Agreement and Prosodification: A Preliminary Sketch

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ABSTRACT.   This paper is a preliminary attempt at showing that agreement relations in syntax affect phonological phrasing.   Building on the basic ideas in the labeling algorithm (Chomsky 2013, 2015), Dobashi (2019) proposes an interpretive approach to phonological phrasing, where minimal search for an unlabelable element demarcates a phonological phrase.   Since labelability is tied to agreement, it is predicted that agreement or lack thereof affects phonological phrasing.   This paper examines several languages to show that this prediction is borne out.[*]

Keywords: labeling algorithm, syntax-phonology interface, phonological phrasing

1. Introduction

In previous and current approaches to the syntax-phonology interface, it is generally assumed that basic prosodic domains are formed by referring to the phrase-structural notions such as maximal projection or the domain of Spell-Out.   Thus, in End-based theory (Selkirk 1986, 1996, Truckenbrodt 1999), the right or left edge of a maximal projection such as VP or NP is aligned with the right or left edge of a phonological phrase.   Likewise, in Nespor and Vogel's (1986) theory, a phonological phrase contains a lexical head X and functional elements on its non-recursive side within the maximal projection XP.   In Multiple Spell-Out approaches to phonological phrasing (Uriagereka 1999, Ishihara 2003, Kratzer and Selkirk 2007, among many others), Spell-Out demarcates a prosodic domain.   Match Theory, which has evolved out of End-based theory, also assumes that syntactic constituents are matched up with prosodic domains (Selkirk 2009, 2011, among others).   One thing in common in these approaches is that they refer to outputs of the syntactic computation, i.e., a phrase structure representation or a linear string corresponding to a domain of Spell-Out, without looking into syntactic relations holding within the phrase structure.   In this paper, I argue that agreement relations should also be referred to in the formation of prosodic domains.

Note that a similar idea has been suggested by Elordieta (1997, 2007).[1]   Roughly put, he argues that the domain of vowel assimilation VA in Lekeitio Basque corresponds to a morphological word in which feature-checking has applied in syntax.   Thus, [V T] or [N D] may correspond to the domain of VA if T and D enter into a checking relation with V and N, respectively, while a compound such as [V V] does not constitute a domain of VA since there is no checking relation between the two Vs.

The idea explored in this paper differs from Elordieta's in that it is based on the interpretive approach to prosodic domains suggested by Dobashi (2019), which incorporates some insights from the labeling algorithm LA (Chomsky 2013, 2015).   LA determines how syntactic objects SOs are interpreted at the conceptual-intentional system in terms of minimal search for a labelable element.   Thus, in the SO K = {H, XP}, where H is a simple lexical item and XP is a phrase consisting of two or more lexical items, H is the label of K since it can be detected with minimal search within K.   Chomsky argues that only functional elements such as C or a categorizer (e.g., v and n) can be a label, and lexical elements such as a verbal root R cannot.   He also argues that T in English is too weak to serve as a label since it does not show rich subject agreement.   Notice that in the syntax-phonology interface, it is lexical elements, but not functional elements, that are visible in the formation of prosodic domains (e.g., Selkirk's (1984) *Principle of the Categorial Invisibility of Function Words*; cf. Tyler 2019).   Given these and other considerations, Dobashi (2019) suggests the following process of phonological interpretation of syntactic objects (PISO):

(1)   A syntactic object SO is interpreted as a phonological phrase if an unlabelable element is detectable with minimal search within the SO.

With this in mind, let us consider (2a), whose syntactic structure is (2b).

(2) a. Bill thinks that John can eat fish.
     b. $[_\kappa$ C $[_\iota$ Bill $[_\theta$ T $[_\eta$ R$_{think}$-v* $[_\zeta$ t_R $[_\varepsilon$ C$_{that}$ $[_\delta$ John $[_\gamma$ T$_{can}$ $[_\beta$ R$_{eat}$-v* $[_\alpha$ t_R fish]]]]]]]]]]]

Here v*P-internal subject is omitted; R raises to v*, leaving a copy of R (indicated by t_R); and the amalgam R-v* is assumed to be labelable (Chomsky 2015).   Along with the bottom-up phase-by-phase derivation, first, α is interpreted as a phonological phrase since the copy of R

(t_R) is detectable with minimal search within α.   Second, γ is interpreted as a phonological phrase since T is detectable with minimal search within γ.   Likewise, in the matrix clause, ζ and θ are interpreted as phonological phrases.   Assuming that the rest of the structure (*Bill*, in this case) is mapped to another phonological phrase, the following phonological phrasing is obtained:

(3)   (Bill)$_\varphi$ (thinks)$_\varphi$ (that John)$_\varphi$ (can eat)$_\varphi$ (fish)

This phrasing is the same as the one predicted by Nespor and Vogel's (1986) theory.[2]

Notice that this approach predicts that there is no phonological phrase boundary between the subject and a following element (verb or auxiliary verb) in languages like Italian, since such languages show rich subject agreement and T is labelable unlike English weak T.   The purpose of this paper is to verify this prediction.

In section 2, I discuss the phrasing of subjects.   The languages that I examine are English and Brazilian Portuguese, whose T is weak, and Italian, Zulu and Chichewa, whose T is strong.   In section 3, I discuss the phrasing of objects in Bantu languages, which sometimes show an object marker within a verbal morphology.   I argue that the presence of object markers indicates that the verbal root R (V) is strong, like T in Italian, and that this strong R accounts for the phrasing of objects in Bantu languages.   In section 4, I briefly discuss the phrasing within DP in Bantu languages, and suggest that the associative markers, which show class agreement, affects phonological phrasing.

2. Phrasing of Subjects
2.1. English

English has impoverished subject agreement, and subjects are generally phrased separately from a following verb or auxiliary verb (Hayes 1989, Nespor and Vogel 1986). The relevant phonological rule is stress retraction under stress clash within a phonological phrase.   Basic examples are shown in (4):

(4)   a. hòrizónal   →   (hór?òntal line)$_\varphi$
                              2   3   1
       b. Jàpanése   →   (Jápanèse connections)$_\varphi$ (Hayes 1989: 216)

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[2] The non-branching phonological phrase "($_\varphi$ fish)" may undergo subsequent restructuring of phonological phrase to meet the binarity requirement.   See Inkelas and Zec (1995), among others.

In (4a), the primary stress of *horizontal* is retracted or shifted to the left since it is followed by another phonological word within the phonological phrase, and *horizóntal* becomes *hórizontal*. The same point is shown by *Japanese* in (4b).   This rule, however, does not apply to subjects, as shown in (5):

(5)   a. Mìssissíppi   → ?? Míssissìppi outlawed it.

<div style="text-align:center">2   3   1</div>

(5)   a. Mìssissíppi   → ?? Míssissìppi outlawed it.

<div style="text-align:center">2   3   1</div>

      b. Tènnessée   →   ?? Ténnessèe will license them.   (Hayes 1989: 217)

If stress retraction applies to the subject *Mississippi* in (5a), the sentence sounds degraded. The same is true of *Tennessee* in (5b).   These examples show that the subject is followed by a phonological phrase boundary in English, as schematically shown in (6).

(6)   English: (Subject)$_\varphi$ (Aux V)$_\varphi$

This phrasing is expected under PISO since T is weak in English.   The syntactic object that immediately contains T (see θ and γ in (2b)) is interpreted as a phonological phrase, and the subject is excluded from this phonological phrase.   Therefore, the stress retraction does not apply to the subject in English.

2.2. Brazilian Portuguese

     Like English, Brazilian Portuguese (BP) has impoverished subject agreement (Fortuny 2008: 133).   According to Sandalo and Truckenbrodt (2002), subjects are always phrased separately from a following predicate.   Their survey is conducted by controlling information structure carefully (see their footnote 1). The data discussed here are in a broad focus context (i.e., all new information), and so the subjects are not topicalized.   The relevant phonological rule is, again, stress retraction under stress clash within a phonological phrase.   In the examples, stress is indicated by underlining, and the acute accent mark ´ is just orthographic. (7) is a basic example:

(7)   (<u>ca</u>fé   <u>quen</u>te)$_\varphi$

       coffee   hot   (Sandalo and Truckenbrodt 2002: 285)

Here, stress retraction applies to *café* 'coffee' in the presence of the following adjective *quente* 'hot' within the same phonological phrase.   But if the same word *café* 'coffee' is a subject of

a simple intransitive sentence, retraction does not apply, as shown in (8a).   If we apply the retraction, we get a bad sentence, as in (8b).

(8)   a.   (ca<u>fé</u>)$_\varphi$ (<u>quei</u>ma)$_\varphi$
                 coffee   burns
        b.   *(<u>ca</u>fé   <u>quei</u>ma)$_\varphi$
                 coffee   burns   (Sandalo and Truckenbrodt 2002: 286)

The same point is made in (9), where the subject consists of two prosodic words:

(9)   Um frango   chi<u>nês</u>   <u>quei</u>mou minha boca   ontem
                                 *<u>chinês</u>   <u>quei</u>mo
                 (N   A   ) (V   . . .
                   a   chicken   Chinese   burned   my   mouth yesterday
                                                            (Sandalo and Truckenbrodt 2002: 288)

        Thus, like English, BP does not show rich subject agreement and subjects are not phrased with a following predicate, regardless of whether the subject is a single word or not, as illustrated in (10):

(10)   Brazilian Portuguese: (Subject)$_\varphi$ (Aux V)$_\varphi$

2.3. Italian
        Let us consider Italian, which shows rich subject agreement on the predicate, unlike English and BP.   It has been observed in Italian (Nespor and Vogel 1986, Ghini 1993) that subjects are phrased separately from a following verb as in (11a) or from an auxiliary verb as in (11b):

(11) a. (Papá)$_\varphi$ (mangia)$_\varphi$
              daddy   eat.3SG
              'Daddy is eating.'
        b. (La ceritá)$_\varphi$ (puó   essere guarita)$_\varphi$
              the blindness can.3SG be   cure.PP
              'Blindness can be cured.'   (Ghini 1993)

Thus, the phonological rule called Raddoppiamento Sintattico RS, which applies between words within a phonological phrase, is blocked between the subject and a following element (see Nespor and Vogel 1986 for details of RS).   These data are cited to support the validity of Nespor and Vogel's (1986) Relation-based theory, which predicts that subjects are always phrased separately from a predicate.   But a closer look at literature on Italian prosody reveals that subjects can in fact be phrased with a following verb.   Let us consider (12):

(12)   a. La città • cadde.
            'The city fell'
       b. L'ultimo re • morì.
            'The last king died.'
       c. La religione che pratica • perde fedeli.
            'The religion he practices is losing adherents.'   (Napoli and Nespor 1979)

These are cited from Napoli and Nespor (1979).   Here a dot • indicates the application of RS. In (12a), RS applies across the word boundary between the subject *la città* 'the city' and the verb *cadde* 'fell.'   In (12b), the subject consists of two lexical words, *l'ultimo re* 'the last king,' and RS applies between the subject and the verb *morì* 'died.'   In (12c), the subject is modified by a relative clause, and RS applies between the subject and the following predicate.   Napoli and Nespor (1979: 830ff.) state that "..., we find that RS is possible between the last word of the subject and the first word of the predicate whenever the subject is sentence-initial— regardless of whether the subject is a single word, several words, or a complex NP."   So, it seems that, as shown in (13), subjects can be phrased with a verb in Italian, contrary to the prediction made by the major theories such as Relation-based theory.

(13)   Italian: (Subject V)$_\varphi$

This phrasing conforms to PISO.   On the assumptions that T is strong and labelable, and that subjects stay in Spec-T in a simple declarative sentence, the basic syntactic structure in Italian will be (14a).   Given (1), the labelable T is not found within the syntactic object α, and therefore α is not interpreted as a phonological phrase and no phonological phrase boundary is formed between the subject and T, as shown in (14b):

(14) a. . . . [$_{CP}$ C [$_{TP}$ Subj [$_\alpha$ T$_{labelable}$ [$_{v*P}$ V-v*   [$_{VP}$ . . .

    b.   (Subj   T   V-v*)$_\varphi$ (. . .

Note that it is generally assumed that V (or V-v* here) moves to T in the absence of an overt auxiliary verb on T in Italian (Belletti 1990).   V-to-T movement, however, does not affect our argument since V is phrased with Subj whether it is on T or on v*.

If this approach is correct, then the phrasing in (11), where the subjects are not phrased with the following predicate, should be accounted for on independent grounds.   Frascarelli (2007) argues that preverbal subjects in Italian can be in an A´-position and interpreted as a topic, and Frascarelli (2000) argues that topicalized elements correspond to intonational phrases in Italian.   Given these, it can be (at least) inferred that in (11), the subjects are actually topicalized and moved out of Spec-T, and thus phrased separately.

In this connection, let us consider Abruzzese, the Abruzzo dialect of Italian (D'Alessandro and Scheer 2015).   In this dialect, subject agreement is rich, and complementizer *che* triggers gemination of a following consonant within a phonological phrase. An interesting example is given in (15):

(15) a. Jè   mmeje chə **vv**e.
    is   better   that   come.3SG
    'It's better that he/she comes.'   (D'Alessandro and Scheer 2015: 614)
    b.   . . .   (chə   vve)$_\varphi$

Here, the subject in the embedded clause is dropped, and the complementizer triggers gemination of the word-initial consonant of the embedded verb.   The phonological phrasing is schematically shown below:

(16)   Abruzzese: (C   *pro*   V)$_\varphi$

This phrasing indicates that, as illustrated in (17), the rich agreement on T does not create a phonological phrase boundary between T and the dropped subject, and as a result, the complementizer and the verb are contained in the same phonological phrase, and the gemination applies between C and the verb:

(17) a. . . . [$_{CP}$ C [$_{TP}$ *pro* [$_α$ T$_{labelable}$ [$_{v*P}$ V-v*   [$_{VP}$ . . .

   b.   (C   T   V-v*)$_φ$ (. . .

Here again, even if V moves to T, V is still phrased with C.

2.4. Zulu and Chichewa

The Bantu languages, Zulu and Chichewa, show subject agreement in class.   I take this to be rich agreement.   In these languages, Penultimate Lengthening (PL) applies to the penultimate vowel at the end of a phonological phrase.   Let us first consider Zulu(Cheng and Downing 2009):[3]

(18) a.   ú-Síph' ú-phekél'   ú-Thánd' in-kû:khu)$_φ$.

      1-Sipho SM1-cook.for   1-Thandi 9-chicken

       'Sipho cooked chicken for Thandi.'

   b.   ín-kosíka:zi)$_φ$ í-théngel'   ábá-fán' ízím-ba:tho)$_φ$.

      9-woman   SM9-buy.for   2-boy   10-clothes

      'The woman is buying clothes for the boys.'   (Cheng and Downing 2009: 209)

In (18a), the penultimate vowel of *in-kû:khu* '9-chicken' is lengthened, and no other vowel is lengthened, indicating that the entire sentence corresponds to a phonological phrase.   In (18b), PL applies to the subject *ín-kosíka:zi* '9-woman' and the direct object *ízím-ba:tho* '10-clothes'. This means that the subject corresponds to a phonological phrase, and the rest of the sentence corresponds to another phonological phrase.   Crucially, Cheng and Downing (2009) point out that the subject is phonologically phrased separately only when it is interpreted as a topic. So in (18b), the subject is phrased separately because it is topicalized.   If the subject is not a topic of the sentence, the default phrasing is like (18a), where the subject is phrased with the following verb.   So the situation is very similar to Italian.   The subject is phrased with a following material unless it is topicalized.   Again, this phrasing is not predicted by the major theories, but consistent with PISO whereby the subject that stays in the Spec of a labelable strong T is not followed by a phonological phrase boundary, and hence it is phrased with the following verb.

Exactly the same is observed in Chichewa (Cheng and Downing 2016):

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[3] Here I follow Cheng and Downing's notation of phonological phrases and show just their right edges.

(19) a. (Ma-kóló   a-na-pátsíra   mwaná   ndalámá   zá   mú-longo   wáake)$_\varphi$

          6-parent   SM6-TAM-give   1.child   10.money 10.of   1-sister   1.her

          'The parents gave the child money for her sister.'

       b. (M-fúumu)$_\varphi$ (i-na-pátsá   mwaná   zó-óváala)$_\varphi$

          9-chief   SM9-TAM-give   1.child   10.clothes

          'The chief gave the child clothes.'   (Cheng and Downing 2016:160)

In (19a), the subject is not interpreted as a topic, and not followed by a phonological phrase boundary.   In (19b), the subject is interpreted as a topic, and it is followed by a phonological phrase boundary, as indicated by the lengthening of the penultimate vowel of the subject.

        The phrasing of subjects in Zulu and Chichewa is summarized as follows:

(20) Zulu/Chichewa: (Subj   V)$_\varphi$

3. Phrasing of Objects

        In this section, I argue that object agreement also affects phonological phrasing.   It is widely observed (see, e.g., Seidl 2001) that objects in Bantu languages are phrased with a verb, whether they are prosodically light (i.e., non-branching) or not.   (21) is from Chichewa, and the relevant rule is PL (see also (18) and (19) above):

(21) a.   (Mwaána)$_\varphi$ (anaményá   nyuúmba)$_\varphi$

            child   SM-hit   house   (Kanerva 1990)

            'The child hit the house'

       b.   (Mwaána)$_\varphi$ (anaményá   nyumbá   ya   bwiíno)$_\varphi$

            child   SM-hit   house   AM   good

            'The child hit the good house.'   (Sam Mchombo: personal communication)

In (21a) the object *nyumba* 'house' undergoes PL, becoming *nyuumba*, but the verb does not, indicating that the verb and the object are phrased together.   In (21b) the object consists of two lexical words, and only the final word *bwiino* 'good' undergoes PL, and *nyumba* 'house' does not, indicating that the verb and the object are phrased together.

        Notice that one peculiar fact about Bantu languages is that they sometimes show object agreement.   As shown in (22), if the verb bears an object marker OM, the object NP is interpreted as a topic and can occur anywhere.

(22) a. SVO: Njûchi zi-ná-wá-lum-a   alenje

              bees   SM-PST-OM-bite- INDIC   hunters

          'The bees bit the hunter

    b. VOS: Zináwáluma alenje njûchi

    c. OVS: Alenje zináwáluma njûchi

    d. VSO: Zináwáluma njûchi alenje

    e. SOV: Njûchi alenje zináwáluma

   f. OSV: Alenje njûchi zináwáluma   (Bresnan and Mchombo 1987: 747)

By contrast, if the verb does not bear an object marker as in (23), the object NP is not interpreted as a topic and must occur in a position immediately after the verb:

(23) a. SVO: Njûchi zi-ná-lúm-a   alenje

              bees   SM-PST-bite-INDIC   hunters

          'The bees bit the hunter

    b. VOS: Zinálúma alenje njûchi

    c. OVS: *Alenje zinálúma njûchi

    d. VSO: *Zinálúma njûchi alenje

    e. SOV: *Njûchi alenje zináluma

    f. OSV: *Alenje njûchi zináluma   (Bresnan and Mchombo 1987: 744-745)

Given these, I assume that the object marker is an incorporated pronoun, anaphorically linked to a topic NP/DP (cf. Henderson 2006, among others).   To analyze this, I suggest that transitive verbs in Chichewa have a set of unvalued agreement features [uφ] that must be valued/checked in the derivation.   Then, there are 2 options to check or value the unvalued agreement features [uφ].   In one option, [uφ] is checked by the object marker, which is realized as an incorporated pronoun PRN.   In this case, the incorporated pronoun is the argument of the verb, and the full DP object is not an argument of the verb but a topic staying outside of the VP.   So it can follow or precede the VP, as in (24a) or (24b). This is why the word order is free as we have seen in (41):

(24) a. $[_{v*P} \ldots \underline{PRN}$-$V_{[u\phi]}$-$v^*$ $[_{VP}$ $t_{V_{[u\phi]}}$ t_{PRN}]] $[_{DP}$ Obj]

                       ↑ Agree ↑

    b. $[_{DP}$ Obj] . . . $[_{v*P} \ldots \underline{PRN}$-$V_{[u\phi]}$-$v^*$ $[_{VP}$ $t_{V_{[u\phi]}}$ t_{PRN}]]

                       ↑ Agree ↑

In the other option, [uφ] is checked by the object DP:

(25)   . . .   [$_{v*P}$ . . . V$_{[uφ]}$-v*   [$_{VP}$ $t_{V_{[uφ]}}$ [$_{DP}$ Obj]]]
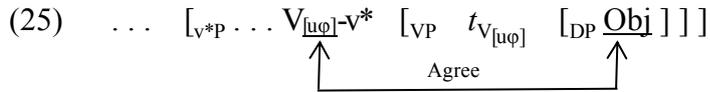
This time, the object DP is an argument of the verb, and the V agrees with the full DP object. Suppose that the valued [uφ] makes the copy of V labelable in Bantu languages, in contrast with V/R in English.   Then, given (1), no phonological phrase boundary is created between the verb and object in (25) since no unlabelable element is detected with minimal search within the VP, and therefore the verb and object are always contained in the same phonological phrase. In this analysis, it is not phrase structure but object agreement that that determines the phonological phrasing of objects in Bantu languages.

4. Phrasing within DP

In this section, I briefly discuss a further prediction.   If the present approach is on the right track, it is predicted that a series of agreement across the structure will create a huge phonological phrase.   In KiVunjo Chaga, like other Bantu languages, post-nominal modifiers show class agreement with the head noun, and the agreement marker is called associative marker AM (McHugh 1999: 198).   If we have two or more modifiers within a DP, we have a series of agreement, and interestingly, such a DP forms a huge phonological phrase.   Thus in (26), a complex DP forms a single phonological phrase with the verb.   The relevant rule here is tone-raising in phrase-final position:

(26) (Ngế cììzrímà ìwìítsà lèérì   tsà ḿndù àlèkóóyà   lèérì   tsà   ắkắlranyí `)$_{φ}$
       I-can   throw money AM person found-REL money AM   clerk
       'I can throw the money of someone who found the clerk's money.' (McHugh 1999: 17)

Similarly in a Bantu language Zanzibar Simakonde (Manus 2018, cited in Rolle and Hyman 2019), a complex DP forms a single phonological phrase.   The relevant phonological rule is PL:

(27) a.   (NOUN   ADJ   GEN   NUM   DEM)$_{φ}$
          ví-lóngó   ví-kúméné   vy-á   náswé   ví-vílí   aviilá
          CL8-pot   CL8-big   CL8-GEN   white   CL8-two   CL8.DEM
          'those two big white pots'

b. * (NOUN)$_\varphi$ (ADJ)$_\varphi$ (GEN)$_\varphi$ (NUM   DEM)$_\varphi$

c. * (NOUN)$_\varphi$ (ADJ)$_\varphi$ (GEN)$_\varphi$ (NUM)$_\varphi$ (DEM)$_\varphi$ (Rolle and Hyman 2019: 4)

So, it seems that agreement affects phonological phrasing: In terms of (1), a strong labelable element does not create a phonological phrase boundary, and hence a huge phonological phrase may result.   However, it should be noted that each modifier constitutes its own phonological phrase in the absence of the demonstrative in Zanzibar Simakonde:

(28) a.   (NOUN)$_\varphi$ (ADJ)$_\varphi$ (GEN)$_\varphi$ (NUM)$_\varphi$

(vi-loôngo)$_\varphi$ (ví-kúmeêne)$_\varphi$ (vy-á   naáswe)$_\varphi$ (vi-viíli)$_\varphi$

CL8-pot   CL8-big   CL8-GEN   white   CL8-two

'two big white pots'

b.   *(NOUN   ADJ   GEN   NUM)$_\varphi$ (Rolle and Hyman 2019: 4)

A closer investigation is needed to consider the relation between associative markers and phonological phrasing.

5. Concluding Remarks

In this paper, I have sketched out a possible new perspective on the formation of phonological phrases.   I have tried to show that phonological phrasing is affected by agreement, which is recast as labelability in the framework of the labeling algorithm. Although the picture outlined in this paper is still a work in progress, I hope to develop further investigation of the relation between agreement (or lack thereof) and formation of prosodic domains.

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