Structure-dependent quantifier floating in Brazilian Portuguese[1]

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Abstract: This paper shows how the internal configuration of the quantifier phrase interacts with focalization in deriving the possibilities and restrictions of quantifier floating in Brazilian Portuguese, elaborating on Valmala Elguea's (2008) discourse-driven analysis of the phenomenon in Spanish. Adopting a contextual approach to phasehood (Bošković 2012), I propose that a focus feature is encoded by an additional layer (FP) on top of the focalized constituent, this FP being licensed in Spec,FocP as in the cartographic model (Rizzi 1997). I show how focalization, encoded as such, affects the extractability of DPs out of QPs, deriving the contrasts between the quantifiers *todos* 'all' and *cada um* 'each one'.

Key-words: *quantifier floating*; *focalization*; *phases*; *Brazilian Portuguese*; *Minimalist Program.*

1. Introduction

By discussing the interaction between informational and syntactic factors involved in quantifier floating in Brazilian Portuguese (BP), I show in this paper how the internal configuration of the quantified expression is crucial in predicting the possibilities and restrictions of floating, in the framework of the Minimalist Program of Generative Linguistics. Following Valmala Elguea's (2008) analysis for Spanish, I assume that also in BP this phenomenon may be discourse-driven, but I argue that informational factors do not suffice and I show how the process of focalization interacts with the conditions imposed on the extractability of DPs out of QPs.

Valmala Elguea (2008) proposes that in Spanish the split between the quantifier and its associate happens when there is a *mismatch* in their "discourse-related feature specification" (p.844), as is illustrated in (1), where the quantifier *todos* 'all' is neutral and the associate *los estudiantes* 'the students' is focalized.

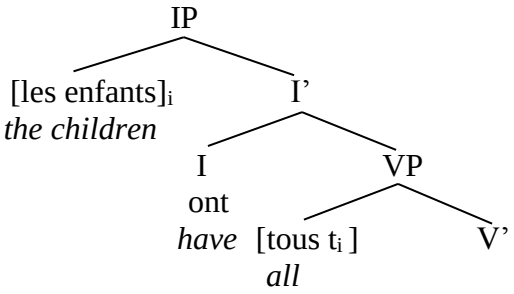
(1) [Los estudiantes]$_{FOC}$ creo que han llegado todos$_{NEUTRAL}$ t$_{foc}$ tarde.
the students (I) think that (they) have arrived all late
['I think that all *the students* have arrived late'] [2]

(Valmala Elguea 2008:844, ex. (24a))

Contrarily to the classical *stranding hypothesis* (Sportiche 1988), where floating quantifiers are inert elements that are left behind by their associates (as shown in (2)), Valmala Elguea proposes that both the quantifier and the associate can undergo movement. In (3), the quantifier *todos* 'all' is focalized in the low left periphery (cf. Belletti 2004), whereas the DP is topicalized in the preverbal position, which is taken to be a non-neutral A'-position in Spanish (cf. e.g. Uribe-Etxebarría 1992, Zubizarreta 1998, and Martí 2000; but see Villa-García 2012 for an alternative analysis).[3] Once the split is generated by a discourse-related mismatch, there is no floating if the quantifier and the associate share the same informational value, as in (4), where the quantifier and the associate are both specified for focus and thus move together to the preverbal position.

(2) a. Les enfants ont tous vu ce film.
the children have all seen this movie (Sportiche 1988:426, ex. (2b))
['All the children have seen this movie']

b.



(adapted from Sportiche 1988:428, ex. (6))

(3) [Los estudiantes de física]$_{TOP}$ han conseguido [todos]$_{FOC}$ t_{foc} t_{top} beca.
the students of physics have got all grant
['All the students of physics have got a grant']
(Valmala Elguea 2008:845, ex. (31c))

(4) [[Todos]$_{FOC}$ [los estudiantes de física]$_{FOC}$]$_i$ han conseguido t_i beca.
all the students of physics have got grant
(Valmala Elguea (2008:844), ex. (26B1))

However, as we see in the data below, informational content alone cannot explain the data. Three questions must be raised. First, if informational factors determine quantifier floating, why do different quantifiers show different patterns of floating in BP? As shown in (5), both *cada um* 'each one' and *todos* 'all' can float in the middle of the sentence, but (6) shows that only *cada um* 'each one' can appear to the right of a neutral object. Second, how can the cross-linguistic variation be accounted for? In Spanish, contrarily to BP, *todos* 'all' can appear to the right of a neutral object, as in (7). Third, is the informational mismatch really a necessary and sufficient condition for quantifier floating? As Valmala Elguea himself points out (cf. (8)), there is no split between a focus quantifier and a neutral associate in Spanish.

(5) a. Os alunos$_i$ leram **cada um** t_i duas revistas.
the students read each one two magazines
'Each one of the students read two magazines'
b. Os alunos$_i$ leram **todos** t_i duas revistas.
the students read all two magazines
'All the students read two magazines

(6) a. Os alunos$_i$ leram duas revistas **cada um** t_i .
the students read two magazines each one
b. *Os alunos$_i$ leram duas revistas **todos** t_i .
the students read two magazines all

(7) Los alumnos han leído dos revistas **todos**. (*Spanish*)
the students have read two magazines all

(8) *[Todos$_{FOC}$]$_i$ han conseguido [t_i los estudiantes de física]$_{NEUTRAL}$ beca.
all have got the students of physics grant
(Valmala Elguea 2008:847, ex. (39))

I address these questions by showing how the floating possibilities and restrictions are the result of the interaction between the internal structure of each quantified expression and the derivational course of the sentence. In section 2, I present the structure of the quantifiers *todos* 'all' and *cada um* 'each one' and propose that a focus feature can be encoded in the structure by an additional layer, whose presence or absence predicts different results, adopting Bošković's (2012) contextual approach to phasehood. In section 3, I show that the predictions made in section 2 are borne out and explain the questions raised in the Introduction.

2. Extracting from the quantified expression

In order to derive the extractability of the DPs in cases of floating, I will adopt Bošković's (2012) contextual approach to phasehood, in which "the highest projection in the extended projection of a major (i.e. lexical) category functions as a phase" (p.1) (see also Bobaljik & Wurmbrand 2005 and Wurmbrand 2011). The following paradigm from Serbo-Croatian, a DP-less language, illustrates the functioning of this approach. In (9) below, the NP *this student* (*this* being left-adjoined to *student*) is the complement of the NP *pictures* and can only be extracted from it in the presence of a quantifier, which adds another layer to the structure.

(9) a. Ovog studenta$_i$ sam pronašla [mnogo/deset slika t_i] (*Serbo-Croatian*)
this$_{GEN}$ student$_{GEN}$ am found many/ten pictures$_{GEN}$
['Of this student I found many/ten pictures']
b. *Ovog studenta$_i$ sam pronašla sliku t_i
this$_{GEN}$ student$_{GEN}$ am found picture$_{ACC}$
['Of this student I found a picture'] (Bošković 2012:11, ex.(17))

The situation is explained below. In (10), in order to be extracted, the NP *this student* must move the edge of the QP-phase, in compliance with the Phase Impenetrability Condition (PIC) (Chomsky 2001). This movement also respects Anti-locality (Abels 2003), as the NP_2 crosses one maximal projection, namely NP_1. In (11), on the other hand, the NP_2 is trapped inside the NP_1: in order to comply with the PIC, the NP_2 must move to the edge of NP_1, as in (11)b, which violates Anti-locality; and the option in (11)c, where the NP_2 moves directly out of the NP_1, violates the PIC.

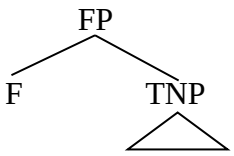
(10) a. [$_{QP}$ many [$_{NP1}$ pictures [$_{NP2}$ this student]]]
b. [$_{QP}$ [$_{NP2}$ this student]$_i$ [$_{QP}$ many [$_{NP1}$ pictures t_i]]]
c. [$_{NP2}$ this student]$_i$ … [$_{QP}$ t_i [$_{QP}$ many [$_{NP1}$ pictures t_i]]]

(11) a. [$_{NP1}$ picture [$_{NP2}$ this student]]
b. *[$_{NP1}$ [$_{NP2}$ this student]$_i$ [$_{NP1}$ pictures t_i]]
c. *[$_{NP2}$ this student]$_i$ … [$_{NP1}$ pictures t_i]

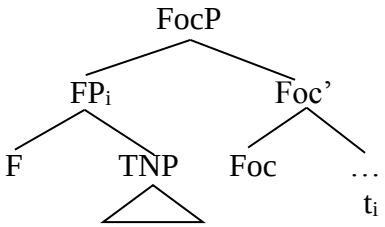
From these examples, we can conclude that the addition of layers in a given domain affects the extractability out of it: an XP can only be extractable if it can move to the edge of the phase that contains it by crossing at least one maximal projection.

I will show below how the floatability of the quantifiers *todos* 'all' and *cada um* 'each one' is subject to these conditions, by proposing that a focus feature can be encoded in the nominal domain by an additional layer (which I call FP here) — contrarily to Bastos-Gee

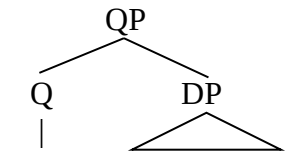
(2011), to whom an informational feature does not force the presence of a correspondent projection in the traditional noun phrase (TNP).[4] This FP projection must be checked against a Foc^0 head, assuming the cartographic approach (since Rizzi 1997).

(12) a. 

= *focalized TNP*

b. 

Let us now observe the internal structure of the quantifiers *todos* 'all' and *cada um* 'each one' and see what predictions the above proposal makes with respect to their floatability. I assume with Vicente (2006) that *todos* takes a DP as its complement (as was first proposed by Shlonsky 1991 for Hebrew *kol* 'all') and I adopt her structure in (13). *Cada* 'each' takes an NP as its complement and cannot be separated from it, as shown in (14). Nevertheless, when this NP is the proform *um* 'one', it may select for a (partitive) DP, which can float, as in (15).[5] The structure adopted is that in (16).

(13) 

all *the students*

(Vicente 2006:99, ex. (42))

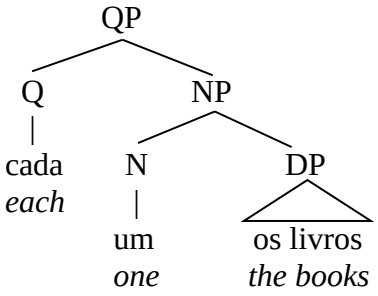
(14) a. **Cada livro** tem um autor diferente.
each book has a author different
'Each book has a different author'

b. ***Livro$_i$** tem **cada t_i** um autor diferente.
book has each a author different

(15) a. **Cada um dos livros** tem um autor diferente.
each one of-the books has a author different
'Each one of the books has a different author'

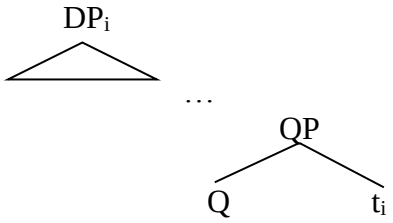
b. **Os livros$_i$** têm **cada um t_i** um autor diferente.
the books have each one a author different

(16)

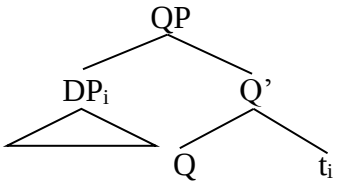


When the quantifier *todos* has a neutral interpretation, there is no FP layer above the QP, which prevents its complement DP from being extracted. It would either violate the PIC (if moved directly across QP, as in (17)a) or Anti-locality (if moved from complement of Q^0 to Spec,QP, as in (17)b). On the other hand, if the focus interpretation of the quantifier entails the presence of an additional FP layer, the DP can be extracted, as schematized in (18).

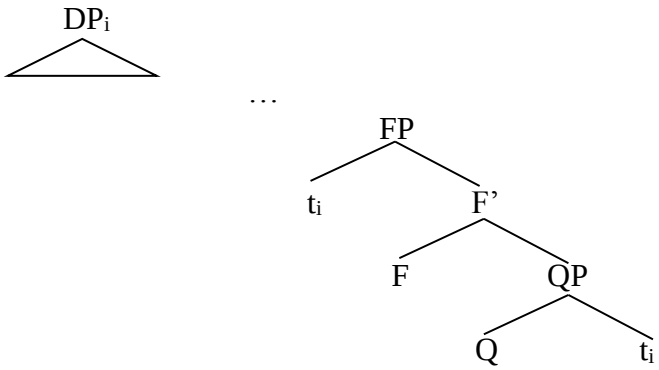
(17) a. *



b. *

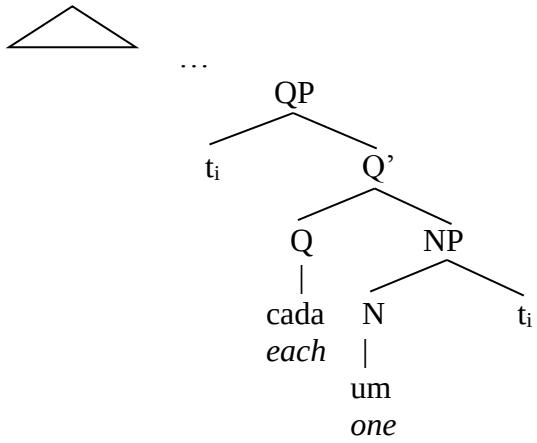


(18)

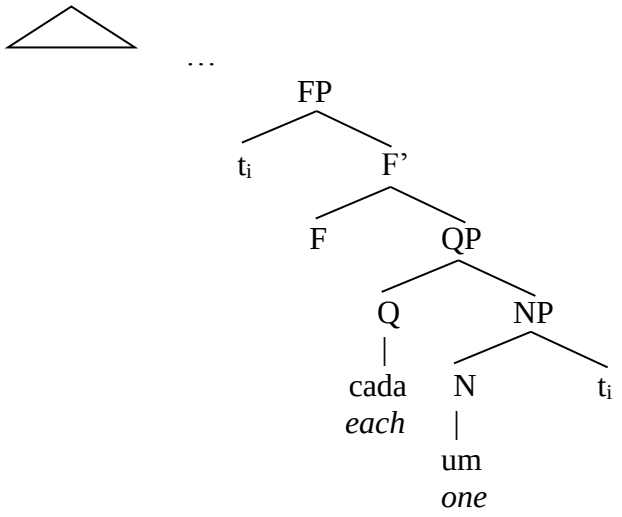


In the case of *cada um*, recall that the floatable DP is not selected by the QP, but by the proform *um* ‘one’. There being an NP projection between the DP and the QP, the DP can be extracted out of the QP in compliance with Anti-locality. If the quantifier has a neutral interpretation, the DP is extracted via Spec,QP, as in (19)a; if the quantifier has a focus interpretation, the DP is extracted via Spec,FP, as in (19)b.

(19) a. DP_i



b. DP_i



The prediction that *todos* 'all' can float only if focalized and *cada um* 'each one' can float either focalized or neutral is borne out. Assuming with Rizzi (1997) that *wh*-elements and focus cannot co-occur, a sharp contrast between *todos* and *cada um* arises: the former cannot float in a *wh*-question, whereas (a neutral instance of) the latter can.

(20) a. *Quantas revistas$_w$ os alunos$_i$ leram todos t_i t_w ?
how-many magazines the students read all
'How many magazines did all the students read?'

b. Quantas revistas$_w$ os alunos$_i$ leram cada um t_i t_w ?
how-many magazines the students read each one
'How many magazines did each one of the students read?'

In the next section, I will show how this analysis, combined with sentential properties of Brazilian Portuguese and Spanish, can account for the questions and contrasts addressed in the Introduction.

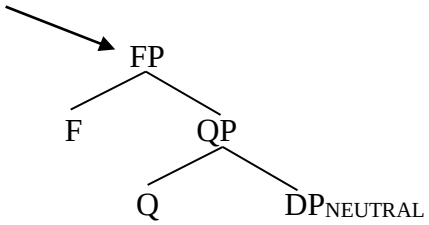
3. Deriving the floatability

I will first address the question of whether the informational mismatch is a necessary and sufficient condition for there being floating. Recall from the Introduction that there is no split between a focalized quantifier and a neutral associate in Spanish, from which we conclude that the informational mismatch is not sufficient.

(21) *Todos$_{FOC}$ han conseguido [los estudiantes de física]$_{NEUTRAL}$ beca. = (8)
all have got the students of physics grant
(Valmala Elguea 2008:847, ex. (39))

In order to circumvent this exception in his analysis, Valmala Elguea (2008) stipulates that focalized quantifiers, on their way to Spec,FocP, "obligatorily pied-pipe [associates] which are not positively specified for different discourse-related features" (p.848). The author is led to this stipulation because he does not commit himself to the internal structure of the quantified expression. Once we assume that *todos los estudiantes de física* 'all the students of physics' projects a QP, the ungrammaticality of (21) above is straightforward. Observe that the neutral discursive value of the DP does not correspond to a "neutral feature" in the system, hence there is no operation to check it. Thus, when a Foc^0 head probes the structure, it forces the movement of the FP (focalized QP) as a whole, correctly deriving (23).

(22) Foc^0



(23) [Todos$_{FOC}$ los estudiantes de física]$_i$ han conseguido t_i beca.
all the students of physics have got grant
(Valmala Elguea, 2008:849, ex. (46))

In BP, the split between a focalized quantifier and a neutral associate is possible, but it leads to a different linear order. Given that its preverbal subject position can be neutral, the associate DP can move to Spec,TP after the quantifier has been focalized in the low left periphery.

(24) a. Os alunos$_{\textbf{neutral}}$ leram todos$_{\textbf{Foc}}$ duas revistas. = (5)b
the students read all two magazines
b. [$_{F'}$ [$_{QP}$ todos [$_{DP}$ os alunos]]]
c. [$_{FP}$ [$_{DP}$ os alunos]$_d$ [$_{QP}$ todos t_d]]
d. [$_{FocP}$ [$_{FP}$ [$_{DP}$ os alunos]$_d$ [$_{QP}$ todos t_d]]$_q$ ler [$_{vP}$ t_q [$_{VP}$ duas revistas]]]
e. [$_{T'}$ T_φ+ler [$_{FocP}$ [$_{FP}$ [$_{DP}$ os alunos]$_d$ [$_{QP}$ todos t_d]]$_q$ [$_{vP}$ t_q [$_{VP}$ duas revistas]]]
f. [$_{TP}$ [$_{DP}$ os alunos] leram [$_{FocP}$ [$_{FP}$ t_d [$_{QP}$ todos t_d]]$_q$ [$_{vP}$ t_q [$_{VP}$ duas revistas]]]

As we saw, *cada um* too can float in this medial position. The derivation of (25) proceeds similarly to (24). But recall that, contrarily to *todos*, *cada um* can also float to the right of a neutral object, as seen in (26).

(25) Os alunos**$_{neutral}$** leram cada um**$_{Foc}$** duas revistas. = (5)a
the students read each one two magazines

(26) a. Os alunos$_i$ leram duas revistas **cada um** t_i . = (6)
the students read two magazines each one
b. *Os alunos$_i$ leram duas revistas **todos** t_i .
the students read two magazines all

Let us derive (26)a. Here the quantifier has a neutral interpretation and hence the DP is extracted via Spec,QP. Observe that both the quantifier and its associate DP appear in (different) neutral positions, from which we conclude that the informational mismatch is not necessary for there being a split.

(27) a. Os alunos$_i$ leram duas revistas cada um t_i . = (26)a
the students read two magazines each one
b. [$_{QP}$ cada [$_{NP}$ um [$_{DP}$ os alunos]]]
c. [$_{QP}$ [$_{DP}$ os alunos]$_d$ [$_{QP}$ cada [$_{NP}$ um t_d]]]
d. [$_{T'}$ T$_\varphi$+ler [$_{XP}$ [duas revistas]$_k$ [$_{vP}$ [$_{QP}$ [$_{DP}$ os alunos]$_d$ [$_{QP}$ cada [$_{NP}$ um t_d]]] t_k]]]
e. [$_{TP}$ [$_{DP}$ os alunos]$_d$ leram [$_{XP}$ [duas revistas]$_k$ [$_{vP}$ [$_{QP}$ t_d [$_{QP}$ cada [$_{NP}$ um t_d]]] t_k]]]

Note also that the object *duas revistas* 'two magazines' can receive either neutral interpretation (in which case XP in (27) is arguably an AgrOP-like projection) or focus interpretation (in which case XP is FocP in the low left periphery) — for instance, (26)a can be the answer to (28). This corroborates the prediction that the floatability of *cada um* 'each one' does not depend on the presence of an additional FP layer on its QP.

(28) Quantas revistas os alunos leram?
how-many magazines the students read
'How many magazines did the students read?'

Let us now rule out (26)b, where *todos* appears to the right of a neutral object. In this position, the quantifier could only be neutral (there is no FocP below AgrOP). There being no FP layer, the DP is trapped inside the QP: by moving out, it would violate either Anti-locality (in (29)c) or the PIC (in (29)d). This confirms the prediction that *todos* cannot float if not focalized.

(29) a. *Os alunos$_i$ leram duas revistas todos t_i . = (26)b
the students read two magazines all
b. [$_{QP}$ todos [$_{DP}$ os alunos]]
c. *[$_{QP}$ [$_{DP}$ os alunos]$_d$ [$_{QP}$ todos t_d]]
d. *[$_{DP}$ os alunos]$_d$ … [$_{QP}$ todos t_d]

Finally we have to address the question of why the Spanish counterpart of (26)b is allowed, as the grammaticality of (30) shows. Observe that *todos* here does have a focus interpretation (which is actually required for it to float), which amounts to saying that there is a focus projection below the position where the object *dos revistas* 'two magazines' surfaces.

(30) Los alumnos$_i$ han leído dos revistas **todos** t_i . (*Spanish*) = (7)
the students have read two magazines all
'All the students read two magazines'

This is exactly what Ordóñez (2005) argues for, in his analysis of post-verbal subjects in Spanish: "This focus projection is lower than the projections that license canonical complement position elements" (p.41). According to him, the middle field of Spanish is as represented in (31), which accounts for the fact that in (32) the subject has focus interpretation.

(31) *verb* [$_{XP}$ *object* [$_{FocP}$ [$_{VP}$]]] (*Spanish*) (adapted from Ordóñez ms:41, ex.(103))

(32) Hoy comprará el almuerzo Juan.
[today will.buy the lunch Juan]
'Today Juan will buy lunch' (Ordóñez ms:42, ex.(105))

Observe also that BP does not have another derivational option available in Spanish, as in in (33)a, where *los alumnos* 'the students' is base-generated as a topic and the syntactic subject is a *pro*. BP neither has referential *pro* (see e.g. Ferreira 2000) nor licenses post-verbal nominative, hence (33)b is not a valid derivation and the sentence could only be derived by movement of *os alunos* 'the students', which is not possible with a neutral *todos*.

(33) a. [Los alumnos]$_{TOP}$ *(pro)* han leído dos revistas **todos** *(pro)*. (*Spanish*)
the students have read two magazines all
b. *[Os alunos]$_{TOP}$ *(pro)* leram duas revistas **todos** *(pro)*. (*BP*)
the students read two magazines all

These contrasts are thus shown to result from the interaction between the internal structure of the quantified expressions and the extractability conditions, as well as the mapping of positions in the middle field of the sentence (see the appendix for a property of the low left periphery of BP that provides independence evidence for the analysis proposed here).

4. Concluding remarks

This paper showed how the focalization process involved in quantifier floating in BP is constrained by the formal requirements of the syntactic component, especially the conditions imposed on extractability by the Phase Impenetrability Condition and Anti-locality. It highlighted the importance of identifying the precise internal configuration of each quantified expression, as its interaction with the sentential positions available in a given language can derive the possibilities and restrictions of quantifier floating. The analysis developed here brings additional evidence for the contextual approach to phasehood and endorses the proposal that a focus feature in the nominal domain can be encoded by an additional layer in the structure (which was showed to be crucial in accounting for the contrasts of floatability between different quantifiers).

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Appendix: A restriction on *Topic+Focus* in the low left periphery of BP

As the data in (1) point out, the low left periphery cannot base-generate elements. They can only be *moved* to that area, as the island sensitivity shows.

(1) *Eu conheço, [do Machado de Assis]$_i$, um cara que leu dois contos t_i .
I know, of-the Machado de Assis, a guy that read two short-stories
(D)o Machado de Assis, eu conheço um cara que leu dois contos.
(of-)the Machado de Assis, I know a guy that read two short-stories.

Observe also that default Case is not available in the low left periphery.

(2) a. Eu li, [*(**d**)o Machado de Assis]$_i$, os principais romances t_i .
[I read (of-)the Machado de Assis the main novels]
b. [(**D**)o Machado de Assis]$_{(i)}$, eu li os principais romances (t_i) .
[(of-)the Machado de Assis I read the main novels]
['As for Machado de Assis, I read his main novels']
(adapted from Avelar 2006:94, ex. (54))

The fact that there cannot be focus-floating (see below) in the low left periphery when an element is topicalized in that area raises the hypothesis that the low left periphery does not tolerate topic and focus simultaneously.

(3) a. *Os alunos$_i$ leram, [do Machado de Assis]$_k$, **todos** t_i as principais obras t_k .
the students read of-the Machado de Assis all the main works
'As for Machado de Assis, all the students read his main works'
b. Os alunos leram, [do Machado de Assis]$_k$, duas obras t_k **cada um**.
the students read of-the Machado de Assis two works each one
'As for Machado de Assis, each one of the students read two of his works'

This restriction on *topic+focus* in the low left periphery seems to be corroborated by the following paradigm.

(4) a. *Topic:*
Eu recomendei, <u>do Machado de Assis</u>, dois livros pra Maria.
I recommended, of Machado de Assis, two books to Mary
b. *Topic+Topic:*
Eu recomendei, <u>do Machado de Assis</u>, <u>pra Maria</u>, dois livros.
I recommended, of Machado de Assis, to Mary, two books
c. *Topic+Topic:*
Eu recomendei, <u>pra Maria</u>, <u>do Machado de Assis</u>, dois livros.
I recommended, to Mary, of Machado de Assis, two books
d. **Topic+Focus:*
*Eu recomendei, <u>do Machado de Assis</u>, PRA MARIA dois livros.
I recommended, of Machado de Assis, TO MARY two books

This restriction accounts for the interesting contrast in (5).

(5) a. Eu mostrei, pr[**os meninos**]$_i$, dois mapas pra [$_{QP}$ t_i [$_{QP}$ **cada um** t_i]]
I showed to-the boys two maps to each one
'I showed two maps to each one of the boys'
b. *Eu mostrei, pr[**os meninos**]$_i$, dois mapas pra [$_{QP}$ t_i **todos** t_i]
I showed to-the boys two maps to all
'I showed two maps to all the boys'

As *cada um* does not depend on focus to float, the dative DP *os meninos* 'the boys' can be topicalized in the low left periphery in (5)a. In (5)b, as *todos* does not have a focus feature (hence no FP projection), the DP *os meninos* 'the boys' cannot move out (due to the PIC / Anti-locality). What if *todos* has an FP layer in (5)b? Then it will be forced to move to the low left periphery and violate the restriction on *topic+focus*.

(6) *Eu mostrei, pr[os meninos]$_i$, [t_i TODOS t_i]$_q$ dois mapas t_q.
I showed to-the boys all two maps
'I showed two maps to all the boys'

The cause and the applicability of this restriction still remain to be identified. Still, it corroborates the analysis proposed in the paper, as we can see a contrast between the floatability of *todos* and *cada um* that is due to the role of a focus feature codified as an additional layer FP.

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[1] This paper is a development of the analysis proposed in my MA thesis (Lacerda 2012), supervised by Jairo Nunes, to whom I am thankful. I also thank Željko Bošković, for suggesting the approach developed here, and Susi Wurmbrand, for valuable comments.
[2] For presentational purposes, translations will be given in a non-floated form.
[3] The exact syntactic status of the preverbal subject position in Spanish is not crucial for my discussion here.
[4] Bastos-Gee (2011) shows evidence for the existence of topic and focus projections in the nominal domain of BP to where topicalized and focalized elements can move, which I do not dispute. I differ from her with respect to the structure of the focalized element, not the structure of the FocP to where it must move.
[5] The nature of the partitive preposition *de* 'of' here is orthogonal. For simplicity, I take it to be dummy.