MOBILE LEXICAL PARENTHESES IN METRICAL GRIDS*

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We propose that metrical structure needs to distinguish parentheses associated with lexical markings from other types of parentheses, and must include parentheses that move. We will show how the theory of Simplified Bracketed Grids can be augmented to allow it to give a better account of metrical systems.

In section 1 we present a brief introduction to the basic ingredients of the grammar of stress that we assume, illustrating how metrical representations are built. We then demonstrate in section 2 why parentheses associated with designated lexical elements must be distinguished from other types of parentheses. In section 3, we show that there are more uses for labeled lexical parentheses in accounting for the stress-shifting nominal paradigms of East Slavic. In section 4 we propose that the same device can account for lexical edge markings in the stress system of Spanish. We conclude in section 5 with the observation that mobile parentheses are the metrical analogs of floating tones in autosegmental theory.

1. The grammar of stress

We assume that the grammar of stress builds metrical representations consistent with the Simplified Bracketed Grid (SBG) theory of Idsardi (1992), Halle and Idsardi (1995), and Halle (1997), with some modifications to be discussed. Metrical structures result from the interaction of a number of parameters that govern how brackets (i.e., parentheses) and heads are assigned to the grid. Unlike earlier versions of metrical theory, SBG builds up metrical structure by assigning single parentheses, rather than pairs of parentheses.

Parentheses are assigned in a variety of circumstances: (a) to edges; (b) to designated elements in the segmental string, such as accented syllables in a language with lexical accent, or heavy syllables in a quantity-sensitive stress system; and (c) in bounded stress systems, after every two (or three) grid marks with no intervening parentheses. In what we will call classical SBG, the form of the theory developed by Idsardi and Halle, parentheses all have the same formal status, however they are assigned. We will argue on grounds of descriptive adequacy that the theory has to recognize different types of parentheses, because they do not all behave in the same way.

We will begin our survey of these parentheses with edges, then move on to designated elements and iterative constituent parentheses.

1.1 Edge markings

SBG allows for a variety of edge markings on line 0, according to the template in (1):

(1) Template for edge markings on line 0
Insert a {left/right} bracket to the {left/right} of the {left/right}-most element.

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The examples in (2) show the four options at the right edge, where L stands for 'left' and R stands for 'right' (the left edge options are parallel). Option (a) results from inserting a right bracket to the right of the rightmost element on line 0. We assume that this is the unmarked option of the four. Option C results from inserting a left bracket to the right of the rightmost element. This gives post-accenting: a foot will begin at the next grid mark. We will not discuss the other options here.

(2) Types of line 0 edge markings at the right edge

a. RRR	b. RLR	c. LRR	d. LLR	
…x x)#	…x)x#	…x x(#	…x(x#	Line 0

1.2 Designated elements: lexical accent

In some languages, some syllables have a lexical property called *accent*. In SBG, lexical accent is represented by a left or right line 0 parenthesis associated with the accented element. For example, the stem of the Russian word *koróv-* 'cow' has the lexical representation shown in (3a); the second syllable has a lexical accent. Compare *golov-* 'head' (3b), which is unaccented.

(3) Russian accented and unaccented stems

a. Accented stem	b. Unaccented stem	
x (x	x x	Line 0
ko rov-	go lov-	Syllables
'cow'	'head'	

In Russian, inflectional suffixes can also be accented. The nominative singular suffix of 'head' is *–a*, which has a lexical accent indicated by the left parenthesis in (4a). The accusative singular suffix is *–u*, which is unaccented (4b).

(4) Russian accented and unaccented suffixes

a. Accented suffix	b. Unaccented suffix	
x x (x	x x x	Line 0
go lo v-a	go lo v-u	Syllables
'head -NOM.SG'	'head -ACC.SG'	

In Russian, the heads of line 0 constituents are on the left; heads are projected to line 1. In the nominative singular of 'head', shown again in (5a), there is only one constituent (foot) due to the parenthesis associated with the accented suffix *–a*. The head of this foot is projected to line 1, resulting in stress on the suffix: *golová*. In the accusative singular of 'head' there are no lexical accents; how does stress get assigned here?

(5) Heads of line 0 constituents projected to line 1: unaccented stem

a. Accented suffix	b. Unaccented suffix	
x	x	Line 1
x x (x)	x x x)	Line 0
go lo v-á	gó lo v-u	Syllables
'head -NOM.SG'	'head -ACC.SG'	

Russian has the edge marking RRR: Insert a right bracket to the right of the rightmost element on line 0. This edge bracket creates a line 0 foot in the accusative singular that extends to the beginning of the word (5b). The leftmost (i.e., the initial) line 0 mark of this foot is projected to line 1, resulting in initial stress: *gólovu*. In the nominative singular (5a) the edge mark has no effect, and stress remains on the suffix.

In the accusative singular of 'cow' (6b), the lexical accent on the second syllable and the right edge mark create a foot whose leftmost mark is projected to line 1, resulting in *koróvu*. In the nominative singular (6a) there are two feet, due to the fact that both the stem and the suffix have a lexical accent. Therefore both heads are projected to line 1. In Russian, the leftmost mark on line 1 is projected to line 2 and becomes the main stress of the word. Other line 1 marks are not realized phonetically as stress; therefore, the nominative singular of 'cow' is stressed *koróva*.

(6) Heads of line 0 constituents projected to line 1: accented stem

a. Accented suffix

```
      x
     (x   x
  x (x  (x)
 ko ró v-a
'cow     -NOM.SG'
```

b. Unaccented suffix

```
      x                 Line 2
     (x                 Line 1
  x (x   x)             Line 0
 ko ró v-u              Syllables
'cow     -ACC.SG'
```

1.3 Heads and line 0 brackets

Notice that the head of a foot created by a lexical accent bracket is adjacent to that bracket. For example, the left lexical bracket in *koróvu* (6b), repeated in (7b), is associated with a left-headed foot. Similarly, in *jágodu* 'berry.ACC.SG' (7a), the left bracket begins a foot headed on the left.

(7) Lexical line 0 brackets adjacent to the constituent head: accented stems

a. Initial accent

```
  x
 (x  x   x)
 já go d-u
'berry    -ACC.SG'
```

b. Second syllable accent

```
      x                 Line 1
  x (x   x)             Line 0
 ko ró v-u              Syllables
'cow     -ACC.SG'
```

This correlation between the orientation of the lexical accent bracket and of foot headedness is not a coincidence. Thus, it would be wrong to represent lexical accents by a left bracket if we were to posit right-headed line 0 feet, as in (8). This would give incorrect **jagodú* and **korovú*, respectively; we would fail to account for the fact that the vowels of *ja* and *ro* have underlying accents. If we were to represent the lexical accents of these vowels with right brackets, we would need to posit right-headed feet on line 0, as in (9).

(8) Left lexical line 0 brackets with right-headed feet

a. Initial accent

```
        x
 (x  x   x)
*ja go d-ú
'berry    -ACC.SG'
```

b. Second syllable accent

```
        x                 Line 1
  x (x   x)               Line 0
*ko ro v-ú                Syllables
'cow     -ACC.SG'
```

(9) Right lexical line 0 brackets with right-headed feet

a. Initial accent

```
  x       x
  x) x    x)
 já go d-u
'berry     -ACC.SG'
```

b. Second syllable accent

```
      x    x
   x  x)   x)
  ko ró v-u
'cow       -ACC.SG'
```

Line 1
Line 0
Syllables

Another way to put this is that the choice of a lexical left or right bracket and the choice of left- or right-headed feet are not independent choices.[1] A syllable with a lexical accent, represented by A in (10), by definition must be associated with a line 1 mark. Therefore, the only choices for lexical brackets and headedness are the two shown in (10): both left or both right.

(10) Line 0 heads adjacent to lexical accent brackets

a. Bracket and head left

```
    x
x (x  x
U  A  U
```

b. Bracket and head right

```
    x
x  x) x
U  A  U
```

Line 1
Line 0
Syllables

In classical SBG theory, however, no connection is made between bracket orientation and headedness, thereby over-generating the two impossible configurations in (11).

(11) Line 0 heads not adjacent to lexical accent brackets

a. Bracket left, head right

```
      x
x (x  x
U  A  U
```

b. Bracket right, head left

```
x
x  x) x
U  A  U
```

Line 1
Line 0
Syllables

The reason for not drawing this connection is that not all brackets require this kind of adjacency. For example, the right edge brackets in Russian have their heads on the left, most obviously as in (5b), but also in (6b) and (7). Edge brackets do not require their heads to be adjacent. Other types of brackets also do not require adjacency, as we will see in the next section.

1.4 Binary feet: iterative brackets

Many languages impose an upper bound (usually two) on the size of metrical feet. For example, Maranungku (Tryon 1970) has primary stress on the first syllable, and alternating secondary stresses thereafter. This pattern corresponds to grouping syllables into trochees from the left, to form binary left-headed feet.

In SBG theory, binary feet are formed by Iterative Constituent Construction (ICC; Halle and Idsardi 1995), given in (12):

(12) Iterative Constituent Construction (ICC)
Insert a {left/right} boundary for each pair of elements.

[1] Dresher (1994, 2016) considers this problem with respect to learnability.

In Maranungku, a right bracket is inserted after every two grid marks, scanning from the left. These feet are headed on the left. In addition, Maranungku has the same RRR edge marking as Russian, which accounts for the final right brackets in (13).[2]

(13) Maranungku: binary left-headed feet constructed from the left

a. Odd parity word

```
  x
 (x       x     x
  x    x) x  x) x)
 láng ka rà te tì
```

'prawn'

b. Even parity word

```
  x
 (x     x     x
  x  x) x  x) x   x)
 wé le pè ne màn ta
```

'kind of duck'

Line 2
Line 1
Line 0
Syllables

Line 1 marks are grouped into a left-headed constituent whose head is projected to line 2, yielding main stress on the initial syllable of each word. The relevant point here is that the heads of feet created by ICC are not adjacent to the ICC brackets.

2. Distinguishing types of brackets

To sum up, we have found that a lexical accent is associated with a parenthesis that requires an adjacent head. Other parentheses, created by ICC or by edge marking, do not require adjacency of their heads. Treating all these parentheses in the same way does not account for this distinction.

2.1 Brackets associated with lexical accents

Therefore, we propose to distinguish brackets associated with lexical accents from other brackets; we will designate them with the diacritic ^{L}:

(14) Condition on lexical parentheses
A lexical (^{L} or ^{L}) parenthesis must be adjacent to its head.

The metrical representations in (7) now appear as in (15); the fact that line 0 heads are adjacent to the lexical parentheses is no longer a coincidence, but follows from (14).[3]

(15) Lexical line 0 brackets adjacent to the constituent head: accented stems

a. Initial accent

```
  x
 (Lx  x   x)
 já go d-u
```

'berry -ACC.SG'

b. Second syllable accent

```
     x
  x (Lx   x)
 ko  ró v-u
```

'cow -ACC.SG'

Line 1
Line 0
Syllables

[2]In (13b), the edge bracket makes a final ICC bracket unnecessary (Halle and Idsardi 1995: 420).

[3]We are thus returning to the view expressed by Halle and Vergnaud (1987: 13–14) that accented elements must be the heads of their constituents. They proposed that lexical accents and heavy syllables in QS languages are first assigned a line 1 grid mark, ensuring that they will be heads. Halle and Idsardi (1995) do not allow this, as they require that all interaction between the lexicon and the grid occur on line 0, a part of the general requirement that each line of the grid be built by projection from the line immediately below.

2.2 Brackets associated with heavy syllables in quantity-sensitive languages

Lexical parentheses are required not just for lexical accent. In a quantity-sensitive (QS) language, heavy syllables (*h*) are distinguished from light syllables (*l*). In QS languages, heavy syllables have inherent prominence that requires them to be heads of feet. In SBG, heavy syllables, like lexical accents, project a bracket. We propose that, like lexical accents, heavy syllables project a lexical bracket (^{L} or ^{L}) which must be adjacent to its head.

For example, Halle and Idsardi (1995) describe Selkup stress (Kuznecova, Xelimskij, and Gruskina 1980; Halle and Clements 1983) as in (16); some examples are given in (17).

(16) Stress in Selkup
Stress goes on the rightmost long vowel, otherwise on the initial vowel.

(17) Selkup examples (syllables with long vowels are *h*, other syllables are *l*)

	Syllables	*Word*	*Gloss*
a.	*l l ĥ l*	i lɨ sɔ́: mɨt	'we lived'
b.	*h l ĥ l*	u: cɨk kɔ́: qɪ	'they two are working'
c.	*ĺ l l l*	qɔ́lʲ cɨm pa ti	'found'
d.	*ĺ l l*	ű̇ŋ ŋɨn tɨ	'wolverine'

In Halle and Idsardi's (1995) analysis, heavy syllables in Selkup project a left bracket on line 0; the heads of line 0 feet are on the left. In addition, Selkup has the edge marking LLL: a left edge bracket is placed at the left edge of the word. The rightmost line 1 element is projected to line 2. As in Russian, other line 1 marks are not phonetically realized as stresses. Examples are shown in (18).

(18) Selkup: sample words

a. With heavy syllables

```
        x
 x      x)
(x  x (x   x
 i lɨ sɔ́ː mɨt
```
'we lived'

b. With no heavy syllables

```
  x                    Line 2
  x)                   Line 1
 (x    x   x  x        Line 0
 qɔ́lʲ cɨm pa ti        Syllables
```
'found'

As with lexical accents, it is not a coincidence that heads are adjacent to the lexical brackets associated with heavy syllables. We would fail to account for the inherent prominence of heavy syllables if, for example, they were to project a right bracket on line 0 with the heads of line 0 feet on the left, as is evident in the examples in (19).

(19) Heavy syllables project line 0 right brackets with left-headed feet

a. One heavy syllable

```
 x
 x)
(x  x  x)  x
*í lɨ sɔː mɨt
```
'we lived'

b. Two heavy syllables

```
      x                  Line 2
  x   x)                 Line 1
 (x)  x   x)  x          Line 0
 *uː cɨ́k koː qɪ          Syllables
```
'they two are working'

In (19), we derive the incorrectly stressed **íliɜːmiɬ* and **uːcíkkoːqɪ*. More generally, these parameter settings would produce the unattested pattern: In words with at least one heavy (*h*) syllable, stress the first of a sequence of light (*l*) syllables that immediately precede the rightmost *h*; if no *l* syllables immediately precede it, stress the rightmost *h*. We conclude that brackets projected by heavy syllables are also lexical brackets, labeled (^{L} or ^{L}), and they must be adjacent to their heads.

3. Brackets that move: East Slavic

We have seen that Russian has accented stems, like *koróv-* 'cow', which are always stressed on the stem (6). Accented stems are represented with a left lexical bracket, (^{L}, to the left of the accented syllable. We have also seen that Russian has unaccented stems, like *golov-* 'head', where stress depends on the suffix (5). When the suffix is accented, as in the nominative singular, stress goes on the suffix; otherwise, as in the accusative singular, stress goes on the initial syllable of the stem.

Russian also has post-accenting stems, like *gospož-* 'lady', shown in (20). Post-accenting stems are represented with a left edge bracket to the right of the rightmost element of the stem. Post-accenting stems always cause the stress to appear on the suffix, regardless of whether the suffix has an accent.[4]

(20) Russian post-accenting stem

a. Accented suffix

```
          x
         (x
  x   x ((x)
 gos po ž-á
'lady      -NOM.SG'
```

b. Unaccented suffix

```
          x
         (x
  x   x ( x)
 gos po ž-ú
'lady      -ACC.SG'
```

Line 2 / Line 1 / Line 0 / Syllables

These three stem types—accented, unaccented, and post-accenting—which also occur in Ukrainian and Belarusian, are well accounted for by SBG theory, as demonstrated by Idsardi (1992). Their lexical metrical representations are summarized in (21).

(21) Three types of East Slavic nominal stems

a. Accented	b. Unaccented	c. Post-accenting	
x (^{L}x	x x	x x(	Line 0
ko rov-	go lov-	gos pož-	Syllables
'cow'	'head'	'lady'	

3.1 Shifting stems

However, there are also other stem types in these languages which require a different mechanism. Some noun paradigms, like Ukrainian *bab-* 'woman', put stress on the stem in the singular and on the suffix in the plural (22a). Others, like Ukrainian *novyn-* 'news', have stress on the suffix in the singular and on the stem in plural (22b). These stem types,

[4]In (20a) there are two adjacent ((parentheses, one due to the post-accenting stem, and the other due to the stressed suffix. In SBG, ((has the same effect as (.

which we call *shifting*, are found in all three East Slavic languages, but are most common in Ukrainian.[5]

(22) Ukrainian shifting stems

a.	NOM SG	NOM PL	b.	NOM SG	NOM PL
	báb-a	bab-ý		novyn-ý	novýn-y
	'woman'			'news'	

Osadcha (2019) argues that classical SBG theory does not account for these patterns. Thus, if we suppose that *bab-* 'woman' has a lexical accent, as in (23), then we can derive the singular forms, but fail in the plural, where the suffix must be stressed: *bab-ý*. Conversely, if we suppose that *bab-* is unaccented (24), then we fail to derive the nominative singular, *báb-a*, because the suffix is accented and would attract the stress. We also fail to derive the nominative plural *bab-ý*, since the suffix is unaccented, and we have seen that when there are no accents in a word, stress defaults to the left.

(23) Ukrainian *bab-* 'woman' as an accented stem

a. NOM SG	b. NOM PL	
x	x	Line 2
(x x	(x	Line 1
(x (x)	(x x)	Line 0
bá b-a	*bá b-y	Syllables

(24) Ukrainian *bab-* 'woman' as an unaccented stem

a. NOM SG	b. NOM PL	
x	x	Line 2
x (x	(x	Line 1
x (x)	x x)	Line 0
*ba b-á	*bá b-y	Syllables

Osadcha (2019) proposes that shifting stems are a distinct type that must be marked with a special type of lexical parenthesis, (^{S}, where the superscript ^{S} stands for 'shifting'. Shifting stems are subject to the Shifting Rule, given in (25):

(25) The Shifting Rule
In the plural, move a (^{S} parenthesis minimally to an adjacent morpheme: for example, (^{S}x x → x x(^{S} or x x(^{S} → x (^{S}x

An example of the application of the Shifting Rule is given in (26). In the singular of *báb-y* (26a), the shifting parenthesis remains in its place and *báb-y* acts like an accented stem. In the plural (26b), the Shifting Rule applies on Line 0: in order to move to an adjacent morpheme (the suffix), the shifting parenthesis moves one grid mark to the right. Now *bab-ý* acts like a post-accenting stem, and stress goes on the suffix. We are treating suffixes as unaccented; however, it doesn't matter whether they have an accent or not, since stress is controlled by the (^{S} parenthesis of the stem.

[5]See Osadcha (2019) for a synchronic and diachronic account of shifting stems in all three East Slavic languages.

(26) Ukrainian *bab-* ‘woman’ as a shifting stem

a. GEN SG

```
  x
 (x
(Sx   x)
 bá b-y
```

b. NOM PL

```
                x          Line 2
               (x          Line 1
(Sx   x)  →   x (Sx)       Line 0
 ba b-y       ba b-ý       Syllables
```

The stem *novyn-* ‘news’ acts like it is post-accenting in the singular (27a). In the plural (27b), the Shifting Rule applies on line 0: in order to move minimally off the suffix, the (^{S} parenthesis moves one grid mark to the left to give *novýn-y*.

(27) Ukrainian *novyn-* ‘news’ as a shifting stem

a. GEN SG

```
      x
     (x
 x  x (Sx)
no vy n-ý
```

b. NOM PL

```
                x          Line 2
               (x          Line 1
 x  x (Sx)  →  x (Sx   x)  Line 0
no vy n-y      no  vý n-y  Syllables
```

3.2 Shifting and the Ukrainian vocative case

Another puzzle resolved by allowing shifting brackets is the stress pattern of the Ukrainian vocative singular. In some paradigms the vocative singular causes the stress to shift one or more syllables to the left. Butska (2002: 13–14) claims that the vocative singular is either the same as the nominative singular or else patterns with the plural forms; however, this is not always the case. Steriade and Yanovich (2013) set the vocative singular aside as a peculiar exception.

Osadcha (2019) proposes that the vocative singular suffixes (*-u, -o, -e*) convert an adjacent left parenthesis into a special parenthesis marked (^{V}, which is subject to a special version of the Shifting Rule, given in (28):

(28) The Vocative Shifting Rule
Move a (^{V} parenthesis one grid mark to the left.

This rule elegantly accounts for the behaviour of the vocative singular in nominal paradigms. We have the following cases:

When the stem is accented, nothing happens (29); the left parenthesis is not adjacent to the vocative singular suffix, and we obtain NOM SG *koróv-a* ~ VOC SG *koróv-o*.

(29) The vocative singular in accented stems

a. NOM SG

```
      x
     (x   x
  x (Lx  (x)
 ko  ró v-a
‘cow      -NOM.SG’
```

b. VOC SG

```
      x                    Line 2
     (x                    Line 1
  x (Lx   x)               Line 0
 ko  ró v-u                Syllables
‘cow      -VOC.SG’
```

In an unaccented stem stress shifts all the way to the left (30); this is simply the default stress when there are no accents. Thus, we have NOM SG *holov-á* 'head' with an accented suffix, but VOC SG *hólov-o* with an unaccented suffix (cf. ACC SG *hólov-u*, also with an unaccented suffix).

(30) The vocative singular in unaccented stems

a. NOM SG

```
        x
       (x
  x  x  (x)
 ho lo v-á
'head   -NOM.SG'
```

b. VOC SG

```
  x                    Line 2
 (x                    Line 1
  x  x   x)            Line 0
hó lo v-o              Syllables
'head   -VOC.SG'
```

In a shifting stem that behaves as post-accenting in singular (31a), the vocative singular suffix relabels the (^{S} parenthesis to (^{V}, which causes stress to shift one syllable to the left (31b); hence, we obtain NOM SG *novyn-á* 'news' ~ VOC SG *novýn-o*. In these forms, the vocative singular patterns with the plural forms.

(31) The vocative singular in shifting stems with post-accenting singular

a. NOM SG

```
        x
       (x
  x  x ($x)
no vy n-á
'news   -NOM.SG'
```

b. VOC SG

```
                    x          Line 2
                   (x          Line 1
 x  x ($x) → x ($x   x)        Line 0
no vy n-o   no vý n-o          Syllables
'news   -VOC.SG'
```

Interestingly, post-accenting stems have the same pattern (32), even if they consistently have stress on the suffix in the rest of the paradigm: hence, we have NOM SG *koról'-Ø* 'king', GEN SG *korol'-á*, NOM PL *korol'-í*, but VOC SG *koról-u*. In these forms, the vocative singular patterns with neither the nominative singular (which has no overt suffix) nor the plural forms.

(32) The vocative singular in post-accenting stems

a. GEN SG

```
        x
       (x
  x  x  (x)
ko ro l'-á
'king   -GEN.SG'
```

b. VOC SG

```
                    x          Line 2
                   (x          Line 1
 x  x ($x) → x ($x   x)        Line 0
ko ro l-u   ko ró l-u          Syllables
'king   -VOC.SG'
```

4. Edge brackets that move: Spanish

There are also edge parentheses that move. Roca (2005) and Doner (2017) show that Spanish stems have a variety of edge brackets that are marked in the lexicon. For example, *almíbar* 'syrup', plural *almíbar-es*, has the edge marking RRR: assign a right bracket to

the right of the rightmost stem element (33); the edge of the stem is indicated with a square bracket].[6]

(33) Spanish stem with lexical edge marking RRR

a. SG	b. PL	
x x x)	x x x) x	Line 0
al mi bar]–Ø	al mi ba r]–es	Syllables
‘syrup -SG’	‘syrup -PL’	

Spanish has binary feet created by ICC: Starting at the right edge, insert a left bracket after every two adjacent x marks where no bracket intervenes. Line 0 constituents are left-headed, and the rightmost line 1 mark receives main stress. The result is stress on the penult in the singular (34a) and on the antepenult in the plural (34b): *almíbar ~ almíbar-es*.

(34) Adding iterative brackets and heads to (33)

a. SG	b. PL	
x	x	Line 2
x)	x)	Line 1
x (x x)	x (x x) x	Line 0
al mí bar]–Ø	al mí ba r]–es	Syllables
‘syrup -SG’	‘syrup -PL’	

Consider now *carácter ~ caractéres* ‘character’. In the singular (35a), this word is just like *almíbar*: It has a right bracket to the right of the rightmost line 0 element of the stem, and an ICC left bracket that creates a left-headed binary foot. The result is *carácter*.

(35) Metrical representation of *carácter* ‘character’

a. SG	b. PL	
x	x	Line 2
x)	x)	Line 1
x (x x)	x (x x) x	Line 0
ca rác ter]–Ø	*ca rác te r]–es	Syllables
‘character -SG’	‘character -PL’	

In the plural (35b), we obtain **carácteres*, the same stress pattern as *almíbares*, but this is not correct. We need *caractéres*, with the stress moving to the penult. Roca (2005) proposes that the difference in the two words is that in *almíbar*, the right edge bracket remains at the right edge of the stem; but in *carácter*, it goes at the right edge of the *word*. Therefore, when the plural suffix *–es* is added to *caracter*-, the bracket will go to its right.

[6]Other nominal edge parameters identified by Roca (2005: 358) are LLR (e.g., *avár-o* ‘miser’, *animal* ‘animal’), considered to be unmarked, and RLR (e.g., *ómicron* ‘omicron’, plural *omicrón-es*).

But how do we assign in the lexical entry of a stem a parenthesis that has to go at the end of a word that has not yet been formed?[7] We propose to use the same mechanism we use to account for shifting stems in East Slavic. Whereas *almibar-* has a regular edge bracket, *caracter-* receives a special bracket labelled ^{W}), where the superscript ^{W} represents 'word'.[8] The ^{W}) parenthesis is subject to the shifting rule in (36):

(36) The ^{W}) Shifting Rule
Move a ^{W}) parenthesis to the end of the word.

The singular of *caracter-* has a null suffix, so the movement of the edge parenthesis to the word boundary, indicated by #, has no effect, as shown in (37). ICC builds a left-headed foot, and the result is *carácter*.

(37) Movement of ^{W}) to the end of the word in the singular has no effect

a. Lexical representation

x x x ^{W})	Line 1
ca rac ter]–Ø#	Syllables
'character -SG'	

b. After movement of ^{W})

x	Line 2
x)	Line 1
x (x x ^{W})	Line 0
ca rác te r]–Ø#	Syllables
'character -SG'	

In the plural (38), the ^{W}) lexical edge parenthesis moves across the grid mark of the plural suffix. As a result, ICC starts from the end of the word and builds a left-headed foot that puts stress on the penult. The result is *caractér-es*.[9]

(38) Movement of ^{W}) to the end of the word in the plural

a. Lexical representation

x x x ^{W}) x	Line 1
ca rac ter]–es#	Syllables
'character -PL'	

b. After movement of ^{W})

x	Line 2
x x)	Line 1
(x x (x x ^{W})	Line 0
ca rac té r]–es #	Syllables
'character -PL'	

To sum up, shifting brackets, which are required to account for nominal paradigms in East Slavic, also provide a mechanism whereby Spanish stems can be assigned edge marking parameters that require edge marks to associate to the edge of a word.

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[7]This problem does not arise in East Slavic or the other languages with edge markings discussed above because edge marks are assigned there at the word level by a general rule. In Spanish, there are several different edge marking conventions, and they are associated with particular stems.

[8]Another example (Roca 2005: 358) is *régimen* ~ *regímen-es* 'diet, regimen, regime', which has edge marking RLR, like *ómicron*, but subject to the ^{W}) Shifting Rule. Doner (2017: 260) proposes that similar differences in edge marks can be found in Spanish verbs: for example, some verb paradigms take the edge marking RRR(Stem), where the bracket remains at the stem edge, whereas others take RRR(Word), which must associate to the word edge.

[9]The grammar predicts a secondary stress on the initial syllable, but our sources do not comment on this.

5. Conclusion

We have tried to show that SBG theory, augmented with distinguished lexical and mobile parentheses, is a unified theory that can account for the complex stress patterns of East Slavic and Romance. In particular, brackets that move can be thought of as metrical analogs of floating tones in autosegmental theory. They are both ways of allowing a piece of phonological structure to become detached from their lexical sponsor.

References

Butska, Luba. 2002. Faithful stress in paradigms: Nominal inflection in Ukrainian and Russian. Doctoral dissertation, Rutgers, The State University of New Jersey.

Doner, Julianne. 2017. Spanish stress and lexical accent across syntactic categories. *Probus* 29 (2): 233–285.

Dresher, B. Elan. 1994. Acquiring stress systems. In *Language computations (DIMACS Series in Discrete Mathematics and Theoretical Computer Science, v. 17)*, ed. Eric Sven Ristad, 71–92. Providence, RI: AMS.

Dresher, B. Elan. 2016. Covert representations, contrast, and the acquisition of lexical accent. In *Dimensions of phonological stress*, ed. Jeffrey Heinz, Rob Goedemans, and Harry van der Hulst, 231–262. Cambridge: Cambridge University Press.

Halle, Morris. 1997. On stress and accent in Indo-European. *Language* 73 (2): 275–313.

Halle, Morris, and G. N. Clements. 1983. *Problem book in phonology: A workbook for introductory courses in linguistics and in modern phonology*. Cambridge, MA: MIT Press.

Halle, Morris, and William J. Idsardi. 1995. General properties of stress and metrical structure. In *The handbook of phonological theory*, ed. John A. Goldsmith, 403–443. Cambridge, MA & Oxford: Blackwell.

Halle, Morris, and Jean-Roger Vergnaud. 1987. *An essay on stress*. Cambridge, MA: MIT Press.

Idsardi, William. 1992. The computation of prosody. Doctoral dissertation, Massachusetts Institute of Technology.

Kuznecova, Ariadna, Evgenij Xelimskij, and Elena Gruskina. 1980. *Ocherki po sel'kupskomu jazyku* [*Studies in Selkup*]. Moscow: MGU.

Osadcha, Iryna. 2019. Lexical stress in East Slavic: Variation in space and time. Doctoral dissertation, University of Toronto.

Roca, Iggy. 2005. Saturation of parameter settings in Spanish stress. *Phonology* 22 (3): 345–394.

Steriade, Donca, and Igor Yanovich. 2013. Accentual allomorphs in East Slavic: An argument for inflection dependence. In *Understanding allomorphy: Perspectives from Optimality Theory*, ed. Eulalia Bonet, Maria-Rosa Lloret, and Joan Mascaró, 254–314. Sheffield and Bristol, CT: Equinox.

Tryon, Darrell. 1970. *An introduction to Maranungku (Northern Australia)* (*Pacific linguistics. Series B ; no. 15*). Canberra: Linguistic Circle of Canberra Publications.