

Focus and Intonation

Sun-Ah Jun
UCLA
(jun@humnet.ucla.edu)

1. Introduction

- It is well known that focus has a prosodic reflection in most languages. The most common prosodic features are: a focused word is realized with expanded pitch range, longer duration, and stronger amplitude, while post-focus words are realized with reduced pitch range and duration and weaker amplitude.
- However, languages differ how these prosodic features are linked to their intonational phonology.
 - Head-prominence languages (e.g., English, German, Dutch) mark focus through pitch accent realized on the stressed syllable of a word.
 - Edge-prominence languages (e.g., Korean, Japanese, Bengali) marks focus through prosodic phrasing realized on the edges of a phrase by intonation.
- Prosodic differences between languages influence how different types of focus (e.g., broad focus, narrow focus, contrastive focus, corrective focus) are realized and how the domain of focus (a word or a phrase) is marked.

2. Goals

- Compare the prosodic system of English and Korean
- Show how different types of focus and the domain of focus are phonetically marked depending on their prosodic system.
- Evaluate recent proposals on the focus theory based on phonetic data.

3. Prosodic System of English and Korean

3.1 English (Pierrehumbert 1980; Beckman and Pierrehumbert 1986)

- lexical prosody – one syllable of a word is lexically specified and is realized as prominent (longer, louder, and higher/lower in pitch relative to the adjacent syllables, and stronger articulation).
- when a word receives phrasal stress, the stressed syllable receives Pitch Accent (i.e., prominent due to pitch). There are *five* types of pitch accents: H*, L*, L+H*, L*+H, H+!H*.
- Intonation and prosodic structure – two prosodic units above Word: Intonation Phrase (IP) and Intermediate Phrase (ip). Each unit is marked by a boundary tone (T- and T%, respectively; T=Low or High). One *ip* should have at least one Pitch Accent and the last Pitch accent within an *ip* is called Nuclear Pitch Accent (NPA). NPA is the most prominent accent of a phrase (similar to sentence stress).

- Default prosody: each word tends to form one AP. But a verb and the preceding word form one AP if they are semantically related or predictable and the phrase as a whole is not longer than seven syllables (Jun 1993, 2003).

4. Phonetic realization of focus

4.1 Types of focus

a. corrective focus: “*not A but B*” style. This is the most common type of focus examined phonetically.

Ex. A: John bought a novel. B: No, he bought a dictionary.

b. contrastive focus: context provides contrast.

Ex1. I thought Mary would buy a motorcycle but she bought a bicycle.

Ex2. All the students admired and some even venerated the master. (Selkirk 2002)

c. wh/answer focus: answer to wh-question.

Ex. Who bought a bicycle? Mary bought a bicycle.

English:

Pierrehumbert (1980), Beckman and Pierrehumbert (1986): L+H* pitch accent on the focused word in declaratives, and L* in interrogatives. Also, post-focus words are deaccented (= no pitch accent), resulting in a low plateau in declarative and a high plateau in interrogative after the focused words. No mention of focus type but close to contrastive/corrective focus.

ex. Legumes are a **good** source of vitamins, but not the best

L+H* L- H%

Legumes are a good source of vitamins, but not

L+H* L- H%

Are **legumes** a good source of vitamins?

L* H- H%

Are legumes a **good** source of vitamins?’

L* H- H%

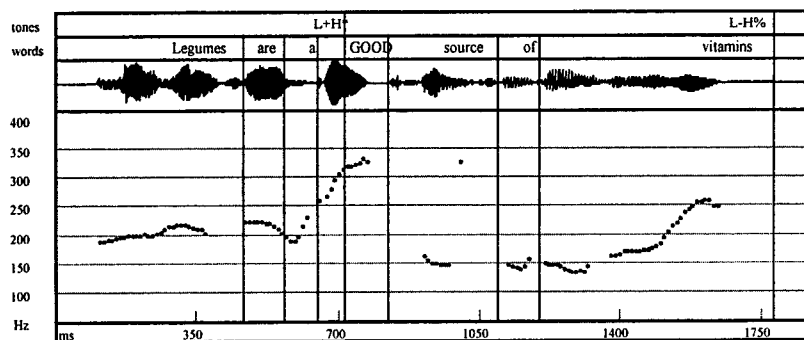


Figure 1. Focus on ‘good’ (declarative)

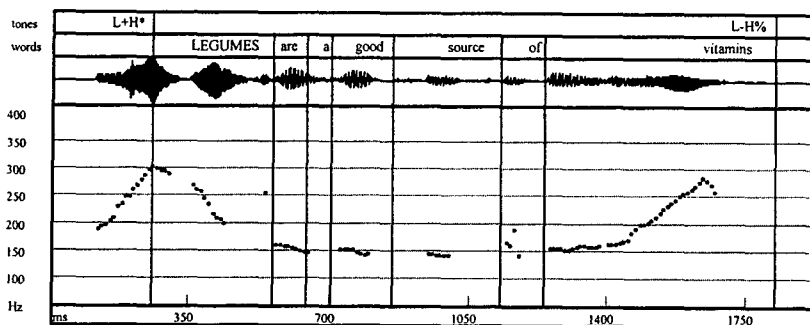


Figure 2. Focus on 'legumes' (declarative)

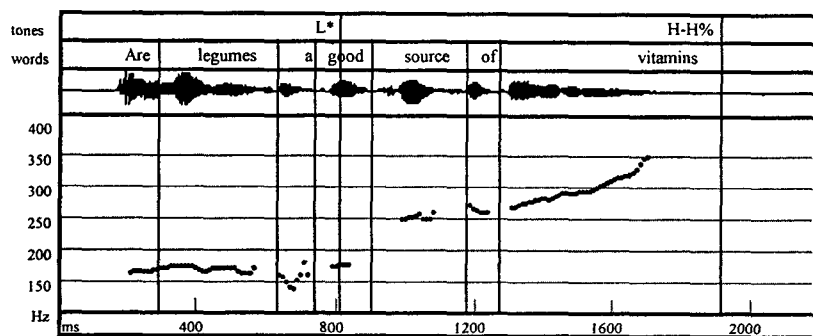


Figure 3. Focus on 'good' (interrogative)

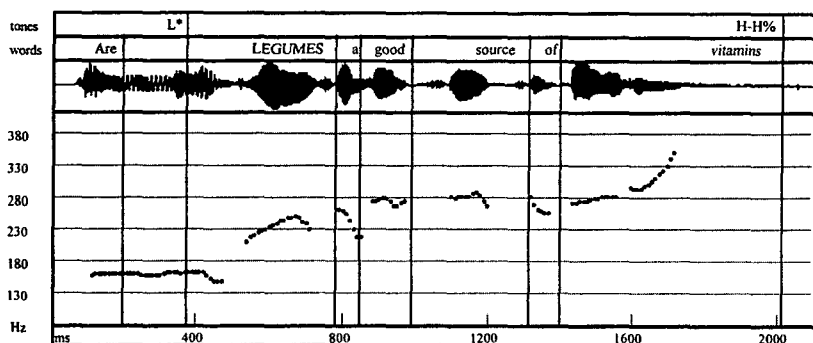


Figure 4. Focus on 'legumes' (interrogative)

Selkirk (2002) shows that the type of pitch accent and phrasing differ between contrastive focus and presentational focus.

Ex. All the students admired and some even enerated the master (contrastive focus)
 They enerated the idols, as if they were the gods themselves (presentation focus)

Focus type	pitch accent type			ip break after focus word
	L+H*	H*	!H*	
Contrastive	76%	9%	8%	99%
Presentational	73%	27%	0	13%

She suggests that “the contrastive/presentational contrast is present in the interface informational/syntactic structure itself, and makes itself felt in the phonological representation through the action of syntax-phonology interface constraints which distinguish the two Focus type”.

Bartels and Kingston (1994, 8): provide at best weak support for a categorical contrast between L+H* and H* pitch accent [...] [P]itch height was by far the most categorical property. They found considerable heterogeneity in the use of cues.

Lofstedt (2006): corrective vs. answer-to-whQ focus

No difference in duration, some difference in pitch

Gfreorer (2006): contrastive vs. corrective vs. answer-to-whQ focus

Korean

Corrective/contrastive focus:

Jun and Lee (1998) and Oh (2001) found longer duration of focused word (especially the word-initial syllable) than neutral. Post-focus words were often dephrased but not always, but pitch range was always reduced after focus. Duration was reduced in post-focus and pre-focus strings, but more reduction in the post-focus string and more reduction in a longer string. Oh (2001) claims that the reduction in duration is due to dephrasing)

Answer to wh-Q:

Oh et al. (2004) found a) a tendency to dephrase after the focused word (more dephrasing as the post-focus string is shorter), b) a tendency to insert an IP break on the left of the focused word (38%), and c) a tendency to use a LHHa tone pattern under focus (but LLHa.in neutral condition).

Cf. Jun, E. (1991; cited in Oh 2001) found no effect of f0 and amplitude, but found a longer duration before focus but not after. What type of focus?

Corrective vs. Answer to wh-Q vs. neutral

Kang (1997) found that f0 peak (AP-initial H tone) is higher in both focus conditions than the neutral condition, and between the focus conditions, f0 was significantly higher in Corrective focus than Answer-to-wh-Q focus. AP-initial L tone was not different in all three conditions.

4.2 Domain of focus

Neutral: John bought a book.

- a. Narrow focus on Obj: answer to “What did John buy?” => John bought [a book].
- b. Narrow focus on Subj: answer to “Who bought a book?” => [John] bought a book.
- c. VP-focus: answer to “What did John do?” => John [bought a book]
- d. All new: answer to “What happened?” => [John bought a book]

Are these realized the same phonetically?

=> a, c, d are claimed to be realized the same: John bought a BOOK.

Experiment on English data: in progress (Lofstedt 2006, Gfreorer 2006)

Experiment on Korean data:

Kim et al. (2006) and Jun et al. (in press): compared VP focus with a neutral condition and found that all words in the VP focus condition were more prominent than those in the neutral condition. Furthermore, unlike English, the VP-initial word was the most prominent.

The prominence relation among the items in a VP would differ from other types of focus where the VP-initial argument is focused. (1) shows the prominence relation in a grid representation. A main difference between these two types of focus is whether YP, the second item in a VP, is prominent or not. The verb (V) in a VP-focus condition may not form its own phrase, i.e., (x), if the verb forms one Accentual phrase with the preceding word in the neutral or default condition (cf. *intergrated* as in Gussenhoven 1983, Truckenbrodt 1995, Büring 2003, and references therein). In the VP-focus condition, the prominence relations among the items in the neutral condition are preserved.

(1)	a. <i>VP focus</i>	b. <i>corrective/contrastive focus on [XP]</i>
	x	x
	x x (x)	x
	x x x (x)	x x (x) (x)
	SUBJ [XP YP V]	SUBJ [XP] YP V

Cf. Second occurrence focus (2OF)

When a focused word (usually associated with a focus-sensitive particle such as *only* and *even*) occurs second time (thus the name 2OF), it is realized differently from the first-occurrence focus or free focus.

Ex. Everyone already knew that Mary **only** eats **VEGETABLE**.

If even **PAUL** knew that Mary **only** eats **vegetables**, then he should have suggested a different restaurant.

(from Hajicova 1984, Partee 1991, 1999)

- 2OF does not get pitch accent. But it does show difference in duration (Beaver et al. 2004).

Cf. Jaeger (2004) – they do get pitch accent if they form a prosodic phrase of their own.

- But, 2OF is marked phonetically by both duration and pitch if it occurs before free focus -- Rooth 1996, Beaver et al. 2004, Fery and Ishihara (to appear)

Do free focus and 2OF need to be encoded in the representation? Why is 2OF realized differently from the second focus in a double foci sentence? Is it because it's Given?

- But given item can still get focus

ex. John is having a party. But only **JOHN_F** knows when and where. (Büring 2006)

Proposal in Büring (2006): The Domain Theory of Primacy

Among two foci in a sentence, the primary focus is the focus whose domain contains the domain of the other". (p.8)

Ex. A: Our graduate students only quote the faculty.

B: No, the FACulty only quote the faculty.

=> [the FACULTY_{F1} [only₂ quote the faculty_{F2}]]~₁CC (CC=context connect)

"There is no theoretical distinction between IOF and 2OF, or any other two types of foci such as Given and non-Given foci. Every focus comes with a domain and that is all we need" (p.5-6).

5. Focus Theories

5.1 Syntax: Selkirk (1984, 1995), Rochemont (1986, 1998)

Focus Projection

(a) F-marking of the *head* of a phrase licenses the F-marking of the phrase

(b) F-marking of an *internal argument* of a head licenses the F-marking of the head.

(2) Mary bought a book about BATS.

(2) can be the answer to either the PP focus question *Where did Mary put the book?* or the VP-focus question *What did Mary do with the book?*

5.2 Argument structure: Vallduvi and Engdahl (1996) and Engdahl and Vallduvi (1996) : focus projection is accounted for by the interaction between argument types and grammatical functions rather than syntactic constituency.

Chung et al. (to appear): For the case when a verb takes two internal arguments such as 'to give', only a theme or a non-oblique, argument can project focus to its head, VP, in Korean. This is different from English where any internal argument can project its focus to the VP if the focused item is the peripheral (rightmost) one.

Data from Kim et al. (2006) and Jun et al. (to appear) show that the VP-initial argument is the most prominent (see above in section 4.2).

5.3 Prominence theory: Truckenbrodt (1995), Büring (2003, 2006), Selkirk (to appear) Büring (2003, 2006)

- Stress, rather than accent, is the basic realization of focus (also in Truckenbrodt '95)
- foci with a non-maximal domain are banned from bearing sentence-level stress

- Focus Prominence (If P is the domain of a focus sensitive operator O, the most prominent element in P is a focus of O)

- IP-Head-Right (The head of the intonational phrase is rightmost stress (at the next lower level) within Intonation Phrase). (also in Truckenbrodt 1995)

2OF shows that Focus Prominence is a stronger constraint than IP-Head-Right.

Selkirk (to appear): contrastive focus (FOCUS)-marking of constituents is directly related – by syntax-phonology interface constraint – only to **metrical prominence** in phonological representation.

Prosodic Nuclear Stress Rule (Intonational Phrase): Align R (Δ IP, IP)

Align the metrical head (main stress) of Intonation Phrase, notated Δ IP, with the right edge of Intonation Phrase.

FOCUS-dominates- Δ IP: The terminal element of a contrastive FOCUS constituent corresponds to string containing the metrical prominence of an Intonational Phrase (Δ IP).

Focus Prominence applies to Korean data, but IP-Head-Right or Align R (Δ IP, IP) does not. In Korean, the most prominent item within a prosodic unit is the *leftmost* one.

6. Conclusion

More phonetic data need to be examined to determine how focus is realized depending on the type and the domain of focus and to build a general theory of focus.

Focus projection principles proposed by Selkirk and other researchers to explain data in English and other Germanic languages may not apply similarly to languages whose prosodic system is not built on the stress-based pitch accent. The Korean data support Büring's (2003) proposal that focus projection rules can be dispensed with. As proposed in Büring (2003), focus projection rules can be replaced by the combination of focus prominence and default prosody (i.e., default accent patterns in English or default phrasing in Korean). It is expected that languages behave differently depending on whether they are head-prominence languages (e.g., English, German) or edge-prominence languages (e.g., Japanese, Bengali) (Hayes and Lahiri 1990, see Jun 2005 for the typology of prominence system). Further research is needed to find out how focus prominence interacts with language-specific default prosody and how the domain of focus interacts with the prosodic system of a language.

References

- Bartels, C. and J. Kingston (1994). "Salient pitch cues in the perception of contrastive focus", in P. Bosch and R. van der Sandt (eds.) *Focus and natural language processing*. IBM working papers on logic and linguistics V. 6, Heidelberg, 1-10.
- Beaver, D., B. Clark, E. Flemming, F. Jaeger, and M. Wolters (2004). "When semantics meets phonetics: Acoustical studies of second occurrence focus". Ms. Stanford University.

- Beckman, M.; Pierrehumbert, J. (1986). "Intonational structure in Japanese and English," *Phonology Yearbook* 3, 255-309.
- Büring, D. (2003). "Focus projection and default prominence," in Proceedings from the Symposium *Informationsstruktur --- Kontrastivt*. Lund, Sweden.
- Büring, D. (2006). "Been there, Marked That – A Tentative Theory of Second Occurrence Focus". Ms. UCLA.
- Chung, C., J.-B. Kim, and P. Sells. (To appear). "On the role of argument structure in focus projections". *Chicago Linguistics Society* 39.
- Engdahl, E. and E. Vallduvi. (1996). "Information packaging in HPSG". C. Grover and E. Vallduvi, eds., *Studies in HPSG: Edinburgh working papers in cognitive science*, 1–31.
- Fery, C. and S. Ishihara (to appear). "Interpreting Second Occurrence Focus", in D. Lenertova et al. (eds.) *Methods in Empirical Prosody Research*. Berlin. Mouton DeGruyter.
- Gussenhoven, C. (1983). "Focus, Mode, and the Nucleus," *Journal of Linguistics* 19: 377-417.
- Hajicova, E. (1984). "Presupposition and allegation revisited", *Journal of Pragmatics* 8: 155-167.
- Hayes, B. and A. Lahiri. (1990). "Bengali intonational phonology". *Natural Language and Linguistic Theory* 9: 46–99.
- Jaeger, T. F. (2004). "Only always associates audibly. Even if only is repeated. The prosodic properties of second occurrence focus in English". Ms. Stanford Univ.
- Jun, S.-A. (1993). *The phonetics and phonology of Korean prosody*. Ph.D. dissertation, Ohio State University.
- Jun, S.-A. (1998). "The Accentual Phrase in the Korean prosodic hierarchy," *Phonology* 15(2): 189–226
- Jun, S.-A. (2000). K-ToBI labeling conventions (version 3). *Speech Sciences* 7: 143–69.
- Jun, S.-A. (2003). "The effect of phrase length and speech rate on prosodic phrasing," *Proceedings of the International Congress of Phonetic Sciences*, Barcelona, Spain.
- Jun, S.-A. (2005). "Prosodic Typology," in S.-A. Jun, ed., *Prosodic typology: Phonology of intonation and tone*. 410–58. New York: Oxford University Press.
- Jun, S.-A., H.-S. Kim, H.-J. Lee, and J.-B. Kim (in press)
- Kang, Y. (1997). "Phonetic correlates of focus in Seoul Korean: F0". Ms. MIT.
- Kim, H.-S., S.-A. Jun, H.-J. Lee, and J.-B. Kim (2006). "Argument Structure and Focus Projection in Korean," in *Proceedings of Speech Prosody 2006*, Dresden, Germany.
- Oh, M. (2001). "Focus and prosodic structure," *Speech Sciences* 8 (1): 21–32.
- Oh, M., S. Kang, and K. Kim (2004). Intonational characteristics of Korean focus realization by American learners of Korean. *Speech Sciences* 11(1): 131–45.
- Partee, B. (1991). "Topics, focus and quantification" in Moor, S. and A. Wyner (eds.) *Proceedings of SALT* 1, 159-187. no. 10 in Cornell Working Papers in Linguistics.
- Partee, B. (1999). "Focus, quantification, and semantics-pragmatics issues", P. Bosch and R. Sandt (eds.) in *Focus – Linguistic, Cognitive, and Computational Perspectives*. Cambridge University Press. 213-232.
- Rochemont, M. S. (1986). *Focus in generative grammar*. Philadelphia: John Benjamins.
- Rochemont, M. (1998). "Phonological focus and structural focus," in P. Culicover and L. McNally, eds., *The limits of syntax*, 337–64. New York: Academic Press.

- Rooth, M. (1996). "On the interface principles for intonational focus," in *Proceedings of Semantics and Linguistic Theory (SALT) VI*, edited by T. Galloway and J. Spence, 202-226. Ithaca, NY: Cornell University.
- Selkirk, E. (1984). *Phonology and syntax: The Relation between sound and structure*. Cambridge, Mass.: MIT Press.
- Selkirk, E. (1995). "Sentence prosody: Intonation, stress, and phrasing," in J. Goldsmith, ed., *The Handbook of Phonological Theory*. 550–69, Cambridge: Blackwell.
- Selkirk, E. (2002). "Contrastive FOCUS vs. presentational focus: Prosodic evidence from right node raising in English". *Speech Prosody 2002*.
- Selkirk, E. (to appear). "Contrastive focus, metrical prominence, and prosodic phrasing: The case of English", in *Tones and Tunes: Studies in Word and Sentence Prosody*, eds. by C. Gussenhoven and T. Riad. Berlin: Mouton de Gruyter.
- Truckenbrodt, H. (1995). *Phonological Phrases: Their relation to syntax, focus, and prominence*. Ph.D. MIT. Published in 1999 by MITWPL.
- Vallduvi, E. and E. Engdahl. (1996). "The linguistic realization of information packaging". *Linguistics* 34: 459–519.