Intervention effects, monotonicity and scope

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0. Introduction

Recent studies have demonstrated that the phenomenon of 'quantification at a distance' in French plays an important role in modern linguistic theory. An interesting problem which Obenauer (1976, 1984) brings up concerns intervention effects. The present paper argues that Rizzi's (1990) syntactic and Zwarts and Szabolcsi's (1991) semantic approach to extraction only provide a partial explanation of this phenomenon. It is shown that scope rather than monotonicity provides the clue to extraction out of weak islands. The prohibition against narrow scope and the correlation established between monotonicity and scope explain the intervention effects in the French quantification at a distance and the Dutch *wat voor*-split.

1. A syntactic approach to quantification at a distance

1.1 Some facts

The particular characteristic of expressions like *beaucoup* ('many', 'a lot') in French is that they can function as ordinary determiners (1a), or can be separated from the rest of the NP by the past participle (1b):

(1) (a) Jean a conduit beaucoup de camions
Jean has driven many of trucks
(b) Jean a beaucoup conduit - de camions
Jean has many driven of trucks
(c) Jean a beaucoup conduit
Jean has a lot driven

The position which *beaucoup* occupies in (1b) is the same as in (1c), where there is no object NP. The usual analysis of (1c) is that *beaucoup* functions as an ordinary VP-adverb. The position of *beaucoup* in (1b) can then be characterized as an adverbial position. Similar examples can be given for *peu* ('few'), *trop* ('too much'), *assez* ('enough'), *autant* ('so many'), *tellement* ('so many'), *pas mal* ('not few'), etc:

(2) (a) Max a peu vendu - de livres
Max has few sold of books
(b) Marie a trop mangé - de carottes cette année
Marie has too many eaten of carrots this year

Although *beaucoup*, *peu*, *trop*, etc. are in an adverbial position, many syntactic analyses claim that they continue to function as a sort of

determiner. This means that there is an empty position in the part of the NP which is left behind, which is bound by the quantifier (cf. Kayne, 1984):

(3) Max a $[_{QP}$ beaucoup] vendu $[_{NP}$ $[_{QP}$ e] de livres]

Obenauer points out that the event should be countable, so that the adverb can express a notion of iterativity. This is illustrated by (4):

(4) (a) Le maire a salué beaucoup de sportifs
The mayor has greeted many of sportsmen
(b) Le maire a beaucoup salué de sportifs
The mayor has many greeted of sportsmen

(4a) can correspond with one greeting event in which many sportsmen are involved or with many greeting events for individual (or small groups of) sportsmen. (4b) lacks the single event reading: the sentence can only mean that there were many sportsmen who were individually or in small groups greeted by the mayor. The meaning of *beaucoup* is then close to that of a frequency adverb like *souvent* ('often').

Separation of the quantifier and the rest of the NP is also possible for expressions introduced by *combien* ('how many'):

(5) (a) Tu as rencontré combien de ministres chez Jean?
You have met how many of ministers at Jean
(b) Combien de ministres as-tu rencontré chez Jean?
How many of ministers have you met at Jean's
(c) Combien as-tu rencontré - de ministres chez Jean?
How many have you met of ministers at Jean's

Interrogative constructions in French can leave the object NP in position (5a). They can also move the NP as a whole in front (5b). The third possibility is to move only the interrogative *combien* and leave the rest of the NP in the regular object position (5c). Obenauer suggests that, in general, this way of splitting correlates with the presence of a preposition. In both constructions of quantification at a distance exemplified until now, we find the partitive preposition *de* ('of'). A third construction involving *de* is based on nominal groups like *qui d'intéressant* ('who of interest'), *rien d'autre* ('nothing else'), which can also split:

(6) (a) Rien d'extraordinaire n'a été prévu
Nothing extraordinary NEG has been foreseen
(b) Rien n'a été prévu d'extraordinaire
Nothing NEG has been foreseen of extraordinary

(7) (a) Qui d'intéressant dit-il qu'il a rencontré?
Who of interesting says he that he has met

(b) Qui dit-il qu'il a rencontré d'intéressant?
Who says he that he has met of interesting

Examples from other languages where splitting correlates with prepositions are the *was für*-split in German and the *wat voor* split in Dutch:

(8) (a) Was für ein Werkzeug sucht er? [German]
What for a tool is he looking for
(b) Was sucht er für ein Werkzeug?
What is he looking for a tool

(9) (a) Wat voor boeken heb jij gelezen? [Dutch]
What for books have you read
(b) Wat heb jij voor boeken gelezen?
What have you for books read

Quantification at a distance is thus a cross-linguistic phenomenon.

1.2 **Intervention effects**

An interesting problem which Obenauer (1976: 64 ssq.) brings up concerns the ungrammaticality of (11b) versus the grammaticality of (10):

(10) (a) Le douanier a pas mal fouillé combien de valises?
The customs-officer has not badly searched how many of suitcases
(b) Combien de valises le douanier a-t-il pas mal fouillé?
How many of suitcases the customs-officer has he not badly searched

(11) (a) Combien le douanier a-t-il fouillé de valises?
How many the customs-officer has he searched of suitcases
(b) *Combien le douanier a-t-il pas mal fouillé de valises?
How many the customs-officer has he not badly searched of suitcases
(c) Combien le douanier a-t-il soigneusement fouillé de valises?
How many the customs-officer has he carefully searched of suitcases

The sentences under (10) show that expressions like *pas mal*, *beaucoup* can function as independent VP-adverbs in interrogative sentences. (11a) shows that splitting is allowed. The ungrammatical (11b) shows that *beaucoup* cannot intervene between the interrogative and the part of the NP which is left behind. This is surprising, for one could theoretically establish a correct binding relation between *combien* and *de* N, as in (10a) and (10b). A first guess would be that no adverb can intervene between *combien* and the rest of the NP, but this is not true, as (11c) shows. We observe the same type of restriction on other constructions involving quantification at a distance:

(12) (a) Qui d'autre cette femme a-t-elle beaucoup aimé?
Who of else this woman has she a lot loved
(b) Qui cette femme a-t-elle aimé d'autre?
Qui this woman has she loved of else
(c) *Qui cette femme a-t-elle beaucoup aimé d'autre?
Who this woman has she a lot loved of else
(d) Qui cette femme a-t-elle profondément aimé d'autre?
Who this woman has she deeply loved of else

Obenauer (1984) claims that the restrictions on quantification at a distance are a typical instance of local binding. He assumes that the trace of a quantifier must be locally bound by the closest possible binder. Ungrammaticalities arise if, as a consequence of this local binding, the *combien/ qui* has nothing left to bind. This hypothesis accounts for unacceptable sentences like (13):

(13) *Combien as-tu beaucoup consulté de livres?
$[_{QP}$ combien] .. $[_{QP}$ beaucoup] .. $[_{NP}$ $[_{QP}$ e] de livres]

The empty quantifier phrase in the object is locally bound by *beaucoup*, although it is strictly spoken the trace of *combien*. As a consequence, *combien* has no variable left to bind and the sentence is ruled out by the prohibition against vacuous quantification.

Obenauer's treatment can is successful in cases like (13), but there are also some problems. For instance, his theory is less felicitous for examples like (12c), for here there is no binding relation possible with the closest quantifier. Consider (14a) and (14b) which are both ungrammatical:

(14) (a) *Cette femme a aimé beaucoup d'autre
This woman has loved a lot of else
(b) *Cette femme a beaucoup aimé d'autre
This woman has a lot loved of else

The reason is that *qui* in (14) is a pronominal which has the status of an NP, whereas *beaucoup* has the characteristics of a determiner or an adverb.

In the same way, the behaviour of frequency adverbs is problematic. Recall that Obenauer (1984) observes that *beaucoup* in constructions of quantification at a distance expresses event quantification. Its meaning is therefore close to the semantics of a frequency adverb like *often*. In a footnote, Obenauer points out that this class of adverbs also yields rather unacceptable results in quantification at a distance constructions:

(15) (a) *?Combien as-tu souvent consulté de livres?
How many have you often consulted of books

(b) ??Combien as-tu rarement conduit de voitures?
How many have you seldom driven of cars

Obenauer calls this a process of pseudo-binding, 'parasitic' on the one in (13), but he provides no analysis of this phenomenon. Obviously, frequency adverbs do not bind the empty determiner position in the direct object, as the ungrammaticality of (16) shows:

(16) (a) *J'ai souvent consulté de livres
I have often consulted of books
(b) *J'ai rarement conduit de voitures
I have seldom driven of cars

If the intervening quantifier cannot bind the empty position, it is unclear how it can count as the closest potential binder. Intuitively, the facts in (11b), (12c) and (15) are closely related, but Obenauer's hypothese of local binding can explain only one of the three cases. The idea of local binding then clearly needs to be modified.

A revised analysis of the quantification at a distance construction is provided by Rizzi (1990). He claims that this phenomenon can be explained in terms of the principle of Relativized Minimality. The basic idea is that intervention is dependent on the character of the binding relation. An intervening A-operator blocks binding in an A-chain, and an A'-operator blocks binding in an A'-chain. The construction of quantification at a distance in French clearly involves an A'-phenomenon in Rizzi's system, for the antecedent of a wh-trace is in an A'-specifier position. So any A'-operator between *combien* and the part of the NP which is left behind blocks the intended binding relation. Relativized Minimality accounts for all the ungrammaticalities under (11b), (12c) and (15). An argument in favour of this approach is the fact that A-operators like floating quantifiers do appear in between *combien* and the part of the NP which is left behind:

(17) (a) Combien de livres ont-ils tous lu?
How many of books have they all read
(b) Combien ont-ils tous lu de livres?
How many have they all read of books

Adopting the analysis of floating quantifiers developed by Sportiche (1988), *tous* is in an inner subject position, which counts as a regular argument position. As an A-binder, *tous* in (17b) does not count as a potential governor for *de livres* in Rizzi's view. Accordingly, *tous* is transparent and does not block extraction.[1] Rizzi's principle of Relativized Minimality then accounts in an interesting way for the minimal contrast between A'-

[1] Thanks to Frank Drijkoningen for pointing this out to me.

operators (11b) and A-operators (17b) in an A'-chain.

Rizzi's analysis seems to work quite well for quantification at a distance and a number of other cases. But his approach does not answer the question why certain intervening expressions create island effects and block extraction, whereas others do not. Rizzi points out that a number of problems which arise with respect to the role of negation and referentiality in extraction phenomena make one look for a more semantically based theory of weak islands. His suggestion that 'affective operators' play a role in extraction phenomena is illustrated by the following sentences:

(18) (a) How did Mary think that John behaved?
(b) How did every girl think that John behaved?
(c) How did most girls think that John behaved?
(d) *How did few girls think that John behaved?
(e) *How did no girl think that John behaved?

A semantically oriented theory which takes this type of phenomena as a starting point is developed by Szabolcsi and Zwarts (1991).

2. A semantic approach to extraction: monotonicity

Szabolcsi and Zwarts (1991) propose a semantic treatment of this type of intervention effects in categorial grammar. Their approach is based on Zwarts' (1986, 1990) analysis of negative polarity items (NPI's). The notion of monotonicity plays a crucial role in the analysis of NPI's. If a determiner establishes a relation Q between two subsets A and B of the universe of discourse U, we can define monotonicity in the right argument as follows:

(19) MON ↑ If Q_U AB and $B \subseteq B'$ then Q_U AB'
MON ↓ If Q_U AB and $B' \subseteq B$ then Q_U AB'

Right monotone increasing determiners are closed under supersets, monotone decreasing quantifiers are closed under subsets. Assuming that individuals which came home late is a subset of the individuals which came home, we can check the monotonicity properties of determiners as follows:

(20) MON↑
(a) All children came home late →
All children came home
(b) Some children came home late →
Some children came home
(c) Many children came home late →
Many children came home

(21) MON↓
(a) No child came home →
No child came home late

(b) Not all children came home →
Not all children came home late
(c) Few children came home →
Few children came home late

For instance, the Dutch NPI *hoeven* is only triggered by mon↓ operators:

(22) (a) *Ieder kind zal zich hoeven verantwoorden [Dutch]
Every child will himself have to justify
'Every child will have to justify himself'
(b) *Veel kinderen zullen zich hoeven verantwoorden
Many children will themselves have to justify

(23) (a) Geen kind zal zich hoeven verantwoorden
No child will himself have to justify
(b) Weinig kinderen zullen zich hoeven verantwoorden
Few children will themselves have to justify

Szabolcsi and Zwarts require that the NPI be the argument of a function with the appropriate licensing properties. An intervening quantifier can block the inheritance of the licensing properties of the trigger under composition. Furthermore, they argue that the set of 'affective' operators, which block extraction can be characterized in terms of monotonicity. The examples under (18) make it clear that monotone increasing NPs do not block extraction, because they preserve inclusions relations. Monotone decreasing and non-monotone NPs, on the other hand, create weak islands:

(24) **Weak islands and Monotonicity** (WIM)
Upward monotonic contexts are good extraction domains. But paths that are not upward monotonic, viz., either downward monotonic or non-monotonic constitute weak islands

This hypothesis is intended to account not only for wh-extraction as in (18), but also for phenomena such as the French quantification at a distance construction. This requires us to study first the monotonicity properties of adverbs such as *beaucoup* and *souvent*.

In my dissertation (De Swart, 1991), I develop an interpretation of adverbs of quantification (Q-adverbs) as expressions which establish a relation Q between two subsets A and B of the domain of eventualities or situations E. The notions of eventuality or situation are meant to be generic terms for events, states, activities, processes, etc. (cf. Bach, 1986 and others). Right monotonicity can then be defined as follows:

(25) MON ↑ If Q_E AB and B ⊆ B' then Q_E AB'
MON ↓ If Q_E AB and B' ⊆ B then Q_E AB'

If we want to test right monotonicity properties of adverbs we have to keep A constant and take supersets respectively subsets of B. The easiest way to test monotonicity properties of Q-adverbs is to use *if..then* constructions. As Lewis (1975) points out, the *if*-clause functions as the restriction on the quantifier (=A) and the main clause gives us the second argument (=B):

(26) MON↑
(a) If she knits something, Anne always knits Norwegian sweaters →
If she knits something, Anne always knits sweaters
(b) If she knits something, Anne sometimes knits Norwegian sweaters →
If she knits something, Anne sometimes knits sweaters
(c) If she knits something, Anne often knits Norwegian sweaters →
If she knits something, Anne often knits sweaters

(27) MON↓
(a) If she knits something, Anne never knits sweaters →
If she knits something, Anne never knits Norwegian sweaters
(b) If she knits something, Anne does not always knit sweaters →
If she knits something, Anne does not always knit Norwegian sweaters
(c) If she knits something, Anne seldom knits sweaters →
If she knits something, Anne seldom knits Norwegian sweaters

As expected, mon↓ adverbial quantifiers, but mon↑ quantifiers do not function as triggers for the Dutch NPI *hoeven*:

(28) (a) Peter hoeft nooit een tentamen over te doen
Peter needs never to repeat an exam
(b) Peter hoeft zelden een tentamen over te doen
Peter needs seldom to repeat an exam
(c) *Peter hoeft altijd een tentamen over te doen
Peter needs always to repeat an exam
(d) *Peter hoeft vaak een tentamen over te doen
Peter needs often to repeat an exam

The monotonicity properties of frequency adverbs thus correlate in an interesting way with those of determiners. We would expect then, that the French quantification at a distance cases can be subsumed under the semantic generalization Szabolcsi and Zwarts (1991) formulated in (24) above. There are some problems, though.

If the monotonicity properties given under (26) and (27) for *often* and *seldom* are also those of *souvent/rarement* and *beaucoup/peu*, we have a problem. Monotone increasing quantifiers are supposed to create good extraction domains. If *souvent* and *beaucoup* are mon↑, they should not block extraction. Consequently, we would expect the sentences under (29) to be all right, but they aren't. There is no clear contrast between (29) and

(30), which involve the mon↓ decreasing quantifiers *rarement* and *peu*:

(29) (a) *Combien as-tu beaucoup consulté de livres?
How many have you a lot consulted of books
(b) *?Combien as-tu souvent consulté de livres?
How many have you often consulted of book

(30) (a) *Combien as-tu peu consulté de livres?
How many have you little consulted of books
(b) *?Combien as-tu rarement consulté de livres?
How many have you seldom consulted of books

It is not surprising, then, that Szabolcsi and Zwarts define *often, souvent* and *beaucoup* as non-monotonic quantifiers. But this is obviously in conflict with the inferences I gave under (26) and (27) to demonstrate that *often* is mon↑ and *seldom* is mon↓. In my view, the arguments Szabolcsi and Zwarts propose are not entirely convincing. When testing monotonicity properties of adverbs we have to make good use of the argument structure of the quantifier. We can only test right monotonicity if we keep A constant and take subsets respectively supersets of B. The example Szabolcsi and Zwarts discuss in their (1990) version is (31a). Although the inference does not go through, I do not think that *often* should be classified as a non-monotonic quantifier. Note that the inference is invalid for the *always* in (31b) as well:

(31) (a) John often sings in the bathtub ←/→ John often sings
(b) John always sings in the bathtub ↛ John always sings

If we could trust these inferences to say something about monotonicity properties in the right argument, we would deduce from (31b) that *always* is a right monotone decreasing quantifier. This is obviously an undesirable conclusion, so (31) is not the kind of context to use in this case. A similar problem arises with respect to the French example in (32):

(32) (a) J'ai beaucoup conduit ce camion ←/→
J'ai beaucoup conduit
I have a lot driven this truck ←/→
I have a lot driven
(b) J'ai peu conduit ce camion ←/→
J'ai peu conduit
I have little driven this truck ←/→
I have little driven
(c) J'ai toujours conduit ce camion ←/→
J'ai toujours conduit
I have always driven this truck ←/→
I have always driven

Szabolcsi and Zwarts use (32a) to argue that *beaucoup* is a non-monotonic

quantifier. But accepting this leads us into trouble, because (32b) and (c) show that the same context would imply that *peu* is no longer monotone decreasing and even *toujours* becomes non-monotone. Assuming that *toujours* is undoubtedly right monotone increasing (cf. 26a), this leads me to conclude that there is something wrong with the argument structure of the quantifier in (32), which makes it inappropriate as a context in which to test monotonicity properties. A context in which there are no problems concerning argument structure involves conjunction of predicates:

(33) (a) John is always singing and dancing →
John is always singing

(b) John is often singing and dancing ←/→
John is often singing

(c) John is seldom singing and dancing ←
John is seldom singing

(d) John is singing and dancing exactly twice a week ←/→
John is singing exactly twice a week

The entailment under (33a) is expected in view of the right monotone increasing character of *always*. According to Szabolcsi and Zwarts (1991), the inference under (33b) is invalid, because frequency standards are unstable. "E.g., it may be that to be both dancing and singing every other day counts as 'often', but to be just dancing every other day does not" (p. 27). Rather surprisingly, Szabolcsi and Zwarts claim that the inference under (33c) goes through, which classifies *seldom* as monotone decreasing. We would expect *seldom* to be just as sensitive to the context as *often* and consequently characterize it as a non-monotone quantifier. But then we would loose the semantic contrast between *often* and *seldom*, which makes it hard to understand why, in *if..then* contexts, *often* tends to pattern with mon↑ quantifiers (cf. 26c) and *seldom* with mon↓ ones (cf. 27c). Also, it does not explain why *few* and *seldom* trigger negative polarity items as in (23b) and (28b), whereas *many* and *often* do not (cf. 22b and 28d). Moreover, the reason why the inference is invalid in (33b) is quite different from the explanation for (33d). Expressions like *twice a week* are not context-sensitive, but they are really non-monotonic: if you are both singing and dancing exactly twice a week, it may well be that dancing alone you do seven times a week. This means that *exactly twice a week* need not take up a different interpretation before and after the arrow in order to block the entailment under (33d). This suggests again that context-sensitivity and non-monotonicity are two different things.

As far as the construction of quantification at a distance, is concerned, we are back at our starting point now. If *souvent* and *beaucoup* are no longer non-monotonic but monotone increasing, we would expect them not to block extraction. But then, why are the sentences under (29)

unfelicitous? I conclude that monotonicity does not give us a good way to handle the problem. This means that we have to develop an alternative analysis of quantification at a distance. I will do this on the basis of an account of intervention effects in the Dutch *wat voor*-split. This analysis will show weak islands to be scope islands.

3. An alternative semantic approach: scope

3.1 The *wat voor*-split

Obenauer and Rizzi claim that splitting constructions such as the French quantification at a distance and the Dutch *wat voor*-split are quite similar, because both involve a prepositional group. Examples are given in (34):

(34) (a) Wat voor boeken heb je gelezen?
What for books have you read
'What kind of books did you read'
(b) Wat heb je voor boeken gelezen?
What have you for books read

At first sight, the *wat voor*-split seems to confirm Rizzi's hypothesis that A'-binders cannot occur in between the interrogative *wat* and the rest of the NP, whereas A-binders can, compare (35)/(36) and (37)/(38):

(35) (a) Wat voor boeken heeft iedereen gelezen?
What for books has everybody read
(b) Wat heeft iedereen voor boeken gelezen?
What has everybody for books read

(36) (a) Ik ben benieuwd wat voor smoes veel mensen nu weer hebben bedacht om hun huiswerk niet te hoeven maken
I am curious what for excuse many people have now again made up for their homework not to need make
(b) Ik ben benieuwd wat veel mensen nu weer voor smoes hebben bedacht om hun huiswerk niet te hoeven maken
I am curious what many people have now again for excuse made up for their homework not to need make

(37) (a) Wat voor boeken heb je veel gelezen?
What for books have you many read
(b) *Wat heb je veel voor boeken gelezen?
What have you a lot for books read

(38) (a) Wat voor boeken heb je (minstens) twee keer gelezen?
What for books have you read (at least) twice
(b) *Wat heb je twee keer voor boeken gelezen?
What have you twice for books read

We see that the A-quantifiers *iedereen* and *veel mensen* in (35) and (36) do not block extraction, whereas the A'-quantifiers *veel* and *(minstens) twee keer* in (37) and (38) do. This is not in accordance with the analysis of Szabolcsi and Zwarts propose, because all the quantifiers in (35)-(38) are classified as mon↑ and are thus expected to create good extraction domains. In particular, Szabolcsi and Zwarts would be unable to explain the contrast between (36) and (37), because they involve the same quantifier. But the A or A'-character of the quantifier is not the only difference between *iedereen/ veel mensen* and *veel/ twee keer*. A closer look at (35a) reveals that it has two readings, depending on the scope of the quantifier. Giving *iedereen* wide scope we ask for everyone which books he/she has read. This reading is easier to get if we stress the common noun. Under the narrow scope reading for the universal quantifier we ask which books are such that everyone has read them. The narrow scope reading is easier to get if we stress the universal quantifier, cf:

(39) (a) Wat voor BOEKEN heeft iedereen gelezen [∀ wide scope]
What for BOOKS has everybody read
(b) Wat voor boeken heeft IEDEREEN gelezen [∀ narrow scope]
What for books has EVERYBODY read

(35b) on the other hand is not ambiguous: it is hard not to give the universal quantifier wide scope over the books. In other words, the predominant reading of (35b) is the one corresponding to (39a): for every person we ask what kind of books he/she has read. Note that it is hard to stress *iedereen* in this construction. Accordingly, the narrow scope reading for the universal quantifier seems to be absent or pretty hard to obtain.

It is generally assumed that scopal relations have their roots in the syntactic structure. For a quantifier to take scope over an expression, it is usually claimed to be necessary for the quantifier to c-command this expression. If we look at the c-command relations in splitted and non-splitted constructions we observe a crucial difference. In the non-splitted (35a) *wat voor boeken* c-commands *iedereen* and *iedereen* c-commands the trace of *wat voor boeken*:

(40) [wat voor boeken$_i$]$_i$ .... [iedereen] .... t_i
c-command c-command

Given that the wh-expression and the quantifier c-command each other, we expect both scope relations to be possible. This prediction is borne out by the ambiguity of the sentence. As far as the splitted construction is concerned, though, *iedereen* still c-commands *boeken*, but not the other way round, at least if we assume that the constituent *wat voor boeken* bears the index of *boeken*, whereas *wat* does not bear that same index:

(41) $[wat]_j$ .... [iedereen] .... $[t_j$ voor boeken$_i]_i$

c-command

Given that *iedereen* c-commands the NP left behind, it can take scope over it. Given that the wh-expression (i.e. the NP as a whole) does not c-command the quantifier, it cannot take wide scope. Consequently, *iedereen* must take scope over the wh-phrase because of syntactic constraints and the sentence is not ambiguous.[2]

A more semantically oriented explanation for the wide scope readings of intervening quantifiers is provided by the quantifying-in mechanism common to proposals developed in Montague grammar. In-quantification is used to give a quantifier which would normally be embedded under another operator wide scope over that operator. In-quantification gives the intervening quantifier wide scope over the wh-phrase so that it is interpreted independently of the splitted construction:

(42) Wat heeft iedereen voor boeken gelezen S

/ \

Iedereen T Wat heeft x voor boeken gelezen IV

In this view, the quantifier is in fact outside the function-argument structure used for the interpretation of the wh-phrase. There is only a variable x intervening, which, just like a proper name, does not block the link between the moved wh-phrase and the part of the NP left behind. Narrow scope readings, on the other hand, cannot be interpreted as if they were outside the relation between the wh-phrase and the part of the NP left behind, because they are subordinate to the wh-quantifier. As such, they are really intervening in an infelicitous way, which explains why they block extraction.

Returning now to (37a) and (38a), we observe that the non-splitted constructions here are not ambiguous. For some reason or another, *veel* and *twee keer* can only take narrow scope with respect to the interrogative *wat voor*: we ask which books are such that you have read them a lot/ at least twice. Given the ambiguity of (35a), this can hardly be due to a syntactic constraint on the interpretation. Therefore, I will assume that the semantic character of the quantifier is responsible for it. (37b) and (38b) show that *veel* and *twee keer* do not occur in between *wat* and the rest of the interrogative NP. We could explain this in Rizzi's way by appealing to the A'-character of *veel* and *twee keer*, but we could also assume that it is related to the fact that iterative adverbs such as *veel* and *twee keer* always take narrow scope with respect to a wh-expression. We can then go on to claim that this is not appropriate in a splitting construction. The latter

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[2] Thanks to Eric Hoekstra for pointing this out to me.

hypothesis is confirmed by (43):

(43) (a) Wat voor boeken heeft niemand gekocht
What for books has nobody bought
(b) *Wat heeft niemand voor boeken gekocht
What has nobody for books bought

Niemand is an A-binder, just like *iedereen*, so Rizzi's theory would predict it to be a harmless intervener. Still, it yields bad results when it is placed in between *wat* and *voor boeken*. Szabolcsi and Zwarts would explain this by appealing to the mon↓ character of the quantifier. But as we saw in (35)-(38) already, monotonicity does not always explain the extraction possibilities in this context. Looking at the scope properties of the negative quantifier, we realize that it always takes narrow scope with respect to the wh-phrase. The non-splitted (43a) is not ambiguous: it only asks for the books x which are such that nobody bought x. We cannot use (43a) to ask for nobody which books he bought. In other words, at least in this context, there is no wide scope reading available for the negative quantifier. Now Kiss (1990) observes that negation takes narrow scope with respect to a wh-phrase. The absence of a narrow scope reading for (43a) suggests that this observation can be extended to mon↓ quantifiers in general. Although the syntax allows for two scope configurations, one of these is ruled out for independent - i.e. semantic - reasons. If this is on the right track, we can relate the ungrammaticality of the intervening negative quantifier in (43b) to the prohibition against narrow scope readings in split constructions.

Let us now turn to A'-binders in order to see whether a similar generalization holds. We observe that Rizzi is not right in his claim that no A'-binder can intervene between *wat* and the rest of the NP:

(44) Wat heb je gisteren voor boeken gekocht?
What have you yesterday for books bought

Gisteren is an A'-binder, so Rizzi would predict the splitting construction to be out, but it isn't. In order to save the analysis and explain this kind of transparencies, he appeals to a notion of specificity. *Gisteren* is indeed a very specific quantifier, and it could be true that such specific A'-quantifiers are transparent in a sense and do not block extraction. But due to its specificity, *gisteren* also takes wide scope, so it is unclear which one of the analyses gives the best explanation. A contrast between Rizzi's generalization and mine can be obtained by studying non-specific A'-binders. We know that Rizzi's hypothesis is invalidated if we find a non-specific A'-binder, which does not block extraction, because it takes wide scope. This is what we observe in the following examples, which may be contrasted with (37) and (38). (The examples are best if read with an accent on *jij* ('you')):

(45) (a) Wat voor boeken lees jij meestal?
What for books read you mostly
(b) Wat lees jij meestal voor boeken?
What read you mostly for books

(46) (a) Wat voor brood eet jij altijd?
What for bread eat you always
(b) Wat eet jij altijd voor brood?
What eat you always for bread

(47) (a) Wat voor appels gebruik jij vaak wanneer je een appeltaart maakt?
What for apples use you often when you an applepie make
'What kind of apples do you often use when you make an applepie'
(b) Wat gebruik jij vaak voor appels wanneer je een appeltaart maakt?
What use you often for apples when you an applepie make

(48) (a) Wat voor wasmiddel gebruikte jij altijd (voordat product X op de markt kwam)
What for detergent used you always (before product X on the market came)
(b) Wat gebruikte jij altijd voor wasmiddel (voordat product X op de markt kwam)
What used you always for detergent (before product X on the market came)

Rizzi would predict (45b), (46b), (47b) and (48b) to be out, because there is no particular reason to characterize the A'-binders *altijd*, *meestal* and *vaak* as specific. But if the scope generalization holds for A'-binders as well, they are all right, because we can give the quantifying adverb wide scope over *wat voor* N. An appropriate answer to (45) would be 'I usually read detectives', to (46) 'I always eat white bread' and to (47) 'I often use Granny Smith apples'. The facts under (45)-(48) suggest that the scope possibilities of the quantifier are more important than its A- or A'-character. Note moreover, that monotone decreasing quantifiers block extraction in a systematic way:

(49) (a) Vertel me eens wat voor mensen jij niet altijd uit zou nodigen
Tell me what for people you not always would invite
'Tell me what kind of people you would not always invite'
(b) *Vertel me eens wat jij niet altijd voor mensen uit zou nodigen
Tell me what you not always for people would invite

(50) (a) Wat voor boeken raadpleeg jij zelden?
What for books consult you seldom
'What kind of books do you seldom consult'
(b) *Wat raadpleeg jij zelden voor boeken?
What consult you seldom for books

The ungrammaticalities in (49) and (50) can be explained by invoking their mon↓ character, as Szabolcsi and Zwarts do. Keeping in mind, though, that monotonicity is related to scope, we can also appeal to the latter notion to explain why mon↓ quantifiers create bad extraction domains. Just as we expect, the mon↓ quantifiers in (49a) and (50a) only allow for a narrow scope reading with respect to the wh-phrase. For instance, (50a) asks which books are such that you seldom consult them and cannot mean that one asks, for rare situations, which books you consult. Given that they do not take wide scope with respect to the wh-phrase, quantifiers like *niet altijd* and *zelden* cannot intervene between *wat* and *voor mensen/boeken*.

So the Dutch *wat voor*-split confirms one half of Szabolcsi and Zwarts' observation, namely that mon↓ quantifiers create islands and block extraction. In order to account for the intervention effects in the *wat voor*-split, I propose the following hypothesis for A and A'-operators alike:

(51) Hypothesis (syntactic formulation):
In a construction:
Q_{2j} ... Q_1 ... $[_{NP}\ [_{QP}\ e_j\ [\ \text{prep N}\ ]$
Q_2 cannot take wide scope over Q_1

We do not need to restrict the hypothesis explicitly to mon↑ quantifiers if we assume that mon↓ quantifiers always take narrow scope with respect to the wh-phrase. A more semantic formulation imposes restrictions on the separation by a quantifier Q_1 of another quantifier Q_2 and its restrictive clause (i.e. the part of the sentence which provides the first argument of the quantifier). The following semantic formulation is equivalent to (51):

(52) Hypothesis (semantic formulation): A quantifier Q_1 can only separate a quantifier Q_2 from its restrictive clause if Q_1 has wide scope over Q_2 (or is scopally independent from Q_2)

The scope hypothesis functions as a starting point for the analysis of the intervention effects in the French quantification at a distance construction.

3.2 **Quantification at a distance in French again**

Returning to the French examples, we may wonder whether scope plays a role in the quantification at a distance construction as well. Rizzi would probably appeal to the difference between A and A'-binders to account for

the contrast between (53) and (54):

(53) (a) Combien de livres ont-ils tous lus?
How many of books have they all read
(b) Combien ont-ils tous lu de livres?
How many have they all read of books

(54) (a) Combien de livres a-t-il beaucoup lus?
How many of books has he a lot read
(b) *Combien a-t-il beaucoup lu de livres?
How many has he a lot read of books

This does not mean that Szabolcsi and Zwarts have nothing to say about extraction in French. (55) and (56) confirm the idea that mon↑ quantifiers create good extraction domains, whereas mon↓ operators do not:

(55) (a) Combien Jean a-t-il a acheté de livres?
How many Jean has he bought of books
(b) Combien est-ce que chaque étudiant a acheté de livres?
How many WH-PART every student has bought of books[3]
(c) Combien est-ce que la plupart des étudiants ont acheté de livres?
How many WH-PART most of the students have bought of books
(d) ?Combien est-ce que beaucoup d'étudiants ont acheté de livres?
How many WH-PART many of students students have bought of books

(56) (a) *Combien est-ce qu'aucun étudiant n'a acheté de livres?
How many WH-PART no student NEG has he bought of books
(b) *Combien est-ce que peu d'étudiants ont acheté de livres?
How many WH-PART few of students students have bought of books

Although (55d) is less acceptable than (55a-c), (56b) is clearly felt as worse.[4] The general pattern is then that mon↓ quantifiers always block extraction, whereas mon↑ quantifiers are transparent, but under certain

[3] The phrase *est-ce que* has no meaning, except for indicating that this is an interrogative construction. Therefore, it is glossed as a wh-particle (WH-PART).

[4] The contrast between (55b) and (56a) is stronger than the one between (55d) and (56b). This is not surprising in view of the discussion of 'gradience' in Szabolcsi and Zwarts (1991). They point out that quantifiers like *the* N, *every* N, *most* N, *two* N give better extraction results than *at least* N or *many* N. They suggest that this is related to the fact that universal quantifiers *every* and (generic) *most* preserve inclusions and (finite) intersections.

conditions only. This suggests that there are differences between *tous* and *beaucoup*, which neither Rizzi, nor Szabolcsi and Zwarts take into account.

A closer look at (53a) reveals that the sentence is ambiguous, just like (35a) above. The universal quantifier can take wide scope so that we ask for all persons how many books they have read. Under the narrow scope reading we ask how many books are such that everyone has read them. In (53b), however, the narrow scope reading of the universal quantifier seems to be absent. The sentence only allows for an interpretation in which we ask for all persons which books they have read.

(54a) on the other hand is not ambiguous: the quantifier *beaucoup* only allows for a narrow scope reading with respect to the interrogative *combien de livres*, just like *veel* did in (37) above. Assuming that hypothesis (51)/(52) is valid for the French case as well, we can explain why (54b) is ungrammatical. We can strengthen our position by studying the behaviour of other A'-binders. Rizzi would predict them all to forbid quantification at a distance. If scope is the crucial issue, we would expect narrow scope readings of the quantifier to give rise to ungrammaticalities as in (54b) and wide scope readings to be acceptable. Acceptable wide scope readings are exemplified in (57) and (58):

(57) (a) Combien d'enfants as-tu toujours voulu avoir?
How many of children have you always wanted to have

(b) Combien as-tu toujours voulu avoir d'enfants?
How many have you always wanted of children

(58) (a) Combien de toasts prépares-tu généralement pour le petit déjeuner?
How many of toasts prepare you generally for breakfast

(b) Combien prépares-tu généralement de toasts pour le petit déjeuner?
How many prepare you generally of toasts for breakfast

Rizzi would predict (57b) and (58b) to be out, because they involve an A'-binder. Under the scope hypothesis, (57b) and (58b) are all right, because we can give the adverb wide scope over *combien de* N. An appropriate answer to (57) would be 'I have always wanted to have six children' rather than 'There are six children I have always wanted to have' and to (58) 'I generally prepare three toasts for breakfast' rather than 'There are three toasts which I generally prepare for breakfast'. So in this context, a wide scope reading of the adverb is preferred, even in the non-split construction.

Extraction is blocked for monotone decreasing quantifiers as usual:

(59) (a) Dis-moi combien de livres de Zola tu n'as jamais encore lu?
Tell me how many of books of Zola you NEG have never yet read

(b) *Dis-moi combien tu n'as jamais encore lu de livres de Zola?
Tell me how many you NEG have never yet read of books of Zola

We observe that negative quantifiers do not get scope over the wh-phrase. If intervening quantifiers have to take wide scope over the wh-phrase, this rules out all mon↓ expressions. Again, this shows that one half of Szabolcsi and Zwarts' descriptive generalization is true for the quantification at a distance cases: mon↓ quantifiers block extraction and create islands. As far as monotone increasing quantifiers are concerned, extraction clearly depends on the scope of the intervening quantifier. We may conclude that the scope hypothesis developed for the Dutch *wat voor*-split in section 3.1 accounts for the French quantification at a distance cases as well.

4. Conclusion on weak islands and scope

Now the question obviously arises why mon↓ quantifiers and iterative adverbs always take narrow scope with respect to a wh-expression. Note that with respect to other operators these expressions can take wide scope:

(60) (a) Not every child brought a present
(b) Nobody knows everything
(c) The president of this association has been killed several times

This means that we cannot claim that for mon↓ quantifiers and iterative adverbs wide scope readings are excluded in general. On the other hand, the comparison between iterative and frequentative adverbs reveals some differences in scope possibilities. For instance frequency adverbs can take scope over sentence initial *if/when*-clauses, but iterative adverbs cannot:

(61) (a) When Anne came in, Paul usually greeted her ≈
In most situations in which Anne came in, Paul greeted her
(b) When Anne came in, Paul greeted her twice ≠
In two situations in which Anne came in, Paul greeted her

In general then, it seems that the scope possibilities of iterative adverbs are more restricted than those of frequency adverbs. Kiss (1990) mentions the scope properties of negation as an observation and she does not provide an explanation for its behaviour. Her claim is that wide scope quantifiers must be specific in the sense of Enç (1991). Enç argues that specific quantifiers can take either wide or narrow scope, whereas non-specific quantifiers are restricted to narrow scope. Enç and Kiss do not explain, however, why a negative quantifier like *nobody* can be specific and take wide scope with respect to *everything* as in (60b), whereas it must take narrow scope with respect to a wh-expression, as we saw in (43). Also, analyses which rely on notions such as specificity, referentiality or discourse-linking do not offer much hope for an explanation of the differences observed between iterative

and frequency adverbs. Why would frequency adverbs such as *often*, *always* be specific (referential, d-linked, etc.) whereas iterative adverbs like *veel*, *twee keer* would be obligatorily non-specific (non-referential, non d-linked, etc.)? Whichever explanation we choose to give of the scope possibilities of natural language quantifiers, it should be formulated in such a way that it is not only valid for NPs, but can be extended in a natural way to other quantificational expressions, such as adverbs. I will leave this open for further research and refer to Szabolcsi (this volume) for more discussion of this issue.

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