"Obligatory Focus" in Japanese and Type-Shifting Principles

Toshiyuki Ogihara

Department of Linguistics

The University of Washington

Seattle, WA 98195

ogihara@u.washington.edu

Megan Crowhurst (ed.), *WCCFL 6*, 213-227, Stanford Linguistics Association

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Toshiyuki Ogihara
The University of Texas at Austin

1. Introduction

It has been acknowledged in the literature (e.g. Kuroda 1965, Kuno 1973, etc.) that in some Japanese sentences, we must assign a "focus" status to the subject NP's if they are interpretable at all. Consider the following data:

(1) John-ga kitigai-da. JOHN is crazy. It is John who is crazy.
NOM crazy ENDING
(2) John-ga hasit-te iru. John is running.
NOM run PROG

In (1), *John* must be interpreted as focused; in (2), *John* is not necessarily a focused expression. I tentatively call it the "obligatory focus" phenomenon.[1] The focus on *John* in (1) is obligatory in that it is the only interpretation available regardless of factors having to do with stress or context. It has been observed that this phenomenon is sensitive to the nature of the predicate that occurs in the sentence (Kuroda 1965, Kuno 1973). In (1) the predicate *kitigai-da* 'crazy' is intuitively a property that is part of the inherent characterization of John, and it is more or less permanent. On the other hand, *hasit-te iru* 'be running' in (2) is a temporary state that John assumes. This distinction is also useful in English. Milsark (1974, 1977) draws a similar distinction between "property predicates" such as *crazy* and "state-descriptive predicates" such as *drunk* in connection with the existential construction in English. For example, (3) is well-formed, but (4) is not:

(3) There are several people cycling along the creek.
(4) *There are several linguists intelligent.

(5) Milsark's Dichotomy of Predicates
A. Property Predicates = Individual-level Predicates (Carlson 1977)
boring, intelligent, insane, crazy, orange, fat, smart, ...
B. State-descriptive Predicates = Stage-level Predicates (Carlson 1977)
sick, tired, hungry, drunk, open, naked, cycling along the creek, ...

The descriptive generalization concerning the above Japanese data is that if a *ga*-marked subject NP composed of a name occurs with a property predicate, the subject NP is forced to receive a focused interpretation.[2] In order to avoid the focus

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[1] Knud Lambrecht (p.c., 1987) suggested to me that a similar phenomenon exists in English as well. For example, *John* in (a) must be interpreted as a focused phrase, whereas John in (b) can, but does not have to, be interpreted as focused. Capitalized words indicate strong stress.
(a) JOHN is crazy.
(b) JOHN is running.

[2] What "focus" means is not uncontroversial in the literature. For our purposes,

reading, one must employ (6), instead of (1):

(6) John-wa kitigai-da. [Lit.] Speaking of John, he is crazy.
TOP crazy

The purpose of this paper is to explain the above data: why is it that the subject NP with *ga* must be focused when it co-occurs with a property predicate?

2. Kuno's Approach

Kuno (1973) assumes that *ga* for nominative case and *ga* for exhaustive listing (or "obligatory focus" in my terms) are different *ga*'s or different uses of *ga*, at least. However, since the "obligatory focus" effect is triggered by the presence of a property predicate, *ga* does not seem to be a marker of "focus" as such. Moreover, the claim that there exists focus marker *ga* is dubious since the "obligatory focus" effect cannot be found in embedded contexts:

(7) [$_{NP}$[$_{S}$John-ga kitigai-da] to yuu koto] wa dare-mo -ga sit-te iru.
NOM crazy ENDING the-fact TOP everyone NOM know
Everyone knows the fact that John is crazy.

In (7), *John* is not forced to receive a focused interpretation. Thus, the "obligatory focus" effect of *ga* is restricted to matrix clauses. If *ga* for "exhaustive listing" were an independent lexical item separate from *ga* for nominative case, it would be very unnatural to restrict its distribution in matrix clauses. This fact leads us to believe that some independent principle at work only in matrix clauses forces a focus reading of the subject NP in some special contexts, thereby giving us the *impression* that there is a *ga* for "obligatory focus".

3. Kuroda's Theory of Judgments

The analysis that I propose in this paper presupposes Kuroda's (1972) theory of judgments. Kuroda (1972) suggests that there are two types of judgments: categorical and thetic. We could think of the former as predicational judgments, the latter non-predicational judgments.

(8) Two types of judgments (Kuroda, 1972: 154)
A. Categorical judgment = Predicational judgment [consisting of two separate acts, one, the act of recognition of that which is to be made the subject, and the other, the act of affirming or denying what is expressed by the predicate about the subject]
B. Thetic judgment = Non-predicational judgment [representing simply the recognition or rejection of material of a judgment]

Kuroda argues that Japanese sentences with a topic involve categorical (or predica-

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we assume that existential and exhaustiveness presuppositions (or implicatures) are sufficient to establish an "obligatory focus" effect. Halvorsen (1978) offers a similar idea with respect to cleft constructions in English. Kuno (1973) explicitly endorses the idea that the "obligatory focus" reading under consideration has something to do with exhaustiveness presuppositions by using the term "exhaustive listing". Since Kuno's descriptive generalization regarding the construction has not been challenged since then, we can assume that the exhaustive character of the construction is well-established. I assume, for the purpose of this paper, that Jackendoff's (1972) and Rooth's (1985) idea that focus readings involve a set of alternatives applies to a different notion of "focus" than the one that is relevant to this paper.

tional) judgments, while those without a topic generally involve thetic (or non-predicational) judgments. Since the distinction between categorical and thetic judgments may be a very hard distinction to grasp for non-native speakers of Japanese, I will explain the intuition that supports this distinction informally. Japanese sentences with a topic NP roughly correspond to the *as for* or *speaking of* construction in English, and the whole sentence can be assumed to have a topic-comment information structure. This picture corresponds to what "predication" in traditional terms is understood to involve. On the other hand, Japanese sentences without topics seem to convey a different kind of information. Suppose that someone uttered (9):

(9) Hora. Inu ga sanbiki hasit-te iru. Look! Three dogs are running. *or*
look dog NOM three run PROG There are three dogs running.

Intuitively, (9) *introduces* three entities in the discourse which are dogs and are running. It does not really assign the property of being running to three dogs that have already been established in the discourse. Kuroda takes this to be the essential distinction between sentences with a topic and those without one.

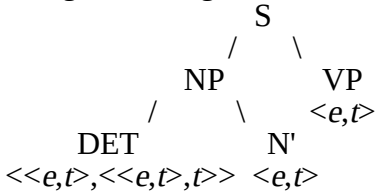
It is not clear how to capture this distinction in formal semantics. In Montague's PTQ, for example, when the truth value of a sentence is computed, the subject NP is assumed to have a semantic value of type $\langle\langle e, t\rangle, t\rangle$ and the predicate a semantic value of type $\langle e,t\rangle$, ignoring intension. They are combined to yield a truth value. This can be taken to be one possible way in which the assignment of a certain property to the individual denoted by the subject NP is represented. Let us assume, for our purposes, that if an expression whose semantic type is $\langle X,t\rangle$ and another expression whose semantic type is X (in either order) combine to yield a truth value, a categorical judgment is involved:

(10) Quasi-Montagovian Interpretation of Predicational Judgments

NP	VP	
e	$\langle e,t\rangle$	→ truth value
$\langle\langle e,t\rangle,t\rangle$	$\langle e,t\rangle$	→ truth value
SUBJECT	PREDICATE	

When an overt quantifier is involved, the mode of semantic composition for a sentence involving a categorical judgment is represented schematically in the following way:

(11) Categorical Judgments



Syntactic Rules:
S → NP VP
NP → DET N'
Semantic Rules:
⟦S⟧ = ⟦NP⟧ (⟦VP⟧)
⟦NP⟧ = ⟦DET⟧ (⟦N'⟧)

On the other hand, it is not easy to formalize the intuition involved in thetic (non-predicational) judgments. Intuitively, what is involved in thetic judgments is that the head noun (or N') of the subject NP and the predicate, both of which are assumed to be set denoting expressions, are intersected first, and a quantifier, if any, occurring in the specifier position of the NP functions as a predicate of sets and determines whether the set resulting from the intersection has a certain property.[3]

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[3] This possibility was suggested by Irene Heim (Fall 1986, class lecture) in connection with the distinction between strong and weak determiners proposed by Milsark (1977).

Although this proposal has a certain amount of plausibility, I confine myself to suggesting it as one possible way of understanding how thetic judgments work. The only assumption I will make for the purpose of the ensuing discussion of the "obligatory focus" phenomenon is that thetic sentences are represented in a way completely different from the function-argument structure that characterizes categorical sentences. Having said this, I will ignore sentences with thetic judgments throughout the rest of the paper.

4. A New Proposal

I will discuss my claim about *wa* and *ga*, which is essentially an extension of Kuroda (1972), in more specific terms. I put forth the following two hypotheses:

(12) Hypotheses:
1. The subject NP in sentences of the form "NP Predicate" is the subject of a predicational judgment if and only if it is *wa*-marked.
2. Non-predicational (thetic) judgments require state-descriptive (stage-level) predicates. (Equivalently, property (individual-level) predicates require predicational (categorical) judgments.)

The first hypothesis simply characterizes the native speaker's intuition that *wa* is the topic marker in Japanese. At this point, it is necessary to make clear what constitutes the subject and the predicate in a predicational judgment in quasi-Montagovian terms. If we assume that the truth-conditionally vacuous type-shifting operations such as $j \rightarrow \lambda PP(j)$ do not result in an endless loop of type-raising operations (e.g. raising the semantic type of a predicate to $\langle\langle\langle e,t\rangle,t\rangle,t\rangle$) and that the basic semantic types associated with syntactic categories are restricted to e and $\langle\langle e,t\rangle,t\rangle$ for NP's and $\langle e,t\rangle$ for VP's, we can simply say that the subject of a categorical judgment is some expression whose semantic type is e or $\langle\langle e,t\rangle,t\rangle$. This is adequate for our purposes.[4] The second hypothesis is that a thetic judgment requires a state-descriptive predicate. This is based on the intuition that thetic judgments always involve transitory relationships between individuals and their attributes, which we claim are denoted by state-descriptive predicates.[5]

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[4] If we do not impose any restriction on the truth-conditionally vacuous type-raising operations, the following recursive definition of *n*-th predicates determines the status of an expression with an arbitrary semantic type:
(i) An expression whose semantic type is *e* is a *0*th-order predicate.
(ii) If an expression whose semantic type is X is an *n*-th order predicate, then an expression whose semantic type is $\langle X,t\rangle$ is an *n+1*th-order predicate, where X stands for any type.
(iii) An *n*-th order predicate is the subject of a categorical judgment iff *n* is even.

[5] I pointed out independently (Ogihara 1984) that *wa*-marked NP's are always strong in the sense of Milsark (1977). This fact, in combination with hypothesis (22) 1, allows us to propose the following hypothesis:

(a) If some expression is the subject of a categorical judgment, it must be strong.

Assume that Kuroda's categorical/thetic distinction is also true of English. Then hypothesis (a) and hypothesis (22) 2 predict the fact that sentences of the form *Weak NP be Property* are prohibited in English (Milsark 1977: 15). For example, (b) is subject to neither of the two judgments:

What do these hypotheses predict? Let us list all the possibilities and discuss their implications:

(13)	John-wa hasit-te iru. TOP run PROG	[NP-wa non-property pred.]	categorical
(14)	John-ga hasit-te iru. NOM run PROG	[NP-ga non-property pred.]	thetic
(15)	John-wa kitigai-da. TOP crazy ENDING	[NP-wa property pred.]	categorical
(16)	John-ga kitigai-da. NOM crazy ENDING	[NP-ga property pred.]	????

Note that (13) through (15) are subject to one of the two judgments without any problem: *John* in (13) is *wa*-marked, so it must be subject to a predicational judgment, and the predicate, *hasit-te iru*, is compatible with a predicational judgment. *John* in (14) is *ga*-marked, so it cannot receive a predicational judgment. The predicate is a non-property and is subject to either of the two judgments. Thus, a non-predicational judgment can be rendered. *John* in (15) is *wa*-marked. Hence (15) is required to receive a predicational judgment. The predicate also requires a predicational judgment. Thus, a predicational judgment can be rendered. However, (16) is problematic. *John* is *ga*-marked. So the subject NP, *John-ga*, cannot be the subject of a categorical judgment. The sentence is not subject to a non-predicational judgment either since (16) involves a property predicate, which requires a categorical judgment. If we take the above two constraints into consideration, (16) must be disposed of as uninterpretable *unless some special mechanism is activated to assign a totally different interpretation to it*. More specifically, I claim that certain type-shifting operations are employed in order to salvage sentences like (16). As a result, the semantic values of the NP and the VP are switched, and a categorical judgment is rendered "backwards": the VP becomes the "semantic subject", and the NP the "semantic predicate". The formal tools that I will exploit for this purpose are type-shifting operators proposed and defended by Partee (1986a, 1986b).

Let us discuss concrete type-shifting operations that I am concerned with here. By type-shifting operations, I specifically mean those that serve to switch the semantic roles of the NP and the predicate. I adopt *ident* and *iota* for simple cases like (1):

(17) *ident* (j) = λx [x = j]: maps John onto the property of being John
(18) *iota* (P) = ιx [P (x)]: (partial); maps a property P onto the unique entity that has P, if there is such an entity

The point of the following translation of (1) is that semantic objects that the lexical categories are associated with are changed completely. VP has an NP-like denotation, i.e. D*e*, and NP has a predicate-like denotation, i.e. D<*e,t*>.[6]

(b) #Sm people are bald. [N.B. sm = 'weak' some]
[weak NP] [property]

Bald requires a categorical judgment, whereas *sm people* cannot be the subject of a categorical judgment.

[6] I will ignore intensions in the following discussion.

(19) 1. kitigai-da ⇒ ιx [kitigai-da' (x)]
2. John ⇒ λy[y=j]
3. John ga kitigai-da ⇒ λy[y=j] (ιx [kitigai-da' (x)])
4. ιx [kitigai-da' (x)] = j

The final line of (19) ensures that *John* receives a focused interpretation. The iota operator makes clear the existential and exhaustiveness presuppositions of the "obligatory focus" reading in that ιx [kitigai-da' (x)] is undefined unless *kitigai-da*' is the characteristic function of a singleton set. The final line says that the unique entity which (who) is crazy is John. My claim is that the existential and exhaustive presuppositions, which are often associated with focus (e.g. Halvorsen 1978), are supplied by these operations and that these presuppositions induce the "obligatory focus" effect.

At this point, I would like to explain the intuition on which my proposal is based. For example, (1) is equivalent to (20) in that *they can be used appropriately in exactly the same situations*. That is, they are not only equivalent in truth conditions but also in felicity conditions:

(20) [$_{NP}$Kitigai-na no] wa John-da. The one who is crazy is John.
crazy one TOP ENDING

(20) is called a "pseudo-cleft" sentence by some linguists (e.g. Muraki, 1974). *No* is a nominalizer and the resulting NP means 'the one who is crazy' in this particular example. Intuitively, the "nominalization" involved here serves to turn the property of being crazy into individuals having this property (i.e. crazy individuals). As the English gloss shows, this has the semantic effect of creating a definite description about an entity having the property of being crazy, although Japanese does not have a definite article. Syntactically, the predicate *kitigai-da* is not turned into an NP in (1). However, at least semantically, the same "nominalization" process can be assumed to take place even in (1).

Let me add in passing some justification for adopting type-shifting operators. From a meta-theoretical viewpoint, employing such powerful tools as type-shifting operators can be regarded as a dangerous move. This is clearly a departure from the adherence to homomorphism between syntactic categories and their semantic types that PTQ strives to achieve. One can invent a large number of mathematically possible, but linguistically unmotivated, type-shifting operators. Thus, we have every reason to be cautious. However, the particular operators that I adopt in this paper are *ident* and *iota*, which are claimed to be natural type-shifting operators by Partee (1986b), and *sigma*, which is a "generalized *iota*". Moreover, I have made clear that the type-shifting operations under consideration in this paper are licensed only when normal interpretations have failed. In other words, they are "last resort" operations. This exceptional status of the triggers of the type-shifting operations matches the exceptional status of these operations themselves. I claim that this justifies the adoption of type-shifting operations.

5. Generalized Type-Shifting Operators

The case that we considered above involves a singular non-quantificational NP, and Partee's operators *ident* and *iota* serve to yield the desired "obligatory focus" effect. However, it is clear that we need generalized type-shifting operators in order to deal with plural and quantificational NP cases. Consider examples (21) and (22) in which the same "obligatory focus" effect is observed:

(21) John to Bill ga kitigai-da.
and NOM crazy ENDING
John and Bill, and only John and Bill, are crazy.

(22) [$_{NP}$Kitigai-na no] wa John to Bill-da.
It is John and Bill that are crazy.

Let us examine what type-shifting operator is needed for predicates. Intuitively, what we need is an operator which constructs out of a property denoting expression a definite-description-like expression which denotes the maximal collection of entities which have this property. For example, given a predicate which means *be crazy*, it creates an expression which means "the ones that are crazy". I adopt the sigma operator, a generalized version of the iota operator, adopted by Link (1983):[7]

(23) *sigma* (P) = σx [P(x)] := ιx [P(x) & $\forall$y [P(y) $\rightarrow$ y$\oplus$x = x]]

The introduction of *sigma* presupposes Link's proposal about plural individuals. Following Link, I assume the circle plus operator of type <e,<e,e>>, which serves to produce a plural individual out of two (possibly plural) individuals. For example, $\oplus$ takes in two individuals j and b as its arguments and returns j$\oplus$b, which is a new individual of type *e* composed of two atomic individuals John and Bill. If one of the arguments is part of the other, the output is the same as the "bigger individual". For example, if $\oplus$ is applied to j and j$\oplus$b, the output is j$\oplus$b. The sigma operator, when applied to the property of being crazy, has the effect of forming a (possibly plural) maximal individual consisting of all the crazy individuals:

(24) kitigai-da' $\rightarrow$ σx [kitigai-da' (x)]

As far as type-shifting of NP's is concerned, the original identity function (i.e. (17)) can be preserved, on condition that plural individuals are introduced as sketched above. Using (17) and (23), (21) is analyzed in the following way:

(25) 1. John to Bill ga $\Rightarrow$ *ident*(j$\oplus$b)
2. λx[x=j$\oplus$b]
3. kitigai-da $\Rightarrow$ σx [kitigai-da' (x)]
4. John to Bill ga kitigai-da $\Rightarrow$ λx[x=j$\oplus$b] (σx [kitigai-da' (x)])
5. σx [kitigai-da' (x)] = j$\oplus$b

The final line says that the maximal individual who is crazy is equivalent to the plural individual consisting of John and Bill. This is the desired interpretation for (21).

Having shown that the type-shifting operators that I have proposed take care of cases involving conjunction, I will examine if these operators make right predictions about sentences involving quantificational NP's.

6. Quantificational NP's as Subject

How do we know whether our type-shifting operators predict well-formed focus readings for sentences involving quantificational NP's? The key is the type-shifting facts in NP's. Since *ident*, which is the type-shifting operator for NP's, requires that its arguments be of type *e*, the question is whether semantic values of type *e* can be assigned to quantificational NP's without producing any undesirable consequences. When there is an overt determiner within the NP, the question reduces to whether the following condition holds:

(26) Let α be of type <<*e*,*t*>,<<*e*,*t*>,*t*>>. There is an α' such that for all β and γ, $\Box$ [α(β)(γ) $\leftrightarrow$ γ (α' (β))].

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[7] I slightly modified the original definition of *sigma* given in Link (1983:307) for the sake of simplicity.

If (26) is satisfied, this means that for a given higher-type determiner, there is a lower type (i.e. <<*e*,*t*>, *e*>) counterpart which produces exactly the same truth conditions as the original.

A more general way of asking the same question is the following: Assume the semantic values of type <<*e*,*t*>,*t*> normally given to quantificational NP's. Also assume Link's proposal about plural individuals. Could we shift the type of a certain quantificational NP from <<*e*,*t*>,*t*> to *e* without producing any truthconditional differences? If the answer is yes, sentences involving this quantificational NP are predicted to receive well-formed readings in "obligatory focus" contexts. If the answer is no, these sentences are predicted to be uninterpretable. As PTQ shows, all NP's, including names like *John*, can receive semantic values of type <<*e*,*t*>,*t*> without predicting incorrect truth conditions. Thus, one can ask this question about all NP's including names like *John* assuming that all NP's have basic semantic values of type <<*e*,*t*>,*t*>. The question can be put formally in the following way:

(27) Let α be of type <<*e*,*t*>,*t*>. Is there an α' of type *e* such that for all β, $\Box [\alpha(\beta) \leftrightarrow \beta (\alpha')]$?

In general, given an α of type <<*e*,*t*>,*t*>, α', if any, is derived through the following operation:

(28) $\alpha' = \textit{sigma} (\cap(\alpha))$

α' is derived by first forming a set by the intersection operation (the intersection of all the sets included in α) and second by changing it to a plural individual composed of all the members of this set. From the above discussion, the type-shifting operator that converts α into α' emerges:

(29) $\lambda\mathbf{P}[\sigma y\ [\lambda x\ \forall P[\mathbf{P}(P) \rightarrow P(x)]]\ (y)] =$
$\lambda\mathbf{P}[\sigma x\ [\forall P[\mathbf{P}(P) \rightarrow P(x)]]]$
[N.B. Bold-face capital letters (e.g. **P**) are variables of type <<e,t>,t>.]

Now, the question is whether this operator, when applied to an expression of type <<*e*,*t*>,*t*>, defines an individual that meets all the requirements specified in the formula. For instance, the NP *John* in (1), assuming that it has a basic semantic value of type <<*e*,*t*>,*t*>, reduces to an expression of type *e* in the following way:

(30) 1. John $\Rightarrow \lambda QQ(j)$
2. $\lambda\mathbf{P}[\sigma x\ [\forall P[\mathbf{P}(P) \rightarrow P(x)]]]\ (\lambda QQ(j))$
3. $\sigma x\ [\forall P[\lambda QQ(j)(P) \rightarrow P(x)]]$
4. $\sigma x\ [\forall P[P(j) \rightarrow P(x)]]$
5. j

Line 4 denotes the maximal individual that has all the properties that John has. I will not go into the proof of why this reduces to j, as this is clear. Since we have succeeded in changing the type of *John* from the generalized quantifier type (i.e. <<*e*,*t*>,*t*>) to the individual type (i.e. *e*), we are now assured that this feeds into *ident*, which is the type-shifting operator for NP's.

In the case of a name like *John*, this is an overly cumbersome way of showing that it can receive a coherent meaning of type e. We knew from the start that John could receive a semantic value of type *e*, i.e. j. Therefore, j could have been fed into *ident* immediately without undergoing the translation process given in (30). The advantage of (29), however, is that it can apply to any NP of type <<*e*,*t*>,*t*> quite generally. In what follows, I will investigate whether various types of quantificational NP's are predicted to have well-formed *e*-type meanings. This, in turn, pre-

dicts whether sentences involving these quantificational NP's have well-formed "obligatory focus" readings.

6.1. Some. There are several ways of translating *some* into Japanese. The occurrences of *some* with a singular common noun are hard to translate into Japanese, and there are only two ways in which this type of information can be encoded: *dare-ka* or *nani-ka* ('who-Q' or 'what-Q', respectively). In other words, there is no way of conveying the same information as "some unicorn (or other)" or "some dog (or other)".[8] The meanings of *dare-ka* and *nani-ka* are invariably non-specific. On the other hand, *some* with a plural N' can be translated into Japanese as "*nan*-classifier-*ka*-*no*-N'."[9] This form is ambiguous between a "specific" reading and a "non-specific" reading. First, let us consider the singular indefinite case:

(31) Dare-ka-ga watasi-o aisi-te iru. Somebody loves me.
who Q NOM I ACC love PROG

This utterance is appropriate when the speaker believes that the set of people who love him is non-empty and this belief does not involve any specific person. This is very close to the interpretation of the existential quantifier in predicate logic:

(32) $\exists x$ [person' (x) & love' (x, I)]

What happens when this form occurs in the "obligatory focus" context? Let us examine the following example:

(33) ?* Dareka -ga kitigai-da. SOMEONE is crazy.
someone NOM crazy ENDING

This sentence has a very strange ring to it. Although the judgment involved is extremely subtle, I hypothesize that the marginal status of (33) stems from the fact that the maximal individual for the NP *dareka-ga* 'someone' is undefined. Let us see if this prediction is borne out.

(34) 1. dareka-ga $\Rightarrow$ *ident* (λ**P**[σx [$\forall$P[**P**(P) $\rightarrow$ P(x)]]]
(λQ$\exists$y[hito'(y) & Q(y)]))
2. *ident* (σx [$\forall$P[λQ$\exists$y[hito'(y) & Q(y)](P) $\rightarrow$ P(x)]])
3. *ident* (σx [$\forall$P[$\exists$y[hito'(y) & P(y)] $\rightarrow$ P(x)]]) [N.B. hito 'person']

Now, pay attention to the argument of *ident*, which must be of type *e*. This, if defined, denotes the maximal individual who has all the properties satisfied by at least one person. There is no such individual unless there is only one person in the model. I prove this informally here. Assume a model with two and only two persons: John and Bill. John has the property of being John (i.e. λx [x=j]); Bill has the property of being Bill (i.e. λx [x=b]). Since each of these properties is satisfied by at least one person, both of them fit the condition $\exists$y[hito'(y) & P(y)]. There are

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[8] Perhaps, "bare nouns" (nouns without any markers or modifiers) can be used in this capacity.

[9] Although the same Chinese character is used for *nani* and *nan*, their pronunciations are different. Since counters are always preceded by *nan*, not by *nani*, they may be different morphemes.

three candidates for being the maximal individual that satisfies the conditions specified in the formula: j, b, and j⊕b. However, none of them has both of the properties given above. John does not have the property of being Bill; Bill does not have the property of being John; j⊕b has neither. Therefore, the maximal individual is undefined. The NP does not have a well-defined semantic value of type *e*. We do not even have to consider type-shifting operations in predicates to conclude that (33) is uninterpretable. This is exactly what we want here.

On the other hand, plural indefinite forms sound much better in this context. As mentioned above, NP's of the form WH + classifier + Q + GEN + N' are used for plural indefinites, and they are "ambiguous". They are "ambiguous" in that they can be either specific or non-specific from the viewpoint of the speaker. Consider the following example:

(35) Nan-nin-ka-no -hito ga kitigai-da.
some (number of) people NOM crazy ENDING
SOME PEOPLE are crazy.

Although the English translation does not make clear what (35) means, it seems that this is acceptable due to the availability of a specific reading of *nan-nin-ka-no-hito*. This suggests that a specific indefinite reading allows us to refer to a certain plural individual that satisfies the descriptive content of the NP. Following Fodor and Sag (1982), I assume that the context assigns a fixed plural individual of type *e* in this case, which in turn is fed into *ident,* and this results in a well-formed "obligatory focus" reading.

6.2. Every. One way of translating *every* into Japanese is to use a *WH*-phrase plus *mo* 'also'. Let us consider the following sentence:

(36) Dare-mo-ga kitigai-da. EVERYONE is crazy.
everyone NOM crazy ENDING

This sentence is well-formed. Let us see if this fact is predicted by our proposal. * in the following translation is Link's recursive plural operator. It is prefixed to a 1-place predicate P and forms all the possible individual sums (group individuals) from the extension of ⟦P⟧ of P. Here, *dare-mo-ga* 'everyone' is translated as λQ∀z [*hito'(z) → Q(z)], the set of properties that all (possibly plural) human individuals have.

(37) 1. dare-mo-ga ⇒ *ident* (λ**P**[σx [∀P[**P**(P) → P(x)]]] (λQ∀z [*hito'(z) → Q(z)]))
2. *ident* (σx [∀P[λQ∀z [*hito'(z) → Q(z)](P) → P(x)]])
3. *ident* (σx [∀P[∀z [*hito'(z) → P(z)] → P(x)]])
4. *ident* (σx [*hito'(x)])

The equivalence of ∀P[∀z [*hito'(z) → P(z)] → P(x)] and *hito'(x) is shown in the following way:[10]

[10] The proof is due to Irene Heim.

(38) (i) Show that for any x, [*hito'(x) → ∀P[∀z [*hito'(z) → P(z)] → P(x)]] holds.
Assume *hito'(a) for an arbitrary individual *a*. Now take an arbitrary property P such that ∀x [*hito'(x) → P(x)]. By universal instantiation, it follows that P(a).
(ii) Show that for any x, [[∀P[∀z [*hito'(z) → P(z)] → P(x)]] → *hito'(x)] holds.
Assume ¬*hito'(a) for an arbitrary individual *a*.
Then ∀x[*hito'(x) → x ≠ a]. Let P be λy[y≠a].
Hence ∀x [*hito'(x) → P(x)]. But of course ¬P(a).

Now, the maximal individual that has the property of being human is the plural individual which includes all the persons in the model. Note that if hito' (assuming that only atomic individuals are allowed to have this property; hito' = the property of being *a* person) is employed instead of *hito' in the translation of *dare-mo-ga* 'everyone', the maximal individual is undefined. If hito' is employed instead of *hito', only distributive readings are permitted with *dare-mo-ga* 'every', whereas the definition of *dare-mo-ga* with *hito' allows collective readings as well. Since (36) is well-formed, the latter point of view, which is controversial in the literature, is vindicated in this particular case. The rest of the translation proceeds as follows:

(37') 5. dare-mo-ga ⇒ λx[x = σx [*hito'(x)]]
6. kitigai-da ⇒ σx [kitigai-da'(x)]
7. dare-mo-ga kitigai-da ⇒ λx[x = σx [*hito'(x)]](σx [kitigai-da'(x)])
8. σx [kitigai-da'(x)] = σx [*hito'(x)]

The final line says that the maximal crazy individual is the maximal plural human individual. This correctly describes the "obligatory focus" reading of (36).

6.3. Most. I assume that *most'* is defined in the following way:

(39) *most'* is that function **f** in D<<*e,t*>,<<*e,t*>,*t*>> such that for **a** and **b** in D<*e,t*>, **f**(**a**)(**b**)= 1 iff |{x| **a**(x) = **b**(x) = 1}| ≥1/2 |{x| **a**(x) = 1}|

Hotondo-no, which is the Japanese equivalent to the English *most*, combines with an N' to form an NP. Let us use the following sentence for an illustrative purpose:

(40) Hotondo-no hito ga kitigai-da.
most GEN person NOM crazy
MOST PEOPLE are crazy.

(40) is well-formed with a focused interpretation. However, a caveat must be added here. In using (40), the speaker seems to have the intention of referring to a certain specific set of people which constitutes a majority of people, which can be informally referred to as a "specific reading" of *hotondo-no* 'most'. Since the claim that *most* can have a specific reading is hitherto unattested in the literature, I would like to give a specific example to show what type of reading is intended here.

Suppose that there is a club which is widely known for its lunatic nature. Not knowing this fact, John joins it. He realizes immediately that most of the members are crazy. Bill, a member of the club, asks John, "You said that our club is crazy. But who is crazy, for instance? We are all nice reasonable people." John answers angrily,

(41) Dare-ga kitigai-dat-te?
who GEN crazy ENDING
Hotondo-no yatu-ra -ga kitigai-da. Omae-mo da.
most GEN guy PL NOM crazy ENDING you also ENDING
Who is crazy? MOST PEOPLE are crazy, including you.
[N.B. PL = plural marker]

It seems to me that this is quite natural, and John is in a position to be able to say which specific individuals are crazy in this context. However, I am not sure if he must be able to pinpoint each one of the crazy people. Let us see below how our proposal deals with this example:

(42) 1. hotondo-no-hito-ga ⇒ *ident* (λ**P**[σx [∀P[**P**(P) → P(x)]]] (hotondo-no' (hito')))
2. *ident* ([σx [∀P[(hotondo-no' (hito'))(P) → P(x)]]])

[N.B. We assume that the NP *hotondo-no hito* 'most people' is that function **g** in D<<*e,t*>,*t*> such that for **a** in D<*e,t*>, **g**(**a**) = 1 iff |{x| **a**(x) = 1 and x is a person}| ≥1/2 |{x| x is a person}|]

At this point, let us examine whether the argument of *ident* is defined. If defined, it is the maximal individual x such that x has all of the properties which are possessed by a majority of people. I will show that there is no such individual by giving an informal proof.

Let A be the set of all persons in the model such that |A| ≥ 3. Let us represent A with *n* elements as $\{a_1, a_2, \ldots, a_n\}$. For each element a_m of A such that $1 \leq m \leq n$, set A-$\{a_m\}$ is defined. This process gives us *n* number of new sets: A-$\{a_1\}$, A-$\{a_2\}$, ... , A-$\{a_n\}$. All the members of set A-$\{a_m\}$ for any m such that $1 \leq m \leq n$ clearly satisfy the characteristic function of A-$\{a_m\}$, which can be understood as the property of being an element of this set. Since |A|≥3, for any *m*, |A-$\{a_m\}$| ≥ 1/2 |A|. This means that for each A-$\{a_m\}$ such that $1 \leq m \leq n$, there is at least one property that all of its members, which constitute a majority of the members of A, satisfy, i.e. the property of being a member of A-$\{a_m\}$. This procedure gives us *n* properties each of which is satisfied by a majority of people. However, for each set A-$\{a_m\}$, there is one element of A, namely a_m, which does not satisfy the characteristic function of A-$\{a_m\}$. Hence, ∩ {A-$\{a_1\}$, A-$\{a_2\}$, ... , A-$\{a_n\}$} is the null set. Thus, there is no individual which satisfies all the *n* predicates that are satisfied by a majority of people. End of informal proof.

I will give a concrete example. Assume a model which contains three and only three persons: John, Mary, and Sue. Now, John and Mary have property λx [x=j ∨ x=m]; Mary and Sue have property λx [x=m ∨ x=s]; Sue and John have property λx [x=s ∨ x=j]. So we have three predicates that are satisfied by three majority groups. However, these three groups do not have a common member. Thus, there is no (maximal) individual that satisfies all the properties satisfied by a majority of people.

This amounts to predicting that sentences which contain *hotondo-no* 'most' cannot have "obligatory focus" readings if most N' is interpreted under non-specific readings. I stated earlier that (40) is well-formed under a "specific reading". Just as in the case of *some*, I assume here that the context assigns a plural specific individual of type *e* and makes it possible to receive a coherent focus reading.

6.4. Cardinals. I assume the following semantic rule for cardinals (i.e. cardinal + classifier + GEN + N') in Japanese:

(43) For any cardinal number *n*, the function $\mathbf{g}_n$ can be defined: $\mathbf{g}_n$ is in D<<*e*,*t*>,<<*e*,*t*>,*t*>> such that for **a** and **b** in D<*e*,*t*>, $\mathbf{g}_n(\mathbf{a})(\mathbf{b})$= 1 iff |{x| **a**(x) = **b**(x) = 1}| ≥ n

Let us consider the following example:

(44) San -nin -no hito ga kitigai-da.
three CL GEN person NOM crazy ENDING
THREE PEOPLE are crazy. [N.B. CL = classifier]

(44) seems to be acceptable only when the speaker has in mind a specific set of people the cardinality of which is three. This is the "specific indefinite" reading of *san-nin-no-hito*.[11] Let us see how our proposal fares with this type of example:

(45) 1. san-nin-no-hito-ga ⇒ *ident* (λ**P**[σx [∀P[**P**(P) → P(x)]]] (san-nin-no-hito'))
2. *ident* ([σx [∀P[san-nin-no-hito'(P) → P(x)]]])

[N.B. san-nin-no-hito' is that function **h** in D<<*e*,*t*>,*t*> such that for **a** in D<*e*,*t*>, **h**(**a**)= 1 iff |{x| **a**(x) = 1 and x is a person}| ≥ 3]

At this point, I would like to invoke the same consideration that was appealed to in connection with *hotondo-no* 'most'. Is there a maximal individual that satisfies all the properties at least three people have? The answer is no as long as there are at least four persons in the universe, and it is possible to show this quite generally. Here, I simply provide a specific case and show that there is no maximal individual that meets the conditions specified above. Assume a model with four and only four persons: John, Bill, Mary, and Sue. Now, John, Bill, and Mary satisfy the characteristic function of set {John, Bill, Mary}. In the same way, the elements of sets {Bill, Mary, Sue}, {Mary, Sue, John}, and {Sue, John, Bill} satisfy the characteristic functions of the sets that they belong to. Thus, all of these properties are satisfied by three people. However, no one satisfies all of the four properties. Thus, it is impossible to find the maximal individual that satisfies all the properties which are satisfied by at least three people.

The reading that we do obtain, I argue, is the one in which a plural specific individual is referred to by the speaker. The comments that I made earlier on specific indefinites apply here as well.

6.5. The. Lastly, I will consider the case of the definite description. Since Japanese has no definite article as such, *sono* 'that' is employed instead. In order to test my proposal against plural cases, I employ a plural definite NP. Consider the following example:

(46) Sono hito -tati-ga kitigai-da. THESE PEOPLE are crazy.
that person PL NOM crazy ENDING

(46) is acceptable with the focus reading. I will assume the following definition of *the*, which is good for both singular and plural cases.

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[11] One problem of NP's with cardinality indication in Japanese is that they can be "definite NP's". That is, there are circumstances where it is more appropriate to translate them into English as definite descriptions. I believe, however, that there is a genuine difference between the definite-NP-like reading of *san-nin-no-hito*, which roughly corresponds to 'the three people', and its specific indefinite reading.

(47) λPλQ[Q(σxP(x))]

The translation proceeds as follows:[12]

(48) 1. sono-hito-tati-ga ⇒ *ident* (λ**P**[σx [∀P[**P**(P) → P(x)]]] (λPλQ[Q(σyP(y))](hito-tati')))
2. *ident* (λ**P**[σx [∀P[**P**(P) → P(x)]]](λQ[Q(σy hito-tati'(y))]))
3. *ident* ([σx [∀P[λQ[Q(σy hito-tati'(y))](P) → P(x)]]])
4. *ident* ([σx [∀P[[P(σy hito-tati'(y))] → P(x)]]])
5. *ident* (σx [hito-tati'(x)])

I will show that the step from line 4 to line 5 is valid. Given the definition of the sigma operator in (23) above, the following two must be shown to be the case.

(49) (i) Show that ∀P[P(σy[hito-tati'(y)]) → P(σx[hito-tati'(x)])].
Assume that there is a property Q such that Q(σy[hito-tati'(y)]) but ¬Q(σx[hito-tati'(x)]). This is a contradiction since by assumption it is impossible for one and the same entity to have and not to have Q at the same time.
(ii) Show that for any *a*, if [∀P[[P(σy hito-tati'(y))] → P(a)]] holds, then a⊕σx [hito-tati'(x)] = σx [hito-tati'(x)] holds.
Assume that there is an *a* such that [∀P[[P(σy hito-tati'(y))] → P(a)]] and a⊕σx [hito-tati'(x)] ≠ σx [hito-tati'(x)]. Let Q be λx[x=σy hito-tati'(y)]. Then, by assumption, Q(a). This, in turn, means that a = σy hito-tati'(y). Hence, σy hito-tati'(y)⊕σx [hito-tati'(x)] ≠ σx [hito-tati'(x)], which is a contradiction.

The rest of the computation is straightforward.

(48') 6. sono-hito-tati-ga ⇒ λy[y = σx [hito-tati'(x)]]
7. kitigai-da' ⇒ σy[kitigai-da'(y)]
8. sono-hito-tati-ga kitigai-da ⇒
λz[z = σx [hito-tati'(x)]](σy[kitigai-da'(y)])
9. σy[kitigai-da'(y)] = σx [hito-tati'(x)]

This means that the maximal crazy individual is the maximal human individual. This is the desired interpretation.

7. Summary

In this paper, I have looked into the following two issues which concern the "obligatory focus" effect in Japanese: (i) How should we account for the phenomenon in a principled way?; (ii) Does the proposed analysis work even in cases involving quantificational NP's?

As for the first issue, I have contended that well-motivated natural type-shifting operators proposed by Partee serve to induce existential and exhaustive presuppositions, which are often associated with focused interpretations. This is claimed to be the reason why the "obligatory focus" reading is forced when type-shifting operations are involved.

As for the second issue, I have tried to motivate generalized type-shifting operators which serve to switch the semantic types of the NP and the VP of a given sentence. I have adopted Link's proposal about plural individuals. The particular proposal made in this paper has been shown to account for cases involving various

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[12] To be more accurate, Link's s*x[P(x)] (1983:307) should be employed in order to make clear the plurality of the NP.

quantificational NP's. The proposal made by Fodor and Sag about specific indefinites is invoked in order to cover similar cases in Japanese.

References

Barwise, Jon and Robin Cooper. 1981. Generalized Quantifiers and Natural Language. *L & P* 4. 159-219.

Carlson, Gregory N. 1977. *Reference to Kinds in English*. Ph D diss., UMass.

Fodor, Janet Dean and Ivan A. Sag. 1982. Referential and Quantificational Indefinites. *L & P* 5. 355-398.

Halvorsen, Per-Kristian. 1978. *The Syntax and Semantics of Cleft Constructions*. Ph D diss., Univ. of Texas at Austin.

Jackendoff, Ray S. 1972. *Semantic Interpretation in Generative Grammar*. Cambridge: MIT Press.

Kuno, Susumu. 1973. *The Structure of the Japanese Language*. Cambridge: MIT Press.

Kuroda, S.-Y. 1965. *Generative Grammatical Studies in the Japanese Language*. Ph D diss. MIT.

_____ 1972. The Categorical and the Thetic Judgment. *Foundations of Language* 9. 153-185.

Lambrecht, Knud. 1987. Sentence Focus, Information Structure, and the Thetic-Categorical Distinction. *BLS 13. Papers from the Parasession on Grammar and Cognition*.

Link, Godehard. 1983. The Logical Analysis of Plurals and Mass Terms: A Lattice-Theoretical Approach. *Meaning, Use, and Interpretation of Language*, eds. by R. Bauerle, Ch. Schwarze, and A. von Stechow, 302-323. Berlin: Walter de Gruyter.

_____ 1986. Generalized Quantifiers and Plurals. ms. Univ. of Munich and CSLI, Stanford.

Milsark, G. L. 1974. *Existential Sentences in English*. Ph D diss., MIT.

_____ 1977. Toward an Explanation of Certain Peculiarities of the Existential Construction in English. *Linguistic Analysis* 3. 1-29.

Montague, Richard. 1973. The Proper Treatment of Quantification in Ordinary English. Approaches to Natural Language, eds. by H. Hintikka, J. Moravcsik, and P. Suppes, 221-242. Dordrecht: D. Reidel.

Muraki, Masatake. 1974. *Presupposition and Thematization*. Tokyo: Kaitakusha.

Ogihara, Toshiyuki. 1984. Strong and Weak Determiners and *Wa* and *Ga* in Japanese. *Shizen Gengo Shori no Tame no Gengogaku ni Kansuru Kenkyuu*, 111-124. Chiba, Japan: Tokyo Rika Daigaku Rikoo Gakubu.

_____ 1986. Toward a Unified Semantic Analysis of *Wa* and *Ga* in Japanese. ms., Univ. of Texas at Austin.

Partee, Barbara H. 1986a. Ambiguous Pseudoclefts with Unambiguous *Be*. *NELS* 16.

_____ 1986b. Noun Phrase Interpretation and Type-Shifting Principles. *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers.* GRASS 8, eds. by Jeroen Groenendijk and Martin Stokhof. Dordrecht: Foris.

Rooth, Mats E. 1985. *Association with Focus.* Ph D diss., UMass.