Evidence for the existence of non-constituent focus

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The purpose of this paper is to demonstrate the existence of non-constituent focus. I use the term *focus* in the same way as authors such as Rooth and Krifka do; I say that a linguistic expression or a sequence thereof is a focus when it is interpreted as contrasting with some other entity (or entities) of the same type. A *non-constituent focus* is a contiguous sequence of expressions that does not form a morphosyntactic constituent and yet is interpreted as a single focus.

It is widely assumed that foci are always morphosyntactic constituents, although there have been sporadic suggestions to the contrary in the literature.[1] It is in fact difficult to establish the existence of non-constituent focus in a language like English, which allows, and sometimes even requires, expressions referring to contextually 'given' entities to be deaccented.

It will be argued in this paper that the existence of non-constituent focus can be demonstrated if we turn our attention to languages that either do not have deaccenting at all or at least do not employ deaccenting as widely as English. More specifically, I claim that Japanese examples like (1) can be shown to involve non-constituent focus.

(1) (Doitsu no yama e itta
Germany GEN mountain to went
wake de wa arimasen.)
it's not that
[[Doitsu no **HATA o**] **futta**] dake desu.
[[Germany GEN flag ACC] waved] it's just that
'(It's not that (I) went to a mountain in Germany.) It's just that (I) waved a flag of Germany.'

I say that an expression in a Japanese sentence is *prosodically prominent* when (i) either the initial mora of the expression has audibly undergone Initial Lowering or the initial mora of the expression is lexically linked to a high tone and hence incapable of undergoing Initial Lowering and (ii) none of the high tones associated with the expression is downstepped (i.e., pronounced lower in pitch than the preceding high tone) or otherwise subdued. (See Pierrehumbert and Beckman (1988), Kubozono (1993), and Gussenhoven (2004) for detailed discussion of downstep and Initial Lowering.) Given this definition, we can say that the second sentence in example (1) can be read with an intonation pattern in which the word *hata* 'flag' is the only prosodically prominent word. My claim is that, when that intonation pattern is used, the boldfaced string *hata o futta* 'waved a flag' in this sentence is a non-constituent focus, interpreted as contrasting with another non-constituent *yama e itta* 'went to a mountain'. In Yatabe and Hayakawa (2005), I make this same claim and propose an HPSG-based theory of non-constituent focus in general, but the arguments for this claim that are presented in that paper are brief and incomplete. The present paper sets forth a more complete set of arguments.

Let me spell out at this point what kind of analysis is advocated for sentences like (1) in Yatabe and Hayakawa (2005). According to the analysis proposed there, the prosodic structure of the second sentence in (1) is roughly [[Doitsu no] [hata o futta]], and its truth condition is something like the following: a verb phrase whose prosodic structure is of the form [[Doitsu no] *X*] denotes what the speaker actually did if the prosodic constituent *X* is associated with the same semantic representation that the prosodic constituent *hata o futta* in (1) is associated with, but it does not denote what the speaker actually did if *X* is associated with the same semantic representation that the prosodic constituent *yama e itta* is associated with. The theory is embedded in a novel theoretical framework in which a semantic representation is associated not with each morphosyntactic constituent but with each prosodic constituent.

The view that (1) involves non-constituent focus has initial plausibility, given the fact (discussed in Gussenhoven (2004)) that the left edge of a focus constituent tends to coincide with the left edge of an Intermediate Phrase in Japanese, a fact which (in conjunction with the fact that the Intermediate Phrase is the domain of downstep and the fact that the pitch range of the Accentual Phrase containing a focus constituent is boosted) leads us to expect that the leftmost high tone in a focus constituent should be realized at a pitch higher than the pitch of other high tones; the highest pitch in a sentence is likely to coincide with the beginning of a focus constituent in Japanese. However, a number of alternative interpretations are conceivable regarding example (1), and I will argue against each such alternative interpretation in the following sections.

1 Multiple foci?

The first alternative interpretation that is considered is one in which example (1) is analyzed as involving multiple foci, that is, an interpretation in which the noun *hata* and the verb

[1] Authors who seem to express the view that things that are not morphosyntactic constituents sometimes function as foci include the following. Gussenhoven (1983) defines the notion of *focus domain* as "one or more constituents whose [+focus] status can be signalled by a single accent" (p. 391). Pierrehumbert and Beckman (1988) speculate that "the accentual phrase, rather than the word, is the minimal domain for focus in Japanese" (p. 109), where the term *accentual phrase* refers to a prosodic, rather than morphosyntactic, constituent. Artstein (2004) advocates a comparable view for focus below the word level if not for focus above the word level.

futta are taken to constitute separate foci. On this account, *hata* ‘flag’ and *futta* ‘waved’ in the second sentence of (1) are being individually contrasted with *yama* ‘mountain’ and *itta* ‘went’, respectively.

This interpretation is falsified by the fact that, in a context where the noun and the verb are clearly individually focused, not just the noun but also the verb has to be prosodically prominent. For instance, when the second sentence in (1) is used as a response to the following question, not just the noun *hata* but also the verb *futta* has to be prosodically prominent.

(2) Doitsu no nani o dô ugokashita no?
Germany GEN what ACC how moved NML
‘What kind of Germany-related thing did you move, and in what way?’

2 Narrow focus on the noun?

The second alternative interpretation that I consider is one in which it is supposed that the only thing that is focused in the second sentence of (1) is the noun *hata* ‘flag’. On this account, what the second sentence in (1) means is something like “The only Germany-related thing that I waved was a flag,” rather than “The only Germany-related thing that I did was to wave a flag.” This account may seem far-fetched, since “I didn’t go to a mountain in Germany. The only Germany-related thing that I waved was a flag.” does not sound like a coherent discourse. However, this is not an entirely unreasonable account, as it is conceivable that verbs like *itta* ‘went’ and *futta* ‘waved’ can both be semantically bleached and end up meaning something like ‘dealt with’; if such semantic bleaching is available, the meaning of (1) could be roughly “I didn’t deal with a German mountain. The only Germany-related thing that I dealt with was a flag,” which does sound like a coherent discourse.

This interpretation should also be rejected, however; it predicts, erroneously, that (4) and (5) below should both be appropriate responses to the question in (3). This prediction is made because the kind of semantic bleaching that is postulated in this account must be available in (5) below just as in (1).

(3) Doitsu no yama e itta no?
Germany GEN mountain to went NML
‘Did you go to a mountain in Germany?’

(4) Iya, Doitsu no hata o futta n da yo.
no Germany GEN flag ACC waved NML COP I tell you
<6, 5, 5, 5>
‘No, (what happend is that) I waved a flag of Germany.’

(5) Iya, futta no wa Doitsu no hata da
no what (I) waved TOP Germany GEN flag COP
yo. <0, 1, 4, 16>
I tell you
‘No, what (I) waved is a flag of Germany.’

The 4-tuples immediately following (4) and (5) represent the result of a questionnaire study conducted in 2006;[2] the first figure shows the number of speakers who found the sentence perfect as a response to (3), the second figure shows the number of speakers who found the sentence slightly unnatural as a response to (3), the third figure shows the number of speakers who found the sentence considerably unnatural as a response to (3), and the fourth figure shows the number of speakers who found the sentence completely incoherent as a response to (3). The figures indicate that (5), unlike (4), cannot be used as a response to (3), contradicting the interpretation under discussion. (4) was also found to be less than perfect by some speakers, presumably because it is difficult to imagine a context in which going to a mountain can naturally be contrasted with waving a flag, but it was found to be significantly more acceptable than (5) [$T = 0$, $n = 16$, $p < 0.0001$]. (All the p values reported for Wilcoxon signed-rank tests in this paper represent one-tailed significance first computed by the *Stat macros for Excel*, developed by Tadao Hirota, and then verified by R (R Development Core Team (2006) and Hothorn and Hornik (2006)).)

A related conceivable analysis which I argue against in this section is one in which the second sentence in (1) is taken to contain two focused constituents, the VP *Doitsu no hata o futta* and the noun *hata*, as shown below:

(6) [Doitsu no [hata]$_F$ o futta]$_F$

This is also not an unreasonable analysis, as the VP *Doitsu no hata o futta* could presumably be contrasted with the VP *Doitsu no yama e itta* and the noun *hata* could presumably be contrasted with the noun *yama*. However, this analysis predicts, incorrectly, that the word *hata* can be more prosodically prominent than the immediately preceding genitive phrase *Doitsu no* in the second sentence in the following example as well, just as it can in (1).

(7) Doitsu no yama ga funka shita
Germany GEN mountain NOM erupted
wake de wa arimasen. Koizumi Shushô ga
it’s not that Prime Minister Koizumi NOM
Doitsu no hata o futta dake desu.
Germany GEN flag ACC waved it’s just that
‘It’s not that a mountain in Germany erupted. It’s just that Prime Minister Koizumi waved a flag of Germany.’

In this discourse, the clause *Koizumi Shushô ga Doitsu no hata o futta* ‘Prime Minister Koizumi waved a flag of Germany’ is contrasted with the clause *Doitsu no yama ga funka shita* ‘a mountain in Germany erupted’ and, by assumption, the noun *hata* ‘flag’ can be contrasted with the noun *yama* ‘mountain’, presumably creating a structure like the following, which involves nested foci.

(8) [Koizumi Shushô ga Doitsu no [hata]$_F$ o futta]$_F$

There seems to be no good reason why the noun *hata* can be more prosodically prominent than the immediately preced-

[2]The order of the sentences to be compared was randomized on a respondent-by-respondent basis. Due to circumstances beyond my control, however, one person answered the version of the questionnaire that was intended for another person, who also answered that version of the questionnaire. Both these persons’ responses were included in the final tally. The respondents were all native speakers of Japanese and students at the University of Tokyo. 8 respondents had no experience with linguistics; the remaining 13 respondents had some experience with linguistics, but they all identified themselves as non-linguists.

ing genitive phrase in (6) but not in (8); in both structures, the noun is assumed to be a focus contained in a larger focus, and there does not seem to be a principled way to explain why an intonation pattern that is possible in one structure is not possible in the other. In my theory, on the other hand, the genitive phrase preceding the noun *hata* is part of the focus in (7) but not in the relevant reading of (1), so it is only natural that the genitive phrase and the following noun should be associated with different intonation patterns in (1) and (7).

3 Deaccenting?

The third alternative interpretation that is considered is one in which example (1) is analyzed as involving deaccenting, that is, an interpretation in which the VP *Doitsu no hata o futta* as a whole is taken to be a single focus and the phrase *Doitsu no* in it is taken to have been deaccented on account of being contextually 'given'. (See Ladd (1996) and Schwarzschild (1999) for discussion on deaccenting in languages such as English.)

A production experiment was conducted, in order to test, among other things, whether the intonation pattern shown in (1) (where the noun immediately preceded by a genitive phrase is the only prosodically prominent word) can be used in a context where (i) a constituent encompassing both the noun and the prenominal genitive phrase (such as the VP *Doitsu no hata o futta* in (1)) is clearly focused as a whole and (ii) the prenominal genitive phrase (*Doitsu no* in the case of (1)) refers to a salient entity and thus is expected to be deaccented in the theory under discussion. If the intonation pattern cannot be used in such a context, that would be problematic for this third alternative interpretation.

25 native speakers of Japanese (6 female speakers and 19 male speakers)[3] were recorded while they read the following 6 experimental materials and 14 fillers. The order of the materials was randomized on a subject-by-subject basis.

(9) a. Kûkô de, Doitsu no shushô wa,
airport at Germany GEN prime minister TOP
Koizumi Shushô to akushu-shita
Prime Minister Koizumi with shook hands
wake de wa arimasen.
it's not that
[[Doitsu no hata o] futta] dake desu.
[[Germany GEN flag ACC] waved] it's just that
'It's not that the prime minister of Germany shook hands with Prime Minister Koizumi at the airport. It's just that (he) waved a flag of Germany.'

b. Doitsu no yama e itta
Germany GEN mountain to went
wake de wa arimasen.
it's not that
[[Doitsu no hata o] futta] dake desu.
[[Germany GEN flag ACC] waved] it's just that
'It's not that (I) went to a mountain in Germany. It's just that (I) waved a flag of Germany.'

(10) a. Yûbe, Jirô no ie no mae
last night Jirô GEN house GEN front
de wa, nagareboshi ga mieta
at TOP shooting star NOM was seen
wake de wa arimasen.
it's not that
[[Jirô no koe ga] kikoeta] dake desu.
[[Jirô GEN voice NOM] was heard] it's just that
'It's not that a shooting star was seen in front of Jiro's house last night. It's just that Jirô's voice was heard.'

b. Jirô no ie ga mieta
Jirô GEN house NOM was seen
wake de wa arimasen.
it's not that
[[Jirô no koe ga] kikoeta] dake desu.
[[Jirô GEN voice NOM] was heard] it's just that
'It's not that Jirô's house was seen. It's just that Jirô's voice was heard.'

(11) a. Yûbe, sono ie no mae de wa,
last night that house GEN front at TOP
nagareboshi ga mieta
shooting star NOM was seen
wake de wa arimasen.
it's not that
[[Dareka no koe ga] kikoeta]
[[somebody GEN voice NOM] was heard]
dake desu.
it's just that
'It's not that a shooting star was seen in front of that house last night. It's just that somebody's voice was heard.'

b. Dareka no ie ga mieta
somebody GEN house NOM was seen
wake de wa arimasen.
it's not that
[[Dareka no koe ga] kikoeta]
[[somebody GEN voice NOM] was heard]
dake desu.
it's just that
'It's not that somebody's house was seen. It's just that somebody's voice was heard.'

(9b) is identical to (1). (9a) is the result of replacing the first (parenthesized) sentence in (1) with a sentence that forces the second sentence to be interpreted as involving VP focus; here, the VP in the second sentence *Doitsu no hata o futta* 'waved a German flag' will have to be interpreted as contrasting with the VP 'shook hands with Prime Minister Koizumi' in the first sentence. (10a) and (10b) are analogous to (9a) and (9b); according to the theory I have proposed, the string *koe ga kikoeta* in the second sentence of (10b) can be interpreted as non-constituent focus, whereas the second sentence in (10a) only allows an interpretation in which the embedded clause *Jirô no koe ga kikoeta* as a

[3] The speakers were all students at the University of Tokyo. One of the speakers had previously taken an introductory linguistics course at the college level, but the other 24 speakers knew nothing about linguistics.

	Mean of $p2/p1$	S.D. of $p2/p1$	Minimum $p2/p1$	Maximum $p2/p1$	Percentage of speakers such that $p2/p1 > 1.03$, $p3/p2 < 0.8$, and $p3/p1 < 0.9$
(9a)	0.748	0.088	0.621	1.000	0%
(10a)	0.766	0.086	0.570	0.947	0%
(11a)	0.766	0.091	0.620	0.967	0%
(9b)	0.829	0.101	0.617	1.066	8%
(10b)	0.844	0.139	0.623	1.235	8%
(11b)	0.840	0.135	0.657	1.131	12%

Table 1: A summary of the result of the production experiment

whole is the focus. (11a) and (11b) are obtained by replacing the word *Jirô* in (10a) and (10b) with the word *dareka* 'somebody' and making minor adjustments in the resulting sentences.

The pitch track of each utterance was obtained using Onsei Kôbô, a commercial software distributed by NTT Advanced Technology, and the peak F_0 achieved during each of the underlined words was recorded. The following setting was used for 21 speakers: sampling frequency = 11025 Hz, window type = Hamming, frame length = 44 (4.0 ms), window length = 882 (80.0 ms), voicing threshold = 0.90, amplitude threshold = 100, and LPC Order = 10. In the case of the remaining 4 speakers, this setting prevented the software from detecting any pitch whatsoever for the entire duration of at least one of the underlined words, so the voicing threshold was lowered to 0.80 for these speakers. The minimum pitch and the maximum pitch were set at 150Hz and 400Hz for all the female speakers, at 50Hz and 200Hz for 17 male speakers, and at 50Hz and 250Hz for 2 male speakers.

Henceforth, the peak F_0 achieved during the head noun inside the prenominal genitive phrase will be referred to as $p1$, the peak F_0 achieved during the noun following the genitive phrase will be referred to as $p2$, and the peak F_0 achieved during the verb will be referred to as $p3$. The last sentences in (9a), (10a) and (11a) will be referred to as the "(a) sentences" and the last sentences in (9b), (10b), and (11b) will be referred to as the "(b) sentences".

According to the alternative interpretation under discussion in this section, the (a) sentences and the corresponding (b) sentences have exactly the same focus-related properties. On this account, the VP *Doitsu no hata o futta* is the focus in both (9a) and (9b), the clause *Jirô no koe ga kikoeta* is the focus in both (10a) and (10b), and the clause *dareka no koe ga kikoeta* is the focus in both (11a) and (11b). Likewise, Germany is a salient entity in both (9a) and (9b), and Jirô is a salient entity in both (10a) and (10b); notice that the German prime minister continues to be the topic for the second sentence in both (9a) and (9b), and that Jirô's house continues to be the topic for the second sentence in both (10a) and (10b). On the other hand, the word *dareka* is arguably a quantifier, and hence does not refer to an entity, unlike words like *Doitsu* and *Jirô*. This means that the word *dareka* 'somebody' in (11a) and (11b) cannot be deaccented on account of referring to a contextually given entity. However, it could conceivably be deaccented on account of having little semantic content, if Japanese allows that sort of deaccenting as English does. Either way, under standard assumptions, deaccenting is expected to take place either in both of the two sentences or in neither of the two, if we accept the theory under consideration.[4] Thus, the theory predicts (i) that the intonation patterns possible in the (b) sentences are the same ones that are possible in the corresponding (a) sentences, and (ii) that the mean $p2/p1$ value should therefore be the same for the (b) sentences as for the corresponding (a) sentences.

On the other hand, my theory predicts (i) that the intonation pattern in which the noun immediately preceded by the genitive phrase is the only prosodically prominent word is possible in the (b) sentences but not in the (a) sentences whereas there is no intonation pattern that is possible only in the (a) sentences, and (ii) that the mean $p2/p1$ value should therefore be higher in the (b) sentences than in the (a) sentences.

The result of the experiment is summarized in Table 1. As the table indicates, in the (a) sentences no speaker used an intonation pattern such that $p2/p1 > 1.03$, $p3/p2 < 0.8$, and $p3/p1 < 0.9$, while in each of the (b) sentences some speakers did; a male speaker from Kanagawa used this intonation pattern for (9b) and (10b), a female speaker from Hiroshima used it for (9b) and (11b), a male speaker from Tokyo used it for (10b) and (11b), and a male speaker from Gifu used it for (11b).[5] In each of the three pairs of experimental materials, the mean value of $p2/p1$ was significantly higher for the (b) sentence than for the (a) sentence [$T = 39$, $n = 25$, $p < 0.001$ for (9a) vs. (9b), $T = 60$, $n = 25$, $p < 0.01$ for (10a) vs. (10b), and $T = 61$, $n = 24$, $p < 0.01$ for (11a) vs. (11b)].

These results are consistent with the predictions of my theory but not with those of the alternative interpretation under consideration. It appears that, like languages like Italian (see Ladd (1996)), Japanese seldom if ever allows deaccenting.

[4]Steedman (2000) proposes an analysis in which an expression such as *someone* is taken to have a referent. When combined with such an analysis, the interpretation under consideration in this section arguably predicts (correctly, as it turns out) that deaccenting of *dareka* should be possible in (11b) but not in (11a).

[5]The participant who had taken an introductory linguistics course before was not among the speakers who used this intonation pattern.

4 Filler-gap dependency?

The fourth alternative interpretation that is considered here is one in which the phrase *Doitsu no* in example (1) is taken to have been syntactically extracted out of the VP, creating a structure of the form [[Doitsu no]$_i$ [t$_i$ hata o futta] $\cdots$], in which the string *hata o futta* could be focused as a syntactic constituent. This is a conceivable interpretation because, in Japanese, it is in fact often possible to dislocate a prenominal expression out of an NP.

However, such an interpretation is ultimately untenable, because dislocation of this type, which I will refer to as extraposition, has properties that make it difficult to lump it together with syntactic operations such as *wh*-movement that create filler-gap dependency.

First, extraposition in Japanese can dislocate a conjunct out of an NP, as in (12), unlike syntactic operations such as *wh*-movement (Yatabe (2003)). The 4-tuple following the sentence represents the result of a questionnaire study conducted in 2006, where the respondents consisted of 28 non-linguists, all of them students at the University of Tokyo; the four figures show the number of speakers who found the sentence completely natural under the intended reading, slightly unnatural under the intended reading, considerably unnatural under the intended reading, and completely impossible under the intended reading, respectively. Let us define the *average rating* of a linguistic material L, $r(L)$, as $(3a+2b+c)/(a+b+c+d)$, when the questionnaire result for L is $<a, b, c, d>$. Here and in the remainder of this article, a linguistic material L that is associated with a questionnaire result is presented with no diacritic if $r(L) > 2$, with '?' if $2 \geq r(L) > 1.5$, with '??' if $1.5 \geq r(L) > 1$, with '?*' if $1 \geq r(L) > 0.5$, and with '*' if $0.5 \geq r(L)$.

(12) ?[Kyôdai to], kanojo ga
[Kyoto University and] she NOM
[Tôdai to] o kurabeteru tte,
[Tokyo University and] ACC is comparing COMP
shitteta? <2, 14, 9, 3>
did you know
'Did you know that she is comparing Kyoto University and Tokyo University?'

The average rating of (12) indicates that the sentence is only slightly unnatural, like a comparable English sentence such as ?*She was comparing Kyoto University today and Tokyo University*, where a conjunct *and Tokyo University* has been extraposed out of an NP.

Second, extraposition in Japanese can only dislocate expressions that are on the left edge of an NP (Yatabe (1996)), as shown by the following contrast. The figures here have the same meaning as those in (12).

(13) ??[Sono toki o-shiro ni ita], kore ga, [Shinderera
[that time castle at was] this NOM [Cinderella
to yû] hito no garasu no kutsu na
COMP call] person GEN glass GEN shoe COP
n desu. <2, 8, 5, 6>
I say politely
'This is the glass shoe of the person called Cinderella, who was at the castle at the time.'

(14) ?*[Sono toki o-shiro ni ita], kore ga, garasu no,
[that time castle at was] this NOM glass GEN
[Shinderera to yû] hito no kutsu na
[Cinderella COMP call] person GEN shoe COP
n desu. <0, 4, 5, 12>
I say politely
'This is the glass shoe of the person called Cinderella, who was at the castle at the time.'

(13) was found to be far from perfect for whatever reason, but it was found to be significantly more acceptable than (14) [$T = 6.5$, $n = 14$, $p < 0.001$]. This difference in acceptability between the two can be attributed to the fact that (13) is a result of extraposing an expression that constitutes the left periphery of an NP whereas (14) is a result of extraposing an expression that does not constitute the left periphery of an NP. (13) and (14) are results of extraposing the relative clause *sono toki o-shiro ni ita* 'who was at the castle at the time' out of the NPs in (15a) and (15b), respectively. Note that the relative clause *sono toki o-shiro ni ita* is preceded by another phrase *garasu no* and hence does not constitute the left edge of the NP in (15b).

(15) a. [[[sono toki o-shiro ni ita] [Shinderera to
[[[that time castle at was] [Cinderella COMP
yû] hito] no] garasu no kutsu
call] person] GEN] glass GEN shoe
b. garasu no [[[sono toki o-shiro ni ita]
glass GEN [[[that time castle at was]
[Shinderera to yû] hito] no] kutsu
[Cinderella COP call] person] GEN] shoe

The fact that extraposition in Japanese can affect only what is at the left periphery of an NP is reminiscent of the fact that extraposition in English can affect only what is at the right periphery of an NP, as shown by the unacceptability of an example like **It appears I have given the assignment to a fool after all(,) complete and utter* (Stucky (1987)). Both in Japanese and in English, this property of extraposition is difficult to account for, as long as extraposition is viewed as a grammatical process that induces filler-gap dependency.

These two observations suggest that extraposition in Japanese should be analyzed not in terms of filler-gap dependency but in terms of 'linearization-based' mechanisms (see Yatabe and Hayakawa (2005)).

5 Conclusion

To summarize, it seems reasonable to conclude that sentences like (1) involve non-constituent focus. This conclusion is of considerable theoretical significance, as it arguably lends support to theories such as Combinatory Categorial Grammar and linearization-based HPSG, in which what is normally not considered to be a morphosyntactic constituent can sometimes be given a semantic interpretation.

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