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# The Weak Island Effect of Floating Quantifiers

Viviane Déprez

Rutgers University

## 0. Introduction

Research on constraints on Wh-movement has standardly focused on clause peripheral factors affecting long movement. Thus, Wh-movement has been shown to be sensitive to the structural position, the semantic nature and the complementizer type of its extraction site. Recently, however, attention has shifted to elements which affect wh-movement in similar ways but whose syntactic position is IP internal. These include negation (Ross 1983), negative quantifiers (Rizzi 1990) and intervening adverbial quantifiers (Obenauer 1984). There have been essentially two influential accounts of inner islands in the literature, one by Rizzi (1990), which focuses primarily on the syntactic position of the island inducing elements, and the other by Szabolcsi and Zwarts (1990, 1991) which focuses primarily on some of its semantic properties.

The present paper has two goals. First, it seeks to argue that the set of inner islands includes some constructions in which floating quantifiers such as the French quantifier *chacun* interact with wh-extractions. Second, it will show that although the floating quantifier constructions affect extractions in similar ways, they share neither the syntactic nor the semantic properties deemed characteristic of inner island inducers under either Rizzi's Relativized Minimality account or Szabolcsi and Zwarts' analysis. This result questions the generality of the respective explanations of these two accounts and calls for a different solution. I will argue that the floating quantifier constructions provide strong evidence in favor of an approach which takes the relative scope of the intervening quantifier and the extracted element to be the principal source of the inner island effect (H. de Swart (1992), E.Kiss (1990), Szabolcsi (1992)), not its monotonicity property or the nature of its syntactic position.

The paper is organized as follows. In the first section, I briefly illustrate the main effects that inner islands and more generally weak islands have on wh-extractions and summarize the two main accounts proposed in the literature. Next, I provide novel empirical arguments demonstrating the island effect induced by floated quantifiers and I discuss the problems these create for the influential accounts of Rizzi (1990) and

Szabolcsi and Zwarts (1990, 1991). In section 4, I develop an analysis of the scopal interactions between the floating quantifiers and wh-extractions.

### 1. Inner Island effects

Weak islands of which inner islands are a subset have standardly been assumed to block the extraction of adjuncts while permitting the extraction of arguments. But as the examples (2) to (4) show, there is more to the weak island effect than a simple argument/adjunct asymmetry. Weak islands have also been shown to affect the extraction of amount and measure phrases (2) (Rizzi 1990), to impose interpretation restrictions on the extracted phrase -- so that only "referential" elements can be extracted (3) (Cinque (1991), Kroch (1989) Szabolcsi (1992)) -- and to prevent split extractions such as the split *combien* extraction in French (4) and the *was fur* split extraction in German and Dutch:

#### - Argument/Adjunct asymmetry

- (1) a. Which book do you wonder whether Peter read?  
 b. \*How do you wonder whether Peter behaved?

#### - Amount extractions

- (2) a. What did John weigh ? Apples/180 lbs  
 b. What do you wonder whether John weighed? Apples/\*180lbs

#### - Referentiality

- (3) a. Which car do you wonder whether John will buy ?  
 b. \*What the hell do you wonder whether John will buy ?

#### - Split extractions

- (4) a. Combien de livres te demandes-tu si Jean a lu ?  
 How many books do you wonder whether John read  
 b. \*Combien te demandes-tu si Jean a lu de livres ?  
 How many do you wonder whether John read of books

As shown in (5), a number of varied constructions containing elements such as factive and negative verbs, negation, negative quantifiers and adverbs of quantification and iteration have been argued to induce characteristic weak island effects on wh-extractions. These are illustrated here with the French split *combien* extractions:

- (5) Factive islands  
 a. \*Combien regrettes-tu que Jean ai acheté de livres  
 How many do you regret that John bought of books

## Negative verbs

- b. ??Combien as-tu nié avoir volé de livres  
How many did you deny having stolen of books

## Negation

- c. \*Combien n'as-tu pas lu de ces livres  
How many did you not read of books

## Adverbs of quantification

- d. \*Combien n'as-tu jamais lu de livres ?  
How many did you never read of books

## Negative quantifiers

- e. \*Combien crois-tu qu'aucun de ces enfants n'a lu de livres  
How many did none of these children read of books

## Iterative adverbs

- f. \*Combien as-tu beaucoup lu de livres ?  
How many did you read a lot of books ?

Rizzi (1990) was the first to argue that the weak island inducing effect of all these varied constructions can be attributed to a single common cause. He proposes that in each of these cases, wh-movement fails to satisfy the ECP because it crosses an element in an A' specifier which counts as a blocker for the formation of a local A'-chain. This account of inner islands is embedded within a general theory of movement whose central conceptual proposal is that the blocking effect of particular elements is relativized to the type of movement considered. Rizzi distinguishes three types of movement, head movement, A-movement and A' movement and argues that these are respectively blocked by heads, constituents in A-specifiers and constituents in A'-specifiers, i.e. elements which occur in the same type of syntactic position as the landing site of the movement they block. Wh-islands, where a wh-element is overtly extracted over an intervening wh-element in the A'-specifier of an intermediate CP are the clearest examples of this blocking effect. To account for the blocking effects of negation, negative quantifiers and negative adverbs which appear to occupy quite different syntactic positions at S-structure, Rizzi proposes that at the level of LF, these elements all come to occupy a common syntactic position, namely the A' specifier of a Neg projection (Zanuttini 1989).<sup>1</sup> Iterative adverbs such as *beaucoup* are argued to occupy yet another A' specifier, i.e. the Spec of VP. Finally, the weak island effect induced by factives and negative verbs could be taken to follow from the hypothesis that these verbs select complementizers containing in their specifier empty operators which induce the relevant blocking effect (Laka 1991, Melvold

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<sup>1</sup> This particular proposal raises in fact some problems for English. To account for the inner island effect of negation, Rizzi (1990) argues that the negation *not* in English, like the negation *pas* in French is a specifier, not a head. A similar reasoning should confer to the adverb of quantification *never* the same A' specifier status. But if *never* and *not* are assumed to occupy the same type of syntactic position, the fact that they behave differently wrt do-insertion construed in terms of head movement is unexpected.

1992).<sup>2</sup> In sum, in Rizzi's view, the cases of weak islands listed in (5) are taken to involve a wh-extraction over a filled A'specifier which acts as the relevant blocker.

In contrast to Rizzi, Szabolcsi and Zwarts (1990, 1991) propose that it is not the syntactic position, but rather specific semantic properties of the intervening elements which are at the source of the weak island effect. They observe that there is an interesting correlation between the monotonicity property of intervening elements and their island inducing effects. Intervening elements which are either monotone decreasing or non-monotonic block extractions. Elements which are monotone increasing do not interfere with extractions. As illustrated in (6) monotone increasing quantifiers such as *every* lead entailments from sets to supersets. Conversely, monotone decreasing elements such as negative quantifiers lead entailments from supersets to subsets. Non-monotonic elements, such as adverbs like *beaucoup*, on the other hand, support entailments in neither direction<sup>3</sup>. This is illustrated in the examples (7) below, where (a) implies (b) for monotone increasing quantifiers, while the implication is reversed with monotone decreasing quantifiers and absent in either direction for non-monotonic ones:

- (6) i. Monotone increasing:  
a. Everyone came early  $\rightarrow$  b. Everyone came
- ii. Monotone decreasing:  
a. No one came early  $\nrightarrow$  b. No one came
- (7) i. Negative intervener = monotone decreasing  
a. John denied Mary came early  $\nrightarrow$  b. John denied Mary came  
a. John never left early  $\nrightarrow$  b. John never left  
a. John did not come early  $\nrightarrow$  b. John did not come
- ii. wh-islands = non-monotonic  
a. I wonder whether John walks quickly  $\leftrightarrow$  b. I wonder whether John walks
- iii. Factive = non-monotonic  
a. I regret that John walks quickly  $\leftrightarrow$   
b. I regret that John walks
- vi. Beaucoup/a lot = non-monotonic  
a. Jean a beaucoup conduit de camion  $\leftrightarrow$   
John drove trucks a lot

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<sup>2</sup> Alternatively, the weak island status of factive complements could be taken to be structural as suggested in Cinque (1991). Under this view, however, weak island effects do not receive a unified account.

<sup>3</sup> More formally, a function *f* is monotone increasing if for every A, B in its domain, if A is included in B then *f*(A) is included in *f*(B). A function is monotone decreasing if for every A, B in its domain if A is included in B then *f*(A) is not included in *f*(B). Note that as discussed by Szabolcsi and Zwart (1991), only the monotonic property of the second argument (the VP) is relevant for inner island effects.

- b. Jean a beaucoup conduit  
John drove a lot

The empirical predictions of both analysis combined are that elements which are either monotone increasing or not in A' specifiers should not interfere with wh-extractions. In the next section, I turn to empirical evidence which shows that neither of these predictions can be fully upheld.

## 2. The weak island effects of floating quantifiers

As shown in (8) the French quantifier *chacun* can occur either within an NP as a syntactic determiner or in a floated position<sup>4</sup>. Note that as predicted by the fact that French is a verb-raising language (Pollock 1989) the floated form is postverbal:

- (8) a. Je crois que **chacun de ces enfants** enverra 3 cartes postales à ses parents  
b. Je crois que ces enfants enverront **chacun** 3 cartes postales à leurs parents  
I think that (each of) these children will (each) send 3 postcards to their parents

These two constructions have been assumed to have essentially the same semantic properties (Choe.J.W 1987). Yet, as I will show, determiner *chacun* and floated *chacun* have significantly different effects with respect to wh-extractions. While determiner *chacun* leaves wh-extraction unaffected, floated *chacun* induces characteristic weak island effects. This is first shown in (9) where a clear contrast arises between the split *combien* extractions over the determiner quantifier and split *combien* extractions over the floated quantifier:

- (9) a. Combien est-ce que tu crois que **chacun de ces enfants** enverra de cartes postales à ses parents ?  
b. \*Combien est-ce que tu crois que ces enfants enverront **chacun** de cartes postales à leurs parents  
How many do you think that (each of) these children will (each) send of postcards to their parents ?

As further shown in (10) floated quantifiers can occupy various positions in a sentence

<sup>4</sup> As in English, the French quantifier *chacun* has a so-called binominal counterpart, illustrated in (i) below.

(i) Les enfants ont lu trois livres chacun  
The children have read two books each

I return to this construction in section 3.

with a more complex tense structure.

- (10) a. Je crois que **chacun de ces médecins** a pu ausculter 3 patients aujourd'hui
- b. Je crois que ces médecins ont (**chacun**) pu (**chacun**) ausculter (**chacun**) 3 patients  
I think that (each of) these doctors has (each) been able to (each) examine 3 patients.

Both regular *combien* extraction and split *combien* extraction are possible when the quantifier is not floated:

- (11) a. Combien de patients est-ce que tu crois que **chacun de ces médecins** a pu ausculter aujourd'hui ?  
How many patients do you think that each of these doctors could examine
- b. Combien est-ce-que tu crois que **chacun de ces médecins** a pu ausculter patients aujourd'hui  
How many patients do you think that these doctors could each examine

But as shown in (12) there is a systematic contrast between regular and split *combien* extraction over any of the floated quantifiers:

- (12) a. Combien de patients est-ce-que tu crois que ces médecins ont **chacun** pu ausculter aujourd'hui ?
- b. ??Combien est-ce que tu crois que ces médecins ont **chacun** pu ausculter de patients aujourd'hui ?
- c. Combien de patients est-ce que tu crois que ces médecins ont pu **chacun** ausculter aujourd'hui
- d. \*Combien est-ce que tu crois que ces médecins ont pu **chacun** ausculter de patients aujourd'hui
- f. Combien de patients est-ce que tu crois que ces médecins ont pu ausculter **chacun** aujourd'hui
- g. \*Combien est-ce que tu crois que ces médecins ont pu ausculter **chacun** de patients aujourd'hui

How many do you think that these doctors have each been able to examine of patients today?

Recall that as mentioned above, the impossibility of split extractions is a particularly clear test of weak island effects. The data in (10) & (12), thus suggest that the floating

quantifier *chacun* should be included in the set of weak island inducers. This is confirmed with the non-split amount extractions in (13) and (14). Recall that as Rizzi argued, pure amount extractions out of weak islands are deviant. The contrasts in (13) and (14) which show that the amount extraction is significantly less natural when the quantifier is floated provide further evidence of their opacity inducing effect:

- (13) a. Combien crois-tu que **chacun de ces livres** devraient coûter  
 b. \*Combien crois-tu que ces livres devraient **chacun** coûter  
 What do you think that (each of) these books should (each) cost
- (14) a. Combien de moins crois-tu que **chacun de ces patients** va peser d'ici une semaine  
 b. \*/?Combien de moins crois-tu que ces patients vont **chacun** peser d'ici une semaine  
 How much less do you think that (each of ) these patients will (each) weigh in a week from now

Note that although I have put a star in front of (13b) and (14b), these sentences are not fully ungrammatical. Rather, to be interpretable, (13b), on the one hand, must presuppose that there is a specific amount of money such that each of the books should individually cost this amount and (14b), on the other hand must presuppose that there is a specific weight such that each patient individually lost the same weight. What (13) and (14) show is that the presence of the floated quantifier induces an interpretation restriction which as argued by Kroch (1989) is typical of the weak island effect. The same is true of the adjunct extraction shown in (15). (15b) is deviant unless an adequate context is constructed which renders natural the presupposition that there is a specific way in which all the boys should have individually behaved.<sup>5</sup>

- (15) a. Comment crois-tu que **chacun de ces garçons** aurait du se comporter ?  
 b. \*Comment crois-tu que ces garçons auraient du **chacun** se comporter?  
 How do you think that (each) the boys should have (each) behaved?

As has been noted by Filippo Beghelli (cited in Szabolcsi (1992)) copular agreement in cleft sentences is sensitive to the weak island effects. (16) shows that when clefting occurs across an inner island inducer, here the negative quantifier **aucun**, agreement is strongly preferred. This distinction reflects in fact the referential/non-referential effect of weak islands. In (16a), with agreement, the NP *five girls* is understood as referring to specific girls. In (16b) on the contrary, *five girl* simply refers to an number of girls, with

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<sup>5</sup> A comparable example featuring an adjunct extraction over a negative adverb is noted in Szabolcsi (1992):

- i. \*Comment n'as tu jamais resolu de problemes ?  
 \*How did you never solve problems ?

no specific girls in mind:

- (16) a. **Ce sont** cinq filles à qui je crois qu'aucun de ces garçons n'a parlé  
These are five girls to whom I believe none of these boys talked
- b. \***C'est** cinq filles à qui je crois qu'aucun de ces garçons n'a parlé  
The number such that I believe none of these boys has talk to that number of girls is five

As shown in (17), the same preference for agreement is manifested when extraction of the clefted element crosses a floated quantifier. This provides yet further confirmation that floated quantifiers induce characteristic weak island effects.

- (17) a. **Ce sont** cinq filles à qui je crois que ces garçons ont **chacun** parle  
These are five girls to whom I believe these boys have each talked
- b. \***C'est** cinq filles à qui je crois que ces garçons ont **chacun** parle  
The number such that I believe these boys have each talked to that number of girls is five

As the facts in (9) through (17) demonstrate, the floated quantifier *chacun* is a weak island inducer. In what follows, however, I will show that floated *chacun* has neither the semantic property nor the syntactic property which have been argued to be characteristic of weak island inducers under either Rizzi's (1990) or Szabolcsi'and Zwarts' (1990,1991) account.

### 3. Problems for Previous Accounts

Begining with the semantic properties, it is clear that, as (18) shows, floated *chacun*, just like its non-floated counterpart, is undoubtedly monotone increasing. In all cases listed under (18), it is true that the sentence in (a) always entails the sentence in (b).

- (18) i. a. Chacun de ces garçons a rapporté 2 livres en retard →  
b. Chacun de ces garçons a rapporté 2 livres  
Each of these boys returned 2 books (late)
- ii. a. Ces garçons ont **chacun** rapporté 2 livres en retard →  
b. Ces garçons ont **chacun** rapporté 2 livres  
These boys have each returned 2 books late
- iii. a. Ces garçons ont **chacun** mangé 3 pommes et bu 3 verres →  
b. Ces garçons ont **chacun** mangé trois pommes  
These boys have each eaten 3 apples (and drunk 3 glasses)

Since floated *chacun* is monotone increasing, its weak island inducing properties are not

accounted for under Szabolcsi and Zwarts' account. Consequently, this suggests that an account of weak islands based only on the monotonicity properties of the intervening element is not general enough.

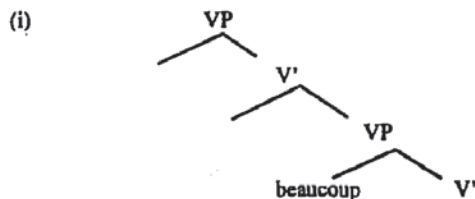
This conclusion appears at first to favor a syntactic account of weak islands. As the following shows, however, floated *chacun* does not seem to occur in any of the A'-specifiers posited by Rizzi. It is clear of course that *chacun* does not occur in the Spec of CP. As shown by (19) furthermore, floated *chacun* cannot be assumed to occur in the Spec of NegP, since in contrast to negative quantifiers, it is incompatible with *ne*.

- (19) a. **Aucun de mes étudiants n'** est venu  
None of my students *ne* have come
- c. \***Mes étudiants ne sont chacun** venus  
My students *ne* have each come

(20) further shows that if Rizzi is right to assume that *beaucoup* is in the Spec of VP then *chacun* clearly cannot be. Rizzi's arguments in support of *beaucoup* as a Spec VP include the fact that it must be immediately adjacent to V and the fact that this position allows only one such element as shown in (20) and (21) respectively:

- (20) a. \*Il a beaucoup soigneusement replié de feuilles  
He has many carefully folded of leaves
- b. Il a soigneusement beaucoup replié de feuilles  
He has carefully many folded of leaves<sup>6</sup>
- (21) \*Il a trop/peu beaucoup aimé de femmes  
He has loved too many/few women a lot

<sup>6</sup> This contrast is noted in Frampton (1992) who suggests that *beaucoup* occurs in one of the specifier of a Larsonian VP shell as represented in (i).



However, neither Rizzi nor Frampton's suggestion accounts for the fact that the adverb in (21b) has a subject orientation. As shown in (ii), in fact VP adverbs which do not allow for a subject orientation can occur neither before nor after *beaucoup*.

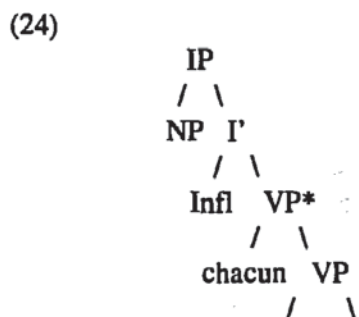
- (ii) a. \*Jean a mortellement beaucoup blessé de soldats  
b. \*Jean a beaucoup mortellement blessé de soldats  
John has mortally wounded a lot of soldiers/soldiers a lot

The facts in (ii) considerably weaken the Rizzi/Frampton's argument for the status of *beaucoup* as a VP specifier since *beaucoup* appears in fact to be in complementary distribution with VP manner adverbs.

However, as shown in (22) and (23), *chacun* can cooccur with *beaucoup* and can be separated from V by VP adverbs. It can therefore not be assumed to occupy the Spec of VP:

- (22) a. Ces garçons ont **chacun** beaucoup lu de livres  
 b. \*Ces garçons ont beaucoup **chacun** lu de livres  
 These boys have a lot each read of books
- (23) a. Les enfants ont **chacun** soigneusement formulé leur demande  
 The children have each carefully worded their request

It has been argued by Sportiche (1988) that floated quantifiers are in fact stranded in the VP internal D-structure position of subjects as represented in (24). If this is correct, then clearly, *chacun* does not occur in an A' specifier but rather in an A position which is the thematic position of external arguments. But if floated quantifiers are in A-positions then their inner island inducing properties remain unaccounted for under Rizzi's Relativized Minimality.



Note that even if it were assumed, as for instance in Williams (1982), that floating quantifiers are adverbial in nature and are adjoined to VP, Rizzi's Relativized Minimality approach still predicts that floating quantifiers should have no effect on wh-extractions. Indeed, if adjoined positions were allowed to count as blockers of A' movement, then not only would all adverbs be expected to create weak island effects, an incorrect prediction as show in (24'), but also all quantifiers should be island inducers since after QR, they all occur in adjoined positions. With respect to the data we have presented, this would predict that there should be no difference between the determiner *chacun* and the floated *chacun*, contrary to fact:

- (24') Combien peut-on vraisemblablement lire de livre en une journée  
 How many could one possibly read of books in one day

To sum up we have demonstrated that neither Rizzi's Relativized Minimality approach nor Szabolcsi and Zwarts' monotonicity analysis achieves a characterisation of weak island inducers which can account for the weak island effect created by the floating quantifier *chacun*. This suggests that the characterization of both accounts is too limited and a different factor is at stake. In section 4, I will argue that the weak island property

of floating quantifiers derives from their scope properties. But before turning to this proposal, I will briefly consider a recent proposal by Tellier and Valois (1993) which seeks to maintain a Relativized Minimality account of the weak island effect of *chacun* by assigning a particular syntactic structure to a subset of the constructions in which it occurs.

Based on the ungrammaticality of examples such as (26), where the quantifier *chacun* immediately precedes NP, Tellier and Valois (1993) (henceforth T&V) propose that *chacun* blocks *combien* extraction only when it forms a constituent with the following NP:

- (25) \*Combien les professeurs ont-ils lu **chacun** de livres  
How many these professors have read each of books

They view prenominal *chacun* in (25) as generated in the A' Spec of DP or as derived from a binominal construction such as (26a) by a rule of fronting as illustrated in (27). In their view, *chacun* in (25) forms a constituent with the adjacent NP<sup>7</sup> and is thus structurally distinct from the floated quantifier, which they assume to be adjoined to some projection of VP, so that it does not interfere with wh-extractions.

- (26) a. Ces professeurs ont lu [<sub>NP</sub> deux livres **chacun**]  
These professors have read each two books  
b. Ces professeurs ont lu [<sub>NP</sub> **chacun** deux livres]  
These professors have read two books each

- (27) V [<sub>QP/DP</sub> [ **chacun** deux livres] t]

There are essentially two major problems with this proposal. First, it simply cannot account for the weak island effects discussed above in section 2. where *chacun* does not occur in a position adjacent to an NP. Second as I will show, the assumption that *chacun* forms a constituent with the following NP appears to be neither well supported nor particularly helpful. As shown in (28) indeed, binominal *chacun* which as argued by Junker (1991) and Safir & Stowell (1989) does form a constituent with its adjacent NP, contrasts with prenominal *chacun* in its compatibility with split-*combien* extractions. If as proposed by Tellier & Valois, prenominal *chacun* derives from the binominal *chacun* by fronting, the contrast in (28) is rather unexpected:

- (28) a. Combien ont-ils lu de livres **chacun** ?  
How many have they read of books each

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<sup>7</sup> In the LI version of their paper, T&V propose that prenominal *chacun* is generated in Spec DP and only suggest in passing a fronting account. The proposal that *chacun* is in Spec DP solves none of the problems I raise against the view that prenominal *chacun* is a binominal quantifier.

- b. \*Combien ont-ils lu **chacun** de livres ?  
How many have they read each of books

Furthermore, the arguments provided by T&V in support of the constituenthood of *chacun* with the following NP remain rather inconclusive. As they note, prenominal *chacun* appears to share with the postnominal *chacun* the possibility of occurring concurrently with an NP in the focus of a cleft construction:

- (29) a. C'est [deux livres **chacun** ] que les professeurs ont lu t  
b. C'est [ **chacun** deux livres] que les professeurs ont lu t  
It is (each) two books (each) that the professors have read

Note that examples such as (29b) can provide evidence for the constituenthood of prenominal *chacun* with the NP only if it is assumed that the focus part of a cleft must contain a single constituent. But, as (30) shows, the focus part of a French cleft can also contain certain adverbs which cannot be easily assumed to form a constituent with the following NP, even though, like *chacun*, they occur in prenominal position in non-clefted sentences:

- (30) a. Ils attaquent à chaque fois une femme sans défense  
They attack each time a defenseless woman  
a'. C'est à chaque fois une femme sans défense qu'ils attaquent  
It is each time a defenseless woman that they attack  
b. Les hommes préfèrent souvent les blondes  
Men prefer often blonds  
b'. C'est souvent les blondes que les hommes préfèrent  
It is often blonds that men prefer  
c. Les hommes regardent plutôt les jeunes  
Men would rather look at the youngs  
c'. C'est plutôt les jeunes que les hommes regardent  
It is rather the youngs that men look at

Whatever the correct analysis of the b. examples is<sup>8</sup>, it seems rather clear that the clefting

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<sup>8</sup> There are essentially two possibilities which I will not elaborate on. First, it could be that sentential adverbs are generally permitted in clefts independently of what the focus is.

(i) It's probably John I saw this morning

Second, given the V raising analysis of French, it could be that the clefted constituent is in fact a VP out of which the V has raised. The structure of examples such as (29b) would then be as in (ii):

constructions do not furnish solid evidence for the non-adverbial status of prenominal *chacun* nor for its constituenthood with the postverbal NP. When clearer tests of constituenthood are taken into account, the results do not favor T&V's conclusion. As shown in (31), there is a clear contrast between postnominal and prenominal *chacun* in NP movement constructions. While the former is possible, the latter is sharply excluded:

- (31) a. ? [Un livre **chacun** ] leur a été donné  
 b. \* [ **Chacun** un livre] leur a été donné  
 (\*Each) a book (each) was given to them

As further shown in (32), a similar contrast occurs in prepositional constructions. While binominal *chacun* is compatible with a prepositional argument, prenominal *chacun* cannot occur between a preposition and its complement NP, although it can occur between the verb and the prepositional phrase:

- (32) a. Ils ont parlé avec/à trois personnes **chacun**  
 They spoke to three people each.  
 a'. \*Ils ont parlé avec/à **chacun** trois personnes  
 They spoke to each three people.  
 a". Ils ont parlé **chacun** avec/à trois personnes  
 They spoke each to three people.  
 b. Elles ont pensé à trois solutions **chacune**  
 They thought about three solutions each  
 b'. \*Elles ont pensé à **chacune** trois solutions  
 They thought about each three solutions  
 b". Elles ont pensé **chacune** à trois solutions  
 They have thought each about three solutions  
 c. Ils ont voté pour trois candidats **chacun**  
 They voted for three candidates each  
 c'. \*Ils ont voté pour **chacun** trois candidats  
 They voted for each three candidates  
 c". Ils ont voté **chacun** pour trois candidats  
 They have voted each for three candidates

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(ii) C'est [<sub>VP</sub> chacun t deux livres] que les enfant ont lus

These two structures lead to different predictions which I explore in work in progress.

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Viviane Déprez

The contrasts in (32) are unexpected if *chacun* is assumed to be able to form a constituent with an NP, casting further doubt on T&V's hypothesis.

In contrast to T&V, I propose that instances of apparent prenominal *chacun* are in fact floated quantifiers which occur in a prenominal position as a result of verb movement. This hypothesis is schematized in (33). Under this view, the position of *chacun* in sentences such as in (26b) is comparable to that of post participial adverbs as in (34) which, following Pollock (1989), provide evidence for the existence of a short movement of the participle in French.<sup>9</sup>

(33) ....V ..ADV/*chacun* [<sub>VP</sub> t [<sub>NP</sub> deux livres ]]

(34) Les experts ont écouté attentivement mes arguments  
The experts have attentively listened to my arguments

This alternative proposal on the structure of prenominal *chacun* is supported empirically, first by the contrasts in (35) through (37) which demonstrate that prenominal *chacun* manifest clear similarities with the preverbal floated *chacun* and clear differences with the binominal *chacun*, and second by crosslinguistic considerations. As first noted by Safir and Stowell (1989) for English and by Junker (1991) for French, binominal *chacun* is subject to a definiteness constraint. Thus, as illustrated in (35a), binominal *chacun* is incompatible with a definite NP. As shown in (35b), however, this constraint does not obtain for the floated *chacun*. As argued by Junker (1991), floated *chacun* is compatible with a definite NP provided that the VP receives an interpretation involving multiple events. As shown in (35c), the prenominal/postverbal *chacun* behaves in this regard in the same way as the preverbal *chacun*.

- (35) a. \*Ces femmes ont accusé cet homme **chacune** hier  
b. Ces femmes ont **chacun** accusé cet homme hier  
c. Ces femmes ont accusé **chacun** cet homme hier  
These women have (each) accused (each) this man (each)

(36) furthermore shows that the same judgment is preserved under clefting. There is a clear contrast between (36a) which is incompatible with the definite article and (36b) which is significantly better.

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<sup>9</sup> Note that even if it were possible for *chacun* to be part of the NP, this hypothesis alone is not sufficient to account for the ungrammaticality of (25). Indeed, given the existence of short movement for French participles (Pollock (1989)), (33) must at least be a possible structure for (25). But since in T&V's view floated *chacun* (or in their terms adverbial *chacun*) is assumed to create no intervention effect, they predict in fact, that under the structure (33), (25) should be fine. It thus appears that V&T's analysis simply fails to provide a full explanation for the ungrammaticality of (25) or for examples such as (9b) above, where regular verb movement has occurred and where *chacun* can undoubtedly be analyzed as a floated quantifier.

- (36) a. \*Tour a tour, c'est cet homme **chacune** que ces femmes ont accusé  
 b. ?Tour a tour, c'est **chacune** cet homme que ces femmes ont accusé  
 In turn it is (each) this man (each) that these women have accused

This provides striking confirmation to the above conjecture that clefting in such cases does not provide an argument against the floated or adverbial status of *chacun*. (37) illustrates a further contrast between the prenominal *chacun* and the binominal *chacun*. As shown in (37a), while a pronominal in the NP cannot be bound by a binominal *chacun*, it can be bound both by the floated *chacun* and by the prenominal *chacun*. Thus, here again, prenominal or postverbal *chacun* clearly behaves in concert with the floated *chacun* and in contrast to the binominal *chacun*.

- (37) a. \*Ces femmes ont trahi leur propre mari **chacune**  
 b. Ces femmes ont **chacune** trahi leur propre mari  
 c. Ces femmes ont trahi **chacune** leur propre mari  
 These women have (each) betrayed (each) their husband (each)

(38) shows furthermore that, here again, clefting preserves this difference.

- (38) a. \*C'est leur propre mari **chacune** que ces femmes ont trahi  
 b. C'est **chacune** leur propre mari que ces femmes ont trahi  
 It is (each) their own husband (each) that these women have betrayed

Turning finally to comparative considerations, observe that as shown in (39b), prenominal *each* is not possible in English. While this crosslinguistic difference remains unexplained under T&V's hypothesis, under the view defended here it follows straightforwardly from the well known difference between French and English with respect to verb movement. The distinction between French and English with respect to prenominal *each* is in fact predicted under the verb movement analysis.

- (39) a. The boys have read three books each  
 b. \*The boys have read each three books

To conclude, it appears that in several respects, prenominal *chacun* has properties parallel to those of the floated *chacun*, not of the binominal *chacun*. Such parallelisms remain unexplained under T&V's hypothesis, suggesting that the analysis they propose is at best incomplete and at worst simply on the wrong track.

#### 4. A scope account

A number of researchers (De Swart 1992, Szabolcsi 1992, E.Kiss 1990) have recently proposed on the basis of empirical facts different from the ones presented in this paper that it is neither the nature of the syntactic position nor the monotonicity properties of the intervening element which are the cause of the weak island effect but rather its scope properties. Diverse formulations of the same basic idea have been given and are listed under (40):

(40) De Swart (1992): A quantifier  $Q_1$  can only separate a quantifier  $Q_2$  from its restrictive clause if  $Q_1$  has wide scope over  $Q_2$ .

E Kiss (1990): If  $Op_i$  is an operator which has scope over  $Op_j$ , then  $Op_i$  must be specific (in the sense of Enç).

Szabolcsi (1992): The weak island effect comes about when the wh-phrase should take wide scope over some operator but is unable to.

The common point of these views is that weak island effects are induced whenever a wh-element is separated from its trace by a scope bearing element whose scope is narrower than that of the extracted element. In such cases, the wh-element is forced to take wide scope over the intervener and this requirement enforces a specific (or so-called referential) interpretation whose relative felicity depends in part on the nature of the extracted element and in part on the discourse context (Szabolcsi 1992). To illustrate, consider for instance the case of wh-islands.

(41) \*What the hell do you wonder where John bought ?

In such cases, it is clear that the lower wh-element which is crossed cannot take wide scope over the extracted wh since it must remain in the lower Spec CP at LF to satisfy subcategorization requirements. The weak island effect is thus predicted. Under the scope account view, weak island effects do not necessarily involve syntactic violations, at least when verbal arguments are extracted.<sup>10</sup> Rather they are seen as imposing a restriction on the possible interpretation of extracted elements. This restriction can be understood as imposing a specificity requirement in the sense of Enç (1990) on the extracted wh-element. As further demonstrated by Kroch (1989), the felicity of such extractions depends essentially on the particular presupposition associated with the question. That is extractions will be judged more or less felicitous depending on the ease of constructing an appropriate context which improves the askability of the question.

Returning to the constructions at hand, recall that as we have shown, weak island effects are induced only by the floated *chacun* not by the quantifier which occurs within NPs. It is a well know (although ill-understood) fact that NP quantifiers such as *each* tend

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<sup>10</sup> Thus Kroch (1989) who argues against a syntactic account of the restrictions on amount extractions suggest that syntax is involved in the blocking of adjunct extractions.

to take the widest possible scope. As Williams (1982) has noted, in sentences such as (42a), the quantifier **each of the professors** in the subject position of the embedded clause can take wide scope over the quantifier in the subject position of the matrix sentence.

- (42) a. Some student thinks that each of the professors is incompetent
- b. Some student thinks that the professors are each incompetent (in a different way)

If, as is standard in GB literature, we assume that relative scope is established under QR and c-command, this suggests that QR can move the subject quantifier **each of the professors** from the matrix position of an embedded sentence all the way to some position in the matrix where it will c-command the matrix subject quantifier. As further noted by Williams, floated quantifiers clearly differ from their non-floated counterpart with respect to their scope properties. In contrast to its determiner counterpart, the floated quantifier *each* in (42b) cannot take wide scope over the matrix quantifier. This suggests that in contrast to their non-floated counterparts, floated quantifiers are not subject to QR. As suggested by Williams (1982), it appears that the scope of floating quantifiers is fixed in their S-structure position.

The combination of the scopal account of weak islands and of Williams's observations about the scope of floating quantifiers permits an elegant account for the weak island inducing effects of floating *chacun* described in section 2, thus providing strong support for this proposal. Consider for instance the contrasts observed in (12) repeated here under (43).

- (43) a. Combien crois-tu que **chacun de ces médecins** a pu ausculter de patients
- a'. LF: [Combien<sub>i</sub> [ [chacun de ces médecins]<sub>j</sub> [ tu crois que t<sub>j</sub> a pu ausculter [t<sub>i</sub> de patients]]]]

Assume that in (43a), QR can raise *chacun de ces médecins* to the matrix clause as illustrated in the structure (43a')<sup>11</sup>. Then, if following May (1985), we construe the interaction between quantifiers and wh-elements in terms of the possibility of forming a Z-sequence, we predict correctly that *chacun de ces médecins* can have wide scope over the wh-element. As a result the fact that no weak island effect arise is accounted for.

Let us turn now to (44). Assuming as suggested by the facts in (42b) that QR is not possible with floated quantifiers, then at LF floated *chacun* will remain adjoined to the VP of the embedded clause:

<sup>11</sup> As the alert reader will have noted, the structure (43a') appears to violate the that-t effect. It has been argued by Lasnik and Saito (1992), however, the that-t effect does not arise at LF because INFL can move to COMP, thus providing an appropriate antecedent governor for a subject trace.

(44) a. \*Combien crois-tu que ces médecins ont *chacun* pu ausculter de patients

a'. LF: [Combien<sub>i</sub> [ tu crois que [ ces médecins ont *chacun* pu ausculter [t<sub>i</sub> de patients]]]]

As a result, it will not be able to form a Z-sequence with the wh-element and it will not be able to take wide scope over it. The weak island effect is predicted.

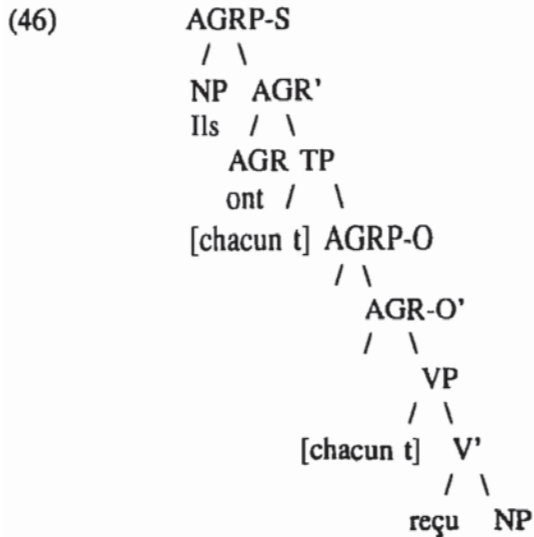
Note that the account we have proposed makes a strong prediction. Since floated *chacun* cannot undergo QR, it should never be able to interact in scope with any wh-element. That is, if following standard assumptions, we take the availability of a pair-list answer as a diagnostic for the possible interaction of a distributive quantifier and a wh-element, we predict that pair-list answers should always be excluded in constructions with floated *chacun*. As it turns out, this prediction is not fully verified. A pair list answer appears to be available with questions such as (45).

(45) Qu'ont ils *chacun* reçu ?  
What have they each received ?

Note, however, that in (45), floated *chacun*, just like any adverb occurring between an auxiliary and a VP could in principle have an ambiguous attachment, either to some inflectional projection, just like sentential adverbs, or to some VP projection. To account for this possibility, I propose the structure (46) for sentences such as (45) where the floated quantifier *chacun* can occur either in a VP internal subject position, as proposed by Sportiche (1988), or in the Spec of TP<sup>12</sup>:

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<sup>12</sup> Although the A/A' status of the two positions for the floated quantifier is irrelevant for our present purpose, one can conjecture that the VP internal subject position is an A position, since it is theta-marked, and that the Spec TP is also an A-position, if as suggested by Chomsky (1992) Spec TP is the nominative Case position, or if as proposed in Deprez (1991) specifiers which share a certain type of feature relation with their specifier (phi-features and Case) are A-positions. As shown furthermore by Deprez (1990), floating quantifiers are only compatible with A-chains. On a Sportiche approach to Q-float, this suggests that all intermediate stranded positions must in fact be assumed to be A-positions.



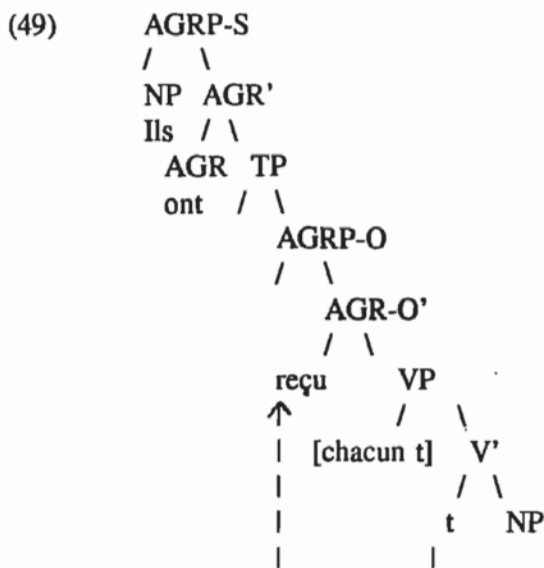
That is, the position of *chacun* in (45) is in fact ambiguous, just like the position of adverbials. Suppose further that, following a suggestion by Chomsky (1991), (1992), we assume that the two AGR-projections can delete at LF after the relevant checking procedures have operated. This deletion can be understood as a consequence of the principle of Full Interpretation, since AGR has no independent semantic content. The proposal is, in essence, that the AGR-projections do not count for the purpose of scope interpretation. This will have as a result that after the deletion of the AGR-projections, floated *chacun* will have sentential scope when it occurs in the Spec of the TP projection and VP scope when it occurs in the VP internal subject position. Since the floated Q will have sentential scope when it occurs in Spec TP, we expect that it will be able to form a Z-sequence with an extracted wh-element dominating it so that a wide scope reading becomes possible. This I suggest, is what leads the possible pair-list answer in (45). Note that the proposed analysis makes an interesting prediction. Suppose that in some structures, the quantifier *chacun* is forced to occur within the VP projection. We then predict very clearly that in such cases the quantifier will not be able to take wide scope and as a result, the weak island effect should be stronger. This prediction is verified by the contrast in (47).

- (47) a. ?Combien ont-ils **chacun** lu de livres  
 How many have they each read of books
- b. \*Combien ont-ils lu **chacun** de livres  
 How many have they read each of books

In (47a), *chacun* could in principle occur either in Spec TP or in Spec VP with an unraised participle. But in fact, avoidance of the weak island effect will determine that *chacun* occurs preferably (or only) in the Spec of TP in such constructions thus taking wide scope over the wh-element. This is in fact correct. The only interpretation of (47a) is as paraphrased in (48) with *chacun* taking wide scope.

(48) For each of them, what is the number such that they read that number of books<sup>13</sup>

For (47b), I assume the structure given in (49) with a short movement of the participle. In such cases, since *chacun* occurs postverbally, it must be attached to the VP projection and thus it is forced to take VP scope. As predicted, the split extraction of *combien* is worse.



A further prediction of the proposed analysis is that cases in which the weak island effect is induced should in principle coincide with cases in which the pair list reading is excluded. This prediction appears to be verified. While in (50a) the pair list reading is possible, it is excluded in (50b). Correspondingly, while in (50c) the split extraction is possible, it is deviant in (50d).

(50) a. *Combien de patients crois-tu que chacun de ces docteurs devraient examiner?*  
 How many patients do you think that each of these doctors should examine

<sup>13</sup> It is interesting to note that all the examples in the literature in which a floating quantifier has been argued not to intervene with wh-extraction (Rizzi 1990, De Swart 1991, T&V 1992) always involve a matrix question with a subject pronoun or a complex inversion structure. This, I believe is in fact not accidental. Adopting Sportiche's proposal of quantifiers stranding, it could be that in cases such as (47a) or all other cases in which the subject NP does not remain in Spec AGR-S, the floated quantifier is in fact stranded in the spec of AGR-S, or more simply (depending on one's assumption about sentential structure) in the highest possible subject position in the tree. This might in fact facilitate the wide scope interpretation of *chacun*. Support for this view comes from the fact that in my judgment as well as in that of a number of the speakers I have consulted, extractions in which the subject remains in the Spec AGR-S so that *chacun* must be lower, such as for instance *est-ce-que* questions as in (i) below, are worse than extractions where the subject is a clitic on C or has moved out of Spec AGR-S to Spec CP as in (47a) above:

(i)??/\* *Combien est-ce que ces professeurs ont chacun lu de livres ?*

If this is correct, then it is possible that at least for these speakers, the wide scope interpretation of *chacun* is restricted to cases in which the quantifier can be floated in the Spec AGR-S. That is, it is only in such cases that *chacun* does not interfere with wh-extractions.

- b. Combien de patients crois-tu que ces docteurs devraient **chacun** examiner?  
How many patients do you think that these doctors should each examine
- c. Combien crois-tu que **chacun de ces docteurs** devraient examiner de patients?  
How many do you think that each of these doctors should examine of patients
- d. \*Combien crois-tu que ces docteurs devraient **chacun** examiner de patients?  
How many patients do you think that these doctors should each examine

To conclude, in this paper, I have provided empirical evidence showing that constructions with the floated quantifier *chacun* induce, in certain cases, characteristic weak island effects on wh-extractions. As I have further demonstrated, the weak island inducing property of the intervener *chacun* is predicted neither under Rizzi's Relativized Minimality nor under Szabolcsi and Zwarts' monotonicity account. I have further argued that the weak island effect of floating *chacun* receives an elegant account under the scope theory of weak island and thus provides strong support for it.

### References

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Dept. of Linguistics  
Rutgers University  
18 Seminary Pl  
New Brunswick, NJ 08903

deprez@cancer.rutgers.edu  
vdeprez@clarity.princeton.edu