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The Scope of Negation and INFL-Movement in English and Japanese*

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0. Introduction

In the recent Government-Binding framework, the rule 'Move α' has been taken to be applicable whenever the application of it does not lead to a violation of any grammatical principle, e.g. the ECP, the Subjacency Condition, etc.. However, it has more recently been suggested (Chomsky (1988)) that movement does not take place so freely: movement of elements occurs only when it is required. We may interpret this view as saying, for example, that quantifier phrases (QPs) are moved because the condition against vacuous quantification requires them to move, or that wh-phrases are moved because of the same requirement and also because they must 'SPEC-HEAD Agree' with C, the head of CP.[1]

In this paper, we will shed light on the movement of INFL. Specifically, we will put forward an assumption that INFL-movement takes place only when some appropriate feature, say *Q* or *IF*, which requires INFL to cliticize onto it, triggers the movement. After reviewing some recent assumptions concerning negation and quantifier scope facts, we will argue for the 'more recent' view on 'Move-α' by considering some negation scope facts in Japanese. Later, we will suggest the presence of some yet unknown feature, whose status we will assume to be on a par with such features as *Q* and *IF*.

1. Background Assumptions

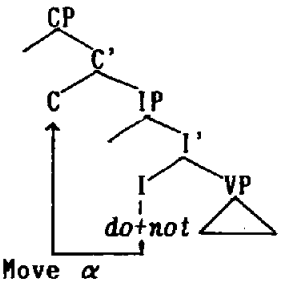
Before kicking off the discussion, let us briefly state some of the background assumptions on which our discussion will be based.

1.1. Configurations and INFL-Movement

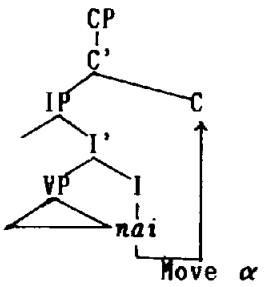
We assume the projection system of Chomsky (1986) so that the configurations of English and Japanese are each presented as in

(1). Furthermore, let us assume the negation operator, namely *not* in English and *nai* in Japanese, to be adjoined to INFL.[2] The locus of the moved INFL is the closest C, the head of CP, and cannot be any position further up in the tree. INFL-movement then, is shown graphically as follows.

(1) a. English:



b. Japanese:



Instances of INFL-movement at S-Structure are easy to find in wh- and yes-no interrogatives in English. In (2), the modal auxiliary verb, generated under INFL at D-Structure, has been fronted by INFL-movement at S-Structure.

(2) a. *Did* you call Mary last night?
b. Whom *did* you call last night?

Another instance of INFL-movement can be found in antecedent clauses of conditionals. The conditional feature [+IF] is lexically realized as *if* in ordinary antecedent clauses of conditionals, as in (3).

(3) a. *If* I should die tomorrow, what would become of my family?
b. *If* I were you, I would not do it.

However, these sentences can also be expressed by placing the modal auxiliaries *should* and *were* respectively in front of the subject NPs as in (4), instead of putting *if* sentence-initially.[3]

(4) a. *Should* I die tomorrow, what would become of my family?
b. *Were* I you, I would not do it.

1.2. Scope Principle

We assume the following principle for the determination of scope orders of logical operators.

(5) Scope Principle:
An operator A may take wider scope over an operator B iff A c-commands B or the variable that B binds at LF.[4]

2. The Scope of Negation and Quantifiers

2.1. Negation and Quantifiers in English

Scope interaction of such logical expressions as QPs and wh-phrases has been an interesting topic among linguists dealing with the syntax of LF. It has been widely observed that more than one interpretation can be obtained from sentences like the followings.

(6) Someone loves everyone.
(7) What did everyone buy for Max?

The sentences above are each ambiguously interpreted, or given an answer, as follows (cf. May (1985, 1988)).

(8) (Interpretations of (6))
a. "There is a person such that he loves everyone."
(SOME > EVERY)
b. "For each person, there is a person that he likes."
(EVERY > SOME)
(9) (Possible answers to (7))
a. "A camera." (WH > EVERY)

b. "John bought a book, Mary bought a taperecorder, Bill bought a computer....." (EVERY > WH)

The sort of ambiguity observed above is also observed in examples containing a QP and the negation operator *not*. [5] (Kroch (1974), Linebarger (1980) etc.)

(10) a. Everyone didn't invite John.
(EVERY > NOT, NOT > EVERY)
b. John didn't invite everyone.
(*EVERY > NOT, NOT > EVERY)

Although we will not discuss why the object QP *everyone* cannot take wide scope over the negation in (10b), (10a) may be ambiguous with respect to the scope order of the subject QP and the negation.

(11) a. "Each person is such that he did not invite John."
(EVERY > NOT)
b. "Not everyone invited John." (NOT > EVERY)

In the previous section, we have seen some instances of INFL-movement at S-Structure. Given that syntactic processes at LF reflect those at SS (cf. Rizzi (1987)), as it is reasonable to assume, a natural hypothesis is that INFL-movement takes place at LF as well. Following Hasegawa (1987) and Hornstein (1988), let us assume that the negation operator *not* takes wide scope over the IP-adjoined QP when it is 'carried upwards' by INFL-movement at LF and that it takes narrow scope when INFL-movement does not take place. Thus, with the Scope Principle defined as in (5), we obtain the NOT > EVERY reading from (12a), and the EVERY > NOT reading from (12b).

(12) a. [$_{CP}$ [$_{C'}$ [didn't]$_2$ [$_{IP}$ everyone$_1$ [$_{IP}$ t_1 [$_{I'}$ t_2 [$_{VP}$invite John]]]]]]

b. [$_{CP}$ [$_{C'}$ [$_{IP}$ everyone$_1$ [$_{IP}$ t_1 [$_{I'}$ [didn't] [$_{VP}$invite John]]]]]]

Note that although t_2 is the trace of *didn't* in (12a), it is not a variable because the negation operator is not the sort of operator that binds a variable in the predicate calculus. Thus, although *everyone* $_1$ c-commands the trace t_2, the Scope Principle predicts that (12a) is the LF structure deriving solely the partial negation (NOT > EVERY) reading.

If INFL containing *not* has already moved at S-Structure, the negation operator takes wide scope over the QP in the subject position. Hornstein (1988) observes that the scope order of the relevant operators in (13a) is NOT > E so that the sentence is understood as a question asking whether everyone stayed, different from (13b) which asks whether anyone stayed.[6]

(13) a. Didn't someone leave?
b. Did someone not leave?

2.2. Negation and Quantifiers in Japanese

In the present section, let us consider the scope interaction of negation and quantifiers in Japanese. Just like the English cases we have seen in the previous subsection, the negation operator *nai* and a QP enter into scope relations in Japanese as well. However, as the following examples tell us, the scope of negation in Japanese may be demarcated at best as including only VP in declarative sentences, as opposed to English cases where the scope of negation may include the whole minimal clause where the negation operator occurs.[7]

(14) a. *zembu-no-gakusei* -ga Taroo-o seme -*na*- katta (koto)
all of students-NOM -ACC blame NEG PAST
"All the students did not blame Taro."
(ALL > NOT, *NOT > ALL)
b. *Jiroo-dake*-ga hon-o kawa- *na* katta (koto)

only-NOM book-ACC buy NEG PAST
"Only Jiro did not buy books."
(ONLY > NOT, *NOT > ONLY)

(15) a. Taroo-ga *zembu-no-gakusei*-o seme -*na*- katta (koto)
"Taro did not blame all the students."
(ALL > NOT, NOT > ALL)
b. Jiroo-ga *hon- dake*-o kawa- *na* -katta (koto)
"Jiro did not buy only books." ("He bought some other things.") (ONLY > NOT, NOT > ONLY)

The examples in (15), where the QPs occur in the object position, are each interpreted ambiguously between QP > NOT and NOT > QP readings. (15a), for instance, may be interpreted either as "Every student is such that Taro did not blame him/her." or as "Not every student is such that Taro blamed him/her." [6] However, when a QP is in the subject position, as in (14a,b), the QP cannot be interpreted as under the scope of negation. Thus (14a), for example, may only be interpreted as "Every person is such that (s)he did not blame Taro." The sentence may not be given a partial negation reading "Not every person is such that he/she blamed Taro."

From the above observation, it is reasonable to say that INFL-movement does not take place in Japanese declarative sentences, because the negation operator *nai* can never take wide scope over the subject QPs in (14). Thus the LF structures of (14a) and (15a), for example, are given as follows. (For an expository purpose, QPs are adjoined to the right of maximal projections in order for it to be easier to know the hierarchical relations among the negation operator and the QP in each representations.)

(16) a. (LF of (14a))
[[[[t_1 [Taroo-o seme-[$_1$ nakatta]$_{I'}$] $_{IP}$] zembu-no-gakusei-ga$_1$ $_{IP}$] $_{C'}$] $_{CP}$]

b. (LFs of (15a))

i) [[[[Taroo-ga [t_i seme-[$_i$ nakatta]$_{I'}$] $_{IP}$] zembu-no-gakusei-o_i $_{IP}$] $_{C'}$] $_{CP}$] (EVERY > NOT)

ii) [[[Taroo-ga [[[t_i seme-$_{VP}$] zembu-no-gakusei-o_i $_{VP}$] [$_I$ nakatta]$_{I'}$] $_{IP}$] $_{C'}$] $_{CP}$] (NOT > EVERY)

In (16a), INFL containing *nai* does not c-command the IP-adjoined QP nor its variable in the subject position, while the QP c-commands the negation operator. Thus the Scope Principle in (5) assigns only the QP > NOT reading to each of (14a,b). If INFL-movement were to take place in Japanese declarative sentences, the INFL containing *nai* would c-command the QP and the sentences (14a,b) should have the NOT > QP reading, contrary to the fact. Thus by *reductio ad absurdum*, we conclude that INFL-movement does not take place in Japanese declarative sentences.

Next consider the scope interaction between *nai* and a QP in the following interrogatives and antecedent clauses of conditionals.

(17) a. *zembu-no-gakusei*-ga Taroo-o seme -*na*- katta no ?
Q

"Didn't all students blame Taro?"
(ALL > NOT, NOT > ALL)

b. *Jiroo-dake*-ga hon-o kawa- *na* -katta no ?
only-NOM book-ACC buy NEG PAST Q
"Didn't only Jiro buy books?"
(ONLY > NOT, NOT > ONLY)

(18) a. dooshite *zembu-no-gakusei* -ga Taroo-o seme-*na*-katta no
why
"Why didn't all students blame Taro?"
(ALL > NOT, NOT > ALL)

b. dooshite *Jiroo-dake*-ga hon-o kawa-*na*-katta no ?
"Why didn't only Jiro buy books?"
(ONLY > NOT, NOT > ONLY)

(19) a. *zembu-no-gakusei-ga* Taroo-o seme *-nai* to, ...
if
"If all students don't blame Taro, ..."
(ALL > NOT, NOT > ALL)

b. *Jiroo-dake*-ga hon-o kawa- *nai* to, ...
"If only Jiro doesn't buy books, ..."
(ONLY > NOT, NOT > ONLY)

(20) a. Taroo-ga *zembu-no-gakusei*-o seme *-na-* katta no ?
"Didn't Taro blame all students?"
(ALL > NOT, NOT > ALL)

b. Jiroo-ga *hon- dake*-o kawa- *na* -katta no ?
"Didn't Jiro buy only books?"
(ONLY > NOT, NOT > ONLY)

(21) a. dooshite Taroo-ga *zembu-no-gakusei*-o seme-*na*-katta no
"Why didn't Taro blame all students?"
(ALL > NOT, NOT > ALL)

b. dooshite Jiroo-ga *hon-dake*-o kawa- *na* -katta no ?
"Why didn't Jiro buy only books?"
(ONLY > NOT, NOT > ONLY)

(22) a. Taroo-ga *zembu-no-gakusei*-o seme *-nai* to, ...
"If Taro doesn't blame all students, ..."
(ALL > NOT, NOT > ALL)

b. Jiroo-ga *hon- dake*-o kawa-*nai* to, ...
"If Jiro doesn't buy only books, ..."
(ONLY > NOT, NOT > ONLY)

We have seen that the scope ambiguity holds between the object QP and *nai*, but not between the subject QP and *nai* in declarative sentences: the scope of negation must be narrower than that of the subject QP. In interrogatives and conditionals, however, the subject QP may be interpreted as being in the scope of negation, as the examples in (17-19) show, while the scope

ambiguity between the object QP and the negation operator remains the same as the one in declarative sentences. In fact, the sentences in (17-19) are all ambiguous in contrast to their declarative counterparts in (14). The sentence (17a), for example, may be construed either as asking whether all students or not all students blamed Taro (NOT > ALL) or as asking whether all students kept themselves from blaming Taro or there were some students who actually cast a blame on Taro (ALL > NOT). Thus, if the addressee takes the question (17a) as asking the former, (s) he will give something like (23a) or (23b) as an answer, while (24a) or (24b) will be a possible answer to the question if the addressee interprets the question as asking the latter.

(23) ((17a) as 'Q NOT EVERY')

a. hai, zembu-no-gakusei-ga kare-o semeta no dewa
yes he-ACC not-be-
arimasen
the-case
Lit. "Yes, it is not the case that all students blamed him."

b. iie, zembu-no-gakusei-ga kare-o seme-nakatta no desu no
Lit. "No, everyone did not blame him." ("No one blamed him.")

(24) ((17a) as 'Q EVERY NOT')

a. hai, zembu-no-gakusei-ga kare-o seme-nakatta no desu
Lit. "Yes, everyone did not blame him." ("No one blamed him.")

b. iie, semeta gakusei mo imashita
also there-be-PAST
Lit. "No, there was a student [were some students] who blamed Taro."

The possibility of scope ambiguity between the subject QP and

nai in interrogatives and conditionals tells us that INFL-movement does occur in these two types of sentences, in contrast to the non-occurrence of the movement in declarative sentences. This contrast in the possibility of INFL-movement naturally leads us to state that INFL-movement does not take place freely: it is not an instance of 'free application of Move-α'. Thus we can confirm our initial hypothesis: INFL-movement takes place only when some feature triggers it.

We have left untouched at which level INFL-movement takes place in Japanese interrogatives and antecedent clauses of conditionals. Whether it takes place at S-Structure or at LF is hard to evidence in Japanese, because the INFL node and the head of CP are linearly adjacent to each other.

We may solve this question by appealing to the level at which wh-movement takes place in Japanese. It has been widely assumed that Japanese is one of the languages in which wh-movement does not take place at SS, but at LF, as opposed to such a language as English which has wh-movement at SS. In both types of languages, wh-phrases move into CP-SPEC by being attracted by the question operator Q. Then we may say that the Q feature is 'activated' at SS in English, but remains inert at SS in Japanese. If so, the same may be said to be true of INFL-movement. INFL-movement occurs at SS in English because Q has the 'triggering power' at SS in the language, while INFL-movement does not occur at SS but at LF in Japanese because Q remains inert and lacks the triggering power at SS.

3. LF-Movement of INFL in English: A Proposal

We have seen in Section 2 that INFL-movement enables the negation operator to take wide scope over the subject QP in English declarative sentences. The discussion there was based on an implicit assumption that INFL-movement can take place freely. However, the discussion of the scope interaction between negation and quantifiers in Japanese has led us to conclude that INFL-movement can occur only when there is a proper attracting feature

Q or *IF*. This contradicts our earlier implicit assumption. One might maintain that the occurrence of INFL-movement is restricted in Japanese but not in English. But it is unclear why there should be such a difference among languages. Thus what we need to assume is that there indeed can appear some triggering feature in English declarative sentences. This possibility seems worth pursuing, as shown in the following.

Let us tentatively call this feature *X* and assume that *X* is generated under C at D-Structure in the same way that *Q* or *IF* is generated. INFL-movement takes place at LF when *X* is there to attract INFL but does not when *X* is not present.

(25) a. (*X* present)

SS: $[_{CP}[\ C'[\ C\ X\ ]\ [\ _{IP}\ [_{I'}\ [_{I}$ do+not$][_{VP}\ldots\ ]]]]$

LF: $[_{CP}[\ C'[\ C\ [\ _{I}$ do+not$]_{i}\ X][_{IP}\ [_{I'}\ t_{i}[\ _{VP}\ldots\ ]]]$
$]]]$

b. (*X* not present)

SS, LF: $[\ _{CP}[\ C'[\ C\ \ ]\ [_{IP}\ [_{I'}\ [_{I}$ do+not$][_{VP}..]]]]]$

The nature of this feature is not very clear. However, Jackendoff's (1972) observation on negation scope suggests the presence of some kind of feature that we are considering. He observed that the following example yields different interpretations according to different choices of pitch accent.

(26) All the men didn't go.

This sentence yields the complete negation reading (ALL > NOT) when the sentence is read with what Jackendoff called an 'A accent'. When we read the sentence with a 'B accent', what we get is the partial negation reading (NOT > ALL).[9]

(27) a. All the men didn't go. (A accent, falling intonation)

b. All the men didn't go. (B accent, rising

intonation)

It seems reasonable to assume that these intonation patterns are determined within the sentence grammar, specifically at PF, since different pitch accents corresponds to different logical interpretations, which are determined at the level of LF.[10] A general assumption here is that the presence of a feature under C carries out the task of determining the pitch accent of the sentence at PF and assign a logical interpretation at LF, telling what type of sentence (interrogative, conditional, exclamatory, etc.) the sentence is. For instance, the feature *Q* , if it is present, signals the sentence to assume a 'rising' pitch accent at PF, triggers INFL-movement at SS, and says at LF that the sentence is interrogative. (cf. Chomsky (1988))

(28) Did Mary see John?
↗

(29)
DS: [*Q* [Mary did see John]]
⇩
SS: [did *Q* [Mary see John]]
⇩
PF: Did Mary see John? ⇦ ⇨LF: Q [Mary saw John]
↗

When no such feature is present, nothing happens so that the sentence has an unmarked, falling pitch accent, has no SAI, and is given a declarative interpretation (non-interrogative, non-conditional) at LF.

Likewise, let us assume that the presence of the feature *X* makes the pitch accent a 'rising' one at PF, just in the same manner as the feature *Q* does, and triggers the movement of INFL at LF. If the feature *X* is not present, nothing happens at either PF or LF so that the sentence has an unmarked, falling intonation contour at PF and has an interpretation in which negation takes

narrow scope. Thus the sentence in (26), if the feature *X* is present, is marked with the rising pitch accent (B accent, (27b)) and interpreted with the negation taking wide scope over the subject QP since the feature *X* triggers INFL-movement.

(30) SS: [*X* [All the men didn't go]]
LF: [$_{C'}$ [$_{1}$ didn't]$_{2}$ [$_{IP}$all the men$_{1}$ [$_{IP}$t$_{1}$[$_{I'}$ t$_{2}$ [$_{VP}$ go
]]]]]
[NOT [[ALL x: x = man][x went]]]
PF: All the men didn't go

If the feature *X* is absent, INFL-Movement does not take place at LF since there is no triggering feature for INFL to move, so that the Scope Principle in (5) assigns ALL > NOT reading. At PF, the intonation contour will be an unmarked, falling one since there is no feature yielding a rising intonation.

(31) SS: [[All the men didn't go]]
LF: [$_{C'}$ [$_{IP}$all the men$_{1}$ [$_{IP}$t$_{1}$[$_{I'}$[$_{I}$ didn't][$_{VP}$ go
]]]]]
[[ALL x: x = man][NOT [x went]]]
PF: All the men didn't go

If we are on the right track in assuming the presence of the feature *X* in the sentence grammar, we can maintain our initial hypothesis that INFL-movement takes place only when there is a proper triggering feature under C.

4. Conclusion

In this paper, we have confirmed our initial hypothesis that INFL-movement must be triggered by some feature, namely *Q* and *IF*, by considering the scope interaction between negation and QPs in Japanese. Furthermore, we have suggested the presence of the

feature *X* in English, which forms the rising intonation at PF and triggers INFL-movement at LF. Our discussion also supports the recent view of the movement rule 'Move α' (Chomsky (1988)): movement takes place only when it is required.

NOTES

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[1] I have expressed this condition elsewhere (Homma (1988a, 1989). The condition says that only those phrases that need to SPEC-HEAD agree with C can and must enter CP-SPEC. Thus QPs like *everyone* and *some girl* cannot move into CP-SPEC since such phrases do not require SPEC-HEAD agreement with C.

[2] Following Hasegawa (1987), I assume that the negation operator is adjoined onto INFL both in English and in Japanese.

[3] The examples are taken from Hasegawa (1987).

[4] This is a slightly modified definition of the Scope Principle proposed in Aoun and Li (1987) and Williams (1988).

[5] If quantifiers like *many, two, three*, etc., indefinite NPs are involved, the scope interaction with the negation patterns differently.

(i) a. Many boys didn't invite John. (QP > NOT, *NOT > QP)
    b. John didn't invite many boys. (QP > NOT, NOT > QP)
(ii) a. A boy didn't invite John. (QP > NOT, *NOT > QP)
    b. John didn't invite a boy. (QP > NOT, NOT > QP)

Unlike the quantifiers like *every* and *all*, the quantifiers in (i) and (ii) cannot be within the scope of negation when they appear in the subject position, and moreover these quantifiers can take wide scope over the negation even if they are in the object

position. Likewise, the negative polarity quantifier *any* cannot appear in the subject position of a declarative sentence.

(iii) a. *Any boy didn't invite John.
b. John didn't invite any boy.

These facts tell us that the quantifiers like *every* and *all* on one hand and the quantifiers like *many*, *a*, *any*, etc. on the other should be treated in different ways at LF. I have discussed this matter in Homma (1988b, 1989).

[6] Quantifiers like *some* and *several* are considered as 'Positive Polarity Quantifiers (PPQs)' and thus cannot be under the scope of negation in declarative sentences. (Kroch (1974), Linebarger (1980))

(i) a. Someone didn't invite John. (SOME > NOT, *NOT > SOME)
b. (*)John didn't invite someone.
(SOME > NOT (probably the 'specific' reading of *someone*), *NOT > SOME)

However, the PPQs can be in the scope of negation in interrogatives and in antecedent clauses of conditionals. For this matter, see Hasegawa (1987).

[7] The following examples involving 'Negative Polarity Quantifiers (NPQs)' might tell us that the scope of *nai* does include the whole minimal clause where it occurs, even in declarative sentences.

(i) a. *daremo* Hanako-o seme-*na*-katta (koto)
anyone ACC NEG
"*Anyone didn't blame Hanako. (No one blamed Hanako.)"
b. Taroo-ga *daremo* seme- *na* -katta (koto)
NOM anyone NEG
"Taro didn't blame anyone."

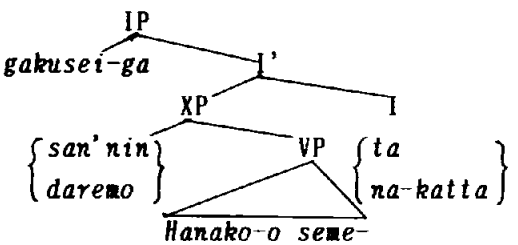
NPQs like *daremo* apparently may occur in the subject position as well as in the object position. However, we may safely say that Japanese NPQs are a kind of floated quantifiers (FQs) and thus do not occupy argument positions. As we see in the following examples, NPQs can occur in the same position that FQs occur.

(ii) a. gakusei-ga *san'nin* Hanako-o semeta (koto)
students-NOM three-Classifier
"Three students blamed Hanako."
b. Taroo-ga gakusei-o *san'nin* semeta (koto)
"Taro blamed three students."

(iii)a. gakusei-ga *daremo* Hanako-o seme-*na*-katta (koto)
"*Any students didn't blame Hanoko. (No students blamed Hanako.)"
b. Taroo-ga gakusei-o *daremo* seme-*na*-katta (koto)
"Taro didn't blame any students."

In (iia) and (iiia), the FQ *san'nin* and the NPQ *daremo* occur in the position structurally lower than the subject position. Then quite possibly we may say that the relevant position is some position lower than I'.

(iv)



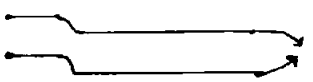
The relevant position is in the c-command domain of INFL, so it will be in the scope of negation even if INFL-movement does not take place at LF. (See also Hasegawa (1987) for the position of quantified expressions without Case-particles.)

[8] In English, however, an object QP cannot take wide scope

over negation, as the example in (10b) shows. I will leave the difference between Japanese and English for future research.

[9] Jackendoff has also observed that the choice of pitch accent affects the interpretation of sentences like the following.

(i) FRED didn't see John.



(A accent)
(B accent)

In this example, the subject NP *FRED* bears a stress and is interpreted as a focus of the sentence, while the rest of the sentence is taken as the presupposition. If (i) is read with an 'A accent', the negation is construed as constituting part of the presupposition of the sentence ((iia)). On the other hand, if the sentence assumes a 'B accent', the negation is disassociated from the presupposition ((iib)).

(ii) a. (With an A accent)
Fred $\in$ λx [x didn't see John]
"It is Fred who didn't see John.

b. (With a B accent)
Fred $\notin$ λx [x saw John]
"It is not Fred who saw John."

It is not very clear how to deal with phenomena like this in the present theory of LF, or whether it is reasonable to do so. I will leave this matter for future research.

[10] It seems rather controvertial to assume like this. At least, some pitch accent patterns are determined by extragrammatical factors: e.g. the speaker's emotion. (Masao Okazaki, p.c.) We will not touch upon this issue here.

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