Proper Interleaving of A- & Ā-movement: a Brazilian Portuguese Case Study[*]

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Abstract

This paper argues against the existence of the *Ban on Improper Movement*, or any other similar constraints on A- and Ā-movement interactions. The argument is empirical: configurations found in Brazilian Portuguese, referred to as *interleaved movement*, are shown to involve A-movement of an Ā-moved element. An analysis of these configurations is proposed which highlights that they are exactly what one expects from a grammar without a ban on A-after-Ā chains. The proposal has important consequences for the treatment of phenomena that have been standardly subsumed within the scope of the Ban on Improper Movement.

1 Introduction

A- and Ā-movement are standardly assumed to interact in a restricted way: although an element that has undergone A-movement may subsequently undergo Ā-movement, the opposite order of operations is thought to be ruled out by grammar. This is standardly taken to be a consequence of a constraint, dubbed as the *Ban on Improper Movement*, which is taken to be a core part of the grammar (Chomsky, 1973, 1977, 1981; May, 1979):[1]

(1) *Ban on Improper Movement* (BIM)
    If an XP has Ā-moved, it may not A-move.

The main goal of the present paper is to argue against the BIM: building on novel data from Brazilian Portuguese, I show that this constraint is empirically inadequate and should therefore be abandoned. Once the BIM is lifted, the Brazilian Portuguese facts, together with all their quirks, receive a natural account. The paper concludes that phenomena standardly subsumed within the scope of the BIM

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[1]For the present purposes, it does not matter whether the BIM is taken to be derived from other deeper principles or not. The issue is simply whether the grammar allows for A-after-Ā chains.

should be accounted for by the horizon-based theory of Keine (2020), mainly because it does not explicit prohibit A-after-Ā-chains from ever occurring.

The BIM was originally motivated by the need to account for the locality of A-movement in languages like English. As shown in (2), English lacks *hyperraising*: although embedded subjects may raise to a matrix subject position across a non-finite clause (2a), they cannot do so across a finite clause (2b).

(2)   *A-movement in English cannot cross finite clauses*

    a. Ann_1 seems [t_1 to have bought a new car].

    b.*Ann_1 seems [t_1 has bought a new car].

At first glance, the ungrammaticality of (2b) seems unrelated to A- and Ā-movement interactions. After all, the following facts can bar an A-chain from being created across a finite clause: (i) movement out of finite clauses must proceed through Spec(CP) (Chomsky, 1973, 1977, 1981), (ii) English Spec(CP) is not an A-position. This is not enough, however, as it does not rule out the possibility of A-movement piggybacking on an Ā-movement step. This is illustrated in (3), where an intermediate Ā-movement to embedded Spec(CP) allows *Ann* to further A-move to matrix Spec(TP). This possibility is ruled out if the grammar prohibits A-movement from applying after Ā-movement.

(3)   *Hyperraising via an intermediate Ā-movement step*
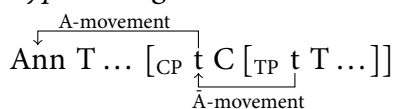

In this paper, I argue that the BIM is too strong: instances of an Ā-moved element subsequently undergoing A-movement are actually attested in natural languages. The argument is made through a case study of a configuration found in Brazilian Portuguese (BrP) illustrated in (4). Here, the *wh*-phrase *quais livros* 'which books' crosses the unaccusative clause-embedding verb *demorar* 'take.time' while triggering φ-agreement with it.

(4)   *Interleaved movement in Brazilian Portuguese*
    [Quais livros]$_1$ demor-**aram** [pra que a   Ana lesse t_1]?
    which books   take.time-PL for   that the Ana read
    'Which books did it take time for Ana to read?'

I present evidence that in (4) not only does matrix T agree with an Ā-moved element but it also triggers A-movement of this element to matrix Spec(TP). The analysis I propose is illustrated in (5). There are three relevant movement steps: first, Ā-movement to embedded Spec(CP); then A-movement to matrix[2] Spec(TP); and, finally, Ā-movement to matrix Spec(CP). Due to the fact that these configurations involve movement chains in which A- and Ā-movement are interleaved, I refer to them as *interleaved movement* configurations.

(5)   *Proposed analysis of interleaved movement configurations*

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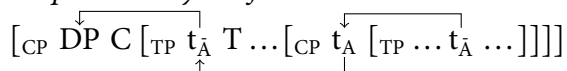
[2]Throughout, I use the term "matrix" to refer to the clause of the selecting (embedding) predicates and not to refer exclusively to the root-clause.

The second movement step in (5) constitutes a violation of the BIM. Thus, after presenting evidence in favor of this analysis, I conclude that this constraint must not be operative in grammar. Once the BIM is dropped, interleaved movement is naturally accounted for. I propose it to be a consequence of successive cyclic Ā-movement: interleaved movement occurs when an intermediate Ā-movement step places a DP in a position visible to an A-probe.

Nonetheless, even though they are allowed by the grammar, A-after-Ā movement chains are still subject to certain constraints. For instance, a crucial property of interleaved movement is that the moved DP must have an Ā-position as its final landing site. As shown in (6), an embedded object cannot be promoted to the subject position of a matrix clause.

(6) *Interleaved movement may not terminate in the matrix subject position*
    *[Uns   livros]₁ demor-**aram** [pra que a   Ana lesse t₁].
    some.PL books   take.time-PL for   that the Ana read
    Intended meaning: 'It took time for Ana to read some books.'

The generalization that emerges is the following: once an XP starts an Ā-movement chain it has to land in an Ā-position, but it may stop over A-positions along the way. I show that this generalization naturally follows from a grammar without the BIM due to two independently observed facts: (i) an XP with an Ā-feature must land in the specifier of a head in which this Ā-feature is interpreted; and (ii) once this XP is merged in this position, it can no longer move (Rizzi's 2006 notion of *Criterial Freezing*).

If there is no BIM, the question still remains as to why interleaved movement is not found in languages like English, as shown by the ungrammaticality of (7):

(7) *No interleaved movement in English*
    *What₁ seems that Ann bought t₁?

Rather than suggesting that the BIM is subject to cross-linguistic variation, I adopt Keine's (2019, 2020) horizons-based approach to phenomena standardly accounted by the BIM. Many other alternatives to the BIM have been proposed (e.g. Müller & Sternefeld, 1993; Williams, 2003; Abels, 2007, 2009), but Keine's system is unique in not making it impossible for A-after-Ā chains to exist. In fact, I show that interleaved movement is actually *expected* to exist in such system. Therefore, the present paper offers further support for this approach.

The rest of the paper is organized as follows: in §2 I present the evidence in favor of the claim that interleaved movement violates the BIM; in §3 I propose an analysis of these configurations; §4 discusses interleaved movement in light of Keine's (2020) theory of probes and horizons and shows how this theory can account for the differences between BrP and English; §5 concludes.

2   Interleaving A- & Ā-movement in Brazilian Portuguese

This section is dedicated to describing the main properties of interleaved movement (IM) and presenting the evidence in favor of my claim that IM sentences violate the BIM.

When an element is Ā-moved across a subjectless unaccusative clause-embedding verb in BrP, it may optionally trigger φ-agreement with it.[3] The sentences in (8) illustrate this with different kinds

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[3] The judgements reported are the author's (a native speaker of the variety of BrP spoken in the state of Rio de Janeiro) and were checked with three other native speakers of BrP.

of Ā-movement: the verb *demorar* 'take time' may either agree with the Ā-moved element or show default third person singular morphology. It is the agreeing variants of the sentences in (8) which I categorize as instances of IM.

(8) *Interleaved movement*

    a. [Quais livros]$_1$ demor-**aram**/-**ou** [pra que a   Ana lesse t$_1$]?
       which books take.time-PL/-3SG for   that the Ana read
       'Which books did it take time for Ana to read?'   *Wh-movement*

    b. os   livros$_1$ [que demor-**aram**/-**ou** [pra que a   Ana lesse t$_1$]]
       the.PL books that take.time-PL/-3SG for   that the Ana read
       'the books such that it took time for Ana to read them'   *Relativization*

    c. [Esses livros]$_1$, eu acho que demor-**aram**/-**ou** [pra que a   Ana lesse t$_1$]?
       these   books I   think that take.time-PL/-3SG for   that the Ana read
       'These books, I think it took time for him to read them.'   *Topicalization*

The analysis I defend in this section is that the movement path of elements that undergo IM creates an improper chain consisting of three steps: (1) Ā-movement to embedded Spec(CP); (2) A-movement to matrix Spec(TP); and (3) Ā-movement to matrix Spec(CP). In §2.1, I provide the evidence for the existence of each of these three movement steps and for their characterization as A- or Ā-movement. Before moving on to discussing the analysis and implications of IM, in §2.2 I emphasize that IM is distinct from other phenomena discussed in BrP, such as hyperraising (Ferreira, 2009; Nunes, 2008) and *tough*-movement (Martins & Nunes, 2005).

2.1 Interleaved movement in three steps

2.1.1 Step 1: Ā-movement to embedded Spec(CP)

Here I present evidence that (i) the moved element in IM configurations is indeed base-generated and moved from the embedded clause and (ii) that movement to the edge of the embedded clause is Ā-movement.

That these configurations indeed involve movement from the gap in the embedded clause is confirmed by a variety of movement tests. In the sentences in (9), we see cases in which the gap is an island – complex NP-island, adjunct island, and *wh*-island, respectively. They are all ungrammatical, which indicates that the gap in the embedded clauses of IM sentences is indeed generated by movement (rather than being, for example, an instance of object drop).

(9) *Interleaved movement: island sensitivity*

    a.* [Quais livros]$_1$ demor-**aram** [pra que ela falasse com [quem escreveu t$_1$]]?
       which books take.time-PL for   that she speak with who   wrote
       Intended: 'Which books are s.t. it took time for her to talk with whoever wrote them?'

    b.* [Quais livros]$_1$ demor-**aram** [pra que ela dormisse [depois de ler   t$_1$]]?
       which books take.time-PL for   that she sleep   after   of read
       Intended: 'Which books are s.t. it took time for her to sleep after reading them?'

c.*[Quais pessoas]$_1$ demor-**aram** [pra que ela dissesse [onde ela viu t$_1$]]?
    which people   take.time-PL for that she say   where she saw
    Intended: 'Which people are s.t. it took time for her to say where she saw them?'

Island sensitivity does not guarantee that the element in matrix Spec(CP) has moved from the embedded clause. Along the lines of Chomsky's (1977) analysis of *tough*-movement, the facts above are consistent with a proposal in which a null operator based generated in the embedded clause moves to embedded Spec(CP) and is then bound by the element in matrix Spec(CP). Evidence against this kind of proposal comes from the fact that reconstruction to a position inside the embedded clause is possible. Since constructions that have been argued to involve null operator movement (e.g. *tough*-movement, parasitic gaps) do not allow for reconstruction for scope and for binding (Postal 1974, Nissenbaum 2000), the availability of reconstruction with IM rules out this kind of analysis.

Before presenting the data, I first discuss ambiguities that arise in *how many*-questions. These *wh*-phrases are complex: they involve two quantifiers, *how*, a quantifier over degrees, and *many*, a quantifier over individuals. We can detect the existence of these two different quantifiers when we have another quantificational item in the question as in (10). This question has two different meanings: one in which the addressee may be considering marrying more the one person and another in which they are not. This ambiguity can be explained as a scopal ambiguity: *many* may be interpreted either above or below *would like*.

(10) *Ambiguity in 'how many'-questions*
    How many people would you like to marry?
    ✓*many≫would like*: What *n* is s.t. there are *n*-many people you would like to marry?
    ✓*would like≫many*: What *n* is s.t. you would like to marry *n*-many people?

When we look at BrP *how many*-questions in which the moved element has undergone IM, such as (11), we see that the *many* component is able to scope under the matrix verb. This would not be possible if the *wh*-phrase was base-generated in the matrix clause.

(11) *Interleaved movement: reconstruction for scope*
    [Quantos livros]$_1$ demor-**aram** [pra que a   Ana lesse t$_1$ numa noite]?
    how.many books take.time-PL for that the Ana read   in.a   night
    ✓*take time ≫ many*: 'What *n* is s.t. it took time for Ana to read *n*-many books in a night?'

Sentence (12) shows that element that have undergone IM may also reconstruct for binding. In this sentence, a quantifier in the embedded clause is able to bind a pronoun in the restrictor of the moved *wh*-phrase. If this *wh*-phrase had not been base generated in the embedded object position in (12), variable binding by the embedded subject would be impossible, contrary to fact.

(12) *Interleaved movement: reconstruction for binding*
    [Quais de suas$_2$ tarefas]$_1$ demor-**am**   [pra que [qualquer aluno]$_2$ faça t$_1$?]
    which of their$_2$ tasks   take.time-PL for that any   student do
    'Which of their$_2$ tasks does it take time for [any student]$_2$ to do?'

I take the data discussed above to show that IM must involve movement from the embedded clause. The next step, then, is to present data in favor of the claim that movement to the edge of the embedded clause is Ā-movement. To do this, I make use of several tests that distinguish A- and

Ā-movement (see Richards 2014 for a review).[4]

The first distinction that I focus on is the locality of the two types of movement: Ā- but not A-movement may cross finite clauses and other DPs. This is illustrated in BrP examples in (13): in (13a) we see that *quem* 'who' can cross a finite clause and other DPs on its way to matrix Spec(CP); in (13b) we see that *alguém* 'someone' cannot raise from an embedded object position to matrix Spec(TP). Although hyperraising is possible in BrP (Ferreira, 2009; Nunes, 2008), the hyperraised DP must be the closest subject.

(13)   *A- vs Ā-movement: locality*

   a. Quem você acha [que a   aluna   viu t]?
      who   2SG   think that the student saw
      'Who do you think the student saw?'

   b.* Alguém   parece [que a   aluna   viu t].
      someone seems   that the student saw
      Intended: 'It seems that the student saw someone.'

As can be seen in (14), in IM configurations, movement to embedded Spec(CP) behaves like Ā-movement, as it is able to cross finite clauses and other DPs.

(14)   *Movement to embedded Spec(CP): finite clauses & other DPs may be crossed*
      os livros$_1$ que demor-**aram** [pra [$_{CP}$ t$_1$ que a   Maria admitisse [$_{CP}$ t$_1$ que leu   t$_1$]]]
      the books   that take.time-PL for   that the Maria admit   that read
      'The books that it took time for Mary to admit that she read.'

Another distinguishing property between A- and Ā-movement has to do with preposition stranding. In BrP, only Ā-movement can strand prepositions: *wh*-movement may leave the preposition *sobre* stranded (15a), but A-movement in passives cannot (15b).

(15)   *A- vs Ā-movement: preposition stranding*

   a. Quem$_1$ você não fala [sobre t$_1$]?
      who   2SG   not talk about
      'Who do you not talk about?'

   b.* [Esse livro]$_1$ não é falado [sobre t$_1$].
      this book   not is spoken about
      Intended: 'This book is not talked about.'

Sentence (16) shows that movement to embedded Spec(CP) in IM configurations, like other instances of Ā-movement, may leave *sobre* stranded.

(16)   *Movement to embedded Spec(CP): prepositions can be stranded*
      os livros$_1$ que demor-**aram** pra [$_{CP}$ t$_1$ que a   Maria pudesse falar [sobre t$_1$]]
      the books   that take.time-PL for   that the Maria could   talk about
      'the books that took time for Mary to be able to talk about.'

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[4] In van Urk 2015, it is argued that certain kinds of movement may have both A- and Ā-properties. None of the movement steps analyzed here have the properties of this kind of composite movement discussed in van Urk's work.

Finally, Ā-movement does not create new antecedents for anaphors, while A-movement does. This is shown in (17): in both sentences, the moved element is generated in a position from which it cannot bind the reciprocal anaphor, but in (17b) the A-moved element is able to bind the anaphor from its final landing site.

(17)   *A- vs Ā-movement: creation of new antecedents for anaphors*

    a. *[Que meninos]$_1$ [a mãe [um d-o outro]$_1$] viu t$_1$?
       which boys   the mother of.each-other   saw

    b. Eles$_1$ parecem pr-[a mãe [um d-o outro]$_1$] [que t$_1$ chegaram].
       they seem   to-the mom of.each-other   that   arrived
       'They$_1$ seem to each other$_1$'s mother to have arrived.'

Once again, movement to embedded Spec(CP) in IM behaves like Ā-movement. As seen in (18), though in principle the moved element could locally bind the reciprocal anaphor from embedded Spec(CP), it cannot, which suggests that movement to that position is Ā-movement.

(18) *Movement to embedded Spec(CP): does not create new antecedents for anaphors*
    *os meninos$_1$ que demor-**aram** [pra t$_1$ que eu admitisse pr-[a mãe um do outro$_1$]
      the boys   that took-time.PL for   that I   admit   to-the mom of-each.other
       [que eu detesto t$_1$]]
       that I   hate

2.1.2 Step 2: A-movement to matrix Spec(TP)

In this subsection I present the evidence in favor of the claim that there is an A-movement step into the matrix clause in IM sentences. Given that the previous movement step was shown to be Ā-movement, this will show that IM is a counterexample to the BIM.

    The first piece of evidence comes from the licensing of floating quantifiers (FQs). In BrP, FQs are licensed by A-movement: (19a) shows that A-movement from Spec(vP) to Spec(TP) licenses them; (19b) shows that object cliticization also does; but (19c) shows that postverbal subjects do not license them. The ungrammaticality of (19c) shows that movement to a position that c-commands the FQ is a precondition on its licensing.

(19)   *Floating quantifiers are licensed by A-movement*

    a. Elas$_1$ vão todas$_1$ [t$_1$ comprar uma casa].
       they will all   buy   a   house
       'They will all buy a house.'

    b. Ele nos$_1$ viu todos$_1$ t$_1$.
       he 1PL   saw all
       'He saw us all.'

    c. *Vão todos$_1$ chegar [os livros]$_1$.
       will all   arrive the books
       'The books will arrive.'

Not all kinds of movement license FQs, however. As shown in (20), Ā-movement does not:[5]

(20)   *Floating quantifiers are not licensed by Ā-movement*

   a.*os livros$_1$ que a   Maria vai todos$_1$ dizer que eu li   t$_1$
      the books that the Maria will all   say   that I   read
      Intended: 'the books such that they were all said by Mary that I read them.'

   b.*Que   livros$_1$ que a   Maria vai todos$_1$ dizer que eu li   t$_1$?
      which books that the Maria will all   say   that I   read
      Intended: 'Which books are such they were all said by Mary that I read them?'

   c.*Essses livros$_1$, a   Maria vai todos$_1$ dizer que eu li   t$_1$.
      these books the Maria will all   say   that I   read
      Intended: 'These books, they were all said by Mary that I read them.'

Since FQ-licensing distinguishes between A- and Ā-movement, we can use it to detect whether A-movement has taken place in IM configurations. This is done in (21) and we see a surprising result: FQs can actually be licensed within the matrix clause - but only when the moved element triggers φ-agreement with the matrix predicate. Note, however, that regardless of the presence of φ-agreement in the matrix clause, an FQ is never licensed in the embedded clause.

(21)   *Floating quantifiers are only licensed if there is φ-agreement*

   a. os livros$_1$ que **vão**   (todos$_1$) demorar [pra que eu fale (*todos$_1$) sobre t$_1$]
      the books that will.PL all   take.time for   that I   talk all   about
      'the books that will all take time for me to talk about.'

   b. os livros$_1$ que **vai**   (*todos$_1$) demorar [pra que eu fale (*todos$_1$) sobre t$_1$]
      the books that will.SG all   take.time for   that I   talk all   about
      'the books that will all take time for me to talk about.'

This is the first datapoint we see in which the presence of φ-agreement affects the sentence's judgement. Remember that I only call IM those sentences in which φ-agreement is present. We can thus conclude from (21) shows that in IM configurations there is an A-movement step into the matrix clause. Furthermore, observe that this is the case even though in (21a) a preposition is left stranded in the embedded clause, which, as we have seen, is a property of Ā-movement in BrP. This can be made sense of if we are dealing with an improper chain: Ā-movement in the embedded clause, and A-movement into the matrix clause.

Another A-property present in IM sentences has to do with the binding of anaphors. As we have seen in the previous section, A- and Ā-movement differ with respect to whether they allow the creation of new antecedents for anaphors. As shown in (22), when an anaphor is in the matrix clause, the moved element may bind it as long as it triggers agreement in the matrix predicate.

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[5]I remain agnostic as to how BrP FQs should be analyzed. Fitzpatrick (2006) argues that FQs that are only licensed by A-movement are to be treated as adverbials. But see Lacerda (2016) for an analysis of BrP FQs compatible with Sportiche's (1988) stranding account of FQs.

(22) *Interleaved movement creates new antecedents for anaphors in the matrix clause*

    a. [eu e   você]$_1$, que parece-**mos** pra   mãe [um d-o outro]$_1$ [que ele detesta t$_1$]
        I   and you,   that seem.1PL to.the mom of.each-other   that he hates
        'you and I, who seem to each other's mother that the doctor hates'

    b.*[eu e   você]$_1$, que parece   pra   mãe [um d-o outro]$_1$ [que ele detesta t$_1$]
        I   and you,   that seem.3SG to.the mom of.each-other   that he hates
        'you and I, who seem to each other's mother that the doctor hates'

The datapoint in (22a) should be contrasted with the one in (18): in IM configurations, an anaphor may be bound from a derived position in the matrix but not in the embedded clause. This contrast makes it clear the BIM is being violated: it can only be understood if movement to embedded Spec(CP) is Ā-movement, but movement into the matrix clause is A-movement.

What the above data suggests is that IM is correlated with detectable A-properties *only in the matrix clause*. I therefore conclude that IM involves an A-step step into the matrix clause. The tests presented above do not show what is the landing site of the movement step, however. We can only tell that it must be a position high enough to license FQs. For our present purposes, the actual landing site matters less than the fact that there is an A-movement step at all. Here, I will assume that we are dealing with A-movement to matrix Spec(TP), given this operation's correlation with verbal φ-agreement. However, if it turns out that further data reveals the actual landing site to be somewhere else in the structure, the core argument remains unchanged.

2.1.3   Step 3: Ā-movement to matrix Spec(CP)

The previous two subsections have argued for the existence of two stopover positions in the derivation of IM. The task of this section is much easier, as we focus on the movement step to the position in which the element is actually pronounced. But the claim to be made is stronger than just saying that the element that has undergone IM *may* subsequently be Ā-moved – I argue that it *must* do so. In other words, the generalization I defend is that the final landing if IM must be an Ā-position.

Example (6), repeated below in (23), showed that one cannot simply promote an embedded object into a matrix subject. This is a surprising property of IM: the previous two subsections have shown that, in the basic IM cases, we first have Ā-movement to embedded Spec(CP) and then A-movement into the matrix clause. What we now see is that the derivation cannot stop just there,[6] a subsequent Ā-movement step is necessary. If this was not the case, (23) should be grammatical.

(23) *No object hyperraising in Brazilian Portuguese*
    *[Uns   livros]$_1$ demor-**aram** [pra que a   Ana lesse t$_1$].
    some.PL books take.time-PL for   that the Ana read
    Intended meaning: 'It took time for Ana to read some books.'

Before proceeding, however, we need to analyze data like (23) more carefully. The issue is that subjects are sometimes hard to distinguish from topics in BrP, and a speaker might be inclined to accept (23) if *uns livros* 'some books' is interpreted as a topic. Thus, I now present a series of tests

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    [6]Under the assumption, of course, that Spec(TP) is the landing site of this A-step. As just pointed out, the data presented above is compatible with the landing site being some other position in the matrix clause.

in which subjects and topics are distinguished and show that, when an XP is unambiguously in Spec(TP), IM sentences are ungrammatical.

I first employ a strategy devised in Ferreira (2009), which is to make use of *cês*, a reduced form of the second person plural pronoun *vocês* which, as shown in (24), cannot be topicalized.[7]

(24) *Reduced pronoun 'cês' cannot be topicalized*

    a. Cês me vir-**am**.
       2PL 1SG see-PL
       'Y'all saw me.'

    b.*Cês, eu **vi**.
       2PL 1SG see.1SG
       Intended: 'Y'all, I saw.'

We can then use *cês* to detect whether a certain position is a subject position or a topic position. As shown in (25), *cês* cannot undergo IM, thus suggesting that the path created by IM cannot terminate at Spec(TP).

(25) *'Cês' as a diagnostic for subjecthood*
    *Cês$_1$ demor-**aram** [pra que eu visse t$_1$].
    2PL take.time-PL for that I saw
    Intended: 'It took time for me to see y'all.'

Another test pointing towards this same conclusion involves control, as PRO must occupy the subject position of the controlled clause, as shown by the constrast in (26).[8] As seen in (27), a clause in which PRO has undergone interleaved movement is ungrammatical.

(26) *Control as a test for subjecthood*

    a. I$_1$ want [PRO$_1$ to see you].

    b. *I$_1$ want [PRO$_1$ you to see t$_1$].

(27) *Interleaved movement and control*
    *Vocês$_1$ quer-em [PRO$_1$ demorar [pra que eu ame t$_1$]].
    2PL want-PL take.time for that I love
    Intended: 'Y'all want to it to be the case that it takes time for me to love you.'

I conclude, then, that although IM configurations involve moment into an A-position, the final landing site of the moved element must be an Ā-position.[9]

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[7] I follow traditional Portuguese grammar in describing verbal φ-agreement morphology triggered by *(vo)cês* as third person plural even though we are dealing with a second person plural pronoun. More accurate terminology would be to describe it as non-first person plural agreement.

[8] The contrast at least shows that PRO must be the highest DP in an A-position in the controlled clause.

[9] Martins & Nunes (2005, 2010) and Nunes (2016) discuss constructions which they argue to involve a base-generated embedded topic being promoted to the matrix subject position (*topic hyperraising*). If, however, one applies the tests for subjecthood mentioned in this section to those data, one finds that in those configurations, the embedded topic is not actually a subject of the matrix clause, but rather a matrix topic. I thus speculate that these constructions are in fact instances of IM: matrix topicalization of an embedded topic triggering agreement with a matrix unnacusative predicate.

2.1.4 Interim summary

In this subsection, I have described the key properties of IM configurations. The main conclusions from this investigation are summarized in (28).

(28) *Three claims*

    a. IM involves an Ā-movement step to the edge of the embedded clause.

    b. IM interleaved an A-movement step into the matrix clause.

    c. IM chains must terminate in an Ā-position.

In the next section, I present an account of IM that is consistent with all these claims. However, before proceeding, in §2.2, I further disentangle IM configurations from similar-looking configurations foud in BrP.

2.2 Differentiating interleaved movement from similar configurations

BrP has several unusual constructions which one might claim to have both A- and Ā-properties. In this section, I present evidence that IM cannot be subsumed under any of these other constructions.

For example, at first glance, one may think that interleaved movement is actually an instance of some kind of hyperraising. BrP, as shown in (29), is known to have subject hyperraising (Ferreira, 2009; Nunes, 2008), so maybe IM only shows that non-subject hyperraising is also possible in the language.

(29) *Hyperraising in Brazilian Portuguese*
[Os livros]$_1$ parec-**em** [que cheg-**aram**].
the books seem-PL that arrive-PL
'It seems that the books arrived.'

Similarly, one could think that interleaved movement is an instance of *tough*-movement, which is possible in BrP (as discussed in Martins & Nunes 2005), as shown in (30). *Tough*-movement involves a non-subject being promoted to a matrix subject also via some combination of A- and Ā-movement. Interleaved movement could, then, involve *tough*-movement followed by further Ā-movement.

(30) *Tough-movement in Brazilian Portuguese*
[O Pedro]$_1$ é difícil de [conversar t$_1$].
the Pedro is hard of talk
'Pedro is hard to talk to.'

The first immediate concern with this kind of proposal is what was just discussed in §2.1.3: the moved element in IM must have an Ā-position as its final landing site. This is not true either of hyperraising or *tough*-movement. As can be seen in (31) and (32), *cês* as well as PRO can undergo both operations, as opposed to IM, which shows that chains created by these kinds of movement may terminate in Spec(TP).

(31) *'cês' as a test for subjecthood*

    a. Cês₁ parec-**em** [que estão chorando].
       2PL seem-PL that be.PL crying
       Intended: 'It seems y'all are crying.'

    b. Cês₁ são difíceis de [conversar t₁].
       2PL are hard.PL of talk
       'Y'all are hard to talk to.'

(32) *Control as a test for subjecthood*

    a. Vocês₁ quer-em [PRO₁ parecer [que t₁ estão chorando]].
       2PL want-PL seem that be-PL crying
       'Y'all want to seem to be crying.'

    b. Vocês₁ quer-em [PRO₁ ser difíceis de [conversar t₁]].
       2PL want-PL are hard.PL of talk
       'Y'all want to be hard to talk to.'

There are further differences between these constructions. For example, interleaved movement and hyperraising do not match in their distribution. Hyperraising in BrP is limited to a subset of unaccusative clause embedding predicates. For example, the predicate *ser comprovado* 'be proven' does not license hyperraising, as shown in (33). Nonetheless, interleaved movement is allowed with this predicate (34).

(33) *No hyperraising with 'ser comprovado'*
    *Cês₁ **foram** comprovad-**os** [que t₁ me roubaram].
    2PL were proven-MASC.PL that me stole
    Intended: 'It was proven that y'all stole from me.'

(34) *Interleaved movement with 'ser comprovado'*
    [Que pessoas]₁ **foram** comprovad-**as** [que ele roubou t₁]?
    which people be.PL proven-FEM.PL that he stole?
    'Which people was it proven that he stole from?'

Furthermore, as first observed by Postal (1974), *tough*-movement is incompatible with reconstruction for scope, as shown in (35). As we have already seen above in (11), that is not the case with interleaved movement.

(35) *Tough-movement & reconstruction*
    [Poucos livros]₁ são difíceis de [ler t₁].
    few books are hard.PL of read
    'Few books are hard to read.'   *few ≫ hard*; **hard ≫ few*

I take the data just discussed to show that interleaved movement should not be subsumed under either hyperraising or *tough*-movement.

3 An analysis of interleaved movement

I now present my analysis of IM. This account will be very minimal: once the BIM is out of the picture, IM naturally follows from standard assumptions concerning the architecture of grammar. The discussion is organized as follows: in §3.1, the basic account of IM is laid out; in §3.2, I show how the constraint that IM must terminate at an Ā-position derives from independent properties of Ā-movement; in §3.3 I conclude with a discussion of the consequences my account of IM to an analysis of hyperraising.

3.1 Removing the Ban on Improper Movement

The discussion in §2 showed that in IM configurations, A-movement may follow Ā-movement. I conclude from this that the BIM is empirically inadequate and should therefore be dropped.[10] I now show how a configuration like IM is expected in a grammar without the BIM.

My account of IM is grounded on very standard proposals. First, I take both φ-agreement and movement (be it intermediate or not) to be triggered by the operation Agree (Chomsky, 2000), defined in (36).[11] Following Müller (2010), given a feature α, I notate those probes seeking α as $[*\alpha*]$ if they only copy feature values from their goals and as $[\bullet\alpha\bullet]$ if they also trigger movement to their specifier.

(36) *Agree*
    An unvalued feature (the "probe") serially searches through its c-command domain for a valued counterpart (a "goal"). It copies the value of the closest goal.

Furthermore, I take CPs to be phases (Chomsky, 2000, 2001), which is why movement across finite clauses must go through Spec(CP). For reasons that will become clear in §4, I assume that vPs are not phases. However, this does not affect in any way the analysis of IM presented here.

I take IM to be a natural consequence of successive-cyclic Ā-movement (in a grammar that does not ban A-after-Ā chains). The analysis in a nutshell is the following: when an XP undergoing successive cyclic movement lands at an intermediate position from which it is visible to the probes in T, it is agreed with and attracted to Spec(TP); after that, the XP continues its subsequent Ā-movement steps.

I now present this derivation in more detail, focusing on how the IM sentence in (37) is derived:

(37) *Basic interleaved movement sentence*
    [Quais livros]₁ demor-**aram** [pra que a   Ana lesse t₁]?
    which   books   take.time-PL for   that the Ana read
    'Which books did it take time for Ana to read?'

First, the embedded object Ā-moves to embedded Spec(CP), as illustrated in (38). At this point, we have a simple derivation in which a DP with Ā-features is attracted by an Ā-probe in the local C.

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[10] Another reaction to this could be that the BIM should be viewed as a parameter rather than a principle. This alternative is discussed in §4.2.

[11] This particular definition is taken from Keine 2020.

(38) *Interleaved movement: Step #1*

$$\text{DP}_{[\check{A},\varphi]} \ \ \text{C}_{[\bullet\check{A}\bullet]} \ \left[\text{TP} \ \dots \ t \ \dots \ \right]$$
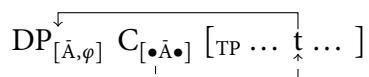
After this, the CP merges with the unaccusative verb *demorar* 'take time' and the resulting constituent is merged with T. As illustrated in (39), since the matrix verb is unaccusative, the DP in embedded Spec(CP) is the closest goal to T and therefore T both agrees with it and attracts it. [12]No stipulations are needed: since the structural description of Agree is met, the operation just applies.

(39) *Interleaved movement: Step #2*

$$\text{DP}_{[\check{A},\varphi]} \ \ \text{T}_{[\bullet D\bullet, *\varphi*]} \ \left[\text{VP} \ V \ \left[\text{CP} \ t \ \dots \ \right]\right]$$
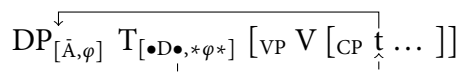
There is independent evidence that a DP in embedded Spec(CP) is visible to the probes in matrix T. Similarly to what is reported in Tsez by Polinsky & Potsdam (2001), a matrix predicate in BrP may agree with a DP in the left periphery of an embedded clause:[13]

(40) *Verbal φ-agreement with an element in the left periphery of the verb's complement*

Fora-**m** comprovad-**as** [quant-**as** pesso-**as** morreram no acidente].
be-PL proven-F.PL how.many-F.PL people-F.PL died in-the accident
'It was proven how many people died in the accident.'

Finally, when matrix C is merged, it triggers movement of the DP in Spec(TP) to its specifier, as shown in (41). Sentence (37) is therefore easily accounted for. Since there is no BIM, IM is expected to occur whenever successive cyclic movement passes through a position from which it is the closest goal to some A-probe.

(41) *Interleaved movement: Step #3*

$$\text{DP}_{[\check{A},\varphi]} \ \ \text{C}_{[\bullet\check{A}\bullet]} \ \left[\text{TP} \ t \ \dots \ \right]$$

There is one important thing left to account, however: the apparent optionality of IM. As discussed above, agreement in (37) is optional: the sentence in (42) in which the main verb exhibits default third person agreement is also grammatical. Note that it is not just φ-agreement which is optional, it is φ-agreement *and* A-movement: as we saw in §2.1.2, sentences like (42) also lack the A-properties that motivated my analysis of IM.
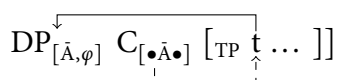
(42) *Interleaved movement is optional*

[Quais livros]₁ demor-**ou** [pra que a Ana lesse t₁]?
which books take.time-3SG for that the Ana read
'Which books did it take time for Ana to read?'

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[12]I take the A-probe in T to be a probe seeking a D-feature, so I write it as [•D•].

[13]One of the three consulted native speakers did not accept this sentence (as well as IM sentences with *ser comprovado* 'be proven'). These sentences are somewhat marginal but one can find examples online: *[…] ainda não foram comprovados quais são os danos causados a longo prazo* 'still not be.PL proven.PL which.PL are the damages caused on the long run' (https://gauchazh.clicrbs.com.br/geral/noticia/2013/11/confira-quais-sao-os-alimentos-com-mais-irregularidades-no-uso-de-agrotoxicos-4320411.html)

I take it that the source of this optionality is the same as the one illustrated in (43). Although we have just seen in (40) that a matrix unaccusative may agree with a DP in embedded Spec(CP), agreement is also optional in these cases.

(43) *Verbal φ-agreement with an element in the left periphery of the verb's complement*

    a. **Foram** comprovad-**as** [quant-**as**   pesso-**as**   morreram no   acidente].
        be.PL   proven-F.PL   how.many-F.PL people-F.PL died   in-the accident
        'It was proven how many people died in the accident.'

    b. **Foi**   comprovad-**o** [quant-**as**   pesso-**as**   morreram no   acidente].
        be.SG proven-M.SG how.many-F.PL people-F.PL died   in-the accident
        'It was proven how many people died in the accident.'

I propose that the source of optionality is the optional presence of a null expletive pronoun. By the time T is externally merged to the root of the sentence, there are two possible structures for deriving the sentences above, as shown in (44). If no expletive is inserted, the DP in Spec(CP) is the closest goal to T and it therefore triggers φ-agreement/A-movement. If the expletive is inserted, it acts as an intervener and T cannot Agree with the DP. This account therefore accounts for why φ-agreement and A-movement go hand in hand in IM.

(44) *Optional insertion of a null expletive*

    a. T $[_{VP}$ V $[_{CP}$ DP$_{[\bar{A},\varphi]}$ C TP $]]$

    b. T $[_{VP}$ pro$_{expl}$ V $[_{CP}$ DP$_{[\bar{A},\varphi]}$ C TP $]]$

I leave aside the question of why null expletive insertion is optional. A possible way to formalize this, could be by stipulating the existence of two kinds of unnacusative *v*s: one which projects a specifier and one that does not.

3.2 Constraining improper chains

The analysis just sketched apparently leaves unexplained a crucial aspect of IM chains: the fact that they must terminate an Ā-position. I now show that this property of IM is actually already accounted for by known facts about Ā-movement.

    In order to do this, I first need to distinguish two kinds of heads hosting Ā-probes. There are those in which the matching Ā-feature is interpreted, and those in which it is not. The first kind triggers movement to the position in which the Ā-moved element will actually be interpreted while the second kind only triggers intermediate Ā-movement steps. They are both illustrated in (45): both Cs trigger movement to their specifiers, but since only the higher CP is interpreted as a question, only the *wh*-features in the higher C are actually interpreted.

(45) *Two kinds of heads with Ā-probes*
    I know [who$_{[wh]}$ C$^{\kappa}_{[\bullet wh\bullet]}$ [you think [t C$_{[\bullet wh\bullet]}$ [I saw t]]]]

Following Rizzi (2006), if H is a head with Ā-probe in which the Ā-feature is actually interpreted, I refer to Spec(HP) as a *criterial position*. I notate these heads with a κ-superscript.

    With this distinction in mind, there are then two derivations we must block.[14] They are illus-

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[14]Note that, because I assume all movement operations to be feature-driven, a derivation in which the DP moves to

trated in (46): in both of these, the IM chain terminates in Spec(TP), but in (46a) the DP is moved into the matrix clause from a criterial position and in (46b) it is not. Both of these derivations are ruled out by independent principles, as I will now show.

(46) *Two derivations to block*

    a. $\mathrm{DP}_{[\bar{A}]}$ T ... $[_\mathrm{CP}$ t C^κ $[_\mathrm{TP}$ ... t ...$]$ $]$ $]$ $]$.
         (Ā-movement / A-movement)

    b. $\mathrm{DP}_{[\bar{A}]}$ T ... $[_\mathrm{CP}$ t C $[_\mathrm{TP}$ ... t ...$]$ $]$ $]$ $]$
         (Ā-movement / A-movement)
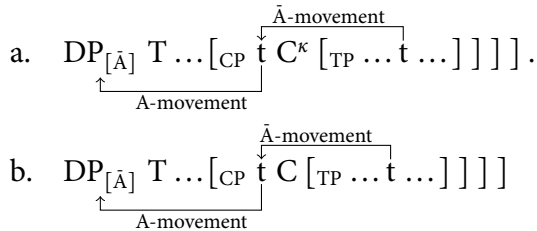
An underlying assumption in current syntactic theorizing is the (descriptive) constraint in (47), which I dub as the *Ā-Criterion*, after Pesetsky's (1982) *wh-criterion*. In a nutshell, the constraint dictates that an XP undergoing successive cyclic Ā-movement must move to a criterial position, and, once it gets there, it may not move any further.

(47) *The Ā-Criterion*
    Given an XP with a set of Ā-features α:

    a. XP must move to the specifier of a phrase headed by a Y^κ where α is interpretable

    b. XP cannot be moved from the the specifier of a phrase headed by a Y^κ where α is interpretable

The first clause of the Ā-criterion rules out sentences in which successive-cyclic movement of an XP terminates before it gets to a criterial position, such as (48). The second clause blocks sentences like (55), where a *wh*-phrases is further moved from its criterial position.

(48) *Ā-movement must land in a criterial position*
    *I know [you think [I said [who$_1$ you saw t$_1$]]]

(49) *No movement from criterial positions*
    *Who$_1$ did you know [t$_1$ C^κ [I saw t$_1$]]?

The point I make is that whatever derives the Ā-criterion (i.e., whatever one takes to block (48) and (55)) is also be responsible for deriving the property of IM that it must terminate in an Ā-position. Each of the derivations in (46) is ruled out by one of the clauses of the Ā-Criterion: (46a) violates (47b), as a DP with Ā-features is being moved from its criterial position; and (46b) violates (47a), because an XP with Ā-features undergoing successive-cyclic Ā-movement does not move to a criterial position.

For concreteness, I now present one possible account of the Ā-criterion (the reader should keep in mind that there are other ways of doing so, however). To derive its first clause, I adopt Preminger's (2014) account of why successive-cyclic movement. Contra Chomsky (2000), Preminger proposes that if a probe cannot find a goal, no issue arises: the probe simply remains unvalued and is interpreted as such at the interfaces. Since Agree can fail, we can assume that every C, no matter whether criterial or not, bears Ā-probes. This proposal has desirable results, as seen in (50): interrogative and declarative Cs have *wh*-probes and movement is triggered only if they find a DP with *wh*-features. Sentence (48), therefore, will never be generated: since every complementizer in the clause has an

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Spec(CP) without being agreed with is already ruled out.

wh-probe, subsequent movement of *who* is obligatory. At the same time, there is no issue in (50b): the *wh*-probes in matrix and embedded Cs find no goals, but since Agree can fail, ungrammaticality does not arise.

(50) *Obligatory operations and successive-cyclic movement*

    a. Who $C^{\kappa}_{[\bullet wh\bullet]}$ [you think [t $C_{[\bullet wh\bullet]}$ [I saw t]]]]

    b. $C_{[\bullet wh\bullet]}$ [you think [$C_{[\bullet wh\bullet]}$ [I saw Ann]]]]

In (46b), we were not dealing with a full representation, as matrix C was not represented. This is fixed in (51). Since we now assume all Cs to have an Ā-probe, Ā-movement to matrix Spec(CP) is obligatorily triggered as the DP in Spec(TP) is within reach of the Ā-probe in C. Note that, if the DP did not have an Ā-feature, it would not have been able to get to Spec(TP) in the first place, as movement to the edge of the embedded clause would not have been triggered.

(51) *Ā-movement cannot stop in a non-criterial position*

    $C_{[\bullet \bar{A}\bullet]}$ [$DP_{[\bar{A}]}$ T …[$_{CP}$ t C [$_{TP}$ …t …]]]]

With respect to the second clause of the Ā-criterion, we can take it to be a result of Rizzi's (2006) *Criterial Freezing*, a constraint that states that an XP with Ā-features is frozen in its criterial position.[15] I will not attempt to spell out the source of this constraint, but I note that it must be stated in a way that only blocks an movement-triggering probe from agreeing with it. The sentences in (52) show that, although the *wh*-phrase in embedded Spec(CP) may not be attracted by the [•D•] probe in T (because of Criterial Freezing), it is still visible to the T's $[*\varphi*]$ probe.

(52) *Only agreement with DPs in embedded criterial positions*

    a. **Foram** comprovad-**as** [quant-**as** pesso-**as** morreram no acidente].
        be.PL proven-F.PL how.many-F.PL people-F.PL died in-the accident
        'It was proven how many people died in the accident.'

    b.*Quant-**as** pesso-**as** **foram** comprovad-**as** [t morreram no acidente].
        how.many-F.PL people-F.PL be.PL proven-F.PL died in-the accident

Summing up, the proposal is the following. IM is a side effect of successive-cyclic Ā-movement: it occurs when an *intermediate* Ā-step puts an XP in a position visible to an A-probe. IM cannot be fed by Ā-movement to a criterial position because this kind of movement freezes the moved element in that position. But, since this was an intermediate movement step, the XP must keep on moving to other Ā-positions because of the same property of grammar that guarantees that successive-cyclic Ā-movement cannot stop on the way to its criterial position.

3.3 Implications for hyperraising

The conclusion from the last subsection is that improper chains always terminate in an Ā-position. From this, one concludes that the derivation of hyperraising discussed in the very beginning of this paper, repeated below in (53), is independently ruled out, even if there is no BIM. But this raises the question then, as to how attested cases of subject hyperraising should be analyzed.

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    [15] Reis & Rosengren (1992) discuss configurations in which Criterial Freezing seems to be violated in German. This might indicate that Criterial Freezing might be subject to cross-linguistic variation. I leave this matter aside.

(53) *Hyperraising via an intermediate Ā-movement step*

$$\text{Ann T} \ldots [_{CP} \text{ t C } [_{TP} \text{ t T} \ldots]]$$

(with A-movement arrow over "Ann" and Ā-movement arrow under CP)

First, we need to establish whether the hyperraised subject stops over the edge of the clause. This is not a necessary assumption. Both Nunes (2008) and Halpert (2019) propose an account of hyperraising as Spec(TP)-to-Spec(TP) movement. Such an analysis will not work for BrP, however, and this is because of my account of IM. As seen in (54), Ā-movement does not block hyperraising. This might not have been an issue if something like the BIM was active, but since I have argued that it is not, if the embedded subject remained in Spec(TP), as in (55a), *quais livros* 'which books' would be the closest goal to matrix T. We therefore need to assume that the embedded subject c-commands the embedded object when T is merged to the structure. The issue is solved if we take hyperraising to go through Spec(CP) and to occupy the higher specifier of embedded CP, as in (55).

(54) *Ā-movement does not block hyperraising*
[Quais livros]$_1$ elas$_2$ parec-**em** [que t$_1$ ler-**am** t$_2$]?
which books they seem-PL that read-PL
'Which books do they seems to have read?'

(55) *Competing analyses of hyperraising*

    a. T [[which books]$_2$ C [she read t_2]]

    b. T [she$_1$ [which books]$_2$ C [t$_1$ read t_2]]

This leads us to a dilemma: we need to assume hyperraising proceeds through embedded Spec(CP), but if the DP Ā-moves to Spec(CP), we would expect the hyperraised DP to be required to terminate in an Ā-position.

A solution can be found in the analysis of hyperraising of Fong (2019). Based on an investigation of Mongolian hyperraising, she proposes that hyperraising proceeds through Spec(CP) via A-movement: in hyperraising languages, C is a A-position. She implements this proposal within the view of the A/Ā-distinction of van Urk 2015, who argues that the distinction between the two types of movement lies on the type of probe that triggers it. Therefore, C can be an A-position as long as it contains an A-probe. Hyperraising in BrP, then, can be analyzed as in (56): as an A-chain. Such an analysis is completely consistent with the analysis of IM presented above.

(56) *Hyperraising in Brazilian Portuguese*

    a. [Os livros]$_1$ parec-**em** [que cheg-**aram**].
       the books seem-PL that arrive-PL
       'It seems that the books arrived.'

    b. the books T $\ldots$ [$_{CP}$ t$_A$ C [$_{TP}$ t$_A$ T $\ldots$]]
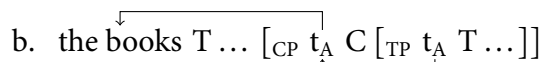
In §2.2, I discussed how the predicates that allow hyperraising and those that allow IM do not coincide. The data is repeated in (57), where we see furthermore that, although *ser comprovado* does not allow for hyperraising, it allows for both IM and and cross-clausal φ-agreement.

(57) *Cross-clausal A-dependencies with 'ser comprovado'*

    a.* Cês$_1$ **foram** comprovad-**os**   [que t$_1$ me roubaram].
       2PL   were   proven-MASC.PL that   me stole
       Intended: 'It was proven that y'all stole from me.'

    b. [Que   pessoas]$_1$ **foram** comprovad-**as** [que ele roubou t$_1$]?
       which people   be.PL   proven-FEM.PL that he stole?
       'Which people was it proven that he stole from?'

    c. **Foram** comprovad-**as** [quant-**as**   pesso-**as**   morreram no   acidente].
       be.PL   proven-F.PL how.many-F.PL people-F.PL died   in-the accident
       'It is still not proven how many people died in the accident.'

We can make sense of this pattern by taking *ser comprovado* to only combine with CPs headed by a C without an A-probe. This implies that A-movement out of the embedded clause is impossible, since only Ā-movement is capable of putting a DP on the edge of the CP phase. Therefore we will only get cross-clausal φ-agreement or IM: if embedded Spec(CP) is a criterial position for the moved DP, we get the former; if it is not, we get the latter.

    My analysis of IM therefore has important consequences for the analysis of hyperraising, at least in BrP. We have shown that we need to follow Fong (2019) in taking hyperraising to proceed via intermediate A-movement to Spec(CP).

4   Constraining the availability of interleaved movement

The remaining question of this paper has to do with how it started. The BIM was motivated to block hyperraising in English. Based on data from BrP, I have proposed to eliminate the BIM and any other similar constraint. But now the issue is how to account for the ungrammaticality of (58).

(58) *No interleaved movement in English*
    *What$_1$ seems that Ann bought?

    In this section, I present the theory of probes and horizons of Keine (2020) as a solution to this problem. As we will see, this theory is able to account (i) for BIM-like effects without explicitly blocking a given sequence of movement operations and (ii) for the attested cross-linguistic variation of these phenomena. This section is organized as follows: in §4.1 I present Keine's theory and show how English and BrP are distinguished in such a theory; and §4.2 presents further support for Keine's system based on the fact that cross-clausal A-dependencies in BrP are restricted to subject raising.

4.1   Selective opacity & horizons

Keine (2019, 2020) argues that the English ban on hyperraising should be viewed as an instance of the more general phenomenon of *selective opacity*: cases in which a specific domain is opaque for some operations but not others.

(59) *Selective opacity*
    A syntactic domain Δ is selectively opaque for α-extraction if Δ prohibits α-extraction but allows β-extraction out of it, where α and β are different types of extraction.

In English, finite clauses are opaque for A-movement but not for Ā-movement. In a similar way, as shown in (60), German V-final finite clauses are transparent for *wh*-movement but opaque for relativization. We see, then, that the phenomenon of selective opacity cuts across finer-grained distinctions than the A/Ā-distinction.

(60) *Selective Opacity in German V-final finite clauses*

    a. Wen₁ glaubt   Fritz [$_{CP}$ dass Maria t₁ getroffen hat]?
       who believes Fritz   that Maria   met   has
       'Who does Fritz believe that Maria met?'

    b. */der Mann [den₁ Fritz glaubt   [$_{CP}$ dass Maria t₁ getroffen hat]]
       the man   who Fritz believes   that Maria   met   has

The challenge of accounting for selective opacity is that different operations have different locality constraints. Keine proposes to locate the issue in the probes themselves: the idea is that each probe is specified for a *horizon*, i.e., a categorial feature that terminates the search process initiated by the probe:

(61) *Horizons*
    If a category label X is a horizon for probe π (notated as "$\pi \dashv X$"), then a π-initiated search terminates at a node of category X. All elements dominated by XP are therefore outside π's search space.

Selective opacity, then, occurs when two probes have different horizons. The differences between the locality of A- and Ā-movement in English can thus be accounted for in the following way. The A-probe in T has C as its horizon (i.e., $[\bullet D\bullet]_T \dashv C$), which means that its search procedure must terminate as soon as it finds a CP. Therefore, even if an XP is in Spec(CP), it is still not accessible to T, as illustrated in (62). Ā-movement may cross finite clauses however: Keine proposes that the Ā-probe in C lacks a horizon altogether (i.e., $[\bullet\bar{A}\bullet]_C \dashv \varnothing$), so its search procedure is only terminated by phases. Therefore, the crucial difference between the probes in C and the one in T is that only the latter may agree with specifiers of CPs.

(62) *Blocking hyperraising with horizons*

$$T_{[\bullet D\bullet]} \ [_{VP} \ V \ ([_{CP} \ \check{D}P \ C \ [\ldots]]]$$
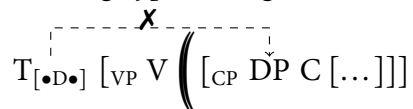
What about languages in which hyperraising is possible? Keine suggests that the difference is in the horizons of T: in hyperraising languages, the A-probe in T has no horizons (i.e., $[\bullet A\bullet]_T \dashv \varnothing$). Since BrP also allows cross-clausal φ-agreement, I take T's φ-probe to also lack a horizon (i.e., $[*A*]_T \dashv \varnothing$).

An important consequence of this account is that is also explains the difference in the availability of IM. IM is predicted to be impossible in English. Since the A-probe in T cannot see inside CPs, intermediate Ā-movement will never land in a position visible to an A-probe. On the other hand, if T can search inside CPs, IM will come for free. Therefore, without any mention of A-after-Ā chains, a horizon based account is able to, in a single swoop, explain why BrP, but not English, exhibits such a wide range of cross-clausal A-dependencies. Given that Keine's system is unique in doing so without resorting to A-/Ā-movement interactions, IM presents further support to this kind of

analysis.

Keine's account of the lack of hyperraising in English crucially relies on the fact that *v*P is not a phase. The issue is the following: if *v*P were a phase, T would have to distinguish between two kinds of DPs in Spec(*v*P) – those that got there from a non-finite clause (T has to attract those) and those that got there from a finite clause (T cannot attract those). However, at the point in which they are in Spec(*v*P) there is not enough information to distinguish these two kinds of DP. The issue is solved if *v*P is not a phase. Note that, although works such as Fox (1999) and Legate (2003), are often cited as providing evidence in favor of *v*P being a phase, Keine points out that Spec(*v*P) is a *possible* stop over position, not an obligatory one. For more discussions on the (non) status of *v*P as a phase, the reader is directed to Keine (2020).

4.2 CPs are selectively opaque in Brazilian Portuguese

A crucial aspect of the horizons-based approach is that cross-linguistic variation is located in probes. However, one could have imagined that, instead, the difference between BrP and English resides on CPs, e.g. only in BrP may A-movement cross them. Yet another alternative would be to parametrize the BIM: it is active in English, but not in BrP. In this section, I argue that such proposals would actually overgenerate. The main issue is that, even when we focus on A-movement, CPs in BrP are selectively opaque.

The sentences in (63) illustrate raising to object in BrP. We can tell that the subject of the embedded clause occupies the matrix object positions because: (i) in (63a) it appears to the left of a matrix adverb; and (ii) it can be cliticized to the main verb.

(63)   *Raising to object in Brazilian Portuguese*

    a. A   Maria viu o   Pedro, com os próprios olhos dela,   comer o   bolo.
      the Maria saw the Pedro with the own   eyes of.her, eat   the cake
      'Maria saw Pedro, with her own eyes, eat the cake.

    b. A   Maria me viu chegar.
      the Maria me saw arrive
      'Maria saw me arrive.

Crucially, although hyperraising to subject is possible in BrP, hyperraising to object is impossible, as illustrated in (64). If one were to claim that any kind of A-movement may cross C in BrP, this sentence would be predicted to be grammatical, contrary to fact.

(64) *No hyperraising to object*
    *A   Maria me viu que cheguei.
     the Maria me saw that arrived
     Intended: 'Maria saw that I arrived.'

Hyperraising was argued to require an A-probe in C, so maybe the ungrammaticality of (64) could simply be due to the fact that BrP raising to object verbs do not select for Cs with an A-probe. Nonetheless, IM should still be allowed. In fact, both the view that locates the BrP exceptionality in its CP and the one that takes the BIM to be a parameter actually predict IM to object to be possible. However, in (65) I show that IM to object is not allowed in the language: if it were, the FQ in the matrix clause would be licensed.

(65) *No interleaved movement to object*
   *[Que   meninos]₁ a   Maria viu todos₁ que chegaram.
    which boys   the Maria saw all   that arrived

In a horizons-based framework, this asymmetry is completely expected. We have seen that it is the probes in T which allow for cross-clausal A-dependencies in BrP. This tells us nothing about the horizon of the A-probe in V: it may as well have C as its horizon. BrP thus seems to corroborate the claim that probes are the culprit for selective opacity effects.

5   Conclusion

This paper has argued, based on a detailed investigation of interleaved movement configurations in BrP, that the BIM and other related bans on A-after-Ā movement should be abandoned. The BrP facts discussed above show that in certain corners of certain languages, one may indeed find actual instances of an Ā-movement element being A-moved.

This investigation has also identified a peculiar property of these improper chains: they must always terminate in an Ā-position. I have argued that this is actually already expected given certain facts we know about Ā-movement, namely that, once a phrase Ā-moves, it must land in a criterial position, and, once it does that, it may no longer move.

A minimal account of IM was pursued. The key idea is that IM is exactly what one expects to find if there is no such thing as the BIM. This minimal analysis, however, has important consequences for the analysis of hyperraising. Namely, it corroborates the analysis of (Fong, 2019): hyperraising, at least in BrP, must involve an intermediate A-movement step to Spec(CP).

Finally, the existence of IM seems to favor a particular alternative to the classic BIM: Keine's (2019; 2020) theory of probes and horizons. The features of the theory that permit IM to exist that (i) it does not explicitly ban A-after-Ā movement, and (ii) allows for parametric variation. Furthermore, I have argued that locating the point of variation in specific probes seems to make the correct predictions concerning the range of attested cross-clausal A-dependencies in BrP.

The present analysis makes certain interesting predictions concerning cross-linguistic variation. Hyperraising is predicted to be possible when (i) T does not have C as its horizon and (ii) C has an A-probe. IM, on the other hand, will be available whenever (i) holds and (iii) null expletives are not obligatory. We therefore expect to find languages that only have IM and also hyperraising languages in which IM is not possible. I leave these predictions to be confirmed in future work.

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