A prosodic constraint on wh-extraction from preverbal infinitival subjects

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Abstract

This paper introduces a series of mitigating circumstances improving the acceptability of wh-extraction from preverbal infinitival subjects in Rioplatense Spanish. It is argued that the factor behind these amelioration effects is encoded in prosodic structure, much in line with the hypothesis that certain island restrictions apply at PF. The linguistic principle accounting for the phenomenon is proposed to be a faithfulness constraint at the syntax-prosody interface stating that an extraction domain XP cannot be mapped as a prosodic word ω at PF. An alternative syntactic account based on freezing is shown to be unable to capture the relevant contrasts.

Keywords— syntactic movement, island repair, prosodic structure, Rioplatense Spanish

1   Introduction

Ross (1969) famously noticed that ellipsis is capable of repairing island violations. Consider the contrast in (1), taken from Merchant (2008: 136). While the sentence in (1a) is ungrammatical due to a violation of a subject island, its counterpart under sluicing in (1b) is perfectly acceptable.[1]

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[1]Throughout this article, we use traces instead of copies just for expository purposes.

(1)   a.   * Which$_i$ a biography of t$_i$ is going to be published this year?

       b.   A biography of one of the Marx Brothers is going to be published this year. Guess which$_i$! ~~a biography of~~ t$_i$ ~~is going to be published this year~~

Restrictions on syntactic movement have been traditionally captured in (narrow) syntactic terms (see Newmeyer 2016, Szabolcsi and Lohndal 2017, Liu et al. 2022, and references therein). However, patterns like (1) have led to the hypothesis that certain movement restrictions are phonological in nature, e.g., Lasnik (2001), Merchant (2001, 2008), Fox and Lasnik (2003). The argument roughly goes as follows. Under the assumption that ellipsis involves deletion of phonological material at PF (e.g., Hankamer and Sag 1976, Sag 1976, Merchant 2001, among many others), the ameliorating effect in (1b) seems to show that the island restriction applies over the surface representation of the sentence, and not on the underlying syntactic structure. Therefore, the island violation must be computed at PF, and not during the syntactic cycle.

In this paper, we present evidence supporting the claim that some movement restrictions involve phonological factors and apply at PF. The data comes from violations of syntactic movement in Rioplatense Spanish[2] that can be seemingly "repaired" under an heterogeneous set of grammatical factors. We claim that the common denominator connecting these scenarios is linked to prosodic constituency, i.e., the property determining the acceptability of the extraction can be tracked to the prosodic structure of the sentence. While we do not advance a fully-fledged theory accounting for the phenomenon, we do offer an explanatory conjecture. We contend that assigning the phonological properties of a word to a whole extraction domain XP prevents the possibility of interpreting a trace within XP.

The structure of the paper is as follows. In section 2, we introduce the basic data points illustrating the type of amelioration effect we are interested in. In section 3, we show that the syntactic accounts available at the moment are not capable of capturing the contrasts and that, as far as we can tell, there is no structural way to do it. In section 4, we sketch an analysis based on the observation that "repaired" sentences lead to prosodic structures in which the extraction domain does not match a prosodic word ω in prosodic structure. Section 5 contains the conclusions.

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[2]All Spanish examples and grammatical judgments reported in this article correspond to the Rioplatense variety, our native language. However, this does not mean that the phenomenon discussed here is a case of dialectal variation restricted to Rioplatense. We predict that the same general picture should hold for other Spanish varieties if the relevant phonological factors are met (see section 4).

2 The data

Our empirical domain consists of infinitival clauses functioning as subjects of completive clauses in Rioplatense Spanish. As the pairs in (2) and (3) illustrate, these subjects can appear both in preverbal or postverbal positions.

(2) a. Creo que causará problemas [TP leer este tipo de libros].
think that will.cause problems to.read this type of books
'I think that reading this type of book causes trouble.'

b. Creo que [TP leer este tipo de libros] causará problemas.
think that to.read this type of books will.cause problems

(3) a. Jorge dijo que estaba prohibido [TP comprar estas cosas].
Jorge said that was forbidden to.buy these things
'Jorge said that buying these things was forbidden.'

b. Jorge dijo que [TP comprar estas cosas] estaba prohibido.
Jorge said that to.buy these things was forbidden

However, an asymmetry arises if a constituent is wh-extracted from these subjects: the extraction is grammatical only if the infinitival TP is postverbal. This type of contrast has been well-attested in Spanish; see Haegeman et al. (2014: 102-118) and references therein for similar observations.

(4) a. ¿Qué libros$_i$ creés que causará problemas [TP leer t$_i$]?
what books think that will.cause problems to.read
'What books do you think it is troubling to read?'

b. * ¿Qué libros$_i$ creés que [TP leer t$_i$] causará problemas?
what books think that to.read will.cause problems

(5) a. ¿Qué cosa$_i$ dijo Jorge que estaba prohibido [TP comprar t$_i$]?
what thing said Jorge that was forbidden to.buy
'What thing did Jorge say it was forbidden to buy?'

b. * ¿Qué cosa$_i$ dijo Jorge que [TP comprar t$_i$] estaba prohibido?
what thing said Jorge that to.buy was forbidden

While wh-extraction yields ungrammatical results for the preverbal subjects in (4b) and (5b), we observe that, for many speakers, there is a series of mitigating circumstances improving the acceptability of these sentences. To begin with, as first noticed by Verdecchia (2018), the relevant extraction becomes possible if additional material, e.g., an adjunct PP, appears together with the infinitive within the subject TP. Compare (4b) to (6). The only difference between these sentences is that the latter has the locative adjunct PP *en el secundario* 'in high school' modifying the infinitive *leer* 'to read',

while the former has a bare infinitive as the sole overt constituent within the clausal subject. This slight difference, however, introduces a stark contrast in acceptability for us and most (but, certainly, not all) native speakers consulted.

(6) ¿Qué libros$_i$ creés que [$_{TP}$ leer   t$_i$ en el   secundario] causará
     what books think that   to.read   in the high.school will.cause
     problemas?
     problems
     'What books do you think it will be troubling to read in high school?'

The same amelioration effect obtains with example (5b) if an adjunct PP such as *en las farmacias* 'in the pharmacies' is added within the subject infinitival clause. This is shown in (7).

(7) ¿Qué cosa$_i$ dijo Jorge que [$_{TP}$ comprar t$_i$ en las farmacias] estaba
     what thing said Jorge that   to.buy   in the pharmacies was
     prohibido?
     forbidden
     'What thing did Jorge say it was forbidden to buy in pharmacies?'

A second amelioration factor we find in these contexts involves introducing a parenthetical adjunct separating the subject TP and the (embedded) finite verb. Thus, for instance, if a parenthetical like *de acuerdo con tu experiencia* 'according to your experience' is inserted between the infinitive *comprar* 'to buy' and the inflected verb *causará* 'will cause' in (4b), the acceptability of the sentence improves, as the vast majority of the informants who share the contrast in (4b) and (5b) report.

(8) ¿Qué libros$_i$ creés que [$_{TP}$ leer   t$_i$], de acuerdo   con tu   experiencia,
     what books think that   to.read   of according with your experience
     causará   problemas?
     will.cause problems
     'What books do you think it causes trouble to read, in your experience?'

Once again, the same amelioration effect can be obtained for (5b), as exemplified in (9). In this case, the parenthetical *sin lugar a dudas* 'without any doubts' separates the infinitive *comprar* 'to buy' and the inflected verb *estaba* 'was'.

(9) ¿Qué cosa$_i$ dijo Jorge que [$_{TP}$ comprar t$_i$], sin   lugar a dudas, estaba
     what thing said Jorge that   to.buy   without place to doubt was
     prohibido?
     forbidden
     'What thing did Jorge say it was forbidden, without any doubt, to buy?

The acceptability of the extractions in (4b) and (5b) also improves if the stranded infinitive is interpreted as a contrastive focus and receives the corresponding intonation. Consider first the dialogue in (10). In the answer in (10B), the infinitive *leer* 'to read' functions as a contrastive focus and receives an emphatic nuclear accent. The example is acceptable to our ears, despite the fact it exhibits the same type of wh-extraction that makes (4b) unacceptable.

(10) A: Creo que comprar esos libros causará   problemas.
         think that to.buy   those books will.cause problems
         'I believe that buying those books will cause problems.'

      B: Bueno, ¿pero qué   libros$_i$ creés que [$_{TP}$ LEER t$_i$] causará   problemas?
         okay   but what books think that   to.read   will.cause problems
         'Okay, but what books do you think it will cause trouble to READ?'

In contrast, this amelioration is not attested if the contrastive focus is on another constituent, such as in *problemas* 'problems' in (11B). This contrast was confirmed by many of the speakers who also share the judgements regarding (4b) and (5b). Yet, it is worth noting that this effect is less systematic than the previous ones.

(11) A: Creo que leer   esos libros causará   beneficios.
            think that to.read those books will.cause benefits
            'I believe that reading those books will cause benefits.'

      B: * Bueno, ¿pero qué   libros$_i$ creés que [$_{TP}$ leer   t$_i$] causará
            okay   but what books think that   to.read   will.cause
            PROBLEMAS?
            PROBLEMS
            'Okay, but what books do you think it will cause TROUBLE to read?'

The same 'repairing effect' can apply to (5b). As the exchange in (12) demonstrates, contrastive focus on the infinitive makes wh-extraction seemingly grammatical.

(12) A: Jorge dijo que vender estas cosas estaba prohibido.
         Jorge said that to.sell these things was   forbidden
         'Jorge said that it was forbidden to sell these things.'

      B: Bueno, ¿pero qué   cosas$_i$ dijo que [$_{TP}$ COMPRAR t$_i$] estaba prohibido?
         okay   but what things said that   to.buy   was   forbidden
         'Okay, but what things did he say it was forbidden to BUY?'

Again, this 'repairing effect' does not apply if the contrastive focus is in *prohibido* 'forbidden' instead, as shown in (13).

(13) A: Jorge dijo que comprar estas cosas estaba permitido.
            Jorge said that to.buy   these things was   allowed
            'Jorge said that it is allowed to buy these things.'

B: *Bueno, ¿pero qué cosas$_i$ dijo que [$_{TP}$ comprar t$_i$] estaba
okay   but what things said that   to.buy   was
PROHIBIDO?
forbidden
'Okay, but what things did he say it was FORBIDDEN to buy?'

A fourth and final amelioration effect is triggered by ellipsis; as discussed in the introduction, ellipsis is known to repair island violations in several contexts (Ross 1969, Merchant 2001). As shown in (14), ellipsis also repairs the unacceptability of (4b).[3]

(14)   Cosmo cree   que leer   ciertos libros causará   problemas, pero no
        Cosmo thinks that to.read certain books will.cause problems   buy not
        sé   qué libros$_i$ ~~cree~~ ~~que~~ [$_{TP}$ ~~leer~~   t$_i$] ~~causará~~   ~~problemas~~.
        know what books think that   to.read   will.cause problems
        'Cosmo thinks that reading certain books will cause trouble, but I don't know
        what books.'

The same repairing effect is granted for the ungrammatical sentence in (5b) under identical conditions, e.g., (15).

(15)   Jorge dijo que comprar ciertas cosas estaba prohibido, pero no sé
        Jorge said that to.buy   certain things was   forbidden but not know
        qué   cosas$_i$ ~~dijo~~ ~~que~~ [$_{TP}$ ~~comprar~~ t$_i$] ~~estaba~~ ~~prohibido~~
        what things said that   to.buy   was   forbidden
        Jorge said that buying certain things was forbidden, but I don't know what
        things.'

As mentioned in the introduction, the fact that ellipsis grants a 'repairing effect' in island violations has been used to argue that movement restrictions are phonological in nature. In section 4, we explore this hypothesis in order to offer a unified explanation of the four amelioration effects presented so far.

3   Structural accounts will not do

It is not clear for us how a purely structural account of islands could explain the amelioration patterns in section 2. Consider once again the sentences in (4b) and (5b). As mentioned, this movement restriction is reminiscent of more traditional subject island effects attested in Spanish. Starke (2001: 57) notices that preverbal subjects in Spanish are opaque for extraction, while postverbal subjects are rather transparent.
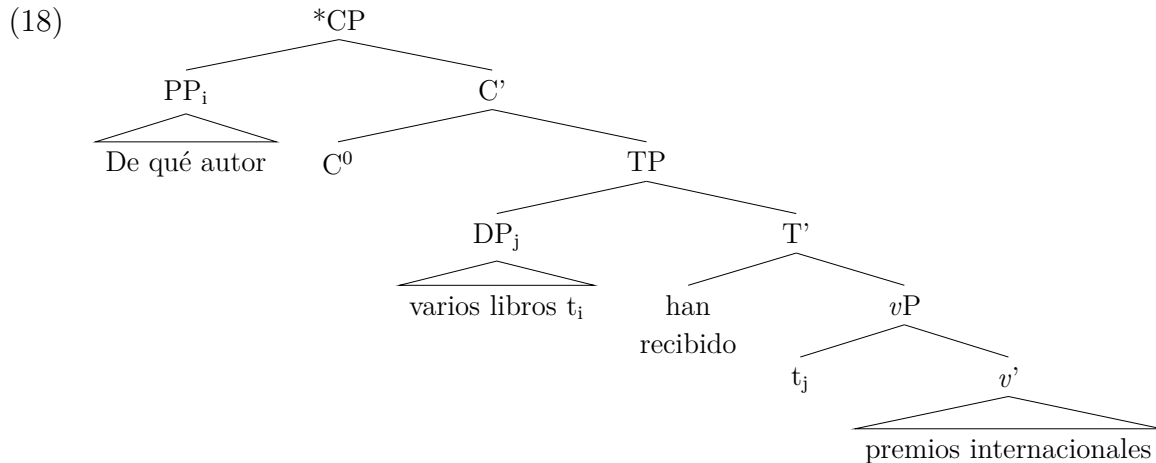
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[3]Unlike the mechanisms illustrated in (6), (8), and (10), the repairing effect granted by ellipsis applies to other syntactic contexts (e.g., Merchant 2001). While we argue that these four ameliorating effects form a natural class, in the sense that they are (at least partially) 'phonological' in nature, this does not mean they are identical. In particular, ellipsis seems to have a wider effect.

(16)   a.   ??* ¿De qué   autor_i   crees   que   [_DP varios   libros   t_i]   han   recibido
             of   which author think   that   several books   have   received
             premios   internacionales?
             awards   international

       b.   ? ¿De qué   autor_i   crees   que   han   recibido premios internacionales
             of   which author think   that have   received awards   international
             [_DP varios   libros   t_i]?
                  several books
             'By which author do you think several books have received international
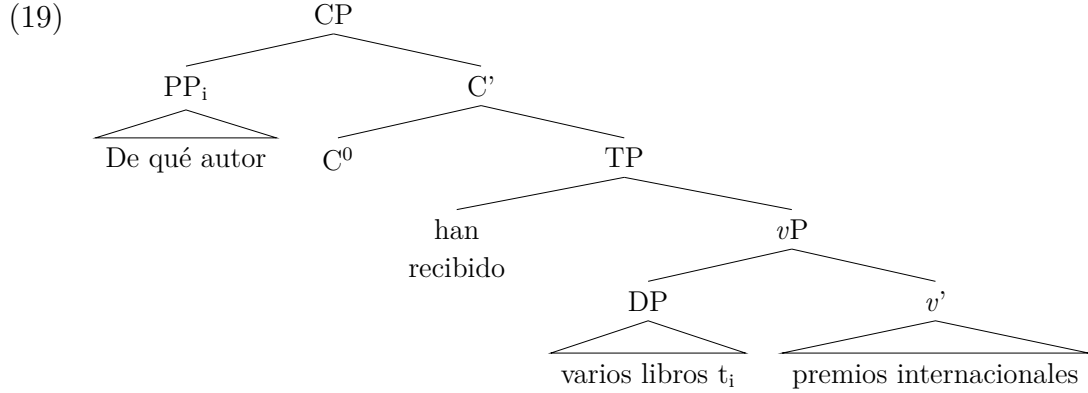   awards?'

This pair can be accounted for in syntactic terms. For instance, Haegeman et al.
(2014) treat it as a violation of the *Freezing Principle*.

(17)   FREEZING PRINCIPLE
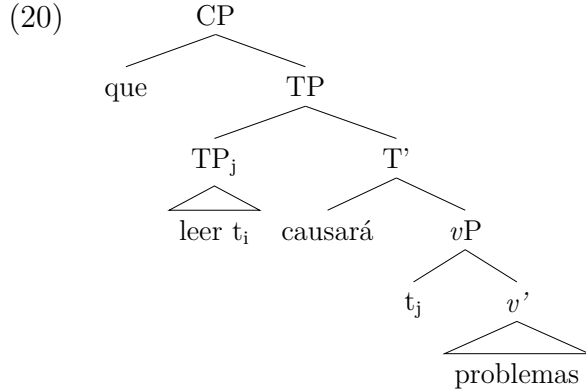   A moved constituent is frozen for extraction.

Under this condition, the opacity of the preverbal subject is expected. That is,
the subject of the sentence in (16a) occupies the [Spec,TP] position after moving there
from [Spec,vP]. Since the subject already moved, wh-extraction of the PP becomes
impossible. This is sketched in (18).

(18)

When the subject is postverbal, as in (16b), it occupies its base position in [Spec,vP].
Thus, wh-extraction in this case is allowed, as shown in (19).

(19)

```
                            CP
              ┌─────────────┴──────────────┐
            PPᵢ                            C'
        ┌────┴────┐              ┌──────────┴──────────┐
     De qué autor              C⁰                      TP
                                          ┌────────────┴────────────┐
                                         han                        vP
                                       recibido          ┌──────────┴──────────┐
                                                         DP                     v'
                                                   ┌──────┴──────┐        ┌──────┴──────┐
                                               varios libros tᵢ      premios internacionales
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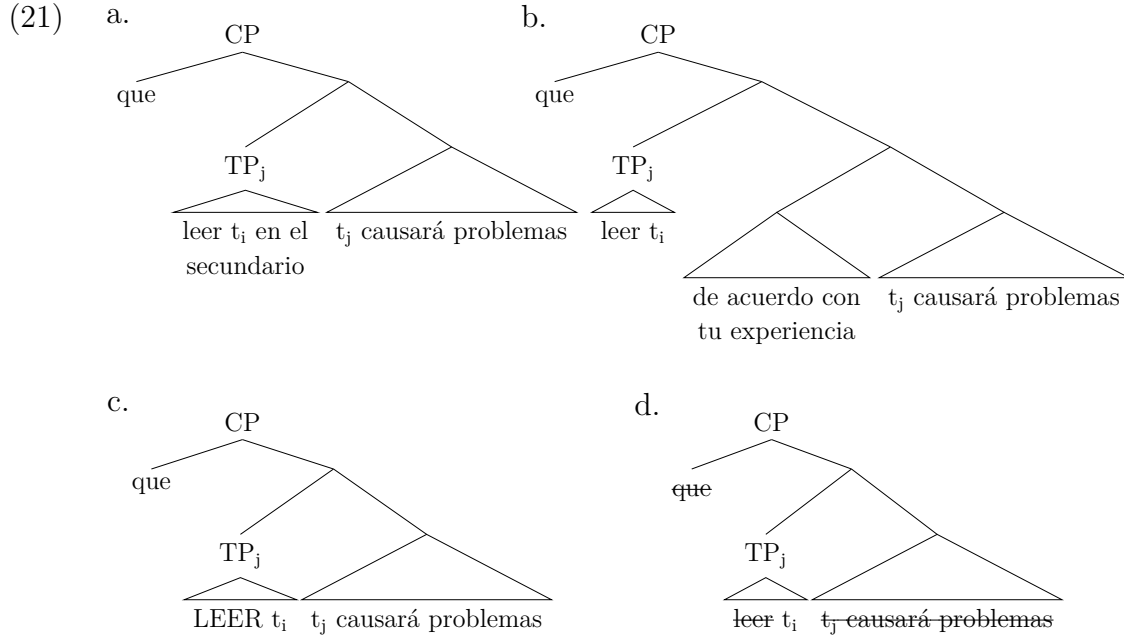
We contend that this line of analysis cannot capture the amelioration effects discussed throughout section 2. Consider the tree in (20), which offers an schematic illustration of the relevant portion of the ungrammatical sentence in (4b).[4]

(20)

```
              CP
        ┌─────┴─────┐
      que          TP
              ┌─────┴─────┐
            TPⱼ           T'
          ┌──┴──┐    ┌────┴────┐
       leer tᵢ   causará      vP
                          ┌────┴────┐
                         tⱼ         v'
                               ┌────┴────┐
                                  problemas
```

If the amelioration effects are to be explained in terms of the Freezing Principle in (17), there should be a syntactic asymmetry between (20) and the trees in (21a), (21b), (21c) and (21d), which represent the 'repaired' sentences in (6), (8), (10B) and (14), respectively. As can be seen, there is no relevant structural contrast between these representations. In all cases, the infinitival clause TP seems to occupy the same position: it is always preverbal, i.e., it moved to [Spec,TP] or above. Thus, no amelioration is predicted under (17), as all relevant examples should be ungrammatical.

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[4]It is not our purpose here to commit to any specific syntactic analyses for these constructions (i.e., where parenthetical adjuncts merge, how contrastive focus is structurally represented, and the like). We only aim to show that there is no obvious structural factor intervening in the amelioration effects.

(21) a.

CP
- que
- TP$_j$
  - leer t$_i$ en el secundario
  - t$_j$ causará problemas

b.

CP
- que
- TP$_j$
  - leer t$_i$
  - de acuerdo con tu experiencia
  - t$_j$ causará problemas

c.

CP
- que
- TP$_j$
  - LEER t$_i$
  - t$_j$ causará problemas

d.

CP
- ~~que~~
- TP$_j$
  - ~~leer~~ t$_i$
  - ~~t$_j$ causará problemas~~

There is a further argument against an explanation based on the Freezing Principle. Under this approach, the pattern discussed by Starke (2001) and Haegeman et al (2014) should be sensitive to the four repair strategies discussed throughout section 2. However, the ungrammatical sentence in (16a) cannot be improved by adding an adjunct PP within the subject, e.g., (22), or by focusing the noun *libros*, e.g., (23). This shows that the data discussed in this paper does not form a natural class with more traditional patterns of subject islands.

(22)   * ¿De qué   autor$_i$ crees que [$_{DP}$ varios libros t$_i$ sobre política] recibieron
          of what author think that   several books   about politics   received
        premios internacionales?
        awards   international
        'By which author do you think several books about politics have received international awards?'

(23)   * ¿De qué   autor$_i$ crees que [$_{DP}$ varios   LIBROS t$_i$] recibieron premios
          of what author think that   several books   received   awards
        internacionales?
        international
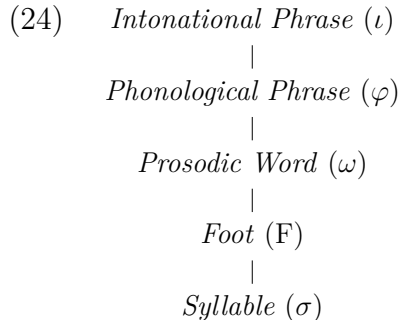   'By which author do you think several BOOKS have received international awards?'

Another possible explanation for subject island phenomena stems from the assumption that specifiers are opaque for extraction, e.g., Huang (1982), Nunes and Uriagereka

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(2000), among others. This approach fails at capturing the relevant contrasts, as it predicts that all instances of subject extraction should be ungrammatical.[5]

In conclusion, a purely structural approach cannot account for the amelioration effects attested in section 2. In the following section, we contend that prosodic structure provides a way of making sense of these patterns, at least in a preliminary fashion.

4 The conjecture: prosodic constituency and traces

We contend that the restriction attested in (4b) and (5b), and the ameliorating effects displayed by these patterns in (6) to (15) are related to the underlying prosodic structure of the sentence. As is known, the prosody of a sentence obtains from a series of hierarchically arranged constituents of phonological nature: syllables are organized into *feet*, feet are organized into *prosodic words*, prosodic words are organized into *phonological phrases*, and phonological phrases are organized into *intonational phrases*, e.g., Selkirk (1984), Nespor and Vogel (1986), Truckenbrodt (2007), Féry (2016). The resulting hierarchy is usually referred to as *prosodic hierarchy*.

(24)   *Intonational Phrase* (ι)
                |
        Phonological Phrase (φ)
                |
            Prosodic Word (ω)
                |
                Foot (F)
                |
            Syllable (σ)

We are concerned with two types of constituent in this hierarchy: phonological phrases ϕ and prosodic words ω. These units can be taken to be phonological counterparts of constituents in the syntactic representation. That is, phonological phrases relate to (lexical) syntactic phrases such as VPs, NPs or APs; prosodic words, on the other hand, relate to (lexical) syntactic heads: they typically realize lexical words together with their adjacent functional elements, which (in general) do not form prosodic words of their own. Following Selkirk (2011), we assume that syntactic and prosodic structures are, in principle, isomorphic. The constraints in (25) and (26) capture this hypothesis.

(25)   MATCH PHRASE (adapted from Selkirk, 2011)
        A phrase in syntax matches a phonological phrase φ in prosodic structure.

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[5]Notice that this line of analysis does not capture the contrast in (4), as postverbal subjects occupy the [Spec,vP] position.

(26) MATCH WORD (adapted from Selkirk, 2011)
      A word in syntax matches a prosodic word ω in prosodic structure.

These constraints are violable, i.e., they may be overridden due to a number of language-specific preferences. This introduces mismatches in the mapping between syntax and prosody.

We believe that the generalization in (27) allows to unify the amelioration effects discussed in the previous section. We conceive (27) as a descriptive statement.

(27) Wh-extraction from a subject infinitival clause S_{inf} in preverbal position leads to unacceptability if S_{inf} has been mapped into a prosodic word ω that is immediately dominated by the phonological phrase φ containing the VP.

According to (27), the deviation of (4b) and (5b) is due to properties of their prosodic structures. Our claim is that in both cases the infinitive heading the infinitival subject is interpreted as a phonological word ω at PF.[6] As such, it is mapped into a single phonological phrase $(S_{inf}VO)_{\varphi}$ together with the rest of the embedded clause, e.g., (28a) and (28b). Due to reasons we will discuss below, this underlying prosodic structure is incompatible with extraction of constituents from within the infinitival phrase.

(28) a. (... leer$_\omega$ causará$_\omega$ problemas$_\omega$)$_\varphi$ cf. (4b)

      b. (... comprar$_\omega$ estaba$_\omega$ prohibido$_\omega$)$_\varphi$ cf. (5b)

What the four ameliorating scenarios introduced in the previous section have in common is that they prevent the generation of prosodic structures like (28a) and (28b). It goes without saying that ellipsis (i.e., phonological deletion) would prevent the violation of (27), so we will focus on the other three contexts. In these, the subject infinitival clause is mapped as a separate phonological phrase φ_1 from the phonological phrase φ_2 containing the inflected verb (and the rest of the predicate), i.e., a prosodic structure of the form $(S_{inf})_{\varphi_1}(VO)_{\varphi_2}$ obtains. As a consequence, extraction from S_{inf} is permitted in these cases.

Let's consider first the cases in which an additional constituent within the infinitival clause rescues the wh-extraction violation. These are the cases presented in (6) and (7),

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[6]An anonymous reviewer asked whether the effects hold with periphrastical verbs. As the example in (i) shows, the complexity of the verbal form does not make any difference.

(i) * ¿Qué libros$_i$ creés   que [$_{TP}$ haber   leído t$_i$] causará   problemas?
        what books believe that   to.have read   will.cause problems
     'What books do you think it is troubling to have read?'

This can be captured within our analysis: under the assumption that these predicates form a complex head in syntax, they are mapped into a single prosodic word ω. Thus, the generalization in (27) holds.

repeated in schematic form together with their contrasting pairs in (29b) and (30b), respectively.

(29)   a.   * ... que [$_{TP}$ leer t_i] causará   problemas
              that   to.read   will.cause problems

        b.   ... que [$_{TP}$ leer t_i en el secundario] causará   problemas
              that   to.read   in the high.school will.cause problems

(30)   a.   * ... que [$_{TP}$ comprar t_i] estaba prohibido
              that   to.buy   was   forbidden

        b.   ... que [$_{TP}$ comprar t_i en las farmacias] estaba prohibido
              that   to.buy   in the pharmacies was   forbidden

According to (27), for the structures in (29b) and (30b) to allow extraction from the infinitival TP, these representations must be mapped into the prosodic structures in (31), with the infinitive forming a phonological phrase φ_1 together with the adjunct PP.

(31)   a. (leer$_\omega$ en-el-secundario$_\omega$)$_{\varphi_1}$ (causará$_\omega$ problemas$_\omega$)$_{\varphi_2}$ cf. (29b)

        b. (comprar$_\omega$ en-las-farmacias$_\omega$)$_{\varphi_1}$ (estaba$_\omega$ prohibido$_\omega$)$_{\varphi_2}$ cf. (30b)

We take that the relevant factor leading to these prosodic structures is syntactic branching within the infinitival subject, i.e., the fact that the subject consists of two prosodic words ω. Based on acoustic analysis of reading data, Elordieta et al. (2003, 2005) and D'Imperio et al. (2005) observe that European Spanish displays the tendency to divide simple SVO declarative sentences into (S)(VO) prosodic phrasings (e.g. (32a)); this preference, however, becomes the rule if the subject has a branching structure. Gabriel et al. (2011) report, also based on reading data, that the overall proportion of (SVO) (e.g., (32b)) groupings is higher in Rioplatense Spanish. This result, however, follows from a higher proportion of non-branching subjects leading to (SVO) phrasings in Rioplatense; branching subjects, on the other hand, categorically lead to (S)(VO) (e.g., (32c)). Thus, syntactic branchingness in the subject must be considered a predictor of (S)(VO) prosodic structures in both European and Rioplatense Spanish.

(32)   a. (Bárbara$_\omega$)$_{\varphi_1}$ (miraba$_\omega$ a-Verónica$_\omega$)$_{\varphi_2}$
            Bárbara   saw   DOM-Verónica
            'Bárbara saw Verónica'

        b. (Bárbara$_\omega$ miraba$_\omega$ a-Verónica$_\omega$)$_{\varphi_1}$

        c. (Bárbara$_\omega$ Duarte$_\omega$ Álamo$_\omega$)$_{\varphi_1}$ (miraba$_\omega$ a-Verónica$_\omega$)$_{\varphi_2}$

                         (Adapted from Gabriel et al., 2011)

Elordieta et al. (2005) provide a syntactic motivation for the general tendency attested in (European) Spanish to separate subjects and predicates in distinct intonational units. They follow Ordóñez (1997) and Ordóñez and Treviño (1999) in postulating that preverbal subjects in Spanish are dislocated in the left periphery. The basic idea is that just like the DP *el auto* 'the car' is a dislocated DP doubled by a clitic within the clause in (33a), the preverbal subject *Cosmo* in (33b) is also dislocated and doubled by the verbal inflection.

(33) a. El auto$_i$ *lo$_i$* compré ayer.
          the car   it bought yesterday
          'The car, I bought it yesterday.'

   b. Cosmo$_i$ compr-*ó$_i$*   el   auto ayer.
       Cosmo bought-3SG the car   yesterday
       'Cosmo bought the yesterday.'

Elordieta et al. (2005) propose that a phonological phrase boundary appears at the left of the extended projection of the VP, i.e., at the TP level. Since preverbal subjects in Spanish are dislocated constituents above this position, they are expected to form independent intonational units from the rest of the sentence. According to these authors, this explains the general preference for (S)(VO) phrasings in Spanish. They further argue that syntactic branching within the subject is an independent condition that applies on top of this preference, increasing even more the need to separate the subject from the rest of the clause.

Coming back to the representation in (31a) and (31b), we argue that syntactic branching is the only factor leading to these (S)(VO) groupings. This follows from the fact that clitic left dislocation does not apply to infinitival clauses in Spanish, e.g., (34).[7]

(34) a. * Venir$_i$ lo$_i$ prometí.
          to.come it promised
          'I promised to come.'

   b. * [Comprar el   auto]$_i$ lo$_i$ quiero.
        to.buy   the car   it want
        'I want to buy the car.'

Since the infinitival clauses in (29) and (30) cannot be taken to participate in a configuration parallel to (33b), they must be taken to occupy the [Spec,TP] position when functioning as preverbal subjects. Thus, according to the analysis by Elordieta et al (2005), they are predicted to be grouped together with the predicate unless they have

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[7]See Muñoz Pérez and Verdecchia (2022) for the observation that infinitival phrases do not undergo movement to the left periphery due to topic-related reasons in Spanish.

a branching structure. This explains why the patterns in (29a) and (30a) are mapped as in (28a) and (28b), respectively, while (29b) and (30b) have the prosodic structures in (31a) and (31b).

Let's move to the repairing effect triggered by focus. As discussed, if the infinitive is interpreted as a contrastive focus and receives the emphatic nuclear accent, the resulting sentence is acceptable. These are the examples presented in (10) and (12), repeated in schematic form together with their contrasting pairs in (35b) and (36b), respectively.

(35) a. * ... que [$_{TP}$ leer t_i] causará   problemas
             that   to.read   will.cause problems

      b.   ... que [$_{TP}$ LEER$_F$ t_i] causará   problemas
             that   to.read   will.cause problems

(36) a. * ... que [$_{TP}$ comprar t_i] estaba prohibido
             that   to.buy   was   forbidden

      b.   ... que [$_{TP}$ COMPRAR$_F$ t_i] estaba prohibido
             that   to.buy   was   forbidden

In these cases, we take that focus must be aligned with a φ-boundary (Truckenbrodt 1999, Féry 2013). This is attested in Rioplatense Spanish, where non-final foci display a boundary L- to their right (e.g., Gabriel 2010). Therefore, the abstract syntactic representations in (35b) and (36b) are expected to be mapped into the prosodic structures in (37a) and (37b), respectively.

(37) a. ... (LEER$_\omega$)$_{\varphi_1}$ (causará$_\omega$ problemas$_\omega$)$_{\varphi_2}$
      b. ... (COMPRAR$_\omega$)$_{\varphi_1}$ (estaba$_\omega$ prohibido$_\omega$)$_{\varphi_2}$

Once again, these examples comply with the generalization in (27). That is, since in neither (35b) or (36b) the infinitival TP is mapped into a prosodic word ω within the same phonological phrase φ as the VP, wh-extraction from these syntactic domains is permitted.

The final amelioration effect to discuss is the one granted by introducing a parenthetical adjunct just after the infinitival subject. The relevant examples are those presented in (8) and (9), which we repeat in (38b) and (39b), respectively, in schematic form and together with their contrasting pairs.

(38) a. * ... que [$_{TP}$ leer t_i] causará   problemas
             that   to.read   will.cause problems

      b.   ... que [$_{TP}$ leer t_i], de acuerdo   con   tu   experiencia, causará
             that   to.read   of according with your experience   will.cause
            problemas
            problems

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(39)   a.   *... que [$_{TP}$ comprar t$_i$] estaba prohibido
             that   to.buy   was   forbidden

        b.   ... que [$_{TP}$ comprar t$_i$], sin   lugar a dudas, estaba prohibido
             that   to.buy   without place to doubts was   forbidden

In this case, the analysis is very straightforward. As Dehe (2014: 31) puts it, "there is wide agreement that intonation is a defining feature of parentheticals, and that parentheticals are prosodically separate and independent from their host". This is also the case in (Rioplatense) Spanish, as the commas in the examples attempt to show. Thus, we take that (38b) and (39b) produce the prosodic representations in (40a) and (40b), respectively.

(40)   a.   ... leer)$_{\varphi_1}$ (de acuerdo con tu experiencia)$_{\varphi_3}$ (causará$_\omega$ problemas$_\omega$)$_{\varphi_2}$

        b.   ... comprar)$_{\varphi_1}$ (sin lugar a dudas)$_{\varphi_3}$ (estaba$_\omega$ prohibido$_\omega$)$_{\varphi_2}$

Once again, since these representations do not comply with (27), extraction from within the infinitival clause can take place. Thus, the acceptability of the representations in (38b) and (39b) is captured.

As the preceding discussion shows, the common denominator connecting all ameliorating conditions is that all of them produce a prosodic representation that prevents the scenario described by the generalization in (27); we include here the repairing effect granted by ellipsis in (14) and (15), since we assume that phonological deletion trivially leads to the satisfaction of (27). While this uniformity in the pattern strongly suggests that the generalization is on the right track and there are prosodic conditions affecting the acceptability of wh-extraction in these examples, it is far from obvious why this should be the case. That is, there is no theoretical principle providing a rationale for the restriction stated in (27) to be true. In what follows, we offer an explanatory conjecture attempting to derive this.

We may take the generalization in (27) as describing the effects of a faithfulness restriction in the mapping between syntax and prosody. That is, much in the spirit of *Match Theory* (Selkirk 2011), we posit a constraint requiring a strict correspondence between syntactic and prosodic units. Our constraint, however, suggests that the syntax-prosody interface involves matching requirements that are specific for certain grammatical processes. Syntactic movement is one of these processes.

As discussed, the relevant syntactic configuration involves an infinitival TP from which a constituent is extracted. If the extraction domain TP is mapped into a prosodic word ω, e.g., (28a) and (28b), movement produces an ungrammatical outcome. However, if the extraction domain TP is mapped into a phonological phrase φ, e.g., (31a), (31b), (37a), (37b), (40a) and (40b), the result becomes acceptable. Thus, we contend that the constraint at play in these configurations roughly looks like (41).

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(41)   An extraction domain XP cannot be mapped as a prosodic word ω.

In practice, the constraint in (41) forbids assigning the phonological properties of a word to a phrase XP consisting of a head X^0 and a trace.

(42)   XP $\not\to$ ω

           X⁰ t_i

(42)   XP $\not\to$ ω

           X^0 t_i

One could argue that the constrain in (41) is superfluous, as the result in (42) should follow from the constraint in (25), i.e., *Match Phrase.* That is, an extraction domain XP cannot be mapped into a prosodic word ω because it should rather be mapped into a phonological phrase φ.

However, the amelioration effects discussed throughout this section cannot be accounted for by appealing to (25). Match Phrase establishes a correspondence between an XP in syntax and a φ in prosody without taking into consideration whether XP is or not an extraction domain. Thus, just as it could be used to derive the prohibition sketched in (42), it would also make the prediction in (43), in which an XP consisting only of its head cannot be mapped into a prosodic word.

(43)   XP $\not\to$ ω

           X^0

The effect of this prohibition is not attested in the configurations we have been discussing. The sentences in (44) also have clausal subjects consisting of a bare infinitive. Arguably, these examples can be analyzed in terms of the prosodic representations in (28), in which the infinitival clauses headed by *leer* 'to read' and *correr* 'to run' are mapped into prosodic words ω at PF.[8] If the contrasts discussed throughout this section were to be explained as violations of Match Phrase, these sentences should be as ungrammatical as (4b) and (5b); however, they are perfectly acceptable.

(44)   a. Cosmo cree   que [$_{TP}$ leer]   causará   problemas.
          Cosmo believes that   to.read will.cause problems
          'Cosmo believes that reading causes trouble.'

       b. Cosmo dijo que [$_{TP}$ correr] estaba prohibido.
          Cosmo said that   to.run was   forbidden
          'Cosmo said that running is forbidden.'

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[8]Notice that in example (44b) we employ the verb *correr* 'to run' instead of *comprar* 'to buy', which we have been using in previous discussion. This is simply because we need a bare infinite in this new example, and an intransitive verb fits better this configuration.

In other words, a principle like Match Phrase misses the basic observation that the XP triggering the whole pattern contains a trace. Thus, the phenomenon requires an explanation connecting prosodic structure and syntactic movement, just as (41) does.

We believe that the constraint in (41) can be motivated in terms of linguistic performance. As is known, prosody and prosodic phrasing play an important part in language processing; see Speer and Blodgett (2006) and Pratt (2018) for discussion. This role is also attested in the on-line interpretation of movement dependencies, as prosodic information is actively used to decide the positions in which traces must be interpreted (Nagel et al., 1994, 2001).[9]

With this background in mind, consider the following abstract scenario. Take a DP that is an argument of a head X^0; X^0 and the DP are the only overt constituents within XP. At some point in the syntactic derivation, DP moves to a higher position, and leaves behind a trace. The resulting structure is illustrated in (45).

(45) $[_{YP}$ DP^i ... $[_{XP}$ X^0 t_i $]]$

Consider the interpretation process of the resulting sentence if the constituent XP is mapped into a phonological phrase φ in the prosodic representation, e.g., (46). Under the assumption that the principles of Match Theory (or any other equivalent faithfulness constraint) are independently active, the prosodic structure in (46) allows to hypothesize that the DP is an argument of X^0. That is, if X^0 is assigned the phonological properties of a phrase, an interpreter can reasonably assume that it is a phrase in the underlying syntactic structure and, as such, she can attempt to locate a trace within its domain. Thus, the DP is likely to receive a proper interpretation as an argument of X^0.

(46) (X^0)$_\varphi$ EXPECTATION: *can host traces*

The situation is quite different if XP is mapped into a prosodic word ω, e.g., (47). In this case, the interpreter once again will follow the faithful correspondences of Match Theory as guiding principles, but this time they will conclude that there must be no traces associated with X^0, so the DP cannot be an argument of X^0. That is, X^0 is assigned the phonology of a word, therefore the interpreter expects it to be a word at the syntactic level; since words cannot host traces (Baker 1988), the expectation is that there is no trace associated with X^0. In sum, this sort of prosodic mapping makes it more difficult to retrieve the proper interpretation of a sentence like (45).

(47) X^0_ω EXPECTATION: *cannot host traces*

This latter scenario is prevented if the constraint in (41) is active. Thus, there seems to be a quite straightforward functional motivation for it to hold.

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[9]Nagel et al. (1994) and Straub et al. (2001) even claim that the prosodic representation of an utterance encodes information on the location of traces. This hypothesis fits well with the argument developed in the main text, but we leave it aside for the sake of simplicity.

5 Concluding remarks

In this paper, we have discussed a number of grammatical contexts that seemingly "repair" an instance of wh-movement. The pattern involves movement from within an infinitival clause functioning as a preverbal subject. If wh-extraction leaves a bare infinitive behind, the sentence is deemed as ungrammatical. However, the acceptability of the extraction improves dramatically under the following circumstances: (i) if the stranded infinitive has an argument or an adjunct, (ii) if a parenthetical adjunct separates the infinitival subject from its verb, (iii) if the bare infinitive functions as a contrastive focus, and (iv) if ellipsis erases the infinitival clause.

We have discussed that a more traditional approach based on the Freezing Principle or any other purely structural means does not seem to be able to capture the relevant data. But, as far as prosodic structure is considered, all amelioration effects seemingly form a natural class. In this line, we have proposed an analysis of these cases in terms of prosodic constituency. In all cases, what seems to improve the acceptability of the sentence is the avoidance of a particular type of prosodic phrasing: that in which the infinitival subject S_{inf} forms a single phonological phrase φ together with the rest of the sentence, i.e., $(S_{inf}VO)$. We have argued that this follows from a specific faithfulness constraint at the syntax-prosody interface: an extraction domain cannot be mapped as a prosodic word ω. We have motivated this constraint on performance grounds.

If our analysis is on the right track, it offers support for the claim that certain aspects of movement restrictions, i.e., islands, are computed post-syntactically at PF. Of course, this does not mean that restrictions of this sort explain every island effect. That is, we are not proposing a general theory of islands, but only a preliminary analysis of the patterns we observe in Rioplatense Spanish in contexts of wh-movement from within infinitival clauses in preverbal subject position. The extent to which this phenomenon extends to other languages or to other island domains remains a question for further inquiry.

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References

Baker MC (1988) Incorporation: a theory of grammatical function changing. University of Chicago Press, Chicago

Dehe N (2014) Parentheticals in Spoken English. The Syntax-Prosody Relation. Cambridge University Press, Cambridge, DOI 10.1017/cbo9781139032391

D'Imperio M, Elordieta G, Frota S, Prieto P, Vigário M (2005) Intonational phrasing in Romance: The role of syntactic and prosodic structure. In: Frota S, Vigário M, Freitas MJa (eds) Prosodies. With Special Reference to Iberian Languages, Mouton de Gruyter, Berlin, pp 59–97

Elordieta G, Frota S, Prieto P, Vigário M (2003) Effects of constituent weight and syntactic branching on intonational phrasing in Ibero-Romance. In: Recasens D, Solé MJ, Romero J (eds) Proceedings of the 15th International Congress of Phonetic Sciences, Barcelona, pp 487–490

Elordieta G, Frota S, Vigario M (2005) Subjects, objects and intonational phrasing in Spanish and Portuguese. Studia Linguistica 59(2-3):110–143, DOI 10.1111/j.1467-9582.2005.00123.x

Féry C (2013) Focus as prosodic alignment. Natural Language & Linguistic Theory 31(3):683–734, DOI 10.1007/s11049-013-9195-7

Féry C (2016) Intonation and Prosodic Structure. Cambridge University Press, Cambridge, DOI 10.1017/9781139022064

Fox D, Lasnik H (2003) Successive-cyclic movement and island repair: The difference between sluicing and VP-ellipsis. Linguistic Inquiry 34(1):143–154, DOI 10.1162/002438903763255959

Gabriel C (2010) On focus, prosody, and word order in Argetinian Spanish: a minimalist OT account. ReVEL special edition n. 4:183–222

Gabriel C, Feldhausen I, Pešková A (2011) Prosodic phrasing in Porteño Spanish. In: Gabriel C, Lleó C (eds) Intonational Phrasing in Romance and Germanic, John Benjamins Publishing Company, Amsterdam, pp 153–182, DOI 10.1075/hsm.10.09gab

Haegeman L, Jiménez-Fernández AL, Radford A (2014) Deconstructing the subject condition in terms of cumulative constraint violation. The Linguistic Review 31(1):73–150, DOI 10.1515/tlr-2013-0022

Hankamer J, Sag I (1976) Deep and Surface Anaphora. Linguistic Inquiry 7:391–426

Huang CTJ (1982) Logical relations in Chinese and the theory of grammar. PhD thesis, MIT, Cambridge, MA

Lasnik H (2001) When can you save a structure by destroying it? In: Kim M, Strauss U (eds) Proceedings of the North East Linguistic Society 31, Gerogetown University, Gergetown, pp 301–320

Liu Y, Winckel E, Abeillé A, Hemforth B, Gibson E (2022) Structural, functional, and processing perspectives on linguistic island effects. Annual Review of Linguistics 8:495–525

Merchant J (2001) The Syntax of Silence: Sluicing, Islands, and the theory of ellipsis. Oxford University Press, Oxford

Merchant J (2008) Variable island repair under ellipsis. In: Johnson K (ed) Topics in ellipsis, Cambridge University Press, Cambridge, pp 132–153

Muñoz Pérez C, Verdecchia M (2022) Predicate doubling in Spanish: On how discourse may mimic syntactic movement. Natural Language & Linguistic Theory 40, DOI 10.1007/s11049-022-09536-3

Nagel HN, Shapiro LP, Nawy R (1994) Prosody and the processing of filler-gap sentences. Journal of Psycholinguistic Research 23(6):473–485, DOI 10.1007/bf02146686

Nespor M, Vogel IB (1986) Prosodic Phonology. Foris, Dordrecht

Newmeyer FJ (2016) Nonsyntactic explanations of island constraints. Annual Review of Linguistics 2(1):187–210, DOI 10.1146/annurev-linguistics-011415-040707, URL https://doi.org/10.1146/annurev-linguistics-011415-040707, https://doi.org/10.1146/annurev-linguistics-011415-040707

Nunes J, Uriagereka J (2000) Cyclicity and extraction domains. Syntax 3(1):20–43, DOI 10.1111/1467-9612.00023

Ordóñez F (1997) Word order and clause structure in Spanish and other Romance Languages. PhD thesis, NYU, New York

Ordóñez F, Treviño E (1999) Left dislocated subjects and the pro-drop parameter: A case study of Spanish. Lingua 107(1-2):39–68, DOI 10.1016/s0024-3841(98)00020-5

Pratt E (2018) Prosody in sentence processing. In: Fernández EM, Smith Cairns H (eds) The Handbook of Psycholinguistics, Wiley-Blackwell, Hoboken, NJ, pp 365–391

Ross J (1969) Guess who? In: Binnick R, Davison A, Green G, Morgan J (eds) Papers from the Fifth Regional Meeting of the Chicago Linguistic Society, Chicago Linguistic Society, Chicago, pp 252–286

Sag I (1976) Deletion and logical form. PhD thesis, MIT, Cambridge, MA

Selkirk E (1984) Phonology and syntax: the relation between sound and structure. MIT Press, Cambridge, MA

Selkirk E (2011) The syntax-phonology interface. In: Goldsmith J, Riggle J, Yu A (eds) The Handbook of Phonological Theory, vol 2, Wiley-Blackwell Malden, Oxford, pp 435–483

Speer S, Blodgett A (2006) Prosody. In: Traxler MJ, Gernsbacher MA (eds) Handbook of Psycholinguistics. Second Edition, Elsevier, Amsterdam, pp 505–537

Starke M (2001) Move dissolves into merge: a theory of locality. PhD thesis, University of Geneva, Geneva

Straub K, Wilson C, McCollum C, Badecker W (2001) Prosodic structure and wh-questions. Journal of Psycholinguistic Research 30(4):379–394, DOI 10.1023/a:1010469607504

Szabolcsi A, Lohndal T (2017) Strong vs. Weak Islands. In: Everaert M, Van Riemsdijk H, Goedemans R, Hollebrandse B (eds) The Wiley Blackwell Companion to Syntax, Wiley Blackwell, Massachusetts, pp 1–51, DOI https://doi.org/10.1002/9781118358733.wbsyncom008, 2nd edition

Truckenbrodt H (1999) On the relation between syntactic phrases and phonological phrases. Linguistic Inquiry 30(2):219–255, DOI 10.1162/002438999554048

Truckenbrodt H (2007) The syntax–phonology interface. In: de Lacy P (ed) The Cambridge Handbook of Phonology, Cambridge University Press, Cambridge, pp 435–456, DOI 10.1017/cbo9780511486371.019

Verdecchia M (2018) Extracción desde sujetos preverbales no finitos. Talk presented at the *XVI Congreso de la Sociedad Argentina de Estudios Lingüísticos*. Universidad Nacional de San Martín.