-related D feature is universally strong).

3. Visibility

While methods for checking the EPP feature associated with Q/WH vary cross-linguistically, it appears to be the case that such a feature must somehow be checked in all interrogatives in all languages (cf. Watanabe 1992; Chomsky 1995). Recently, this condition has been encoded in the grammar as follows: the EPP is a general uninterpretable feature requiring visibility to be erased (Chomsky 2000, 2001, see also Platzack 1998 who explores the consequences of a visibility condition on the C domain in Germanic languages and Italian). Obvious examples of such checking/visibility satisfaction are by Merge: in-situ languages like Chinese have Q particles that can be base generated in the C domain; and Move: in a language like English one question word raises to Spec-CP.

Since French does not have question particles with constituent questions, it is usual for material to move and thereby check the EPP feature in C. That is, by default a WH element should raise. The case of split combien constructions is a good illustration of this. However, it is also possible for no morphological element to be present in Spec-CP, as (27) illustrates.
(27) Elle a vu qui?
she has seen who
‘Who has she seen?’

In a case like (27), a special intonation is required instead. We will suppose that this special intonation satisfies the visibility requirement. More specifically, we can suppose that the special intonation pattern of (27) signals the presence of a null operator in Spec-CP that checks the EPP feature associated with Q/WH. In the type of French described in this paper, the special intonation pattern is associated with deaccenting, not with heavy stress on the WH word as in Cheng and Rooryck (2000).²

The symbol L% in (28) stands for a low boundary tone; it illustrates the fact that a French WH phase in-situ has a falling pitch movement in the contour associated with the utterance (for similar phonological effects, see Oiry 2004). Deaccenting is also argued to be a WH-scope marking strategy in Japanese (Ishihara 2002).

(28) [Spec-CP Op Elle a vu qui?] L%

This predicts a split configuration in French that is much like the split configuration we find with split combien constructions. Evidence to support this view comes from the fact that such in-situ examples share the syntactic properties of split combien constructions: they give rise to intervention effects (see (37) and (40) below, as well as Mathieu 1999, 2004; Butler and Mathieu 2004 for details). It follows that, in French, visibility is not only achieved morphologically but is also achieved phonologically.

Of course the fact that visibility is always achieved does not tell us why there should be a visibility requirement associated with C. We will suppose that this visibility requirement has a functional role: it ensures that an overt signal is made to the effect that the speaker’s utterance should be interpreted as an information question, as opposed to a reprise question.

A reprise question comes in two brands: (i) an ‘echo’ question as in (29b); and (ii) a ‘reference’ question as in (30b). Bolinger (1987) introduces the term ‘reprise’ for both uses and this is also the term used in Ginzburg and Sag (2001). This term captures the fact that in order to determine the meaning of such a

² Cheng and Rooryck’s account is based on the idea that the intonation in (27) is comparable to that found in a yes-no question like C’est un livre? ‘Is it a book?’ Both types of questions are claimed to have a rising contour. Their idea is that WH phrases in situ are licensed by the yes-no question operator; this applies to both French and Chinese. The difference between French and Chinese is that in French WH feature movement is necessary to set the value of the Q morpheme, which is otherwise underspecified, to Q/WH.
question, one must in some sense have access to the preceding utterance. Engdahl (2001) uses the term ‘reprise’ as the general term for context dependent questions. In (29b), B asks for clarification of what A said. In (30b), B asks for further information concerning the intended referent of *them*.

(29)  

a. A: Mary is going to visit [inaudible]  
b. B: She is going to visit WHO?

(30)  

a. A: Mary is going to visit *them*.  
b. B: She is going to visit WHO?

What is crucial is that interrogative reprises must contain an accented WH-phrase. This differs from ordinary in-situ information questions in French, where an accent on the WH phrase in-situ is impossible. Instead, as already noted, a falling pitch movement in the contour is obligatory.

Finally, we note that in the case of split *combien* constructions, *combien* checks or saturates the relevant feature to satisfy the visibility requirement.

4. Last Resort and Semantics

We now turn to the second question with which this paper began: Why is pied-piping required when an intervener is present? We take as our starting point the dynamic semantics stance on interpretation offered by, among others, van Rooy (1997), Stalnaker (1998), Zimmermann (1999), Kamp (1990), and Dekker (2002). This starts with the observation that, for a discourse to be interpretable, information pertaining to the discourse itself is needed. We will call this usage information. An archetypal example is the contrast between (31) and (32) (due to Partee).

(31)    I dropped ten marbles and found all of them, except for one. It is probably under the sofa.

(32)    I dropped ten marbles and found only nine of them. ??It is probably under the sofa.

The first sentences in (31) and (32) are truth-conditionally equivalent: they provide the same information about the world. But unlike (31), the first sentence of (32) does not give sufficient information to allow for the resolution of the anaphoric link.
To capture the distinction between (31) and (32), we can suppose that the occurrence of one in the first sentence of (31) comes with an ∃ usage instruction. This makes available an ‘intentionally present’ individual (i.e. the lost marble) that the pronoun in the second sentence can take as its referent. In contrast, (32) is bad because no such intentionally present individual is made available. Note that the referential intentions associated with the use of indefinites like one in (31) are to be attributed to the speaker, who is supposed to be able to support what she says. The hearer has no such requirements, and so can generally take an ∃ occurrence to introduce a new subject. Now consider the speaker’s support for (33).

(33) There isn’t a tiger in the cage.

This can be characterized as a ban on an update of her state with (34).

(34) A tiger is in the cage.

Consequently, the requirement of referential intentions is replaced by the requirement to have evidence that she, as a hearer, bans any update with (34), no matter who, with whatever intentions, would try to attempt to bring about such an update. This situation arises because the ∃ usage instruction a tiger makes available is assumed to only be visible from within the scope of the negation. From outside negation’s scope, ∃ is opaque, accounting for the absence of referential intentions, which in turn accounts for the absence of any potential anaphoric pick up.

We wish to claim that there is a related visibility requirement on the C domain for interrogative sentences to meet. In this respect, the approach we advocate is in line with the existential disclosure approach of Honcoop (1998). We propose that this visibility requirement arises because cross-linguistically interrogatives come with a bare interrogative operator Q base generated as the highest element. The reader is referred to Butler and Mathieu (2004) for the technical details. Thus all interrogatives give rise to split configurations. To have values under question to impart to variables, Q is taken to rely on the presence of ‘wh’ usage instructions. Whenever WH-phrases carry wh, they must be in a visible relation with the C domain, in the sense of not falling underneath a scopal operator, for Q to function as a binder of WH variables. This explains why (35) and (36) are okay.

(35) Op Qui,t est-ce que tu n’as pas vu e?,
Q wh is-this that you NE-have scopal-op seen
Q x you_did_not_see(x)
(36) **Op** Tu as vu qui?
    Q you have seen wh
    Q x you_saw(x)

It also explains why (37) is bad, with Q left to ask a question without the support required to bind any variables.

(37) *Op* Tu n’as pas vu qui?
    Q you NE-have scopal-op seen wh
    Q you_did_not_see(x)

That is, (37) is incoherent. On the one hand, because of the intervening scopal operator, it fails to show any wh usage information, and thus no values under question are introduced (hence the plain Q in the interpretable representation), and on the other hand, it really does have a WH-phrase primed to receive values under question (the free x). The approach generalizes as in (38) and can be seen as a rationalization of Pesetsky’s (2000) Intervention Effect Condition and other related proposals.

(38) **Op** [Matrix ... (*scopal_op)[ ... [Restriction ... usage-instruction ... ] ... ] ... ]

As a further illustration of the configuration in (38), we will go through the details of the split combien construction in (39), and contrast this with the all-fronted option of (40).

(39) **Combien** as-tu lu e_i de livres?
    how-many have-you read of books
    ‘How many books have you read?’

(40) **Combien de livres**, as-tu lus e_i?
    how-many of books have-you read-AGR
    ‘How many books have you read?’

In addition to their overt structures, the two options differ in terms of the locality effects to which they are susceptible. Notably the split option displays intervention effects, as (41) shows, while the all fronted option escapes such effects, as (42) illustrates.

(41) *Combien** n’as-tu pas lu e_i de livres?
    how-many NE-have-you not read of books
    ‘How many books have you not read?’
(42) **Combien de livres, n’as-tu pas lu e?**

How many of books NE-have-you not read-AGR

‘How many books have you not read?’

To account for this difference we will analyze *combien de* DPs as follows:

(43) \[
[\text{DP combien de livres}] := [\exists y [\text{wh } x = |y| \text{ books}(y)]
\]

That is, *combien de* is taken to introduce a set of books \( y \), the number of which \( x \) is brought into question by the presence of *combien*. By itself, *combien* is taken to contribute:

(44) \[
\text{combien} := [\text{wh } x = |y|]
\]

Thus, *combien* is not a question operator. Rather it contributes a usage instruction wh (providing the information that the sentence contains at least one WH-phrase), and restrictive material \( x = |y| \) (the condition that brings into question the number of books).

**The split option**

Combining our analysis of *combien de* DPs in (43) with our assumption that all interrogatives come with a null Q operator gives (39) the following LF:

(45) \[
[\text{CP Op combien, as-tu lu [DP combien de livres]?}]
\]

\[
\text{Q} [\text{wh } x = |y| \text{ have-you read } [\exists y \text{ books}(y)]}
\]

\[
\text{Q } x [\text{wh } x = |y| \text{ (you_read(y) } [\exists y \text{ books}(y)])]
\]

Here, Q has visible information permitting it to bind a variable. Nevertheless, the LF is bad: *combien*’s movement leaves an occurrence of \( y \) outside its binder’s scope. The situation is salvageable if the restrictive content of *combien* reconstructs. We indicate this by splitting *combien* into *’combien’* (the residue of movement) and ‘combien’ (all the restriction material), as in (46). Notably, in (46), all \( y \) occurrences are in the scope of their binder.

(46) \[
[\text{CP Op combien as-tu lu [DP combien de livres]}]\]

\[
\text{Q } \text{ have-you read } [\exists y [\text{wh } x = |y| \text{ books}(y)]}
\]

\[
\text{Q } x \text{ (you_read(y) } [\exists y [\text{wh } x = |y| \text{ books}(y)])]
\]
This analysis tells us why intervention effects occur. (41) is ruled out because reconstruction of combien’s restrictive content is forced for the same reasons that it was forced in (46). As (47) shows, this has the undesirable consequence of placing at LF the usage information that comes with combien under the scope of the intervener pas ‘not.’ Thus, (47) is out for the same reason as (37): there are no visible occurrences of wh from Q, and so Q is not permitted to bind any variables, with the result that x fails to denote.

(47) *[CP Op combien n’as-tu pas lu [DP combien de livres]]?
   Q Neg (you_read(y) [∃y[wh x = [y]books(y)])

The all-fronted option

We continue with the same assumptions for the all-fronted option. The difference from the split option is that this time the whole combien de DP moves to the clause initial position. As a consequence, in (48), which is the LF for (40), y’s binder moves with combien. This removes the need for reconstruction, with all variables being bound (Q is able to bind x thanks to the visible wh).

(48) [CP Op [DP Combien de livres] as-tu lus e i]
   Q x[∃y[wh x = [y]books(y)] you_read(y)]

It also gives (42) the LF (49), which is likewise interpretable, with the essential usage information wh occurring in the matrix Spec-CP position and hence outside the scope of the potential intervener pas ‘not’.

(49) [CP Op [DP Combien de livres] n’as-tu pas lus e i]
   Q x[∃y[wh x = [y]books(y)] Neg you_read(y)]

Scope Effects

Split combien constructions provide a particularly clear illustration of the need to account for intervention effects in terms of scope. Consider (50).

(50) a. Combien, ont-ils tous lu e de livres?
    how-many have-they all read of books

   b. Combien de livres, ont-ils tous lus e?
    how-many of books have-they all read-AGR
‘How many books have they all read?’

As noted already, de Swart (1992) observes that (50b) is ambiguous. Either the universal takes wide scope over the WH-phrase (we ask all persons how many books they read), or the universal takes narrow scope (we ask for a single number: the number of books everyone read). In contrast, (50a) only has the reading where the universal takes wide scope. Attempts to derive the reading where the universal takes narrow scope can only result in LFs like (51). This gives an intervention effect: there are no visible occurrences of $wh$ because of the intervening universal, and so $Q$ is not permitted to bind any variables, with the result that $z$ is left without a denotation.

(51) $Q [\forall x \text{person}(x)] (\text{read}(x, y) [\exists y [\text{wh } z = |y|] \text{books}(y)])$

Note that (50b) encounters no such problem because it can yield the LF in (52) where the usage information $wh$ is visible from $Q$, that is, outside the scope of the intervener tous ‘all.’

(52) $Q z [\exists y [\text{wh } z = |y|] \text{books}(y)] [\forall x \text{person}(x)] \text{read}(x, y)$

The question that now arises is why the wide scope reading for the universal is nevertheless available when other interveners such as negation lead to complete ungrammaticality, cf. (41).

To explain this, we can follow Krifka (2001), who argues that a universal can scope out of a question act (and quite generally all speech acts) because such a scoping has the effect of giving rise to a conjunction of question acts (more generally speech acts). Thus we can view a pair-list question like (53a) with its universal quantifier as abbreviating a conjoined question, e.g. (53b).

(53) Which book did every linguist read?

a. $[[\text{DP every linguist}], [Q-\text{ACT which book did } e \text{ read}]]$

b. $[Q-\text{ACT1 which book did John read}] \text{ and } [Q-\text{ACT2 which book did Mary read}] \text{ and ...}$

Thus, in the LFs of readings where a universal takes wide scope there is no universal present between $Q$ and WH to act as an intervener. Negation, on the other hand, cannot scope out of question acts (for example, pair-list readings are never available in questions such as What did no one see?, see also Chierchia
1992), which means that it is always present between Q and WH and consequently negation acts like an intervener.

5. Vacuous Movement

We now turn to the third question posed at the outset, i.e., why raising of the nominal in French remains possible when bare operator movement can satisfy the visibility requirement. In the previous section we established the idea that intervention effects arise with interpretation crashes. It is reasonable to suppose that syntax has no access to information from the interpretation procedure. It follows that syntax itself cannot be sensitive to when intervention effects will occur. The optionality syntax displays can therefore be viewed from the perspective of syntax blindly permitting potentially sub-economical movements to meet coverage demands. For example, full movement in (40) is not required, as the speaker can ask the same question with a split-DP, namely (39). In contrast, full DP movement is necessary in (42); else the speaker would lack the ability to ask the question, there being no interpretable split alternative (41 is ruled out since it brings about an intervention effect). With this reasoning we can suppose that syntax allows a potentially vacuous movement (as in (40)) ‘just in case’ the worst happens and an intervener is present in the structure.

6. Conclusion

Our account has left us with two visibility requirements in the C domain. The first involves typing the clause, that is, signaling that an information question interpretation is required. We implemented this idea as the introduction of Q into the Logical Form. The second visibility requirement corresponds to the need for usage information to support the interpretation, much like we saw with Partee’s marbles example of (31)-(32). We implemented this idea as the introduction of wh into the Logical Form.

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