Predicting English Native Speakers' Intuition in Stress Placement by Using Metrical Grid Theory

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Ko, Yumi. 2012. Predicting English Native Speakers' Intuition in Stress Placement by Using Metrical Grid Theory. *SNU Working Papers in English Linguistics and Language X, XX-XX* This paper examines the hypothesis that metrical grid principles would expect correct stress placement realized by English native speakers' intuition. The two purposes of this paper are to review the metrical grid theory and to apply its principles to nonce words to see if the metrical grid theory correctly represents English native speakers' intuition in placing stress. Two English native speakers, one Canadian woman and one British man, participated in this experiment. Two lists of nonce words, nouns and verbs respectively, were given to them within the contexts with a direction to read aloud. Although there are some exceptions, most of words and stress are explained by the phonological principles. Therefore, it is concluded that English native speakers have inherent abilities to place stress, and metrical grids present how stress placement is produced. **(Seoul National University)**

Keywords: stress placement, grid theory, metrical grid, native speakers' intuition, nonce words

1. Introduction

The aim of this article is to review metrical grid principles and parameters and to compare the theoretical expectation of the metrical grid theory with the recorded result of English native speakers' stress placement by intuition.

1.1 Stress

The term *stress* refers to the perceived prominence of syllables. Prominence is typically realized by duration, intensity, fundamental frequency movement (often high pitch), spectral tilt (amount of energy

at higher frequencies) (Iggy Roca 1999, Wyn Johnson 1999). Generally, duration, intensity, and high pitch are observed in English stress, and high pitch is the strongest form of stress among them (Fry 1955, 1958). [1]Considering a stress minimal pair from English in (1) and (2), however, it is obvious that pitch is not the only cue for stress because stress realized by pitch is covered by questioning accents. In addition to questions, focusing words are fully stressed. The examples are given in (3).

(1)

'P e r m i t (noun)
'I n c r e a s e
'C o n t e s t
'C o n t r a s t

(verb) P e r 'm i t
I n 'c r e a s e
C o n 't e s t
C o n 't r a s t

(2) In questions:

P e r m i t ? (noun)

P e r m i t ? (verb)

[1] "..word-level stress is an abstract quality: a potential for being stressed. Word-level stress is the capacity of a syllable within a word to receive sentence-stress when the word is realized as part of the sentence. ..our knowledge of the structure of the language informs us which syllables have the potential of being stressed; we 'hear' the underlying phonological form" (Lehiste 1970)

(3)

(a) I TOLD you the permit (n.) has expired!

(b) I TOLD you they'd permit(v.) him to retire!

To sum up, stress is the prominence of syllable realized by various forms, or it may not be stressed in some environments such as questioning and focusing words although it has a potential for being stressed. Despite these characteristics of stress, word-level stress, the underlying phonological form, is only considered in this experiment. (Lehiste 1970)

1.2 Typological properties

According to Hayes, there are four typological properties of stress: 1. Culminativity, 2. Rhythmic distribution, 3. Demarcative property, and 4. Quantity-sensitivity. First, there is always a primary stress within any morphonological or syntactic constituents like stem, word, and phrase. [2]Although there are some exceptions like in function words, stress in them are also realized when they are pronounced alone. Second, when there is more than one stress placement, they tend to be stressed alternatively, typically in a binary fashion. Third, stress tends to mark edges of constituents like phrases and words. Finally, intrinsic

[2] This requirement typically exempts grammatical words, e.g. 'the' normally realized as stressless [ðə] because grammatical words are phonologically cliticized to neighboring content words [ðə ˈbʊk]. However, if it is pronounced alone, it receives stress [ˈðə].

prominence in heavy syllables as in long vowels and diphthongs tends to attract stress. (Hayes 1983, 1995: 3.1)

1.3 Metrical grid

Metrical grid theory is one of the methods which explain stress placement using metrical grids of asterisks. There are several properties of the metrical grids. Initially, it shows relevant prominence as in (4). As shown below, asterisks for the base line are put on vowels which form syllable heads, and the additional asterisks are stacked in the next step in the stress line, showing prominence. Further details of how to put the asterisks will be mentioned again in the following method section. The main point here is that words' relevant prominence is easily observed within the metrical grid structures.

(4)

*	*	Stress line (word-level prominence)
* *	* *	Base line (syllable heads, sonority peak)
(to) implant	(an) implant	

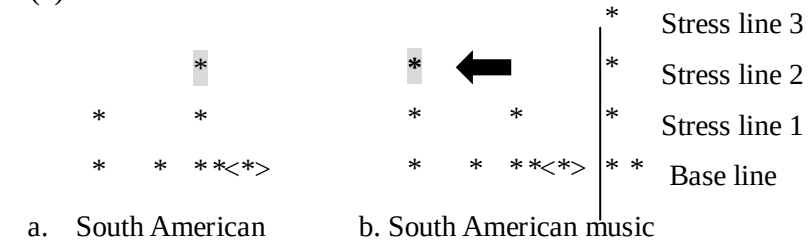
Stress retraction under clash occurs by rhythm rule as shown in (5).

(5) Rhythm Rule:

For example, rhythm rule is observed in 'South American' and 'South American Music.' In the figure (6b), it is observed that the asterisk on 'e' in 'American' is moved to on 'ou' in 'South' by the

rhythm rule. However, [3]rightward movement is blocked in English, which is a language specific property. Also, the asterisk column doesn't allow empty space between asterisks, which is called 'Continuous column constrain' as seen in the following figure (7) and (8) – (7) is acceptable, but (8) is blocked according to the right direction of the movement and 'continuous column constrain.'

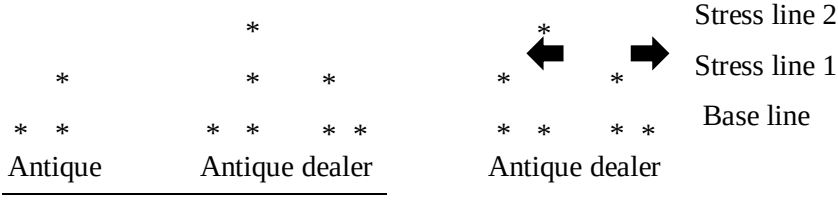
(6)



a. South American b. South American music

(7)

(8)



[3] In German, both directions are possible.

The above figures reveal two important facts. One is that rhythm rule is applied within word, and the other is two conditions that retraction doesn't occur: 1. Leftward movement only, 2. Continuous column constraint. That is, 'a' in 'antique dealer' doesn't attract the asterisk in stress line1 by rhythm rule because if it takes an asterisk from 'i' in 'antique,' it breaks the continuous column constraint. Also, the asterisk on 'ea' in dealer can't move rightwards as well. Therefore, the rhythm rule is not applied to 'antique dealer (compound)' in (8) while 'antique chair (noun phrase)' follows rhythm rule.

1.4 English parameters of stress

"Three-syllable window" means that stress in many languages falls on one of the last three syllables-ultimate (final), penultimate (second to the last), and antepenultimate (third to the last). English is also under this tendency. Among the three patterns, English prefers penultimate the most and ultimate the least.

To structure metrical grids, metrical parameters are needed. For the case of English, foot head location is left, and construction direction is right to left. For extrametricality, right-most element extrametricality is for noun, and it is not applied to verbs. Detailed steps will be provided in the following method section.

2. Methods

To show how to expect stress placement by using metrical grid structures, its stages will be explained majorly with English parameters. The stages are restricted to the primary stress.

End stress is projecting the right-most/ left-most asterisk, and extrametricality is making the right-most/ left-most asterisk extrametrical (Iggy Roca, 1999). According to "The elsewhere

condition," the more specific rules are applied in order. By "The elsewhere condition," extrametricality is applied before end stress because extrametricality is realized only in specific environments like in nouns and compounds. Footing is necessary to explain antepenultimate stress in nouns. There are two types: 1. Trochee (left-headed), 2. Iamb (right-headed). Accenting exists for heavy syllables. Since English is a quantity-sensitive language, heavy syllables are accented. However, there are some exceptions. Word-final consonants (CVC) are considered lite although they are heavy by definition. Also, extrametricality is blocked in nouns when word-final vowels are long or complex in English.

Two examples will be provided for a noun and a vowel respectively. First, the grid baseline is constructed in (9) by projecting syllable heads. Then, the right-most asterisk is made extramtrical in (10). In (11), footing is done from right to left, and left-headed foot is constructed on the stress line1. Finally, end stress is put on the right most foot head.

(9)

* * * * Base line

Asparagus (n.)

(10)

* * *<*> Base line

Asparagus (n.)

(11)

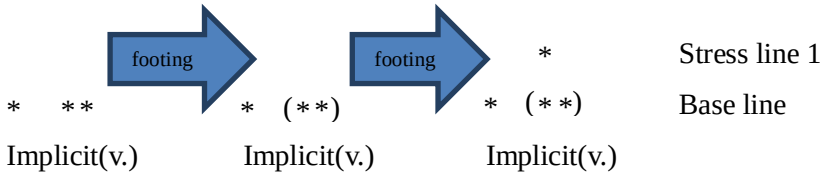
* Stress line 1

* (* *)<*> Base line

Asparagus (n.)

A verb example follows the same process with the above noun example except for the step of extrametricality as in (12).

(12)



3. Data Collection

20 words are classified according to metrical grid forms. They are all foreign or nonce words, which the subjects, English native speakers, are not familiar with. They are asked what second languages they have learned and if they know any of the listed words in the provided sheet. The subjects answered they didn't know any of the words in the list. In order to give the subjects information of part of speech, the word lists are provided within sentences as in (13).

(13) I like a/an _____
1. nisan
2. praco
3. sonbahar

I _____ (it/ you)
1. dejar
2. sonar
3. apelar

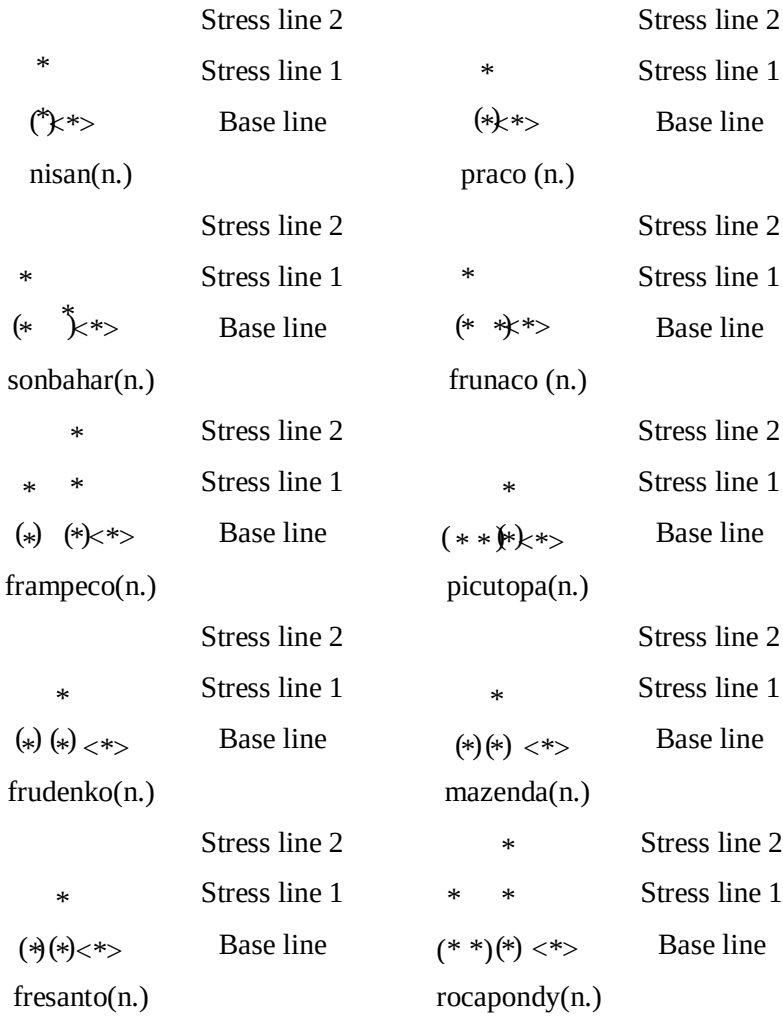
According to metrical grid principles, English words can be divided into three groups: antepenultimate, penultimate, and ultimate. The following table (14) shows the stress pattern of English nouns and verbs. Length of the words ranges from two to four syllables. Also, (15) and

(16) present metrical grids of nouns and verbs respectively.

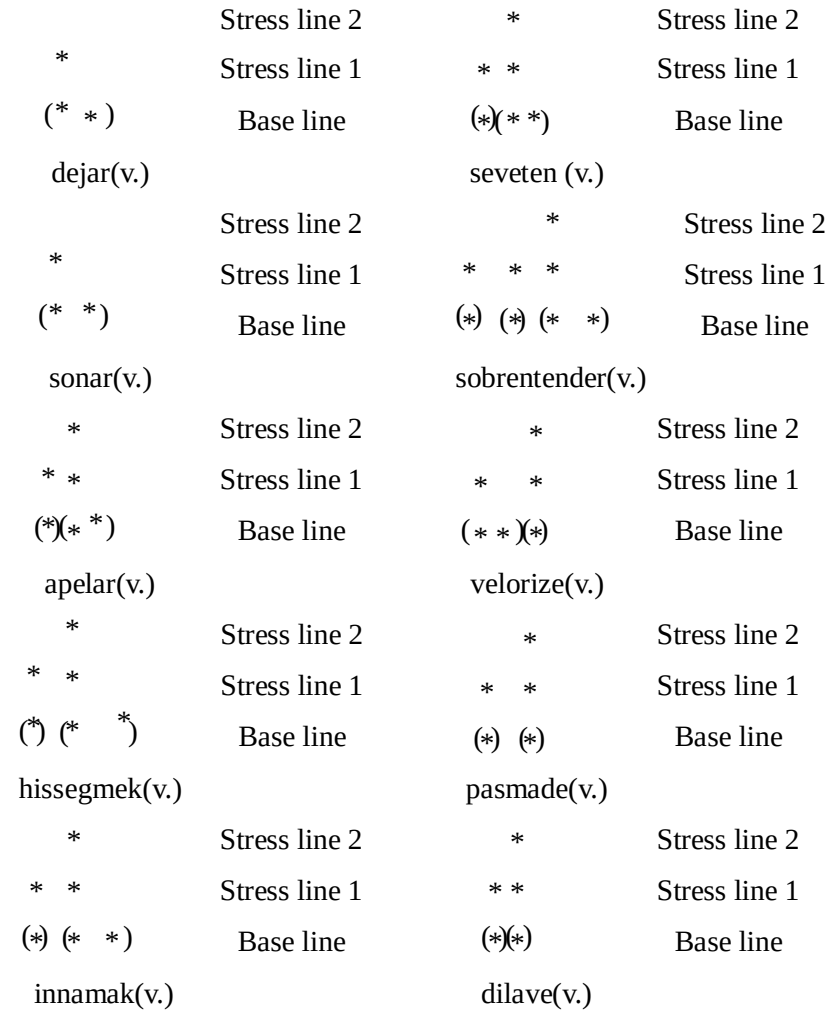
(14)

		Stress		
		Antepenultimate	Penultimate	Ultimate
Nouns	Penultimate: light	O		
	Penultimate: heavy		O	
Verbs	Final: light		O	
	Final: heavy			O
		Stress		
		Antepenultimate	Penultimate	Ultimate
Nouns	Penultimate: light	Son.ba.har Fram.pe.co Fru.na.co	Ni.san Pra.co	
	Penultimate: heavy		Fru.den.ko Fre.san.to Pi.cu.to:.pa Ma.zen.da Ro.ca.pon.dy	
Verbs	Final: light		De.jar So.nar A.pe.lar Hi.sseg.mek I.nna.mak Se.ve:.ten So.bren.ten.der	
	Final: heavy			Ve.lo.rize Pas.made Di.lave

(15)


Stress line 2
Stress line 1
Base line
nisan(n.)
praco (n.)
sonbahar(n.)
frunaco (n.)
frampeco(n.)
picutopa(n.)
frudenko(n.)
mazenda(n.)
fresanto(n.)
rocapondy(n.)

(16)


Stress line 2
Stress line 1
Base line
dejar(v.)
Stress line 2
Stress line 1
Base line
seveten (v.)
Stress line 2
Stress line 1
Base line
sonar(v.)
Stress line 2
Stress line 1
Base line
sobrentender(v.)
Stress line 2
Stress line 1
Base line
apelar(v.)
Stress line 2
Stress line 1
Base line
velorize(v.)
Stress line 2
Stress line 1
Base line
hissegmek(v.)
Stress line 2
Stress line 1
Base line
pasmade(v.)
Stress line 2
Stress line 1
Base line
innamak(v.)
Stress line 2
Stress line 1
Base line
dilave(v.)

4. Results

Two native speakers participated in this test. Both of them answered they were not familiar with the words in the list. One is a Canadian woman, who has learned French, German, Latin, Old English, and Korean, and the other is an English man, who has learned Korean.

Recording and interviewing were done through internet. The subjects were provided with a questionnaire for preparatory research and a word list for recording. They filled in the questionnaire and answered to my questions and also sent me back their voice recording through internet.

Metrical grid principles mostly predicted correct stress placement. However, some exceptions were found although most of them were explained by vowel reduction and long vowels. Especially, the Canadian woman tended to reduce vowels in pronouncing verbs, so her stress was different from expected results as shown in (17).

From the above, it is apparent that English natives have inherent intuition in stress, which was proved by the general tendency of stress placement. In other words, the participants in this study presented a common tendency of stressing; although there was some discordance of stressing between the two participants, it is considered that the differences were caused by other phonological facts rather than only stress issues. Moreover, this analysis offered evidence that metrical gird principles explain English native speakers' stress placement correctly.

(17)

*	Stress line 2		Stress line 2
* *	Stress line 1	*	Stress line 1
(*)(* *)	Base line	(* *)	Base line
apelar(v.)		[ə.plər](v.)	

*	Stress line 2		Stress line 2
* *	Stress line 1	*	Stress line 1
(*) (* *)	Base line	(* *)	Base line
hissegmek(v.)		[hɪs.gmæk](v.)	

*	Stress line 2		Stress line 2
* *	Stress line 1	*	Stress line 1
(*) (* *)	Base line	(* *)	Base line
seveten (v.)		[sev.tæn] (v.)	

5. Conclusion

The present study was motivated by the fact that stress placement is expectable by metrical grid theory. According to the theory, English words' stress placement is explained by rules, so even it is possible to guess other foreign language word stress placement, which we haven't seen before, if their parameters are given. Thus, it was hypothesized that English native speakers would expect accordant stress placement on nonce words with their intuition according to the metrical theory as the theory explain their stress placement on English words, and the result was positive. At first, it seemed that the two participants put stress on different syllables, but they followed the same rules of metrical grid theory if vowel reduction was considered from the Canadian participant's recording.

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