

PREPOSITION CONTRACTION AND MORPHOLOGICAL SIDEWARD MOVEMENT IN BRAZILIAN PORTUGUESE

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In this paper we discuss data from Brazilian Portuguese which arguably involve one instance of a preposition in the syntactic component but end up surfacing with two instances, yielding what at first sight looks like PP coordination. We argue that the copying of the preposition takes place in the morphological component and is triggered by the Parallelism Requirement on coordinated structures. More specifically, we propose that if morphological merger affects a preposition and an adjacent determiner that is part of a coordinated structure, all conjuncts must undergo similar morphological merger. If the syntactic structure has only one preposition, the morphological component then copies the preposition and merges the copies with all the conjuncts so that the Parallelism Requirement can be satisfied.

1. INTRODUCTION*

In this paper we discuss constructions such as (1) in Brazilian Portuguese, where the coordinated subject of an inflected infinitival surprisingly displays PP coordination instead of DP coordination.

- (1) Ela não pensou **no** João e **na** Maria viajarem (junto com eles).
she not thought in-the João and in-the Maria travel-INF.3PL together with them
 ‘She didn’t think about John and Mary traveling with them.’

The fact that the infinitival verb in (1) shows up with third person plural morphology, thus requiring a plural subject, presents us with the following paradox. On the one hand, if (1) is to be associated with the structure in (2) below to account for the presence of two PPs, there is no plural subject with which the verb can agree. In addition, the coordinated PP is not a likely candidate to hold the external θ -role assigned by the infinitival verb. On the other hand, if (1) is to be associated with a structure involving a coordinated DP, as in (3), in order to capture verbal agreement, there is no explanation for why the second conjunct surfaces as a PP.

- (2) Ela não pensou [CP ... [_{andP} [_{PP} **no** João] [_{and'} e [_{PP} **na** Maria]]] viajarem...]
she not thought in-the João and in-the Maria travel-INF-3PL
- (3) Ela não pensou **em** [CP ... [_{andP} [_{DP} **o** João] [_{and'} e [_{DP} **a** Maria]]] viajarem...]
she not thought in the João and the Maria travel-INF-3PL

We propose that this syntax-phonology mismatch can be solved if one assumes that the standardly assumed Parallelism Requirement on coordinated structures (e.g. Chomsky, 1995; Fox, 2000; and Hornstein & Nunes, 2002) also applies to the morphological component (see Ximenes, 2002, 2004). More specifically, we propose that sentences such as (1) have a syntactic structure along the lines of (3), but in the morphological component, the preposition is copied and merged with the second conjunct, yielding what superficially looks like PP coordination. In other words, the derivation of sentences such as (1) involves sideward movement (in the sense of Nunes, 2001, 2004) of the selecting preposition in the morphological component.

The discussion is organized as follows. In section 2, we discuss preposition contraction in coordination environments in simple sentences. In section 3, we discuss sentences with inflected infinitives in European and Brazilian Portuguese (henceforth EP and BP). In section 4 we present a detailed analysis of morphological sideward

* The research reported here has been supported by FAPESP (grant # 2006/00965-2). Earlier versions of the ideas discussed here were presented at the II Encontro de Gramática Generativa, the 14th Colloquium on Generative Grammar, the 23rd West Coast Conference on Formal Linguistics, and at the following Universities: Campinas, Connecticut, Florida International, Hamburg, Leiden, Maryland, MIT, Nantes, and São Paulo. We are thankful to these audiences. Special thanks to Željko Bošković for his comments and suggestions. Thanks also to Pilar Barbosa, Laura Kornfeld, Ana Maria Martins, Telmo Mória, Eduardo Raposo, and Giorgio Magri, for their judgments.

movement. Section 5 discusses feature projection based on intriguing data involving duplication of prepositions. Finally, section 6 presents some concluding remarks.

2. PREPOSITION CONTRACTION AND SPURIOUS PREPOSITIONS IN COORDINATED STRUCTURES

A common phenomenon found in many languages is that some prepositions are lexically specified as triggering contraction with some determiners following them, as illustrated in (4)-(6) for Portuguese, Italian and French.

- (4) *Portuguese*
 a. *Eu votei **em o** Pedro.
 *I voted **in the** Pedro*
 b. Eu votei **no** Pedro.
 *I voted **in-the** Pedro*
 ‘I voted for Pedro.’
- (5) *Italian*
 a. *Mi ricordo **di la** tua faccia.
 *myself remember **of the** your face*
 b. Mi ricordo **della** tua faccia.
 *myself remember **of-the** your face*
 ‘I remember your face.’
- (6) *French*
 a. *Il a parlé **de le** garçon.
 *he has talked **of the** boy*
 b. Il a parlé **du** garçon
 *he has talked **of-the** boy*
 ‘He talked about the boy.’

The contrast in (4) in Portuguese, for instance, shows that part of the lexical specification underlying the preposition *em* and the determiner *o* should contain the information that they must contract under adjacency. Within the framework of Distributed Morphology (see Halle & Marantz, 1993), we may interpret such contraction along the lines of (7) below. Given the spelled-out structure in (7a), P and D undergo morphological merger in (7b), followed by fusion in (7c), and Vocabulary Insertion then plugs in a single vocabulary item, namely, *no*, as shown in (7d).¹

- (7) a. Spelled-out structure: [PP **P** [DP **D** N]]
 b. Morphological merger: [PP [DP **P+D** N]]
 c. Fusion: [PP [DP **P/D** N]]
 d. Vocabulary insertion: [PP [DP **no** N]]

¹ For purposes of exposition, we will henceforth make reference to words rather than sets of features.

Interestingly, if contraction takes place at the edge of a coordinated phrase, the preposition must be present in both conjuncts, as shown in (8)-(10).²

(8) *Portuguese*

- a. *Eu me lembrei **do** João e **a** Maria.
*I myself remembered **of-the** João and **the** Maria*
- b. Eu me lembrei **do** João e **da** Maria.
*I myself remembered **of-the** João and **of-the** Maria*
 'I remembered João and Maria.'

(9) *Italian*

- a. *Mi ricordo **della** tua faccia e **la** tua voce.
*myself remember **of-the** your face and **the** your voice*
- b. Mi ricordo **della** tua faccia e **della** tua voce.
*myself remember **of-the** your face and **of-the** your voice*
 'I remember your face and your voice.'

(10) *French*

- a. *Il a parlé **du** garçon et **la** fille.
*he has talked **of-the** boy and **the** girl*
- b. Il a parlé **du** garçon et **de la** fille.
*he has talked **of-the** boy and **of the** girl*
 'He talked about the boy and the girl.'

Evidence that the preposition contraction involving the first conjunct of (8)-(10) is what triggers the presence of the preposition in the second conjunct is provided by the Portuguese data in (11)-(13) below, for example. In (11), the names are not preceded by a determiner with phonological content; in (12), the preposition *sobre* never undergoes contraction; and in (13), the preposition is of the contracting type but the numerals preceding the nouns do not allow contraction. In all these cases, preposition contraction

² Languages like German show optional contraction with some prepositions, as exemplified in (i) below (see e.g. van Riemsdijk, 1998 for relevant discussion). But like the languages discussed here, if contraction takes place in the first conjunct, it must also take place in the other conjuncts, as illustrated by the contrast in (ii).

German

- (i) a. Briefe **von dem** Präsidenten
*letters **from the(DAT.)** president*
- b. Briefe **vom** Präsidenten
*letters **from-the(DAT.)** president*
 'letters from the president'
- (ii) a. *Briefe **vom** Präsidenten und **dem** Kanzler
*letters **from-the(DAT.)** president and **the(DAT.)** chancellor*
- b. Briefe **vom** Präsidenten und **vom** Kanzler
*letters **from-the(DAT.)** president and **from-the(DAT.)** chancellor*
 'letters from the president and the chancellor'

cannot obtain in the first conjunct and, accordingly, the preposition in the second conjunct is optional.³

- (11) a. Eu votei **em** Pedro e Ana.
*I voted **in** Pedro and Ana*
 b. Eu votei **em** Pedro e **em** Ana.
*I voted **in** Pedro and **in** Ana*
 ‘I voted for Pedro and (for) Ana.’
- (12) a. Eu falei **sobre a** música e **o** filme.
*I spoke **about the** song and **the** movie*
 b. Eu falei **sobre a** música e **sobre o** filme.
*I spoke **about the** song and **about the** movie*
 ‘I spoke about the song and (about) the movie.’
- (13) a. Eu votei **em dois** homens e **duas** mulheres.
*I voted **in two** men and **two** women*
 b. Eu votei **em dois** homens e **em duas** mulheres.
*I voted **in two** men and **in two** women*
 ‘I voted for two men and (for) two women.’

The contrasts in (8)-(10) may be taken to show that the Parallelism Requirement on coordinated structures imposes restrictions not only on syntactic and semantic structures (see e.g. Chomsky, 1995; Fox, 2000; and Hornstein & Nunes, 2002), but on morphological structures, as well.⁴ That is, if contraction happens in the boundary of the first conjunct, it must also happen in the other conjunct. The question that then arises is what exactly is being computed with respect to the Parallelism Requirement. Given that fusion only affects sister nodes, thus requiring merger (Halle & Marantz, 1993), the data above could be accounted for if the Parallelism Requirement took either morphological merger or fusion into consideration. However, the contrast in (14) below indicates that morphological merger is what is at stake: an instance of the preposition *em* is required in the second conjunct, despite the fact that it does not fuse with the numeral (We return to this issue below).

- (14) a. Eu votei **no** Pedro e **em** duas outras pessoas.
*I voted **in-the** Pedro and **in** two other people*
 b. ?*Eu votei **no** Pedro e duas outras pessoas.
*I voted **in-the** Pedro and two other people*
 ‘I voted for Pedro and (for) two other people.’

³ This does not mean that the two structures necessarily mean the same. As discussed in Nunes (2001, 2004) and Hornstein & Nunes (2002), for instance, only coordination of PPs gives rise to a multiple event interpretation in Romance.

⁴ See Ximenes (2002, 2004) for further examples and discussion of the effects of the Parallelism Requirement in the morphological component.

At first sight, the full range of data could be accounted for if the syntactic component could freely coordinate PPs or DPs, depending on the number of prepositions available in the numeration. That is, given two potential derivations D_1 , with a numeration containing a single instance of the preposition *em*, for instance, and D_2 , with a numeration containing two instances of *em*, only D_2 could converge in the morphological component if *em* undergoes morphological merger with an adjacent element within a coordinated structure. Take the sentences in (15a) and (16a) and the respective structures associated with them, for example.

- (15) a. *Eu votei **no** João e **a** Maria.
I voted in-the João and the Maria
 ‘I voted for João and Maria.’
 b. Eu votei em [_{andP} [DP o João] [_{and'} e [DP a Maria]]]
I voted in the João and the Maria
- (16) a. Eu votei **no** João e **na** Maria.
I voted in-the João and in-the Maria
 ‘I voted for João and (for) Maria.’
 b. Eu votei [_{andP} [PP em o João] [_{and'} e [PP em a Maria]]]
I voted in the João and in the Maria

When (15b) gets to the morphological component, contraction (morphological merger + fusion) must happen between the preposition and the determiner in the first conjunct. The Parallelism Requirement then requires that the second conjunct should also undergo morphological merger. However, there is no preposition in the second conjunct for the second conjunct to merge with and the derivation violates the Parallelism Requirement. By contrast, in (16b) two PPs are coordinated, which allows for morphological merger to take place in both conjuncts, in compliance with the Parallelism Requirement. Hence, the contrast between (15a) and (16a).

Despite its attractiveness, a proposal based simply on the possibility of coordinating DPs or PPs proves too simplistic when sentences like (1), repeated here as (17), are taken into consideration.

- (17) Ela não pensou **no** João e **na** Maria viajarem (junto com eles).
she not thought in-the João and in-the Maria travel-INF-3PL together with them
 ‘She didn’t think about John and Mary traveling with them.’

As mentioned in section 1, we cannot analyze (17) as involving coordination of two PPs, because we wouldn’t obtain agreement on the verb. In order for verbal agreement to be captured, (17) must involve DP-coordination in the syntactic component and, consequently, only one preposition should be present, as represented in (18).

- (18) Ela não pensou **em** [_{CP} ... [_{andP} [DP o João] [_{and'} e [DP a Maria]]] viajarem...]
she not thought in the João and the Maria travel-INF-3PL

Constructions such as (17) therefore indicate that at least in some cases, the second preposition has to be inserted in the structure later in the derivation, after the syntactic computation. This is the line of reasoning we will pursue in this paper. But before presenting our analysis proper, we will first discuss the general pattern of contraction involving prepositions and determiners embedded in the subject of an inflected infinitival clause in both European and Brazilian Portuguese.

3. PREPOSITION CONTRACTION AND INFLECTED INFINITIVES IN PORTUGUESE

Although both European and Brazilian Portuguese permit inflected infinitives, the two dialects contrast in several aspects that are relevant to our discussion. The first difference is that in the contexts where both dialects allow an inflected infinitival, such as (19) below, for instance, contraction is the canonical form in BP, whereas speakers of EP reject it or accept it only marginally. In fact, BP speakers associate lack of contraction in structures like (19a) with formal style, typical of written language.

- (19) a. A hipótese **de os** meninos terem viajado é implausível.
the hypothesis of the boys have-INF-3PL traveled is implausible
 (BP:√; EP:√)
- b. A hipótese **dos** meninos terem viajado é implausível.
the hypothesis of-the boys have-INF-3PL traveled is implausible
 ‘The hypothesis that the boys have traveled is implausible.’
 (BP:√; EP:?!*)

Interestingly, this contrast between the two dialects does not arise when an infinitival clause is not involved. That is, all speakers detect a very strong contrast between (19a) and (20a), for instance.

- (20) a. *A hipótese **de os** meninos é implausível. (BP:*; EP:*)
the hypothesis of the boys is implausible
- b. A hipótese **dos** meninos é implausível. (BP:√; EP:√)
the hypothesis of-the boys is implausible
 ‘The boys’ hypothesis is implausible.’

The second difference is that BP optionally allows the dummy preposition *de* before inflected infinitivals in impersonal constructions, as illustrated in (21) (see Martins & Nunes, 2005 and Nunes, 2007, 2008).

- (21) a. É difícil todos aqueles professores elogiarem os alunos. (BP:√; EP:√)
is hard all those professors praise-INF-3PL the students
- b. É difícil **de** todos aqueles professores elogiarem os alunos. (BP:√; EP:*)
is hard of all those professors praise-INF-3PL the students
 ‘It is hard for all those professors to praise the students.’

Yet another difference is that BP allows inflected infinitives as prepositional complements in environments where this is not permitted or is rather marginal in EP, as illustrated in (22) and (23) (see Ximenes & Nunes, 2004 and Martins & Nunes, 2005).

- (22) a. Ninguém se lembrou **de os** meninos estarem doentes. (BP:√; EP:*)
nobody REFL remembered of the boys be-INF-3PL sick-PL
 b. Ninguém se lembrou **dos** meninos estarem doentes. (BP:√; EP:*)
nobody REFL remembered of-the boys be-INF-3PL sick-PL
 ‘Nobody remembered that the boys were sick.’
- (23) a. Eu pensei **em os** meninos fazerem a tarefa. (BP:√; EP:*)
I thought in the boys do-INF-3PL the job
 b. Eu pensei **nos** meninos fazerem a tarefa. (BP:√; EP:*)
I thought in-the boys do-INF-3PL the job
 ‘I thought about the boys doing the job.’

Finally, as opposed to EP, BP also allows ECM prepositional complementizers, as illustrated in (24) (see among others Lightfoot, 1991; Salles, 1997; and Hornstein, Martins & Nunes, 2008 for relevant discussion).

- (24) O João trouxe o relatório pra mim ler. (BP:√; EP:*)
the João brought the report for 1SG.OBL read-INF
 ‘João brought the report for me to read.’

All these differences seem to stem from the different categorial status the preposition preceding infinitives has in each dialect. Nunes (2007, 2008) proposes that the dummy preposition *de* in impersonal constructions such as (19b) in BP is actually a marker of inherent Case assigned by the impersonal predicate. By receiving inherent Case, Nunes argues, the infinitival clause becomes immobile, as illustrated by the contrast in (25) below. In turn, as the infinitival clause preceded by *de* cannot move, it does not prevent movement of the embedded subject, thus yielding hyper-raising constructions (see Ferreira, 2000, 2004, this volume; and Nunes, 2007, 2008), as illustrated in (26).

- (25) a. Todos aqueles professores elogiarem os alunos é difícil.
all those professors praise-INF-3PL the students is hard
 b. *De todos aqueles professores elogiarem os alunos é difícil.
of all those professors praise-INF-3PL the students is hard
 ‘It is unlikely for all those professors to praise the students.’
- (26) a. *Todos aqueles professores são difíceis elogiarem os alunos.
all those professors are hard praise-INF-3PL the students
 b. Todos aqueles professores são difíceis **de** elogiarem os alunos.
all those professors are hard of praise-INF-3PL the students
 ‘It is unlikely for all those professors to praise the students.’

Here we will assume the gist of Nunes's proposal, reinterpreting it as follows. Whenever one finds an inflected infinitival preceded by a preposition in EP, we have a standard form of clausal complementation, namely, the preposition takes an infinitival CP headed by a null C for its complement, as sketched in (27) below. In BP, on the other hand, the prepositions under discussion came to be reanalyzed as Cs, as sketched in (28), being either ECM complementizers, as in (24), or the morphological realization of the inherent Case assigned by the embedding predicate, as in (19b), (21b), (22b), and (23b).

(27) [... X [PP P [infinitival-CP C [TP ...]]]]

(28) [... X [infinitival-CP C/P [TP ...]]]

Thus, the subject of the inflected infinitival in (19a), for instance, is not really adjacent to the subcategorizing preposition in EP, for the null complementizer intervenes, as illustrated in (29) below.⁵ The marginal acceptability of contraction in (19b) for some EP speakers is presumably due to later phonetic readjustment rules (see Vigário, 2001).

(29) [[a hipótese **de** [CP C [os meninos terem viajado]]] é implausível]
the hypothesis of the boys have-INF-3PL traveled is implausible

By contrast, in BP the preposition and the infinitival subject in (19b) are indeed adjacent, as shown in (30) below, explaining why contraction is the canonical option. As mentioned above, lack of contraction in BP as in (19a) is restricted to formal style in written texts, which suggests that these conservative registers still keep the structure in (27) as an option.

(30) [[a hipótese [CP **de** [os meninos terem viajado]]] é implausível]
the hypothesis of the boys have-INF-3PL traveled is implausible

Once these differences between EP and BP are pointed out, from now on we will focus on BP since it exhibits a more complex paradigm. Also, given that all BP speakers distinguish lack of contraction involving infinitives and standard nominal complements ((19a) vs. (20a)), we will assume that BP infinitival clauses preceded by a preposition is to be associated with the structure in (28), unless we are dealing with formal registers or late phonetic readjustments (see section 4.3 below), in which case the structure in (27) is also available.⁶

⁵ See Bošković (1997), who argues that lack of *wanna*-contraction in (i) is due not to the intervention of traces, which are deleted copies (see Chomsky, 1995; Nunes, 2004), but to the intervention of a (Case-marking) empty complementizer.

(i) [who_i do you **want** [CP t_i C [t_i **to** buy a car]]]

⁶ Earlier versions of this work explored the idea that the optionality of contraction in BP when infinitival clauses are involved could be due to unordered applications of morphological merger and deletion of the null complementizer (Ximenes, 2002, 2004) or to a structural ambiguity of infinitival clauses between CPs and TPs (Ximenes & Nunes, 2004; see also Benucci, 1992 and Longa, 1994 for relevant discussion). We

We now turn to the apparent instances of PP coordination in the subject position of infinitival clauses.

4. PREPOSITION DUPLICATION AND INFLECTED INFINITIVES IN BRAZILIAN PORTUGUESE

So far we have discussed inflected infinitivals with simple subjects. The paradigm in BP becomes more interesting when the general structures in (27) and (28), with CP-external and CP-internal prepositions, involve coordinated subjects, as sketched in (31) and (32).

(31) [... X [PP **P** [infinitival-CP C [TP [*andP* [DP1 **D** NP] [*and'* and [DP2 D NP]]] ...]]]]

(32) [... X [infinitival-CP **C/P** [TP [*andP* [DP1 **D** NP] [*and'* and [DP2 D NP]]] ...]]]

We are particularly interested in cases where the preposition and the determiner of the first conjunct in the structures outlined in (31) and (32) are of the contracting type. Below we discuss the outputs of each structure when it is shipped to the phonological component.

4.1 Infinitives with CP-external Prepositions and Lack of Contraction

The configuration in (31) is illustrated **by sentences** like the ones in (33a) and (34a) in formal registers of BP. Although the relevant prepositions and the determiner of the first conjunct are lexically specified as triggering contraction, the adjacency requirement is not met. As shown in (33b) and (34b), the null complementizer intervenes between the preposition and the determiner, blocking contraction (but see section 4.3 below for further discussion). Once contraction with the first conjunct does not happen, the Parallelism Requirement on coordinated terms is vacuously satisfied.

(33) a. Ele não aprovou a ideia **de o** João e **a** Maria viajarem.
he not approved the idea of the João and the Maria travel-INF-3PL
 ‘He didn’t approve of the idea of João and Maria traveling.’
 b. ... a ideia **de** [CP **C** [TP **o** João e **a** Maria viajarem]]

(34) a. Ela não pensou **em o** João e **a** Maria viajarem.
she not thought in the João and the Maria travel-INF-3PL
 ‘She didn’t think about João and Maria traveling.’
 b. ... pensou **em** [CP **C** [TP **o** João e **a** Maria viajarem]]

Thus, in the formal registers of BP, with CP-external prepositions, there is no difference between simple and coordinated infinitival subjects as far as contraction is

believe that our current interpretation of the facts provides a more natural account of the data in that it relies on independent properties that distinguish BP and EP with respect to inflected infinitives.

concerned. As we will see below, things become quite different when CP-internal prepositions are involved.

4.2 Infinitives with CP-internal Prepositions

Let us now return to the unexpected instances of coordinated PPs in the subject position of infinitival clauses such as the ones in (35), for instance.

- (35) a. Ele não aprovou a ideia **do** João e **da** Maria viajarem.
he not approved the idea of-the João and of-the Maria travel-INF-3PL
 ‘He didn’t approve of João and Maria’s traveling.’
 b. Ela não pensou **no** João e **na** Maria viajarem.
she not thought in-the João and in-the Maria travel-INF-3PL
 ‘She didn’t think about João and Maria traveling.’

As mentioned in sections 1 and 2 there is no obvious derivational source for sentences like these. For instance, if (35a) is associated with the structure in (36) below, the coordinated PP arguably cannot bear the external θ -role assigned by the infinitival verb, nor can it trigger plural agreement. If the first preposition is CP-external, as in (37), in addition to the thematic and agreement problems, we would now have coordination of dissimilar categories (a DP and a PP). Finally, if (35a) were associated with (38), the agreement and thematic problems would disappear and coordination would involve the same type of categories. However, the intervening null complementizer should block contraction with the first conjunct, as seen in section 4.1, and there would be no explanation for the presence of the preposition in the second conjunct.

- (36) *... ideia [CP C [TP [_{andP} [PP **do** João] [_{and'} e [PP **da** Maria]]]]] viajarem...
 (37) *... ideia [PP **de** [CP C [TP [_{andP} [DP **o** João] [_{and'} e [PP **da** Maria]]]]]]] viajarem...
 (38) ... ideia [PP **de** [CP **C** [TP [_{andP} [DP **o** João] [_{and'} e [DP **a** Maria]]]]]]] viajarem...

Given that the structure in (38) is successful in capturing the thematic and agreement properties within the embedded TP, let us keep it constant and explore an alternative representation for the upper part of the embedded clause. Consider the structure in (39), which differs from (38) in that the preposition is CP-internal.

- (39) ... ideia [CP **de** [TP [_{andP} [DP **o** João] [_{and'} e [DP **a** Maria]]]]]]] viajarem...

After (39) is spelled out, *de* and *o* must undergo morphological merger, as shown in (40), for they are adjacent.

- (40) ... ideia [CP [TP [_{andP} [DP **de+o** João] [_{and'} e [DP **a** Maria]]]]]]] viajarem...

Moreover, given that the merger in (40) affects the boundary of a coordinated structure, the Parallelism Requirement then demands that the other conjunct also display

merger. At first sight, there seems to be no way to satisfy this demand. However, one of the most typical morphological processes in grammar is reduplication, where a segment is copied from a given structure in order to fulfill some morphological requirement. If the inadequacy in (40) is morphological in nature, the system should in principle be allowed to use this morphological copy operation to remedy the problem.

We propose that this is exactly what happens. More specifically, the morphological component copies the preposition *de* from the first conjunct of (40) and merges it with the determiner of the second conjunct, as shown in (41a), and after fusion takes place in (41b), the sentence surfaces as in (35a), with an apparent instance of syntactic PP coordination.

- (41) a. *Copy and morphological merger:*
 ... ideia [CP [TP [_{andP} [DP **de**ⁱ+o João] [_{and'} e [DP **de**ⁱ+a Maria]]]]] viajarem...
 b. *Fusion:*
 ... ideia [CP [TP [_{andP} [DP **do** João] [_{and'} e [DP **da** Maria]]]]] viajarem...

The step depicted in (41a) resembles sideward movement (in the sense of Nunes, 2001, 2004), with the difference that in (41a) we are dealing with computations in the morphological component. Nunes (2001, 2004) has observed that once the Minimalist Program resorts to the structure-building operation Merge and adopts the copy theory of movement (see Chomsky, 1995), the computational system should in principle allow instances of sideward movement, where a given element is copied from one syntactic object and merged into another independent syntactic object, as illustrated in (42):

- (42) a.
$$\begin{array}{ccc} [K \dots \alpha^i \dots] & & \alpha^i \\ & \swarrow \text{Copy} & \uparrow \\ & & [L \dots] \end{array} \quad \begin{array}{c} \longleftarrow \text{Merge} \longrightarrow \\ \searrow \end{array}$$

 b.
$$\begin{array}{ccc} [K \dots \alpha^i \dots] & & [M \alpha^i [L \dots]] \end{array}$$

According to Nunes, ATB extraction constructions are among the constructions that require steps like the ones in (42). A sentence such as (43) below, for example, is to be derived along the lines of (44)-(46). After K and L are formed in (44), the computational system copies [*which book*] from K and merges it with L to satisfy the θ -requirements of *recommend*, as shown in (45). After further computations, K and M are integrated into a single structure and another copy of [*which book*] is created to check the strong *wh*-feature of C, as shown in (46a). The lower copies are then deleted in the phonological component, as shown in (46b), yielding (43).⁷

- (43) Which book did you recommend and Mary buy?
 (44) a. K = [_{andP} and [TP Mary did buy [which book]]]
 b. L = recommend

⁷ See Nunes, 2001, 2004 and Hornstein & Nunes, 2002 for details and relevant discussion.

- (45) *Sideward movement of [which book]:*
 a. **K** = [_{andP} and [_{TP} Mary did buy [which book]ⁱ]]
 b. **M** = [_{VP} recommend [which book]ⁱ]
- (46) a. [_{CP} [which book]ⁱ did [_{andP} [_{TP} you [recommend [which book]ⁱ]] [_{and} and [_{TP} Mary buy [which book]ⁱ]]]]]
 b. [_{CP} [which book]ⁱ did [_{andP} [_{TP} you [recommend [~~which book~~ⁱ]] [_{and} and [_{TP} Mary buy [~~which book~~ⁱ]]]]]]]

To sum up, once both the syntactic and the morphological components have copying and merger procedures, one should in principle expect sideward movement (that is, copying from one constituent and merging with another) in both components. The spurious prepositions found in the second conjunct of sentences like (35), repeated here in (47), attest the existence of sideward movement in the morphological component.

- (47) a. Ele não aprovou a ideia **do** João e **da** Maria viajarem.
he not approved the idea of-the João and of-the Maria travel-INF-3PL
 ‘He didn’t approve of João and Maria’s traveling.’
 b. Ela não pensou **no** João e **na** Maria viajarem.
she not thought in-the João and in-the Maria travel-INF-3PL
 ‘She didn’t think about João and Maria traveling.’

Once prepositions selecting inflected infinitives came to be reanalyzed as CP-internal in BP, the infinitival subjects became adjacent to the preposition in C and from the perspective of the morphological component, this is no longer different from standard PPs, where the preposition is adjacent to its DP complement. Given the morphological demands of the Parallelism Requirement on coordinated structures, morphological merger of the preposition with the adjacent determiner of the infinitival subject triggers further computations when the subject is coordinated (the second conjunct must undergo morphological merger, as well). Sideward movement of the preposition to the second conjunct then makes it possible for the Parallelism Requirement to be complied with and after fusion of the prepositions with the relevant determiners, the subject surfaces with a misleading PP coordination shape, as in (47).⁸

Interesting evidence for the analysis of spurious PP coordination proposed above is provided by discourse fragments, as illustrated by the contrast between (48) and (49).

⁸ If this reasoning is on the right track, it also has consequences for standard coordination of complements. (i) below, for instance, could in principle be derived from a numeration containing two instances of the preposition *em* in the numeration, yielding PP coordination, or from a numeration containing only one instance of *em*, yielding DP coordination in syntax, but PP coordination in the morphological component, along the lines of (41). We leave an exploration of these possibilities for another occasion.

- (i) Eu votei **no** João e **na** Maria.
I voted in-the João and in-the Maria
 ‘I voted for João and (for) Maria.’

- (48) a. A: – Nós aprovamos a proposta **de o** João e **a** Maria viajarem.
we approved the proposal of the João and the Maria travel-INF-3PL
 ‘We approved the proposal of João and Maria traveling.’
 B: – ***De o** Pedro e **a** Susana também.
of the Pedro and the Susana too
 ‘And also the proposal of Pedro and Susana traveling.’
 b. [... [PP **P** [C [TP [*andP* [DP1 **D** NP] [*and* and [DP2 **D** NP]]] ...]]]]
- (49) a. A: – Nós aprovamos a proposta **do** João e **da** Maria viajarem
we approved the proposal of-the João and of-the Maria travel-INF-3PL
 ‘We approved the proposal of João and Maria traveling.’
 B: – **Do** Pedro e **da** Susana também.
of-the Pedro and of-the Susana too
 ‘And also the proposal of Pedro and Susana traveling.’
 b. [... [CP **P** [TP [*andP* [DP1 **D** NP] [*and* and [DP2 **D** NP]]] ...]]]
 c. [... [CP [TP [*andP* [DP1 **Pⁱ+D** NP] [*and* and [DP2 **Pⁱ+D** NP]]] ...]]]]

Given that (48a) involves the uncontracted version, it must be associated with a structure where the preposition is CP-external, as outlined in (48b). Conversely, once (49a) involves contraction and preposition duplication, it should be associated with a structure with a CP-internal preposition in the syntactic component, as in (49b), and a fake PP coordination in the morphological component, as in (49c). The contrast between the fragments in (48a) and (49b) can now receive a straightforward explanation: whereas the preposition and the *andP* in (48a) do not form a constituent in any step of the derivation (cf. (48b)), in (49a) the prepositions end up being within the *andP* constituent in the morphological component (cf. (49c)).

Let us now consider an apparent problem for the correlation between preposition contraction and preposition duplication.

4.3 Apparent Violations of the Parallelism Requirement

We have been assuming that contraction is the result of morphological merger followed by fusion and that if morphological merger affects the border of the first conjunct of a coordinated DP, the Parallelism Requirement demands that the remaining conjuncts must also undergo morphological merger. Although these assumptions made it possible for us to account for the syntax-phonology mismatches discussed in section 4.2, where syntactic DP coordination surfaces as PP coordination in the morphological component, they seem to incorrectly rule out BP sentences like the ones in (50).

- (50) a. Ele não aprovou a ideia **do** João e **a** Maria viajarem.
he not approved the idea of-the João and the Maria travel-INF-3PL
 ‘He didn’t approve of the idea of João and Maria’s traveling.’
 b. Ela não pensou **no** João e **a** Maria viajarem.
she not thought in-the João and the Maria travel-INF-3PL
 ‘She didn’t think about João and Maria traveling.’

In (50), contraction obtains between the preposition and the determiner of the first conjunct, but the second conjunct does not show any signs of having undergone morphological merger. At face value, this should flatly violate the Parallelism Requirement and undermine the proposal we advanced in section 4.2.

However, there is still a scenario that would render (50) compatible with the Parallelism Requirement. Recall that we have been crucially assuming that the Parallelism Requirement imposes some demands on coordinated structures in the *morphological* component. So, the contraction depicted in (50) would not violate the Parallelism Requirement if it resulted from late phonetic readjustment rules (see Vigário, 2001), after morphological computations. We would like to propose that this is what indeed happens in (50). More specifically, we propose that the contracted forms *do* and *no* are ambiguous in terms of their derivational source: they can result from fusion in the morphological component or late phonetic readjustment. From this perspective, if the derivation of the sentences in (50) does not involve fusion in the morphological component, it must be the case that the adjacency requirements are not met in their morphological structures; in other words, the sentences in (50) are to be associated with the structures in (33b) and (34b), repeated below in (51), with a CP-external preposition.

- (51) a. ... a ideia **de** [_{CP} C [_{TP} **o** João e **a** Maria viajarem]]
 b. ... pensou **em** [_{CP} C [_{TP} **o** João e **a** Maria viajarem]]

Given the structures in (51), contraction between *de* and *o* and between *em* and *o* take place as late phonetic readjustments, after all morphological computations have been executed.

The type of ambiguity exhibited by *do* and *no* with respect to their morphological or phonetic source is not unusual. As pointed by Vigário (2001:340) with respect to phonological clitics in EP, “coexisting variants of very frequent words may either be the result of reduction of strong forms or follow from lexically stored allomorphy.” Fortunately, there are reduced forms that can unambiguously be analyzed as resulting from fusion or phonetic readjustment, which allow us to appropriately test the predictions of the proposal advocated here.

The first case is provided by the preposition *por*, which under contraction is replaced by its allomorph *per*, as illustrated in (52) below.

- (52) a. *Eu torço **por o** presidente.
 I root by the president
 b. Eu torço **pelo** presidente. (*por + o = pelo*)
 I root by-the president
 ‘I root for the president’

Given that contracted forms involving *por* resort to allomorphy, we predict that they should not be found in sentences analogous to (50), with contraction affecting only the first conjunct of the embedded subject. That this prediction is borne out is shown by the data in (53), which should be derived from either of the structures in (54) (see section 3).

- (53) a. Eu fiquei contente **por a** Maria e o João ganharem o prêmio.
*I was happy **by the** Maria and the João win-INF-3PL the prize*
 b. *Eu fiquei contente **pela** Maria e o João ganharem o prêmio.
*I was happy **by-the** Maria and the João win-INF-3PL the prize*
 c. Eu fiquei contente **pela** Maria e **pelo** João ganharem o prêmio.
*I was happy **by-the** Maria and **by-the** João win-INF-3PL the prize*
 ‘I was happy because João and Maria won the prize.’
- (54) a. ... contente **por** [_{CP} **C** [_{TP} **o** João **e a** Maria ganharem ...]]
 b. ... contente [_{CP} **por** [_{TP} **o** João **e a** Maria ganharem ...]]

In (54a), there is no adjacency between *por* and *o*; accordingly, morphological merger and fusion are blocked in the morphological component and the derivation surfaces as (53a). Crucially, *por* and *o* cannot be converted to *pelo* by phonetic readjustment; hence, (53b) is ruled out. In turn, morphological merger in (54b) is obligatory as *por* and *o* are adjacent; the Parallelism Requirement then triggers copying and morphological merger of *por* with the second conjunct (an instance of morphological sideward movement), as shown in (55), yielding (53c) after fusion takes place in both conjuncts.

- (55) ... contente [_{CP} [_{TP} **por**ⁱ+**o** João **e por**ⁱ+**a** Maria ganharem ...]]

The converse situation is presented by data such as (56).

- (56) a. Ela pensou **em eu** fazer isso.
*she thought **in I** do-INF this*
 b. Ela pensou **n’eu** fazer isso.
*she thought **in-I** do-INF this*
 ‘She thought about me doing this.’
 c. Ela pensou **n’eu** e **a** Maria fazermos isso.
*she thought **in-I** and **the** Maria do-INF-1PL this*
 d. *Ela pensou **n’eu** e **na** Maria fazermos isso.
*she thought **in-I** and **in-the** Maria do-INF-1PL this*

(56a) and (56b) show that the sequence *em eu* may be reduced to *n’eu* in BP. The contrast between (56c) and (56d) in turn shows that such reduction does not license preposition duplication. Thus, it must be the case that the contracted form *n’eu* results from later phonetic readjustment rules and not from morphological merger. That this is correct is indicated by the fact that there is no syntactic environment for licensing *n’eu*, as *em* assigns oblique Case and *eu* bears nominative, as illustrated in (57).

- (57) a. *Ela pensou **em eu**.
*she thought **of I***
 b. *Ela pensou **n’eu**.
*she thought **of-I***

- c. Ela pensou **em mim**.
she thought of me
 ‘She thought of me.’

Let us now consider some consequences of the approach explored here.

5. FURTHER CONSEQUENCES

5.1 Contraction Involving Small Clauses

We argued above that the apparent cases of PP coordination in the subject position of an infinitival clause in BP are attributed to the possibility of reanalyzing CP external prepositions as heads of CP. Evidence for this proposal is provided by instances of contraction involving small clauses. Consider the contrast between (58) and (59), for instance.

- (58) a. Apesar **de o** meu pé estar quebrado, eu fui à festa.
despite of the my foot be-INF broken, I went to-the party
 b. Apesar **do** meu pé estar quebrado, eu fui à festa.
despite of-the my foot be-INF broken, I went to-the party
 ‘Despite my foot being broken, I went to the party.’
- (59) a. *Apesar **de o** meu pé quebrado, eu fui à festa.
despite of the my foot broken, I went to-the party
 b. Apesar **do** meu pé quebrado, eu fui à festa.
despite of-the my foot broken, I went to-the party
 ‘Despite my broken foot, I went to the party.’

Given that in BP, prepositions preceding inflected infinitives can be CP-external or CP-internal (see section 3), (58a) can be derived from the spelled-out structure in (60a), where the intervening C blocks contraction between the preposition and the determiner. In turn, (58b) is to be associated with the spelled-out structure in (60b), where the preposition and the determiner are adjacent and must undergo contraction in the morphological component.⁹

- (60) a. *Spelled-out structure:*
 ... apesar **de** [CP C [TP [o meu pé] ...]] → ... **de o** ...
 b. *Spelled-out structure:*
 ... apesar [CP **de** [TP [o meu pé] ...]] → ... **do** ...

By contrast, under the standard assumption that small clauses do not contain a CP layer, the subject of a small clause should be adjacent to a subcategorizing head. In other words, both sentences in (59) are to be associated with the spelled-out structure in (61),

⁹ (58b) could also be derived from the structure in (60a) with late phonetic readjustments, as discussed in section 4.3.

where the preposition and the determiner are adjacent and contraction is obligatory; hence the contrast between (58a) and (59a).

- (61) *Spelled-out structure:*
... apesar **de** [sc [o meu pé] ...] → ... **do** ...

As we should expect by now, if the subject of structures analogous to (59b) involves coordination, we should obligatorily find apparent PP coordination. That this is exactly what we find is illustrated in (62).

- (62) a. *Apesar **do** meu pé e o meu braço quebrados, eu fui à festa.
despite of-the my foot and the my arm broken I went to-the party
b. Apesar **do** meu pé e **do** meu braço quebrados, eu fui à festa.
despite of-the my foot and of-the my arm broken I went to-the party
'Despite my broken foot and arm, I went to the party.'

Given the spelled-out structure in (63a), the derivation of (62b) involves sideward movement of *de* in the morphological component, as illustrated in (63c).

- (63) a. *Spelled-out structure:*
... apesar **de** [sc [_{andP} [o meu pé] [_{and'} e [o meu braço]]] ...]
b. *Morphological merger:*
... apesar [sc [_{andP} [**de+o** meu pé] [_{and'} e [o meu braço]]] ...]
c. *Morphological sideward movement:*
... apesar [sc [_{andP} [**deⁱ+o** meu pé] [_{and'} e [**deⁱ+o** meu braço]]] ...]
d. *Fusion:*
... apesar [sc [_{andP} [**do** meu pé] [_{and'} e [**do** meu braço]]] ...]

5.2 Feature Projection under Coordination

Let us finally examine the puzzling contrasts in (64) and (65).

- (64) a. *Eu lembrei **de** cada senador e o presidente
I remembered of each senator and the president
b. Eu lembrei **de** cada senador e **do** presidente
I remembered of each senator and of-the president
'I remembered each senator and the president.'
- (65) a. *Eu confio **em** Deus e o João
I trust in God and the João
b. Eu confio **em** Deus e **no** João
I trust in God and in-the João
'I trust in God and John.'

In these sentences, the determiner that triggers contraction is in the second conjunct. Once the preposition and the contracting determiner are not adjacent, as respectively illustrated in (66), contraction cannot take place and, consequently, preposition duplication should not be obligatory. In other words, (64a) and (65a) should be acceptable, contrary to fact.

- (66) a. ... [**de** [*andP* [DP cada senador] [*and'* e [DP **o** presidente]]]]
 b. ... [**em** [*andP* [DP Deus] [*and'* e [DP **o** João]]]]

Intuitively, the unacceptability of (64a) and (65a) seems to suggest that the preposition is sensitive to the morphological properties of nonadjacent conjuncts. Exploring this idea, we would like to propose that *andP*, the coordinated phrase, bears not only syntactic and semantic information about its members, as is standardly assumed, but morphological information, as well. Percolation of the morphological specifications of the head of second conjunct of (64a), for example, places them in a local configuration with the selecting preposition, as sketched in (67).

- (67)
- | | |
|-------------------------------------|--------------------------------------|
| PP | |
| 3 | |
| de <contracting preposition> | <i>andP</i> <contracting determiner> |
| | 2 |
| [cada senador] | and' <contracting determiner> |
| | 2 |
| e | DP <contracting determiner> |
| | 3 |
| o <contracting determiner> | presidente |

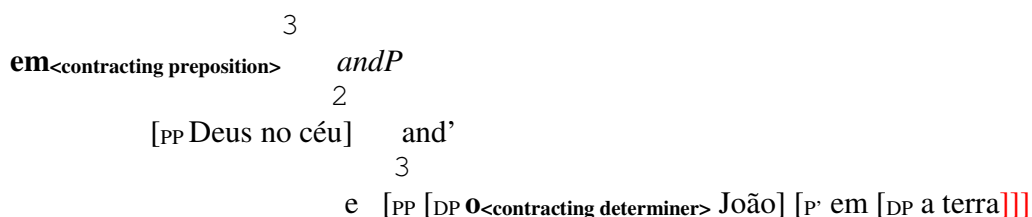
Given (67), the Parallelism Requirement should enforce that each conjunct undergoes morphological merger through sideward movement of the preposition, as illustrated in (68); hence, the unacceptability of sentences such as (64a) and (65a).

- (68) a. *Morphological sideward movement:*
 [*andP* [DP **de**ⁱ+cada senador] [*and'* e [DP **de**ⁱ+**o** presidente]]]
 b. *Fusion:*
 [*andP* [DP **de**+cada senador] [*and'* e [DP **do** presidente]]]

Evidence for this proposal comes from coordination of small clauses, as illustrated by the contrast between (65a) and (69) below. The only relevant difference between these sentences is that (69) involves coordination of PP small clauses, as shown in (70).

- (69) Eu confio **em** Deus no Céu e **o** João na Terra
I trust in God in-the Heaven and the João in-the Earth
 'I trust in God in Heaven and John on Earth.'

- (70) PP



In (70), the information that the determiner inside the second conjunct is of the contracting type does not percolate up the tree, as it is embedded within the PP small clause. Since *andP* doesn't carry the information of the contracting preposition, duplication of *em* is not triggered.

Interestingly, if we switch the conjuncts in (69), placing the conjunct with the contracting determiner adjacent to *em*, preposition duplication now becomes obligatory:

- (71) a. *Eu confio **em o** João na Terra e Deus no Céu
I trust in the João in-the Earth and God in-the Heaven
- b. Eu confio **no** João na Terra e **em** Deus no Céu
I trust in-the João in-the Earth and in God in-the Heaven
 'I trust in God in Heaven and John on Earth.'

Given what we said regarding (70), the morphological information of the determiner in (71) does not percolate up for it is also embedded within the PP small clause, as shown in (72). However, the determiner is adjacent to the preposition *em* and contraction is obligatory in this circumstance. Morphological sideward movement of *em* is then triggered in order for the Parallelism Requirement to be satisfied, as illustrated in (73).

- (72) [PP **em**<contracting preposition> [*andP* [PP [**o**<contracting determiner> João na terra]] [*and*' e [PP Deus no céu]]]
- (73) a. *Morphological sideward movement:*
 [PP [*andP* [PP [**em**ⁱ+o João na terra]] [*and*' e [PP **em**ⁱ+Deus no céu]]]]]
- b. *Fusion:*
 [PP [*andP* [PP [**no** João na terra]] [*and*' e [PP **em**+Deus no céu]]]]]

6. CONCLUDING REMARKS

Based on data on contraction between prepositions and determiners, this paper has argued that the morphological component can resort to morphological sideward movement (a sequence of copy and merger in the morphological component) in order to comply with the demands of the Parallelism Requirement on coordinate structures – more specifically, to comply with the requirement that if morphological merger applies to the boundary of a given conjunct, it must apply to all the other conjuncts. The core pieces of empirical

evidence for this proposal come from mismatches between syntactic and morphological structures in Brazilian Portuguese inflected infinitives, where the coordinated subject of the infinitival clause ends up realized in the morphological component as a coordinated PP. We argued that in these cases the preposition preceding the infinitival is duplicated in the morphological component and integrated into the structure via morphological sideward movement.

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