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Prosody and semantics of the focus particles always and only in Korean: Theoretical implications from a perception experiment

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Abstract
This study sheds light on the relationship between the prosodic features and semantic functions of the Korean focus particles (FPs) *hangsang* 'always' and *ocik* 'only'. Based on a production experiment, Nambu and Lee (forthcoming) argue that different phonetic realizations of *hangsang* and *ocik* reflect their semantic distinction, supporting Beaver and Clark's (2008) Quasi/Free/Conventional Theory. We conducted a perception experiment to examine the extent to which listeners are conscious of prosodic cues related to *hangsang* and *ocik* with different environments. Following the production experiment, the results of the experiments show that *ocik* has rigid prosodic behavior as conventional association, in contrast to *hangsang*, whose prosodic behavior, which reflects free association, depends on contextual conditions, supporting Beaver and Clark's (2003, 2008) claim

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Prosody and semantics of the focus particles *always* and *only* in Korean: Theoretical implications from a perception experiment

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1 Introduction

This study addresses the relationship between prosodic features and semantic functions of focus particles (henceforth, FPs). Well-known as focus-sensitive operators, FPs such as *only* are sensitive to the placement of focus as in (1).

(1) a. Jan only gave Bill [money]$_{FOC}$.
(Everything Jan gave Bill was money.)
b. Jan only gave [Bill]$_{FOC}$ money.
(Everyone Jan gave money was Bill.) (Beaver et al. 2007)

In (1), focused elements accompanied by prosodic salience are marked by a subscripted [FOC]. We can interpret the sentence differently depending on which element is focused. Thus, (1) indicates that the prosodic marking by focus affects truth-conditional meaning, interacting with the FP *only*. In this sense, FPs associate with focus (cf. Jackendoff 1972, Rooth 1985). Previous studies have debated as to whether the way focus sensitive expressions associate with focused elements should be explained by pragmatics or semantics (e.g., Lambrecht 1994, Roberts 1996, Rooth 1992, 1996, von Fintel 1994). Beaver and Clark (2003, 2008) investigated properties of the FPs *always* and *only*, in terms of how they associate with focus. Even though *always* and *only* are similar in meaning, Beaver and Clark claim that English *always* and *only* and their equivalents in other languages such as German differ in their ways of associating with focus. To account for the different behaviors of the FPs, they proposed the Quasi/Free/Conventional (QFC) theory, a hybrid theory of semantics and pragmatics. In order to provide additional support for the cross-linguistic observations of Beaver and Clark, Nambu and Lee (forthcoming) explored properties of the Korean FPs *hangsang* 'always' and *ocik* 'only'. They conducted a production experiment and examined the phonetic realizations of *hangsang* and *ocik*, because focus is closely tied to prosodic salience (cf. Selkirk 1996, Kadmon 2001). The results show that the prosodic realizations of *hangsang* and *ocik* and their focused elements are different, which reflects the semantic functions of *hangsang* and *ocik*. Nambu and Lee (forthcoming) claim that *hangsang* and *ocik* should be treated in different ways, supporting the QFC theory.

To examine the exact functions of the FPs *always*/*hangsang* and *only*/*ocik* and verify the findings in the production study by Nambu and Lee (forthcoming), this study explores how much listeners are conscious of the prosodic cues that create an association of *hangsang/ocik* with focus. We conducted a perception experiment and tested the relationship between the prosody and semantic functions of *hangsang* and *ocik*, manipulating the pitch contours of *hangsang* and *ocik* in order to ascertain what the plausible prosodic contours are.

This paper is organized as follows. Section 2 examines the difference between *hangsang* and *ocik* with two tests, pro and extraction, and introduces a brief overview of how *always* and *only* are treated in the QFC theory. Section 3 illustrates the procedures of the experiment, and describes the results. In section 4, we argue that *hangsang* and *ocik* should be treated differently, based on findings that show different prosodic functions for each FP, and then provide unresolved issues of the present study. Section 5 concludes this study.

2 Background

2.1 *Hangsang* and *Ocik*

*This paper has benefited from invaluable comments from Aviad Eilam, Florian Schwarz, Satoshi Tomioka, Jiahong Yuan, Yi Xu, Marielle Lerner, and Catherine Lai. Further, we would like to thank the audience at the 35th Penn Linguistics Colloquium. Any remaining errors are our own.

In this section, we show that *hangsang* 'always' and *ocik* 'only' behave differently with respect to association with focus, based on the two tests for English *always* and *only* in Beaver and Clark (2003, 2008).

First, Beaver and Clark show that English *always* can associate with a reduced pronoun, in contrast to *only*. To test the Korean FPs *hangsang* and *ocik*, we used pro instead of a reduced pronoun, because reduced pronouns are not available in Korean. The following examples contain pro in Korean, and the target sentences follow a context that is designed to assign a focus feature on *hangsang* and *ocik*. The given context is the same as the English one in Beaver and Clark 2003.

Context: You had many discussions with Sandy, but what I want to know is the extent to which you talked about Fred. Of all the times you talked with Sandy, how often was Fred the person you talked about?

(2) *Na-nun [hangsang]$_{FOC}$ Sandy-wa pro tholon-ha-yess-ta.*
I-TOP always Sandy-with discuss-do-PST-DECL
'I always discussed (someone) with Sandy.'
(Whenever I discussed someone with Sandy, I discussed Fred.)

(3) #N*a-nun [ocik]$_{FOC}$ Sandy-wa pro tholon-ha-yess-ta.*
I-TOP only Sandy-with discuss-do-PST-DECL
Cannot mean: 'I only discussed (someone and no one else) with Sandy.'

As shown in (2) and (3), *ocik* cannot construct an association with pro, while *hangsang* can associate with it.[1] This indicates that *hangsang* and *ocik* behave differently, as do English *always* and *only*.

Second, Beaver and Clark (2003, 2008) provide evidence that English *always* can associate with an extracted element, as opposed to *only*. The test in Korean also shows different properties of *hangsang* and *ocik* as follows:

Context: I have two roommates, Kim and Sandy. I always stock their fish tanks. I stock Sandy's fish tank with goldfish and nothing else. I stock Kim's fish tank with goldfish and with clownfish.

(4) *Kimssi-uy ket-un nay-ka hangsang clownfish-lo chaywu-nun ehang-ita.*
Kim-GEN thing-TOP I-NOM always clownfish-with stock-COMP tank-DECL
a. 'I said I stock Kim's and no other tank with clownfish.' [TRUE]
b. 'I said I stock Kim's tank with clownfish and nothing else.' [FALSE]

(5) *Kimssi-uy ket-un nay-ka ocik clownfish-lo chaywu-nun ehang-ita.*
Kim-GEN thing-TOP I-NOM only clownfish-with stock-COMP tank-DECL
a. *'I said I stock Kim's and no other tank with clownfish.' [TRUE]
b. 'I said I stock Kim's tank with clownfish and nothing else.' [FALSE]

The interpretation (4a), which is true in the given context, is available for *hangsang*. On the contrary, such an association is not available for *ocik*. Again, the Korean FPs *hangsang* and *ocik* show the same properties as the English equivalents.

As argued in Beaver and Clark (2003, 2008), the data show that *always/hangsang* creates an association freely, but *only/ocik* shows a more restricted association. In the next section, we introduce the theory of focus by Beaver and Clark (2008), which identifies the different associations with focus between *always* and *only*.

2.1 The QFC Theory

Previous studies have debated whether pragmatics or semantics should explain the way in which

[1] *Hangsang* also associates with a learner or a pronoun that lacks prosodic prominence.

FPs associate with focus (Lambrecht 1994, Rooth 1992, 1996, von Fintel 1994). Beaver and Clark (2008) propose the QFC theory, which is equivalent to an "intermediate theory" of focus discussed by Rooth (1992). They claim that associations of *always* and *only* with focus are formed differently, as we observed with the Korean examples in the previous section. This approach stipulates the different properties of *always* and *only*, dividing FPs into subsets, which contrasts with previous analyses that make no difference in treatment of FPs (Büring 2008, Rooth 1992, 2010, Sudhoff 2010). In the QFC theory, the function of *always* is categorized as free association, constructing an association with contextually salient sets of events or situations. *Only*, on the other hand, functions as conventional association, which constructs an association based on a lexically-encoded dependency on focus. The semantic formulae for the two FPs are shown in (6):[2]

(6) a. *Always*: free association
Truth conditions of NP *always* VP: $\forall e\ \sigma(e) \rightarrow \exists e'\ \rho(e, e') \wedge q(e')$
b. *Only*: conventional association
Truth conditions of NP *only* VP: $\forall e\ p(e) \rightarrow q(e)$
σ = a function which identifies a context
ρ = a function which maps events to events
p = a meaning of NP VP minus content related to any focused parts of the VP
q = an ordinary meaning of a sentence NP VP (Beaver and Clark 2008)

As shown in (6a), *always* makes use of contextual variables σ and ρ bound by a given context. Thus, the formula describes *always* as able to associate with any salient element in the given context. In contrast, *only* needs an element to be associated in its domain as stipulated in (6b). Based on their analysis, we assume that prosodic prominence is not required for *always* to create an association since it takes any contextually salient element. In the case of *only*, on the other hand, the above analysis implies that a prosodically salient element is required in its domain to create an association. This assumption is supported by a production study in Nambu and Lee (forthcoming), which shows that the element associated with *hangsang* is not necessarily salient in prosody, in contrast to *ocik*, which needs an associated element with prosodic prominence.

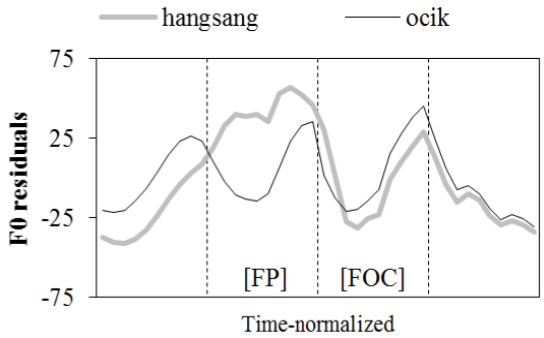

Figure 1: Time-normalized F0 contours of 36 repetitions of the sentence, *Nanun hangsang/ocik. mantwulul cohahapnita* ('I always/ocik like dumplings.') by six speakers. The thick line represents the F0 contour for the sentence with *hangsang*. The thinner line represents the F0 contour for the sentence with *ocik*. Each word is bordered by a vertical line. (Adapted from Nambu and Lee, forthcoming.)

Figure 1 shows that the focused element with *ocik* exhibits the most prominent pitch in contrast to *hangsang*.[3]

[2]Refer to Beaver and Clark (2003, 2008) to see the details of the formula.

[3]In general, F0 contours are gradually on the decline over the course of sentences, which is known as F0 declination (cf. Cohen et al. 1982). However, to compare the two peaks in a sentence, the F0 declination effect has to be excluded in order to observe the exact intonational functions of the target sentence. Thus, we

In this study, we conducted a perception experiment to investigate whether the different semantic properties of *always* and *only* are reflected in prosody and are perceptually detectable.

3 Experiment

3.1 Methodology

3.1.1 F0 Manipulation

We used stimuli with pitch contours manually manipulated in order to examine the prosodic functions of *hangsang* and *ocik*. Figure 2 shows three different time-normalized F0 contours for the stimuli with *hangsang* (*Nanun hangsang mantwulul cohahapnita.* 'I always like dumplings.'), labeled as *HangsangH* for *hangsang* ([FP]) with a high pitch, *FocusH* for the focused element ([FOC]) with a high pitch, and *DoubleH* when both *hangsang* and the focused element have high pitches. We produced the same manipulated F0 contours with *ocik*.

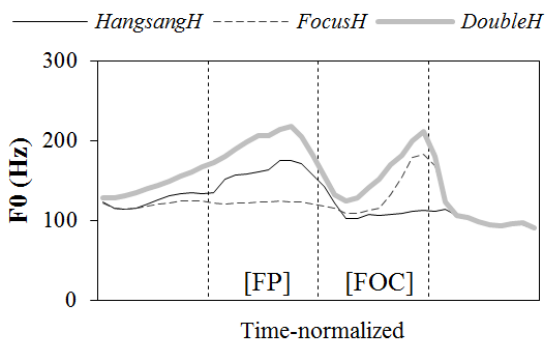

Figure 2: Manipulated F0 contours of the sentence, *Nanun hangsang mantwulul cohahapnita* ('I always like dumplings'). Each word is bordered by a vertical line.

3.1.2 Stimuli

The manipulated pitch contours were provided in three different environments: (i) the sentence in isolation (7a), (ii) the sentence preceded by a prompt question (7b), and (iii) the sentence with a discourse context (7c). The last two environments were designed to elicit a focus effect on *mantwulul* 'dumplings'. In total, 72 sound files (24 sentences * 3 environments) served as stimuli. In (7), the target sentences are in square brackets and the FPs are in boldface.

(7) a. The sentence in isolation
[*Nanun* ***hangsang/ocik*** *mantwulul cohahapnita*.]
'I always/only like dumplings.'

b. The sentence preceded by a prompt question
Q: *Hangsang/ocik mwuesul cohahaseyyo?*
A: [*Nanun* ***hangsang/ocik*** *mantwulul cohahapnita*.]
'What do you always/only like? I always/only like dumplings.'

c. The sentence given with a discourse context
Ce nun elyessul ttaypwuthe han kaci cohahanun umsiki isssupnita. Pika okena myengcel naley hokun ceyka aphul ttay celul wihayse nwunimkkeyse sonswu picecwusin mantwuka isssupnita. Kulayse, [Nanun ***hangsang/ocik*** *mantwulul cohahapnita.]*
'There is something I have liked since I was young. When it rained, when it was a holiday, or when I was sick, my elder sister used to make food for me. For this reason, I

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conducted a linear regression to neutralize the F0 declination effect and measure the slope.

$$\hat{\beta} = (XX)^{-1}Xy = (\frac{1}{n}\sum x_i x_i)^{-1}(\frac{1}{n}\sum x_i x_i)$$

don't like other food. I always/only like dumplings.'[4]

3.1.3 Subjects

Eleven native speakers of Korean (mean age = 28.36) participated in the experiment. They were recruited at the University of Pennsylvania and paid for their participation. They signed a consent form. None of them had hearing problems.

3.1.4 Procedure

To examine whether or not listeners are conscious of the prosodic functions of *hangsang* and *ocik*, we conducted a rating experiment with a 5-point scale (1: very unnatural, 3: OK, 5: very natural). The experiment was conducted in a quiet room at the University of Pennsylvania. The stimuli were provided in the three different environments that are given in Section 3.1.2. The experiment was thus divided into three subsets. In each set, the target pitch contours were provided in isolation (Set 1, (7a)), with a prompt question (Set 2, (7b)), or with a discourse context (Set 3, (7c)). Listeners were asked to rate whether the pitch contours sounded natural based on a 5-point scale. They were allowed to use a decimal point (e.g., 0.5, 1.5, 2.5, 3.5, 4.5), because a significant number of the manipulated utterances would fall somewhere in between natural numbers (cf. Sprouse 2007). The target pitch contours were presented in randomized order. The answer sheet was presented on paper. Before the experiment, the stimuli were shown to the listeners in order for them to become familiar with the procedure of the experiment. They were allowed to listen to the same pitch contours multiple times until they felt confident about their judgment.

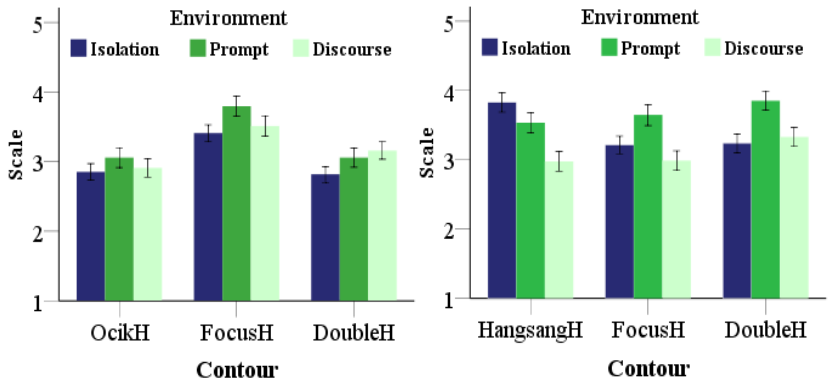
3.2 Analyses and Results

In this study, as stated above, the pitch contours were manipulated to examine the functions of the two FPs: *hangsang* and *ocik*. Depending on the placement of a peak, we have three different pitch contours in the three different environments. Thus, there are two independent variables: CONTOUR (HangsangH/OcikH, FocusH, and DoubleH) and ENVIRONMENT (Isolation, Prompt question, Discourse context). The dependent variable is a 5-POINT SCALE. In order to identify the different prosodic properties of *hangsang* and *ocik*, two-way repeated measures ANOVAs were conducted on the FPs.

First, let us look at *ocik* in Figure 3a. The mean value of *OcikH* is 2.94 (Isolation: 2.85, Prompt: 3.06, Discourse: 2.91). The mean value of *FocusH* is 3.57 (Isolation: 3.41, Prompt: 3.80, Discourse: 3.51). The mean value of *DoubleH* is 3.01 (Isolation: 2.82, Prompt: 3.06, Discourse: 3.16). As Figure 3a shows, the values of *FocusH* are the highest (mean: 3.57), followed by *DoubleH* (mean: 3.01), and *OcikH* (mean: 2.94) in all the environments.[5] Two-way repeated measures ANOVAs show that the effect of CONTOUR for *ocik* is significant (F [2,20] = 11.190, $p < 0.01$).

[4]We found a problem in the stimuli. In (7c), a conflict occurs between the sentences "I don't like other food" in the context and "I always like dumplings" as a target sentence. The first sentence is designed to indicate that I don't like other food except dumplings. In this case, *dumplings* becomes exclusive. However, *dumplings* in "I always like dumplings" is generally interpreted as non-exclusive because of a temporal meaning of *always*. For example, a sentence such as "I always like dumplings, and I sometimes like pizza." is acceptable. This conflict reflects the low acceptability of the stimuli with a discourse context, as displayed in Figure (4b).

[5]One may ask why the lowest mean value of each contour is still around 3 but not lower than that. A plausible answer is that Korean has neither a lexical tone nor a pitch accent so that the listeners are tolerant of the wrong prosodic alignment in the manipulated pitch contour in the experiment. That is, peak alignment is not fixed at the word/sentence level, which is along the line of Cho's (2010) claim that the precise alignment of H peaks is not crucially important to understanding Korean words and phrases.

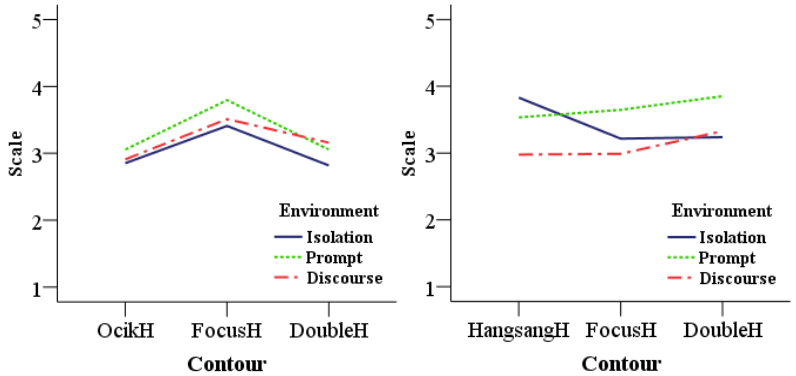


(a) (b)

Figure 3: Means and standard errors (error bars: ± 1 SE) of the three different pitch contours in the three different environments for *ocik* (a) and *hangsang* (b).

In the case of *hangsang* in Figure 3b, the mean value of *HangsangH* is 3.48 (Isolation: 3.83, Prompt: 3.53, Discourse: 2.98). The mean value of *FocusH* is 3.28 (Isolation: 3.22, Prompt: 3.65, Discourse: 2.99). The mean value of *DoubleH* is 3.47 (Isolation: 3.24, Prompt: 3.85, Discourse: 3.33). The values of *HangsangH* are the highest (mean: 3.48), followed by *DoubleH* (mean: 3.47) and *FocusH* (mean: 3.28) in the three environments. The results of two-way repeated measures ANOVAs, however, show no significant effect of CONTOUR for *hangsang* (F [2,20] = 1.041, p = 0.372).

Now, let us look at Figure 4. The main effect of ENVIRONMENT for *ocik* is not significant (F [2,20] = 2.121, p = 0.146) (Figure 4a). In addition, a significant interaction effect between CONTOUR and ENVIRONMENT for *ocik* is not found (F [4,40] = 1.302, p = 0.286). That is, the environments do not affect the prosodic function of *ocik*. The same prosodic function for *ocik*, which has prosodic prominence on a focused element (i.e., *FocusH*), is preferred regardless of the environment.



(a) (b)

Figure 4: Influence of ENVIRONMENT on the three different contours for *ocik* (a) and *hangsang* (b).[6]

As for *hangsang* (Figure 4b), the effect of ENVIRONMENT is significant (F [2,20] = 5.096, p < 0.05). In addition, a significant interaction effect is discernable between CONTOUR and ENVIRONMENT (F [4,40] = 12.15, p < 0.001). Thus, the results of *hangsang* differ in the three environments. To investigate the prosodic function(s) of *hangsang* in more detail, we conducted multiple pair-

[6]Figure 4b shows that the average rating of *hangsang* with a discourse context is lower than the other environments. This is because of the issue that we mentioned in footnote 4.

wise comparisons to see which categories are different in a group under the effect of ENVIRONMENT. As shown in Table 1 below, *HangsangH* is the most preferred contour when the sentence is in isolation, but the difference between *FocusH* and *DoubleH* is not significant. When the sentence is paired with a prompt question, there is no difference in preference between the three pitch contours. When the sentence is in a discourse context, *DoubleH* is the most plausible contour. This indicates that *hangsang* does not seem to have a unique function; rather, it varies depending on the environment, in contrast to *ocik*, which shows little variance.

		Isolation	Prompt	Discourse
(A) contour	(B) contour	$\Delta(\mu A\text{-}\mu B)$	$\Delta(\mu A\text{-}\mu B)$	$\Delta(\mu A\text{-}\mu B)$
FocusH	DoubleH	-.02	-.20	**-.34
FocusH	HangsangH	**-.61	.11	.01
HangsangH	DoubleH	**.59	-.32	*-.35

Table 1: Multiple pairwise comparisons for the effect of CONTOUR (* = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$).

4 Discussion

The results of *ocik* demonstrate that the values of *FocusH* are the greatest among the three different contours. In addition, no interaction effect is present between CONTOUR and ENVIRONMENT. The findings indicate that the prosodic function, to induce a focus feature on the following domain, is consistent regardless of the environment. The results of *hangsang*, on the other hand, differ in the three environments. *HangsangH* is the greatest when the sentence is in isolation. *DoubleH* is the greatest when the sentence is preceded by a prompt question and when the sentence is in a discourse context. Therefore, except when the sentence is in isolation, *DoubleH* is assumed to be a preferred prosodic function of *hangsang*, although the differences under the effect of ENVIRONMENT are not always significant.

In this study, *hangsang* and *ocik* show different prosodic functions. We claim that the results of this study support Beaver and Clark's (2003, 2008) theory, following the results of the production experiment by Nambu and Lee (forthcoming). As was stated, *hangsang* does not need to have the most salient prosody on a focused element, whereas in the case of *ocik*, a prosodic cue must be in its domain to create a conventional association with a focused element.

However, there is another possible account for the different prosodic behaviors between *hangsang* and *ocik*. It is reasonable to think that *hangsang* with prosodic prominence as observed in the experiments reflects contrastiveness, which *ocik* does not have. For example, when the sentence is in isolation as shown in (8), *always* contrasts with an implicit generic operator, since the sentence "I like dumplings" can be paraphrased with "I usually like dumplings." Hence, if *hangsang* replaces the implicit generic operator, its function is to emphasize the fact that the proposition "I like dumplings" holds at all times under consideration, and thus *hangsang* is prosodically marked.

(8) In isolation
  a. I like dumplings ⇔ I usually like dumplings.
  b. I [always]$_{FOC}$ like dumplings.

In addition, consider the case when focus is elicited on *dumplings* by the question "what do you always like?" as in (9). In this case, it is apparent that *dumplings* has prosodic prominence. However, a question that immediately arises is why *hangsang* exhibits prosodic prominence, as we observed in the experiment, although it is given in context. We assume that when *hangsang* comes with a stative verb, *hangsang* contrasts with a possible alternative (e.g., *sometimes*). Therefore, it is realized with prosodic prominence.

(9) In a context
Q: What do you always like?
A: I [always]$_{FOC}$ like [dumplings]$_{FOC}$, (and I sometimes like pizza).

Another question is why contrastive focus gives rise to prosodic prominence. Zimmermann (2007) provides a description of contrastive focus as follows.

(10) Contrastive Focus Hypothesis:
Contrastive marking on a focus constituent α expresses the speaker's assumption that the hearer will not consider the content of α or the speech act containing α likely to be(come) common ground. (Zimmermann 2007:155)

Zimmermann (2007:155) states that "[c]ontrastive foci express a contrast between the information conveyed by the speaker in asserting α and the assumed expectation state of the hearer," and then argues that the element that receives contrastive focus has prosodic prominence in order to draw the hearer's attention.

There is another issue that we need to unravel from the results: Why is *DoubleH* possible in Korean? *DoubleH* represents *hangsang* with prosodic prominence, which reflects contrastiveness, and a narrow focus on the element following *hangsang* elicited by either a prompt question or a discourse context. As Xu and Xu (2005) argue, multiple intonational functions (e.g., topic, focus, demarcation, attitudinal functions) can occur in one utterance; they should be unique and should not be canceled by each other. Therefore, the two distinct intonational functions, the prosodic prominence on *hangsang* and the focused element, can exist simultaneously. Further, it has been documented in English and Mandarin that *DoubleH* is possible (Eady et al. 1986, Xu and Xu 2005).

4.1 Unresolved issues

There are several points that need to be improved in future research. First, more fluent data are needed to establish the exact functions of the FPs. In this study, we only used one predicate type, stative, but, as we discussed, if *hangsang* with a stative predicate induces a contrastive focus on *hangsang*, we might get different results if we use an eventive predicate in the experiment. Thus, it is necessary to include an eventive predicate to compare the results. Second, the 5-point scale in the present study might not make the difference between the groups large enough to observe statistical significance. For example, although *DoubleH* had the greatest rate among the contours when the sentence was preceded by a prompt question, the difference between *DoubleH* and other contours was not statistically significant. It is possible that the insignificance may not reflect the real preference for the prosodic functions. Rather, if we had used a 7-point or a 9-point scale, the differences between the pitch contours would have been more obvious.

5 Conclusion

The findings of this study provide a represention of the relationship between the prosodic features and semantic functions of the FPs *hangsang* and *ocik*. The results indicate that *ocik* needs a prosodic cue in its domain to construct an association with a focused element, whereas such a restriction is not equally present for *hangsang*. The prosodic function of *ocik* was not affected by the environment, given that *FocusH* was shown to be the most likely contour for *ocik*. In contrast, the results for *hangsang* differed by environment. Hence, we conclude that *hangsang* does not bear a unique prosodic function, as opposed to *ocik*. The results indicate that the prosodic functions of *hangsang* and *ocik* reflect their semantic distinctions, as described in the QFC theory. The results thus cast doubt on the previous analyses of treating the FP in the same way (Büring 2008, Rooth, 1992, 2010, Sudhoff 2010), and support Beaver and Clark (2003, 2008), who claim that the FPs should be treated differently.

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