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Syntactic Structure and Intonational Phrasing

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1 Syntactic Assumptions

I am assuming a non-transformational syntax, with rules giving PS trees like those of GPSG or HPSG.[1] Where GPSG and HPSG disagree, notably in the treatments of adjuncts in the VP, the syntax-prosody mapping rules that I am envisaging so far are equally compatible with either.

The rules here proposed are not compatible with 'small clause' analyses, either for constructions with matrix verbs like *consider* (as in the standard GB treatment), or for 'subject-aux inversion' (as in the earlier GPSG proposal).

Where GPSG and HPSG agree with one another and disagree with the s-structure of GB, adherents of GB can probably get something equivalent to the other structure in PF. The problem would be to provide satisfactory vvmotivation for the 'adjustment rules' that would be required for the purpose. The amount of 'adjustment' needed would of course be far greater for any grammar of the type proposed by Kayne. As regards Steedman's CCG, there is apparently no problem involved in getting the structures I am assuming, but it might be difficult to bar undesirable alternatives in a principled manner.

2 Prosodic Assumptions

The units of the prosodic hierarchy include the tone unit (TU)— alias 'intonational phrase' (IP)—and the rhythm unit (RU).[2] There seems to be no general agreement on the precise definition of the TU, but I shall assume that any satisfactory definition must include some reference to TU-final lengthening.[3] A normal TU ending or CLOSURE may or may not be followed by an audible interval of silence. TUs typically have one NUCLEUS (alias sentence stress), a peak of prominence generally taking the form of one of a limited range of pitch movements; but according to some analysts, there are TUs with more than one nucleus,

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[1]For GPSG, see Gazdar et al. 1985, and for HPSG, Pollard and Sag 1987.

[2]For the difference between RU and foot, see below. As regards the need for units intermediate between foot and intonational phrase (see Nespor and Vogel 1986 for what is probably the most elaborate version of the hierarchy), I prefer to reserve judgement.

[3]Some lengthenings are produced by hesitation, but this generally sounds quite different.

and also TUs without pitch movement on the nucleus. I am taking the term 'nucleus' to include the whole of the pitch movement that begins on the nuclear syllable. The end of the nucleus, therefore, coincides with the closure.[4]

The ability to place TU closures deliberately is part of the speaker's competence (though the ability to control the exact amount of following silence is not—speakers do not naturally differentiate between a short following silence and none). TU closures belongs to fluent speech, and are the result of the speaker's decision to put pauses in particular places, in accordance with what he judges to be the listener's needs (where 'pause' is used in its ordinary non-technical sense, corresponding to closure with or without a following interval of silence).

The division of the stream of speech into TUs ('pausing' in ordinary language) is subject to grammatical constraints.

The RU (rhythm unit) has one obligatory constituent, the downbeat (D), which is optionally preceded by an upbeat (U). The downbeat must contain a stressed syllable, which may be followed by one or more unstressed syllables, while the upbeat can contain only unstressed syllables. It follows that each RU contains just one (rhythmic) stress. What is perceived as (rhythmically) stressed depends more on timing than on loudness, and the distinction between unstressed syllables in upbeats and downbeats is likewise based on differences of timing.[5]

Most but not all (rhythmic) stresses also have some intonational prominence. Such stresses may be called ACCENTS. In some analyses, the NUCLEUS is defined as the last accent in the intonational phrase (= TU).

Example (1) shows the relationship between TU, RU, D, and U. In the line of writing, a preceding ' | ' is used for the beginning of a downbeat and a preceding '.' for the beginning of an upbeat.

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(1)  |Peter  |left  .the  |house  .at  |seven  .I  |think
     (D    ) (D  ) (U )  (D    ) (U) (D   ) (U) (D    )
     (RU   ) (RU ) (RU        ) (RU       ) (RU       )
     (TU                                              )
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Unless the speaker wishes to express some kind of contrast, the beginning of the TU nucleus (here left unmarked) will be on the first syllable of *seven*. The division into RUs as marked in (1) represents fairly deliberate speech. With increasing speed of utterance, medial upbeats tend more and more to be absorbed in preceding downbeats.[6]

Apart from being divided by closures into TUs, most speech contains hesitations, restarts and corrections. Hesitations may be manifested as intervals of silence, drawled

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[4]Provided that there is only one nucleus per TU. I am reserving judgement on the question whether a TU may contain more than one nucleus, as has been suggested by various British analysts; see for example Crystal 1969.

[5]The relationship between timing and the perception of stress is quite complex: see for example Mark Liberman 1978, *The intonational system of English*, 190-193, and Robert Ladd 1978, *The structure of intonational meaning*, 42-43. '(Rhythmically) stressed' is here used for what Abercrombie calls 'salient', but the RU is not Abercrombie's 'foot', since the Abercrombian foot must start with a salient syllable, i.e. there is no notion of 'upbeat' in the structure of his foot.

[6]It is clear that the RU as here defined may include both more and less than the foot in mainstream metrical phonology, but that the differences between RU and foot decrease with increasing speed of utterance. The RU is also different from Pike's 'total contour' (1945, *The intonation of American English*), since this must have intonational prominence on the stressed syllable. So in (1) above, assuming various accents on the first four RUs and none on *I think*, the last two RUs (*at seven I think*) would be one 'total contour' for Pike. The notion of RU as a structural unit goes back to Wiktor Jassem (see 1952, *The intonation of conversational English*), but the rhythmic phenomena on which it is based are of course well known, and the descriptions go back to Daniel Jones at least.

articulations, 'filled' or 'voiced' pauses (typically [ə] or [əm]), or combinations of these. They may occur either between or within TUs.[7] Hence a TU may be interrupted by a shorter or longer interval of silence, marking an 'unscheduled' stoppage in the stream of speech. Such stoppages are normally recognized as such by listeners, the end of the preceding string being characteristically different from the TU closure. I shall call what precedes such a stoppage a BREAK. Breaks are often, but not necessarily, associated with other forms of disfluency: sentences left uncompleted, or restarts, or corrections.

Since TU breaks are in the first place unpremeditated stoppages in the process of speech production, indicating performance mishaps, the ability to produce them deliberately is not part of a speaker's competence. Like other mishaps, however, TU breaks can be faked, and it is indeed an important part of the actor's art to be able to fake them convincingly.

Conventional English orthography provides the option of marking TU breaks by dashes (never by commas!); but unfortunately the dash has other functions as well. Transcriptions of recorded speech do not always attempt to distinguish closures from breaks. The transcriptions of the Survey of English Usage (SEU) at University College London show the distinction wherever a silence occurs before what the transcribers perceived as the nucleus of the TU (such silences have no TU ends marked before them). Since breaks, like other kinds of disfluency, are rare in postnuclear position, this means that the distinction between closure and break is usually clear in the Survey texts.

In the following examples from Svartvik and Quirk 1980, *A Corpus of English Conversation*, which presents SEU texts in a simplified transcription, the TU breaks may be identified by the TU-internal instances of '.' and '-' ('brief pause' and 'unit pause' in the SEU system, where 'pause' means simply an interval of silence). '•' represents the end of a TU, '{ }' marks what the SEU analyzes as a subordinate TU, ' | ' represents the TU 'onset' (the first stressed syllable), the words that contain nuclear accents are written in capitals, and other prominences distinguished by Svartvik and Quirk are represented here by ' | ' (For an account of the full SEU system of transcription, see Crystal 1969) All the examples are from text S.1.3., with numbering of TUs as in the text.

(2) a. 30 and ‖realized i'd |left my . COAT• 31 in my ‖LOCKER•
  b. 89 i mean you're . ‖WELL away {AREN'T you•}•
  c. 167 so they ‖sent - the machine OVER•
  d. 443 and she's . ‖quite ESTABLISHED in her FIELD•
  e. 452 [əm] - - - i ‖think she's . possibly nineteenth CENTURY•
  f. 510 i ‖ don't know if |you've had any - - DEALINGS with it•
  g. 1082 the ‖only breath of - fresh AIR•
  h. 1085 was that - at about ‖{NINE o'clock} in the EVENING•
  i. 1138 ‖did - you FIND {PRESIDENT•}• .1139 that ‖when you were in the DESERT•
  j. 1185 i would be ‖interested to KNOW• 1186 ‖how - - |general a PATTERN this is•
  k. 1224 and ‖then she got a - research fellowship at GLASGOW•

The following set of examples (taken from the same source) illustrates the association of breaks with other forms of disfluency (most of them involving sentences left uncompleted).

(3) a. 32 and i ‖just couldn't FACE• 33 going ‖all the way BACK again• 34 with ‖this great . you know my ‖ARMS were |aching•
  b. 112 i said you know i . i ‖haven't used one for YEARS•
  c. 254 they ‖had . they ‖shortlisted |five PEOPLE•
  d. 523 but ‖i . ‖you . ‖lunch one just sort of went INTO•
  e. 1204 she's ‖got - ‖one can SEE• 1205 that ‖if she weren't MARRIED• 1206 ‖she's got some of the QUALITIES in |fact•

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[7]When they occur within TUs, they are especially common immediately before open-class words—and in utterances with code-switching (Ellen Prince, p.c.) immediately before a switch.

In what follows, I shall make a notational distinction between '•', representing tone unit CLOSURES, and '–', representing tone unit BREAKS. For example:

(4)   a.   I still have to add• the bibliography•
      b.   I still have to add the– bibliography•

3   Parentheticals and Interruptions

Just as we have distinguished in the phonology between TU closures and TU breaks, so we must distinguish in the syntax between parentheticals and interruptions. The placing of parentheticals, like the placing of TU closures, is subject to syntactic constraints, while the occurrence of interruptions, like the occurrence of breaks, is not so constrained. Some typical parenthetical items are:

(5)   however, in fact, of course, I suppose, you know

The existence of grammatical constraints on their insertion is indicated by a comparison of the following sentences:

(6)   a.   * Several, of course, customers took their complaints to the manager.
      b.   Several customers, of course, took their complaints to the manager.
      c.   * Several customers took, of course, their complaints to the manager.
      d.   * Several customers took their, of course, complaints to the manager.
      e.   Several customers took their complaints, of course, to the manager.
      f.   ? Several customers took their complaints to, of course, the manager.
      g.   * Several customers took their complaints to the, of course, manager.
(7)   a.   Joan, however, thought it silly to make a fuss.
      b.   * Joan thought, however, it silly to make a fuss.
      c.   * Joan thought it, however, silly to make a fuss.
      d.   Joan thought it silly, however, to make a fuss.

Interruptions range from hesitation markers (8.a), through interjections (8.b), to brief sentences (8.c):

(8)   a.   er, ah, oh
      b.   tsk, ugh
      c.   come in, sorry, thanks

Of these, the easiest to contextualize is the hesitation marker *er*. We may contrast (6) with (8):

(9)   a.   Several—er—customers took their complaints to the manager.
      b.   Several customers—er—took their complaints to the manager.
      c.   Several customers took—er—their complaints to the manager.
      d.   Several customers took their—er—complaints to the manager.
      e.   Several customers took their complaints—er—to the manager.
      f.   Several customers took their complaints to—er—the manager.
      g.   Several customers took their complaints to the—er—manager.

A parenthetical may be pronounced as a separate TU, but it can be (and often is) included in a single TU with part or all of the utterance in which it is included. When is is medial, it can readily form a separate TU together with what precedes—but hardly with what follows. In this respect, the conventional punctuation, with its equal insistence on commas before and after, tends to mislead. Compare the following, with the parenthetical between NP subject and finite VP in (10), between modal auxiliary and main verb in (11), and between NP complement and PP complement in (12):

(10) a. Several customers• of course• took their complaints to the man-
           ager•
      b. Several customers of course• took their complaints to the manager•
      c. * Several customers• of course took their complaints to the manager•
      d. Several customers of course took their complaints to the manager•
(11) a. They did• of course• take their complaints to the manager•
      b. They did of course• take their complaints to the manager•
      c. * They did• of course take their complaints to the manager•
      d. They did of course take their complaints to the manager•
(12) a. They can take their complaints• of course• to the manager•
      b. They can take their complaints of course• to the manager•
      c. * They can take their complaints• of course to the manager•
      d. They can take their complaints of course to the manager•

Syntacticians sometimes feel that since parentheticals 'bear no obvious relationship to the sentences they seem to be included in' (Espinal 1991:726) they should simply be excluded altogether from the syntactic analysis of the structures within which they are placed. McCawley (1982) does this by attaching them to a higher node and allowing PS trees with crossing branches, while Espinal (1991:745) accommodates them by postulating 'separate phrase markers that intersect at the linear axis' and assuming 'that final lineariza-tion between disjunct [i.e. parenthetical] constituents and the host clause will take place at PF'. But this seems to give insufficient weight to the difference between parentheticals and interruptions, and to the way that parentheticals fit into a very general syntactic constraint on intonational phrasing (see Section 5 below on the End Stop Principle). I shall therefore assume that parentheticals, however generated, and however they may be set apart, in view of their 'unlicensed' status, from other syntactic constituents, do participate in dominance and precedence relations in syntax, and I shall take them to be always ICs of the highest accessible node in the sentence in which they are included.[8] This makes *of course* an IC of S in (10), of the finite VP (11), and of a base-form VP in (12). Depending on the analysis of VP (recursive or flat), the *of course* in (12) will be the last IC of three (V+NP+parenthetical, with PP adjoined), or the third of four (V+NP+parenthetical+PP).

It is not intended to imply that parentheticals all have the same options, either positionally or intonationally; but whereas interruptions, basically, are accidental intrusions, the results of technical hitches of one sort or another, the inclusion of parentheticals in syntactic structures is produced by the unimpeded working of the speaker's competence.[9]

Some types of items can function either as parentheticals or as more integral parts of the sentence in identical sequences. For example:

(13) a. All of these charges, he claims, can be disproved (par.)
      a′ All of these charges he claims• can be disproved•
      b. All of these charges, he claims can be disproved (non-par.)
      b′ All of these charges• he claims can be disproved•

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[8] 'Accessible' here means 'accessible on the assumption that branches do not cross'.

[9] Unfortunately, there seems to be, as yet, no generally agreed definition of 'parenthetical' as a syntactic term. Whatever definition one adopts, it seems reasonable to say that their use should not necessitate hesitation breaks or anacolutha. This restriction would lead one to exclude some instances of items that can be parentheticals elsewhere. For example:

(i) the—if you'll pardon the expression—absurdity of the claim
(ii) in—shall we say two or three days

In the first type, which was pointed out to me by Mark Liberman, a preceding hesitation break (rather than a TU closure) would normally be expected. In the second we have an anacoluthon preceded by a hesitation break.

Here the placing of the medial TU closure disambiguates (13.b'). We may compare the following, with syntactic disambiguation between (14) and (15) and between (16) and (17):

(14) a. How much of this, do you think, can they really prove? (par.)
      b. * How much of this• do you think can they really prove•
      c. How much of this do you think• can they really prove•
(15) a. How much of this do you think they can really prove? (non-par.)
      b. How much of this• do you think they can really prove•
  (16) vv
        a. None of these charges, he claims, can they prove (par.)
      b. * None of these charges• he claims can they prove•
      c. None of these charges he claims• can they prove•
(17) a. None of these charges does he claim they can prove (non-par.)
      b. None of these charges• does he claim they can prove•

Since *do you think* in (14) and *he claims* in (16) must be parentheticals, (14.c) and (16.c), which link these phrases to the left, are strongly preferred to (14.b) and (16.b), which link them to the right.

4   The Sense Unit Condition

Selkirk (1984:286) formulates a 'Sense Unit Condition on Intonational Phrasing' which states that

(18) The immediate constituents of an intonational phrase must together form a sense unit.

The term 'immediate constituent of an intonational phrase' is defined as follows (p. 290):

(19) An *immediate constituent of an intonational phrase* IP_i is a syntactic constituent contained entirely within ('dominated' exclusively by) IP_i and not dominated by any other syntactic constituent contained entirely within IP_i.'

And 'sense unit' is defined as follows (p.291):

(20) Two constituents C_i, C_j form a sense unit if (a) or (b) is true of the semantic interpretation of the sentence:
      a. C_i modifies C_j (a head)
      b. C_i is an argument of C_j (a head).
      If more than two constituents form a sense unit it will be because the appropriate relations of the type just defined exist among them.'

It follows from (18)–(20) that (21.b,c,d) are all acceptable phrasings for (21.a):

(21) a. Mary prefers corduroy
      b. Mary prefers corduroy•
      c. Mary• prefers corduroy•
      d. Mary prefers• corduroy• (Selkirk's 5.129)

And it follows also that (22.b,c) are acceptable phrasings for (22.a), but that (22.d) is unacceptable, and similarly with the phrasings in (23):

(22) a. Jane gave the book to Mary
      b. Jane(•) gave the book to Mary• (S.'s 5.134a,b)
      c. Jane(•) gave the book• to Mary• (S.'s 5.134c,g)

        d.   * Jane(•) gave• the book to Mary• (S.'s 5.134e,f)
(23)   a.   Jane read the book last week
        b.   Jane(•) read the book last week•
        c.   Jane(•) read the book• last week•
        d.   * Jane(•) read• the book last week•

So far, all is as it should be.[10] However, the definition of the sense unit as given in (20) would not allow the phrasings of (24) or (25):

(24)   This is the cat• that chased the rat• that ate the cheese•
(25)   Jane tried• to begin• to learn Spanish•

To deal with these, Selkirk relaxes the conditions in (20) by an addition (pp. 293–4) to the effect that

(26)   The argument-head relation may be viewed as obtaining between the head of an argument phrase and the head which is sister to the argument phrase.

     Now if one goes beyond the limited set of constructions considered by Selkirk, one soon comes to the conclusion that the SUC is both too restrictive and too permissive. On the one hand, its application bars perfectly normal TU (=IP) divisions like

(27)   He thinks (that) Mary• prefers corduroy•
(28)   They consider Jane• to be very clever•
(29)   I find this idea• very reasonable•

In all these the first TU (=IP) fails to satisfy the SUC, since neither of the required relations obtains between *Mary* and *that* (or *Mary* and *thinks*) in (27), between *Jane* and *consider* in (28), or between *this idea* and *find* in (29). The only way to accommodate them would seem to be a further relaxation of (20) by an vv'extension (or extensions) of argumenthood' not envisaged by Selkirk, viz. in such a way as to include the specifier of the argument phrase (assuming *Jane to be very clever* in (28) and *this idea very reasonable* in (29) to be constituents and *Jane* and *this idea* to be specifier nodes).
     But even this further relaxation of the SUC would fail to provide for the very large number of cases in which parentheticals of one kind or another are incorporated in TUs that include the preceding syntactic node. For example:

(30)   a.   The customer of course• will complain•
        b.   The customer however• will complain•
        c.   The customer I suppose• will complain•
        d.   The customer presumably• will complain•
        e.   The customer sir• is always right•

     So far we have considered constructions in which the SUC is too restrictive. But it would also appear to be too permissive, in that it sanctions the anomalous TU boundaries around the 'infinitive clause' and the 'small clause' in sentences like

(31)   * They consider• Jane to be very clever•
(32)   * I find• this idea very reasonable•

since the semantic interpretation would presumably take the 'clauses' as arguments of the matrix predicates *consider* and *find*, and *Jane* and *this idea*, being arguments of *very clever* and *very reasonable* respectively, as properly related to their sisters in their respective IPs (TUs). Nevertheless, utterances like these are avoided by most speakers and felt to be

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[10]Though special provision has to made, of course, for coordinative constructions like those in *Jane gave the book to Mary, the picture to Sue, and the scarf to Barbara.*

anomalous by most listeners. It is important to remember in this context that the SUC is based on semantic argumenthood (see (20) above), and that this is crucial to sentences like (21.d), repeated here as (33), if we adopt the usual view that the subject is not a sister to the finite verb:

(33)   Mary prefers• corduroy•

We must consider here also the relative acceptability of (34.a,b) and (35.a,b):

(34)   a.   * Couldn't• this be just a mistake•
         b.   Couldn't this• be just a mistake•.
(35)   a.   * Why should• this be such a problem•
         b.   Why should this• be such a problem•

According to the SUC, (34.a) and (35.a) should be much better than (34.b) and (35.b), with the 'clause' *this be just a mistake* as semantic argument of *couldn't* and *this be such a problem* as semantic subject of *should*, but in fact just the opposite seems to be the case.

All these examples seem to indicate that a semantic approach to constraints on phrasing, in the manner of the SUC, may be ill-conceived, and that a completely different approach may be more appropriate. I shall here explore the possibility that intonational phrasing, though guided, of course, by discourse considerations, is constrained by syntax (in the sense of constituency structure) after all. Clearly this cannot be taken in the sense that intonational phrasing must directly reflect constituency structure, but there do seem to be limits on possible mappings between syntactic and prosodic structure, and there may be no place for semantically based rules at all (in the sense of 'semantic' defined for the SUC.)

5   An Alternative: The End Stop Principle

It is generally agreed that intonational phrasing is determined to a considerable extent by pragmatic considerations, and that it is bound up with such things as intonational focusing on the one hand and destressing on the other. But there is no doubt that syntax is also a factor. I suggest that the greater part of the purely syntactic element in the constraints on intonational phrasing may be stated as follows:

(36)   For any well-formed TU x, the end of the highest-ranking syntactic constituent
         whose beginning coincides with the beginning of x determines the latest possible
         end of x.

I shall refer to (36) as the End Stop Principle (ESP).

The constraints imposed by the ESP coincide to a large extent with those imposed by the SUC, but the ESP makes no direct reference to semantic relationships. For example, both SUC and ESP bar the following:

(37)   * Three mathematicians• in ten derive a lemma• (S.'s 5.132)

This conflicts with the ESP in that the highest-ranking syntactic constituent whose beginning coincides with the beginning of the second TU is the PP *in ten*. The TU extends beyond it and is therefore ill-formed. Similarly with (38):

(38)   * Jane gave• the book to Mary• (S.'s 5.134f)

Here too the second TU is ill-formed: the relevant constituent is *the book*, since *the book to Mary* is not a constituent. On the other hand, Both SUC and ESP allow the following, even though the second exemplifies a kind of tension between intonational and syntactic phrasing:

(39)   Give the book• to Mary•
(40)   Mary prefers• corduroy• (S.'s 5.129)

The ESP makes no reference to any semantic relationship between *the book* and *give* or between *Mary* and *prefers*. It is sufficient that in both cases the first TU begins at the beginning of the sentence and does not extend beyond the end of the sentence.

It will be convenient at this point to introduce the following terms, which distinguish between different patterns of syntax-phonology mapping—or more specifically of IC-TU mapping:

1. **Leftward Grouping (LG):**
   The inclusion of an IC in a TU that excludes its rightmost sister, but includes its leftmost sister.
2. **Leftward Annexation (LA):**
   The inclusion of an IC in a TU that excludes its rightmost sister but includes a preceding IC that is not its sister.
3. **Rightward Grouping (RG):**
   The inclusion of an IC in a TU that excludes its leftmost sister, but includes a sister on its right.
4. **Rightward Annexation (RA):**
   The inclusion of an IC in a TU that excludes its leftmost sister, but includes a following IC that is not its sister.
5. **Congruent Mapping (CM):**
   Any mapping that does not fall under 1.–4.

The End Stop Principle has nothing to say about 1., 2., or 5., but declares instances of 3. and 4. to be ill-formed. (On differences between Leftward Annexation and Leftward Grouping, see Section 6. below.)

Unlike the SUC, the ESP has no problem with 'small clauses' and the like, assuming that the syntax analyzes the lower subject as a complement of the matrix verb (as in most theories outside the GB 'family'). The ESP predicts that (41) and (42) (= (28) and (29) above), which involve neither RG nor RA, will be strongly preferred to (43) and (44) (= (31) and (32) above), which are instances of RG.

(41)   They consider Jane• to be very clever• (LA, LG)
(42)   I find this idea• very reasonable• (LA, LG)
(43)   * they consider• Jane to be very clever• (LA, RG)
(44)   * I find• this idea very reasonable• (LA, RG)

Subject-aux inversion is provided for equally straighforwardly, with (45.b) and (46.b) (= (34.b) and (35.b) above), which do not involve RG, are preferred to (45.a) and (46.a) (= (34.a) and (35.a) above), which do.

(45)   a.   * Couldn't• this be just a mistake• (RG)
         b.   Couldn't this• be just a mistake•. (LG)
(46)   a.   * Why should• this be such a problem• (LA, RG)
         b.   Why should this• be such a problem• (LA, LG)

Again the relative acceptablility judgements are just what one would expect in accordance the ESP, together with the standard PSG analyses of these structures (subject as sister to aux). And of course there is no problem with (47) (= (27) above), which is an instance of LA:

(47)   He thinks (that) Mary• prefers corduroy•

The sentences in (48) and (49) (= (30) and (31) above), where the parentheticals are intonationally joined on the left to the subject or to the verb, are further instances involving neither RG nor RA, and so constitute no problem for the ESP, but are all anomalous according to the SUC:

(48) a. The customer of course• will complain•
      b. The customer however• will complain•
      c. The customer I suppose• will complain•
      d. The customer presumably• will complain
      e. The customer sir• is always right•
(49) a. He thinks of course• that the customer will complain•
      b. He thinks however• that the customer will complain•
      c. He thinks I suppose• that the customer will complain•
      d. He thinks presumably• that the customer will complain•
      e. He thinks sir• that the customer is always right•

The intonational treatment of the focusing adverb *also* is similarly explained by the ESP, if we assume (as it seems we must) that it contrasts with focusing *only* and *even* in being unable to be syntactically adjoined on the left to the NP or PP on which it focuses.[11] The inability of this *also* to adjoin will account for the contrasts in syntactic well-formedness in (50)-(52) and in intonational well-formedness in (53):

(50) a.   [Only the neighbours] were interviewed
      b.   [Even the neighbours] were interviewed
      c. * [Also the neighbours] were interviewed
(51) a.   [Only the neighbours] have they interviewed
      b.   [Even the neighbours] they have interviewed
      c. * [Also the neighbours] they have interviewed
(52) a.   They questioned [only the neighbours] about it
      b.   They questioned [even the neighbours] about it
      c. * They questioned [also the neighbours] about it
(53) a.   They interviewed• only some of the neighbours• (LA)
      b.   They interviewed• even some of the neighbours• (LA)
      c. * They interviewed• also some of the neighbours• (LA, RG)
      d.   They interviewed also• some of the neighbours• (LA, LG)

It is highly significant that (53.d), with *also* separated intonationally from its focus and attached to the word on its left (here its left-hand sister) is strongly preferred to (53.c), with *also* intonationally attached to its focus (here its right-hand sister).[12] In all these cases ((41)–(53)), the ESP provides simply and straightforwardly for phrasings that are problematic in various ways for the SUC.

It is worth noting that the ESP works equally well for the GPSG and HPSG analyses of adjuncts in VPs, as shown in (54):

(54) a. Mary read the book carefully
          S[NP VP$_1$[VP$_2$[V NP] ADVP]] (GPSG)
          S[NP VP[V NP ADVP]] (HPSG)
      b. Mary(•) read the book(•) carefully•
      c. * Mary(•) read• the book carefully•

The alternative bracketings show that the principle gives the same results no matter which analysis is chosen: ADVP as adjunct to VP (GPSG) or ADVP as adjunct to V (HPSG). In both analyses, the relevant constituent in (54.c) is the NP that is sister to V, and the last TU extends beyond it and is consequently ill-formed. However, the mapping types differ: (54.c) involves RA for GPSG, but RG for HPSG.

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[11] See also Taglicht 1984.

[12] The type represented by (53.c) must be distinguished from the following, with the correlative pair *not only...but also*:

i. They interviewed not only the family• but also some of the neighbours•

A principle which is similar to the ESP is suggested by Bing (1979:64): '[An] intonation phrase following a non-initial phrase-boundary cannot include non-constituents.' But this is too strong, since it would bar perfectly normal utterances like

(55)   However• most people thought• that this wouldn't do•

and also, of course such old familiar examples as *This is the cat• that killed the rat• that ate the cheese•*.

6   Additional Constraints

If a structure of non-binary coordination is intonationally divided, there must be TU closures between all its ICs. We may refer to this as the Coordination Principle. Compare the following (with 'CoStr' for 'coordination structure', and 'CoNP' for 'Coordinator+NP'):

(56)   a.   apples, pears, and bananas (CoStr[NP NP CoNP])
         b.   apples pears and bananas•
         c.   apples• pears• and bananas•
         d.   * apples pears• and bananas•
         e.   * apples• pears and bananas•

This is more restrictive than the ESP, since it bars not only Rightward Grouping but Leftward Grouping as well.[13] It is perfectly all right, of course, to have a division like that in (57), but only because the coordination structure can be taken as recursive, with an intonational division at the upper level, but not at the lower:

(57)   apples and pears• and bananas•
         $CoStr_1[CoStr_2[NP\ CoNP]\ CoNP]$

So far we have dealt only with constraints that can be stated purely in terms of syntactic phrase structure trees, but there are of course others. The most obvious of these is the requirement that a TU must must contain an item that is not only accentable, but in fact has sufficient intonational prominence to serve as nucleus of the TU. It follows from this, for example, that an NP VP structure will not be divided after the NP if the NP is a dummy (*there* or *it*). For example:

(58)   a.   There was no one there•
         b.   * There• was no one there•
(59)   a.   It was raining•
         b.   * It• was raining•

And in an utterance type like (60), *he* will have nuclear prominence. This does not apply, of course, to *he* followed by a hesitation break, as in (61); indeed, hesitation breaks without any preceding stress are very common indeed. But utterances with hesitation breaks, being non-fluent, are anomalous by definition.

(60)   He• was not at home•
(61)   * He– was not at home•

We can go further: there seem to be requirements that apply only to LA (though not, it seems, to all types of LA). Thus we do not find LA with subjects of finite clauses unless the subject has a nuclear accent.[14] Compare the a. and b. utterances in (62) and (63), where words bearing nuclear accents are capitalized and ' | ' indicates a following rhythmical stress, with or without an accent:

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[13]Leftward Annexation is unaffected by the Coordination Principle; so examples like *to buy apples• pears• and bananas•* are unproblematic.

[14]Except where there is subject-aux inversion, in which case the requirement does not apply, since the mapping type is LG.

(62)   a.   we │know that │MARY● pre│fers │CORDUROY●
       b. * we │KNOW that │mary● pre│fers │CORDUROY●
       c.   we │know that │SHE● pre│fers │CORDURO Y●
       d. * we │KNOW that │she● pre│fers │CORDUROY●

There seems to be a similar requirement for the 'aux' element:[15]

(63)   a.   │mary │COULD● │do it │EASILY●
       b. * │MARY │could● │do it │EASILY●
       c.   │MARY● could │do it │EASILY●
(64)   a.   she │COULD● │do it │EASILY●
       b. * SHE could● │do it │EASILY●
       c.   SHE● could │do it │EASILY●

The intonational oddity of (63.b) and (64.b) is particularly striking in view of the normality of (65) and (66), with VP 'deletion':

(65)   │MARY │could●
(66)   │SHE could●

The whole subject of the relation between intonational phrasing and accentuation is quite complex, and requires more systematic study than it has received so far. But it is clear that there can be no satisfactory account either in purely syntactic or in purely pragmatic terms. Compare (67) with (68):

(67)   a.   │she CON│SIDERS it● │very much │BETTER●
       b. * │she CON│SIDERS● it │very much│BETTER●
(68)   a. * │she CON│SIDERS it● is │very much │BETTER●
       b.   │she CON│SIDERS● it is │very much│BETTER●

7   Conclusion

We may sum up by saying, firstly, that the claims made for the Sense Unit Condition cannot be made good, and secondly, that there seem to be at least two principles involved—the End Stop Principle and the Coordination Principle —which can be formulated in purely syntactic terms, and require no direct reference to any other component of the grammar. The first of these principles has a very wide area of application: it accounts not only for everything that is covered by the Sense Unit Condition, but also a good deal more. We have noted the following:

1. Finite complement clauses (e.g. (27) above)
2. 'Exceptional clauses' (e.g. (28), (31))
3. 'Small clauses' (e.g. (29), (32))
4. Subject-aux inversion (e.g. (34.a-b), (35.a-b))
5. Parentheticals (e.g. (30).a-e))
6. Focusing *also* (e.g. (53.c-d))

Thirdly, the End Stop Principle is stated in purely configurational terms, and makes no direct use of concepts like head, complement, or adjunct. And finally, no purely syntactic account can be sufficient, but accentuation and deaccentuation have to be taken into account.

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[15]Except where there is subject-aux inversion, in which case the 'aux' cannot be TU-final when another node follows, since this would result in RG.

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