Japanese Wh-Phrases as Operators with Unspecified Quantificational Force[*]

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1. Introduction

The precise analysis of Japanese wh-words such as *dare* 'who', *nani* 'what' and *itu* 'when' has been controversial. I argue in this paper, building on an insight of Nishigauchi (1990), that they are operators that need to be specified for quantificational force. When applied to wh-questions, this yields the covert movement analysis that Lasnik and Saito (1984) and Richards (2001) pursued on the lead of Huang's (1982) analysis of Chinese.

The Japanese wh-expressions exhibit apparently conflicting properties. First, they are interpreted differently in different contexts as the following examples show:

(1) Taroo-wa [[dare-ga sore-o tabeta] ka] sitteiru
     Taroo-TOP who-NOM it-ACC ate   Q   know
     'Taroo knows who ate it.'

(2) [[[Dare-ga   kaita] hon] mo] omosiroi
        who-NOM wrote book also interesting
     'For every x, x a person, the book that x wrote is interesting.'

In (1), *dare* indeed seems to be construed as an interrogative wh-phrase. However, it is part of universal quantification in (2), an example cited from Takahashi (2002). Then, the quantificational force originates in the particles, *ka* and *mo*, instead of *dare*. Kuroda (1965) made this observation and called the wh-words 'indeterminate pronouns'. He explicitly states that they function as "yet unbound variables." Nishigauchi (1990) develops this idea and proposes an analysis in terms of Heim's (1982) unselective binding. According to this analysis, *mo* serves as a universal quantifier and *dare* is interpreted as a variable in (2).
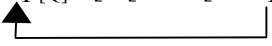
At the same time, a locality restriction is observed between a wh-expression and the associated particle. In particular, wh-island effects obtain as discussed in detail in Nishigauchi (1990) and Watanabe (1992). The examples in (3) illustrate this.

(3) a.   [[Hanako-ga   sono toki [[Taroo-ga   kuru] to]   itta] ka] osiete kudasai
       Hanako-NOM that time   Taroo-NOM come COMP said Q   teach please
       'Please tell me if Hanako said then that Taroo was coming.'

   b.   [[Hanako-ga   sono toki [[dare-ga   kuru] to]   itta] ka] osiete kudasai
       Hanako-NOM that time   who-NOM come COMP said Q   teach please
       'Please tell me who Hanako said then was coming.'

   c.   [[Hanako-ga   sono toki [[dare-ga   kuru] ka] tazuneta] ka] osiete kudasai
       Hanako-NOM that time   who-NOM come Q   asked   Q   teach please
       A.   Please tell me if Hanako asked then who was coming.
       B. ??Please tell me who Hanako asked then if she/he is coming.

(3a) shows that the question particle *ka* yields a yes/no question in the absence of a wh-expression. The most deeply embedded subject *Taroo* is changed to *dare* 'who' in (3b). This example demonstrates that a wh-expression and the associated question particle *ka* can be separated by a clause boundary. Finally, *ka* is substituted for the most deeply embedded complementizer *to* in (3c). This example should be ambiguous. If the wh-expression is associated with the lower *ka*, it should have the interpretation in A, which is indeed possible. On the other hand, if it is associated with the higher *ka*, the lower *ka* should be interpreted as 'whether' and the interpretation in B should obtain. But this interpretation is more difficult. This wh-island effect suggests that Japanese wh-questions are derived by movement.
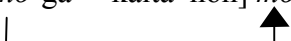
Attempts have been made to reconcile these two properties. For example, Tsai (1999) adopts Watanabe's (1992) analysis for Japanese and proposes that a null interrogative operator originates with the wh-word in the language and moves to its scope position as in (4a) whereas Chinese allows direct merger of the null operator at its scope position as in (4b).

(4) a. $[_{CP} Op_{[Q]\,x} [_{C'} [_{TP} ... [_{DP} Op_{[Q]\,x} [wh_x]] ...] C]]$

   b. $[_{CP} Op_{[Q]\,x} [_{C'} [_{TP} ... [_{DP} [wh_x]] ...] C]]$

Then, wh-expressions are construed as variables bound by interrogative operators in both languages. But wh-island effects are observed in Japanese because the interrogative operator

must move to the scope position. Particle movement analysis, as an alternative, is entertained in Maki (1995) and Hagstrom (1998) for wh-questions, and Takahashi (2002) for other quantificational constructions. For example, Takahashi proposes that *mo* in (2) originates with *dare* and moves to its surface position as in (5).

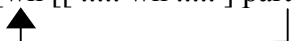(5)   [[Dare-*mo*-ga   kaita hon] *mo*] omosiroi

This analysis, like Nishigauchi's (1990), assumes that *dare* is interpreted as a variable and *mo*, which is argued to undergo movement, serves as a universal quantifier.

   Although these analyses have many attractive features, I argue that they do not quite capture the special relation between wh-expressions and the associated particles in Japanese. I propose then that wh-expressions in Japanese are operators without specific quantificational force. I argue that they must move covertly to positions that allow them to probe particles and to have their quantificational force valued. This is illustrated in (6).

(6)   [wh [[..... wh .....] particle]]

            quantificational force

The analysis basically works out Nishigauchi's (1990) idea that "the quantificational force of a wh-expression" is determined by "a quantificational particle." I show that it successfully accounts for the island sensitivity as well as the relation between wh-expressions and the associated particles. Although it incorporates the insights of the works mentioned above, it is different in one fundamental respect from most of them. Nishigauchi (1990), Tsai (1999) and Takahashi (2002) all follow Kuroda (1965) and assume that wh-expressions are interpreted as variables. I question and argue against this widely held assumption.[1]

   In the following section, I go over Nishigauchi's (1990) unselective binding analysis, illustrating the basic facts of wh-expressions in Japanese at the same time. In Section 3, I first discuss Tsai's (1999) proposal to develop this analysis on the basis of comparative syntax of Chinese and Japanese. Then, I consider Takahashi's (2002) analysis in terms of particle movement. Through the discussion, I present the motivations for the idea that wh-expressions in Japanese are not to be construed as variables but are operators. In Section 4, I outline the analysis and discuss some consequences. Section 5 concludes the paper.

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[1] Nishigauchi's (1990) analysis is nicely summarized in Nishigauchi (1991). A survey of various analyses, including Shimoyama's (2001) semantic account, can be found in Shimoyama (2008).

2. Nishigauchi's (1990) Unselective Binding Analysis

As noted above, wh-expressions in Japanese are employed in various contexts. This is illustrated in (7) with *dare* 'who'.

(7) a.   [[Dare-ga   kuru] *ka*] osiete kudasai (interrogative wh)
        who-NOM come Q   teach please
        'Please tell me who is coming.'

    b.   [dare-*mo*-ga   yomu] hon (universal quantifier)
        who-also-NOM read   book
        'the book that everyone reads'

    c.   [dare-*ka*-ga   suteta]   hon (existential quantifier)
        who-or-NOM discarded book
        'the book that someone discarded'

    d.   [dare-*de-mo*   motteiru] hon (free choice)
        who-Cop.-also have   book
        'the book that anyone has'

    e.   [dare-*mo* yomanai] hon (negative polarity)
        who-also read-not   book
        'the book that no one reads'

It should be clear from these examples that the particles in italic play crucial roles in the interpretation. Further, as shown in (2), repeated below as (8), not only the question particle *ka* but also the other particles can appear separated from the wh-words.

(8)   [[Dare-ga   kaita hon] mo] omosiroi
        who-NOM wrote book also interesting
       'For every x, x a person, the book that x wrote is interesting.'

In this example, *mo* appears on the relative head whereas *dare* 'who' is contained within the relative clause. While forms like *dare-mo* in (7b) may be lexicalized, the relation between *dare*

and *mo* in (8) is clearly mediated by syntax.[2] Hence, I focus on cases where a wh-expression and the associated particle appear apart as in this example. As the relevant cases are observed most extensively with the question particle *ka* and the universal particle *mo*, I mainly discuss these in what follows.

Nishigauchi (1990) develops Kuroda's (1965) idea that wh-words are 'indeterminate pronouns', and proposes an analysis for the diverse contexts of wh-expressions in terms of unselective binding. Let us first briefly review Heim's (1982) unselective binding before discussing his analysis. Heim assumes that quantification is represented with a tri-part clause structure as in (9b).

(9) a. Everyone is smart
    b. [Every$_x$] [x is a person] [x is smart]
    c. [Every x: x is a person] [x is smart]

The second part 'x is a person' is the restriction on the quantifier, and the last part is the core sentence. (9b) is expressed as (9c) in more familiar notation. Given this, (10a), an example of donkey anaphora, would be initially assigned the structure in (10b), pending the interpretation of the indefinite *a painting*.

(10) a. Everyone who bought a painting was satisfied with it
    b. [Every$_x$] [x is a person and x bought a painting] [x was satisfied with it]
    c. [Every$_{x, y}$] [x is a person, y is a painting, and x bought y] [x was satisfied with y]

The final structure to be obtained is (10c). Then, Heim proposes that indefinites are interpreted as variables and are unselectively bound by quantifiers. In (10b), *a painting* is interpreted as a variable bound by *every*. With a proper representation of the restriction, we derive (10c).

Although the universal quantifier that unselectively binds the indefinite is explicit in (10a),

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[2] The pattern in (8) with the universal *mo* is quite productive. On the other hand, the form, wh-word+mo, is idiosyncratic. For example, *dare-mo* 'who+mo' is allowed, but *nani-mo* 'what+mo' is not, as shown below.

(i) *Nani-mo(-ga)   oisikatta
    what-also-NOM delicious-was
    'Intended. Everything was delicious.'

Further, the particle *mo* usually cannot be followed by a Case marker, but *dare-mo* in (7b) must be. These facts suggest that *dare-mo*, for example, is lexicalized as a noun meaning 'everyone'.

it can be implicit. Thus, (11a), another typical example of donkey anaphora, is analyzed as in (11b).

(11) a.　If a man sees a panda, he chases it

　　 b.　[Every$_{x, y}$] [x is a man, y is a panda and x sees y] [x chases y]

Conditionals, Heim points out, inherently have universal force. *If* in (11a), for example, can be replaced by *whenever*. Then, the implicit universal quantifier binds the indefinites, *a man* and *a panda*, and the corresponding pronouns, *he* and *it*, as in (11b).

Heim's (1982) proposal is that indefinites are always interpreted as variables. When there is no quantifier to bind them, she assumes the operation of existential closure, which inserts an existential quantifier into the structure. (12a) is interpreted as in (12b).

(12) a.　John saw a cat

　　 b.　[Some$_x$] [x is a cat] [John saw x]

Diesing (1992), on the basis of Carlson's (1977) observations, proposes that existential closure applies to bare plural subjects of stage-level predicates as in (13) whereas a generic operator serves to bind subjects of individual-level predicates as in (14).

(13) a.　Firemen are available

　　 b.　[Some$_x$] [x is a fireman] [x is available]

(14) a.　Cats are wise

　　 b.　[Generic$_x$] [x is a cat] [x is wise]

(13a) expresses a temporal situation whereas the predicate in (14a) expresses a permanent property. The subject in (14a) is not interpreted existentially, as in 'There are wise cats', but is interpreted generically.

Nishigauchi (1990) proposes that wh-expressions in Japanese are interpreted as variables, just like indefinites, and the associated quantificational particles serve as unselective binders. This allows the embedded question in (15a) to be interpreted as in (15b).

(15) a.　Taroo-wa　[[Hanako-ga　　nani-o　　　tabeta] ka] sitteiru

　　　　　Taroo-TOP　Hanako-NOM what-ACC ate　　Q　know

　　　　　'Taroo knows what Hanako ate.'

b. [Q$_x$] [x is a thing] [Hanako ate x]

Nani in (15a) is interpreted as a variable in (15b) with the restriction that it is a thing. Similarly, (2), repeated again in (16a), receives interpretation as in (16b-c).

(16) a. [[Dare-ga   kaita hon] mo] omosiroi
         who-NOM wrote book also interesting
         'For every x, x a person, the book that x wrote is interesting.'
   b. [Every$_x$] [x is a book and *dare* wrote x] [x is interesting]
   c. [Every$_{x, y}$] [x is a book, y is a person, and y wrote x] [x is interesting]

Mo, like *every* in (10a), is assumed to be a universal quantifier on the relative head. This by itself leads to the representation in (16b). Then, *dare*, like indefinites, is unselectively bound by the universal quantifier and consequently, the interpretation in (16c) obtains.

Nishigauchi (1990) presents this unselective binding analysis, but he notes at the same time that there is a clear locality restriction between a wh-expression and the associated particle. (3) was an example illustrating the wh-island effect on a wh-expression and the question particle *ka*. Nishigauchi demonstrates that the effect is even more clearly observed on the relation between wh-expressions and the particle *mo*. A relevant example is shown in (17).

(17) a. Taroo-wa [[Hanako-ga   kuru to]   kiite] mo ikanai daroo
         Taroo-TOP   Hanako-NOM come COMP hear even go-not will
         'Taroo won't go even if he hears that Hanako is coming.'

   b. Taroo-wa [[dare-ga   kuru to]   kiite] mo ikanai daroo
         Taroo-TOP   who-NOM come COMP hear even go-not will
         'For every x, x a person, Taroo won't go even if he hears that x is coming.'

   c. Taroo-wa [[dare-ga   kuru ka] kiite] mo ikanai daroo
         Taroo-TOP   who-NOM come Q   hear even go-not will
         A. Taroo won't go even if he hears who is coming.
         B. *For every x, x a person, Taroo won't go even if he hears if x is coming.

Mo is construed as 'also, even' in the absence of a wh-expression, as (17a) shows. It can be observed in (17b) that *mo*, just like the question *ka*, need not be clausemates with the associated wh-expression. (17c) shows that an intervening *ka* blocks the association of *mo* with a wh-expression. *Dare* 'who' in this example can only be part of a question and cannot yield a

universal quantification structure with *mo*. The wh-island effects in (3c) and (17c) suggest that a wh-expression moves covertly to the vicinity of the associated particle.[3] Nishigauchi (1990), then, proposes that a government relation between the binder and the bindee is required for unselective binding to obtain.

Nishigauchi (1990) considers important data and faithfully tries to accommodate them in his analysis. At the same time, the appeal to both unselective binding and covert movement is a little puzzling. Operator movement reflects the property of the moved phrase as both an operator and a variable. For example, Chomsky's (1993) copy + deletion theory of movement yields the interpretation of a wh-chain as in (18).

(18) a.　　Who did John see?
　　　b.　　[[which x: x is a person], x] did John see [[which x: x is a person], x]
　　　c.　　[[which x: x is a person], x̶] did John see [~~which x: x is a person~~, x]

Who is an operator '[which x: x is a person]' and a variable 'x' at the same time. It is copied at an operator position as in (18b). Then, with deletion, the operator part receives interpretation at the landing site and the variable part at the initial site as in (18c). On the other hand, unselective binding applies to two independent elements; one is a quantifier and the other is a phrase that is interpreted as a variable. It is not clear why it requires movement.

It is interesting in this connection that while Nishigauchi (1990) appeals to unselective binding in his analysis, he also hints that wh-expressions in Japanese have quantificational forces of their own. For example, he states that "the quantificational force of a wh-expression" is determined by "a quantificational particle." This is not consistent with Kuroda's (1965) characterization of wh-expressions as "indeterminate pronouns," which Nishigauchi aims to develop in his analysis. I pursue this alternative conception of Japanese wh-expressions in Section 4.

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[3] Other island effects, including complex NP effects, are not observed in similar Japanese examples. Thus, (i) is perfectly grammatical.

(i)　Boku-wa　[[[nani-o　　motteiru] hito]-ni　　atte] mo　odorokanai
　　　I-TOP　　　what-ACC have　　person-DAT meet even be-surprised-not
　　　'For every x, x a thing, I won't be surprised even if I see a person who carries x.'

I assume with Nishigauchi (1990) that the movement of the wh-expression pied-pipes the whole island in these cases though the precise mechanism of pied-piping still needs to be worked out.

3. Alternatives with Null Operator Movement and Particle Movement

In this section, I consider two alternative analyses that attempt to reconcile unselective binding and the wh-island facts. I first examine Tsai's (1999) proposal that adopts Watanabe's (1992) empty operator movement analysis. Then, I discuss the particle movement analysis of Takahashi (2002). Building on their insights, I motivate the idea, already hinted at in Nishigauchi (1990), that wh-expressions in Japanese are operators that need to receive specific quantificational force from quantificational particles.

3.1 Tsai's (1999) Comparative Syntax of Wh-Questions in Chinese and Japanese

As discussed above, if Japanese wh-expressions are subject to unselective binding, it is puzzling that they exhibit wh-island effects. Tsai (1999) proposes a solution for this, but I first briefly go over his analysis of Chinese as it helps to elucidate the peculiarity of Japanese wh-expressions further.

As Tsai discusses in detail, there is abundant evidence that Chinese wh-expressions are indefinites and are interpreted with unselective binding. Let us first consider (19).

(19) Shei xian lai, shei jiu keyi xian chi ne
      who first come who then can first eat Q_{wh}
      'For which x, x a person, if x comes first, then x is allowed to eat first.'

This example is interpreted as a question with a wh-question marker. The two instances of *shei* 'who' are not interpreted as independent interrogative operators but are construed as variables bound by the same operator. This, Tsai argues, follows if *shei* is an indefinite and is unselectively bound by a null interrogative operator as in (20).

(20) $[_{CP} Op_{[Q] x} [_{TP} ... shei_x ..... shei_x ...]]$

Note that the Japanese counterpart of (19) in (21) can only be interpreted as a multiple-wh question.

(21) [Dare-ga   saisyo-ni kita-ra, dare-ga   saisyo-ni taberareru ka] (osiete kudasai)
       who-NOM first   come-if who-NOM first   eat-can   Q   teach please
       '(Tell me) for which x and y, x and y persons, if x comes first, then y can eat first.'

There is a clear difference between Chinese and Japanese here.

When the question particle *ne* is omitted from (19), then the sentence can be interpreted with universal quantification as shown in (22).

(22)   Shei xian lai,   shei (jiu) xian chi
      who first come who then first eat
      'For every x, x a person, if x comes first, then x eats first.'

This is expected if *shei* is subject to unselective binding as Tsai (1999) points out. As noted above, conditionals have implicit universal force. When the universal quantifier unselectively binds *shei*, the desired interpretation obtains. The situation with wh-expressions in Japanese is again different. (23a) is an example of donkey anaphora with an indefinite *gakusei* 'student'.

(23) a.   Gakusei-ga   ku-reba, baku-wa *pro* au
        student-NOM come-if I-TOP   meet
        'For every x, x a student, if x comes, I will meet x.'

   b. *Dare-ga   ku-reba, boku-wa *pro* au
       who-NOM come-if I-TOP   meet

Heim's (1982) analysis correctly predicts the interpretation because indefinites are construed as variables and conditionals have universal force. But when a wh-expression *dare* 'who' is substituted for the indefinite, the sentence becomes ungrammatical as shown in (23b).

As expected, Chinese wh-expressions can be interpreted with existential closure in the absence of an unselective binder. Tsai (1999) notes that the following example is ambiguous:

(24)   Akiu bu xiang chi shenme
      Akiu not want eat what
      A. 'Akiu doesn't want to eat anything.'
         ($= \neg$ [Some$_x$] [x is a thing] [Akiu wants to eat x])
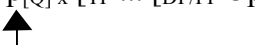   B. 'What does Akiu not want to eat?'

The wh-question reading in B obtains with a null interrogative operator. On the other hand, the interpretation in A is derived by existential closure under negation as indicated below the translation.

Finally, Chinese wh-expressions do not exhibit wh-island effects, in contrast with Japanese, as the following examples from Huang (1982) show:

(25) a. Ni   xiang-zhidao [Akiu mai-bu-mai   shenme] (ne)
    You wonder   Akiu buy-not-buy what Q_{wh}
    'What is the thing x such that you wonder whether Akiu will buy x.'

   b. Ni   xiang-zhidao [shei mai-le   shenme]
    you wonder   who buy-Asp what
    A. 'What is the thing x such that you wonder who bought x.'
    B. 'Who is the person x such that you wonder what x bought.'

(25a) can be construed as a matrix wh-question on *shenme* 'what'. And (25b) is ambiguous. In particular, it can be a matrix wh-question on *shei* 'who' or *shenme* 'what'. Tsai (1999) argues that this too follows from the unselective binding analysis because no movement applies in these examples.

Tsai's (1999) Chinese examples discussed above illustrate well that wh-expressions in the language are construed as variables and are subject to unselective binding. Then, how should the corresponding Japanese examples be analyzed? Adopting Watanabe's (1992) analysis of Japanese wh-questions, Tsai proposes that the contrasts between Chinese and Japanese should be attributed to the difference in the positions where null interrogative operators are merged. They are merged at their scope positions in Chinese whereas they originate at the edges of DPs and PPs in Japanese. This is illustrated in (26).

(26) a. Chinese
      $[_{CP} Op_{[Q] x} [_{TP} ... wh_x ...]]$

   b. Japanese
      $[_{CP} Op_{[Q] x} [_{TP} ... [_{DP/PP} Op_{[Q] x} [...wh_x ...]] ...]]$

According to this analysis, wh-expressions in Japanese questions are indefinites unselectively bound by null interrogative operators just as those in Chinese. But as the operators in Japanese are merged at the edges of DPs and PPs, they must move to their scope positions. This yields the wh-island effects.[4]

Tsai points out that this analysis enables us to capture the similarities between *dou* 'all' in

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[4] Aoun and Li (1993) and Takita and Yang (2014) discuss further contrasts between Chinese and Japanese, and also arrive at the conclusion that Chinese wh-questions are interpreted by binding whereas the Japanese counterparts are derived with movement.

Chinese and the universal particle *mo* 'also' in Japanese. An example of *dou*-quantification is shown in (27).

(27)   Akiu shei dou xiangxin
        Akiu who all   trust
        'Akiu trusts everyone.'

In this example, *dou* unselectively binds the wh-expression. (16a) with *mo*, repeated below as (28), can be analyzed similarly along the lines proposed by Nishigauchi (1990).

(28)   [[Dare-ga   kaita hon] mo] omosiroi
          who-NOM wrote book also   interesting
        'For every x, x a person, the book that x wrote is interesting.'

In this example, *mo* unselectively binds the wh-expression exactly as *dou* does in (27).

Tsai's (1990) proposal clearly is an important contribution to the comparative syntax of Chinese and Japanese. However, questions arise with the specifics of the analysis. First, it is not clear why null interrogative operators must merge with DPs or PPs in Japanese. It makes sense to merge them at their scope positions. On the other hand, if they must originate elsewhere, there must be a reason for it. But one cannot say that wh-expressions require them to be in the vicinity. In (28), for example, the wh-expression and its unselective binder appear far apart. Secondly, the analysis does not capture all the wh-island effects observed with wh-expressions in Japanese. Let us consider again (17c), repeated as (29).

(29)   Taroo-wa [[dare-ga   kuru ka] kiite] mo ikanai daroo
        Taroo-TOP   who-NOM come Q   hear even go-not will
        A.   Taroo won't go even if he hears who is coming.
        B. *For every x, x a person, Taroo won't go even if he hears if x is coming.

As Nishigauchi (1990) points out, a clear wh-island effect is observed with the association of *dare* 'who' and *mo* 'also'. But if *mo*, as a universal quantifier, can unselectively bind *dare*, this is unexpected.

Finally and most importantly, Tsai's (1999) detailed comparison of Chinese and Japanese raises doubts on the hypothesis that wh-expressions in Japanese are interpreted as variables. He acknowledges that Japanese examples similar to (22), repeated as (30), are totally ungrammatical.

(30)   Shei xian lai,   shei (jiu) xian chi
        who first come who then first eat
        'For every x, x a person, if x comes first, then x eats first.'

This is confirmed by (31).

(31) *Dare-ga   ku-reba, boku-wa dare-ni   au
        who-NOM come-if I-TOP   who-DAT meet
        'Intended. For every x, x a person, if x comes, I will meet x.'

Given the universal force of conditionals, this example should be able to have the intended interpretation if *dare* can indeed be unselectively bound. Tsai takes the ungrammaticality of examples of this kind as evidence that Japanese does not allow merger of an operator at the sentential level. But this is dubious if conditionals have intrinsic universal force because of its meaning.

   A clearer case can be made on the basis of the following examples:

(32) a.   Taroo-wa hito-ni   atte ita
           Taroo-TOP person-DAT meet was
           'Taroo was meeting a person.'
           (= [Some$_x$] [x is a person] [Taroo was meeting x])

      b. *Taroo-wa dare-ni   atte ita
           Taroo-TOP who-DAT meet was
           'Intended. Taroo was meeting a person.'

(33) a.   Taroo-wa hito-ni   awanakatta
           Taroo-TOP person-DAT met-not
           'Taroo did not see a person.'
           (= ¬ [Some$_x$] [x is a person] [Taroo saw x])

      b. *Taroo-wa dare-ni   awanakatta
           Taroo-TOP who-DAT met-not
           'Intended. Taroo did not see a person.'

Tsai (1999) has demonstrated with (24) that wh-expressions in Chinese can be interpreted with existential closure. The operation of existential closure itself should be operative in Japanese

because the indefinites in (32a) and (33a) receive existential interpretation. But then, the inserted existential quantifier should be able to bind the wh-expressions in (32b) and (33b) if they are subject to unselective binding. The ungrammaticality of the examples then indicates that wh-expressions in Japanese are not interpreted as variables.

In the following subsection, I consider Takahashi's (2002) alternative particle movement analysis. It not only overcomes some of the problems pointed out in the preceding paragraphs but also presents further insights into the nature of Japanese wh-expressions. I argue, however, that it raises new questions as well.

3.2 Takahashi's (2002) Particle Movement Analysis

In order to motivate his particle movement analysis, Takahashi (2002) shows that the relation between wh-expressions and quantificational particles is much tighter than a standard unselective binding analysis predicts. I go over this discussion first.

Recall that a standard case of unselective binding takes place between a quantifier that selectively binds a variable and an independently generated expression that is construed as a variable. Let us consider (10) again, repeated below as (34).

(34) a.   Everyone who bought a painting was satisfied with it
     b.   [Every$_x$] [x is a person and x bought a painting] [x was satisfied with it]
     c.   [Every$_{x, y}$] [x is a person, y is a painting, and x bought y] [x was satisfied with y]

As indicated in (34b), 'Every$_x$' binds the variable 'x' in the subject position and also within the restriction. Then, it enters into unselective binding relation with the indefinite *a painting* and yields (34c). Nishigauchi (1990) assumes that this happens also in the binding relation between a quantificational particle and a wh-expression. This can be seen in the analysis of (16) repeated below as (35).

(35) a.   [[Dare-ga   kaita hon] mo] omosiroi
          who-NOM wrote book also   interesting
          'For every x, x a person, the book that x wrote is interesting.'
     b.   [Every$_x$] [x is a book and *dare* wrote x] [x is interesting]
     c.   [Every$_{x, y}$] [x is a book, y is a person, and y wrote x] [x is interesting]

As noted in Section 2, *mo* is assumed to universally quantify over the relative head *hon* 'book', and then, unselectively bind *dare* 'who'. (35c) indeed seems to be the correct interpretation of

(35a).

However, Takahashi (2002) points out that *mo* is not interpreted as a universal quantifier independently of a wh-expression. First, (36a) and (36b) differ in meaning.

(36) a.   Taroo-wa   dono hon-mo   yonda
           Taroo-TOP which book-also read
           'Taroo read every book.'

     b.   Taroo-wa hon-mo   yonda
           Taroo-TOP book-also read
           'Taroo read a book also.' NOT 'Taroo read every book.'

While *mo* in (36a) serves to express universal quantification over books, *mo* in (36b) simply means 'also'.

Further, Takahashi (2002) observes that the analysis in (35) faces a problem when the adjective *omosiroi* 'interesting' is changed to a stage-level predicate. His example is given in (37).
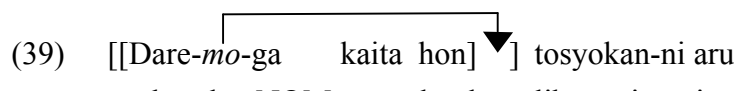
(37)   [[Dare-ga   kaita hon] mo] tosyokan-ni aru
        who-NOM wrote book also library-in   is
       'For every x, x a person, there is (also) a book that x wrote in the library.'

(37) does not mean that the library has every book of every author. It is true if there is at least one book for each author in the library. It can be paraphrased as in (38).

(38)   [Every x: x is a person] [Some y: y is a book and x wrote y] [y is in the library]

Then, the fact that (35) is construed with universal quantification over books is not because *mo* universally quantifies over *hon* 'book' but is due to other factors. It seems certainly relevant that the main predicate is individual-level. Takahashi (2002) concludes that *mo* is interpreted as a universal quantifier only with respect to a wh-expression.
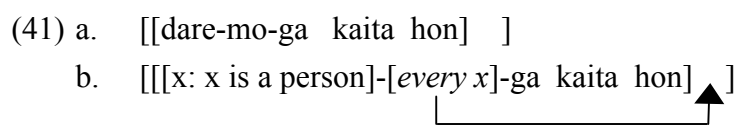
In order to capture this tight relation between wh-expressions and quantificational particles, Takahashi (2002) proposes that *mo* as a universal quantifier, for example, selects a wh-expression. Based on this, he analyzes examples like (37) with particle movement as in (39).

(39)   [[Dare-*mo*-ga   kaita hon]] tosyokan-ni aru
          who-also-NOM wrote book   library-in   is
          'For every x, x a person, (also) a book that x wrote is in the library.'

This movement seems well motivated for the purpose of interpretation. As noted in (18), operator movement establishes an operator-variable chain with copy and deletion. (18) is repeated in (40).

(40) a.   Who did John see?
     b.   [[which x: x is a person], x] did John see [[which x: x is a person], x]
     c.   [[which x: x is a person], x̶] did John see [[which x: x is a person], x]

If *dare-mo* is composed of two parts, *dare*, which is construed as a variable with a restriction, and *mo*, which is interpreted as a universal quantifier, then it should suffice to move *mo*. This is illustrated in (41).

(41) a.   [[dare-mo-ga kaita hon]   ]
     b.   [[[x: x is a person]-[*every x*]-ga kaita hon]]

     c.   [[[x: x is a person]-[*every x*]-ga kaita hon] [*every x*]]

Takahashi (2002) proposes this movement analysis specifically for quantificational particles other than the question *ka*, but similar analyses are presented for the question particle in Maki (1995) and Hagstrom (1998).

Although Takahashi's analysis has attractive features, a few questions can be raised. First, it remains to be seen whether the wh-island effect on the relation between a wh-expression and the associated particle can be captured properly with particle movement, as Takahashi acknowledges and discusses. Secondly, the analysis, like those of Nishigauchi (1990) and Tsai (1999), assumes that wh-expressions are interpreted as variables. Then, it is not clear why they cannot occur without quantificational particles and be interpreted with unselective binding. Examples like (23b), repeated as (42), indicate that this is impossible.

(42)   *Dare-ga   ku-reba, boku-wa *pro* au
       who-NOM come-if I-TOP   meet
       'Intended. For every x, x a person, if x comes, then I will meet x.'

Third, according to the analysis, a quantificational particle must always be employed together with a wh-expression. This is so because *mo*, for example, is interpreted as a universal quantifier only in conjunction with a wh-expression. Takahashi (2002) appeals to selection to guarantee this, but the nature of the selectional relation is unclear. The distributions of the relevant particles and wh-expressions suggest that it is rather the wh-expressions that require particles. The following examples show that the question particle *ka* can occur without a wh-expression, but a wh-expression cannot be interpreted without a particle:

(43) a. Taroo-wa [[Hanako-ga   nani-o   tabeta] ka] sitteiru (koto)
     Taroo-TOP   Hanako-NOM what-ACC ate   Q   know   fact
     '(the fact that) Taroo knows what Hanako ate'

  b. Taroo-wa [[Hanako-ga   wani-o   tabeta] ka] sitteiru (koto)
     Taroo-TOP   Hanako-NOM alligator-ACC ate   Q   know   fact
     '(the fact that) Taroo knows if Hanako ate alligator meat'

  c. *Taroo-wa [[Hanako-ga   nani-o   tabeta] to]   omotteiru (koto)
     Taroo-TOP   Hanako-NOM what-ACC ate   COMP think   fact

The embedded clause of (43a) is a wh-question, and that of (43b) with the same question particle *ka* is interpreted as a yes/no question. (43c) contains only a wh-expression without *ka*, and fails to receive an interpretation.
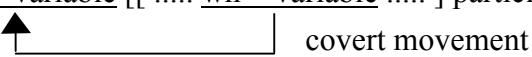
The same point applies to the particle *mo*, as shown in (44).
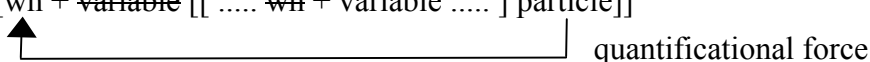
(44) a. [[Dare-ga   kaita hon] mo] tosyokan-ni aru (koto) (= (37))
       who-NOM wrote book also library-in   is   fact
       '(the fact that) for every x, x a person, there is (also) a book that x wrote in the library'
  b. [[Kaigironzya-ga kaita hon] mo] tosyokan-ni aru (koto)
       skeptic-NOM   wrote book also library-in   is   fact
       '(the fat that) there is also a book that a skeptic wrote in the library'

  c. *[Dare-ga   kaita hon]-ga   tosyokan-ni aru (koto)
       who-NOM wrote book-NOM library-in   is   fact

Mo in (44b) is interpreted as 'also' in the absence of a wh-expression. (44c), without *mo*, is totally ungrammatical. According to Takahashi's (2002) analysis, the *mo* in (44a) and that in

(44b) are different lexical items. The former is a universal quantifier whereas the latter means 'also, even'. But a unified analysis would be desirable.

If the *mo*'s in (44a) and (44b) are identical, then they should both be interpreted as 'also'. This implies that it is not a universal quantifier in (44a). Then, *dare* 'who' should be interpreted as the universal quantifier after all. Since this construal of *dare* is possible only in the presence of *mo*, the particle should be the source of its quantificational force. This brings us back to Nishigauchi's (1990) statement that "the quantificational force of a wh-expression" is determined by a "quantificational particle." The idea can be schematically expressed as in (45).

(45) a.   [wh + variable [[..... wh + variable .....] particle]]
                                                          covert movement
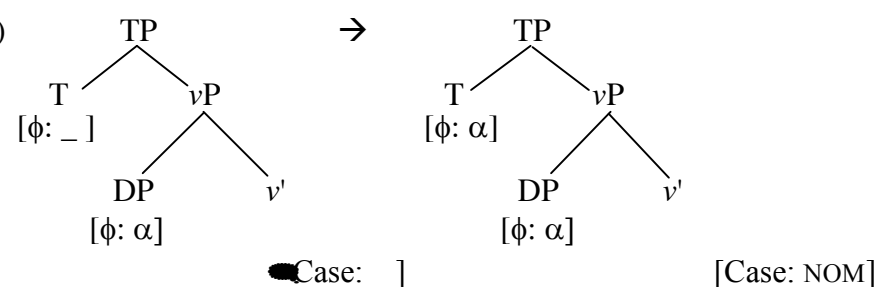
    b.   [wh + variable [[..... wh + variable .....] particle]]
                                                          quantificational force

A wh-expression is an operator without specific quantificational force. It then has to move covertly to a position where it can probe a quantificational particle that provides the required quantificational force. When it probes *mo*, the wh-expression is interpreted as a universal quantifier. I outline an analysis along this line in the following section.

4. Valuation of Operator Feature with Covert Movement

I propose in this section that the mechanism of feature valuation, widely assumed for ϕ-features and Case features, can successfully accommodate the idea illustrated in (45). I first briefly go over the mechanism of feature valuation as proposed in Chomsky (2000) and Bošković (2007), and then apply it to wh-expressions in Japanese.

Chomsky (2000) proposes that ϕ-feature agreement takes place under probe-goal relation as in (46).

(46)   TP   →   TP
        T   vP   T   vP
     [ϕ: _]   [ϕ: α]
            DP   v'   DP   v'
         [ϕ: α]   [ϕ: α]
          [Case: _]   [Case: NOM]

Subject-verb agreement is a phenomenon where the morphological form of T reflects the ϕ-feature values (for person, number, and gender) of the subject. Since T itself does not have values for these features, it searches its domain for a DP. It then enters into Agree relation with the DP and acquires its ϕ-feature values. Chomsky assumes that the Case of the DP is valued as nominative as a reflection of this agreement. Bošković (2007) develops this analysis and proposes that Case is valued also in probe-goal relation. His analysis is illustrated in (47).
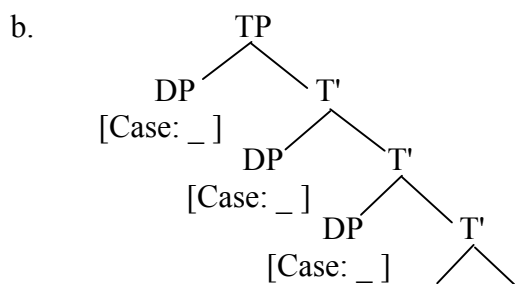
(47)

```
        TP              →            TP              →            TP
      /    \                       /    \                       /    \
    T        vP                  T        vP                  DP        T'
  [ϕ: _ ]   / \               [ϕ: α]     / \              [ϕ: α]      / \
           /   \                         /   \           [Case: NOM]  /   \
         DP     v'                     DP      v'                    T      vP
       [ϕ: α]                        [ϕ: α]                       [ϕ: α]    / \
          ◄Case: _ ]                                             [Case:   _     ]
   t      v'
```
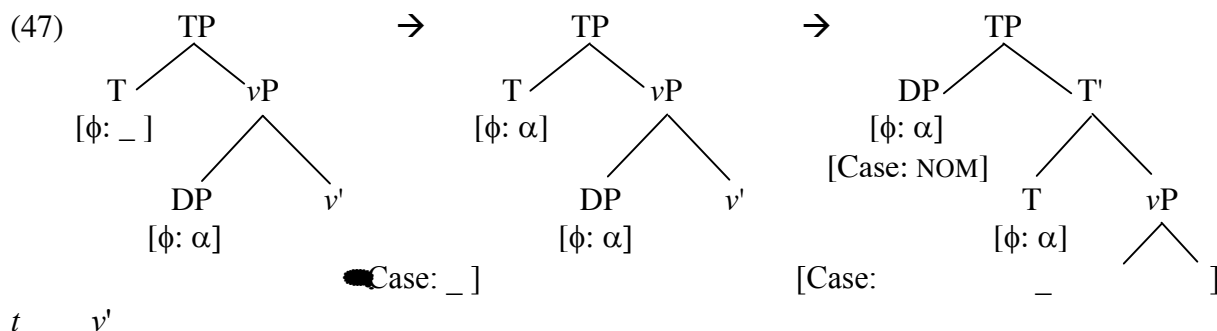
In the last step, the subject DP raises to a position from which it can probe T, and T values its Case feature as nominative.[5] This, according to Bošković (2007), motivates the movement of the subject to the specifier position of T.

In Saito (2014), I argued that the multiple nominative subject construction in Japanese provides support for Bošković's (2007) analysis. Kuno's (1973) celebrated example in (48a), for example, is accounted for as in (48b).

(48) a. Bunmeikoku-ga   dansei-ga   heikin-zyumyoo-ga   mizika-i
          civilized.country-NOM male-NOM average-life.span-NOM short-Pres.
          'It is in civilized countries that male's average life span is short.'
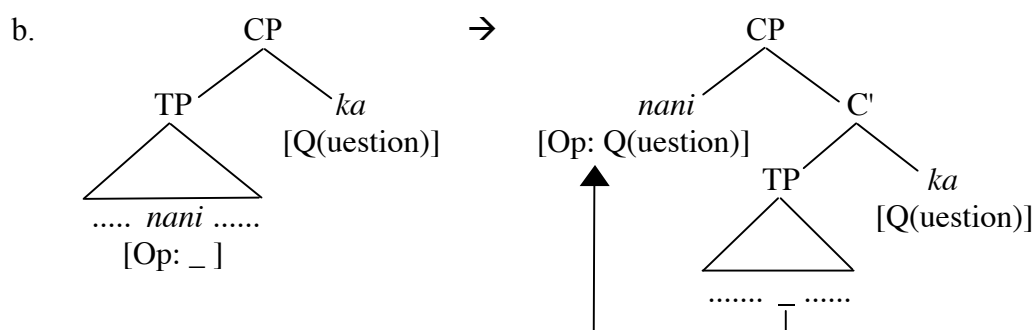
     b.
```
              TP
            /    \
          DP      T'
       [Case: _ ] / \
                DP    T'
             [Case: _ ] / \
                      DP     T'
                  [Case: _ ]  / \
```

---

[5] If probe is by definition (a feature on) a head, then the relation of DP and T here is not a probe-goal relation, strictly speaking. Hisa Kitahara suggests the possibility that Case feature valuation is mediated instead by a mechanism similar to that employed for feature sharing in Chomsky (2013). After internal merge forms {DP, T'}, search into DP yields D, the locus of Case feature, and search into T' yields T, which values the Case feature as nominative. This can be an appropriate configuration for Case valuation. The idea in effect characterizes the "Spec-head" relation in terms of search. It is more precise but I continue to use "probe-goal" in the text for ease of exposition.

<center>vP   T</center>

By assumption, all the subjects have Case features that need to be valued. As they all find T in the search domain, their Case features are valued as nominative.[6]

The mechanism of feature valuation just illustrated allows the analysis of wh-expressions in Japanese as unvalued operators that need to be specified for quantificational force. The embedded wh-question in (49a), for example, is analyzed as in (49b).

(49) a.   Taroo-wa   [[Hanako-ga   nani-o   tabeta] ka] sitteiru (= (43a))
          Taroo-TOP   Hanako-NOM what-ACC ate   Q   know
          'Taroo knows what Hanako ate.'

b.

```
        CP                    →              CP
      /    \                              /      \
    TP      ka                        nani        C'
   /  \    [Q(uestion)]          [Op: Q(uestion)]  /  \
  /____\                              ↑          TP    ka
  ..... nani ......                   |         /  \   [Q(uestion)]
      [Op: _ ]                        |        /____\
                                      |       ....... _ ......
                                      |_____|
```

Nani 'what' has an operator feature, but its value is not lexically specified. Then, it must move to a position that allows to it to probe for a quantificational particle, just like the DP in (47) raises to probe for T. The question particle values the operator feature of *nani* and turns the wh-expression into an interrogative operator.
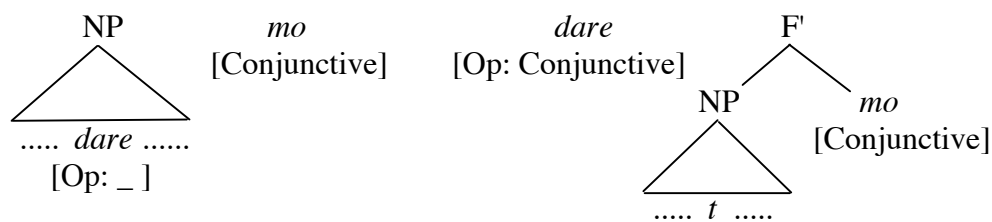
The example of universal quantification in (44a), repeated below in (50a), is analyzed in basically the same way.[7]

(50) a.   [[Dare-ga   kaita hon] mo] tosyokan-ni aru
            who-NOM wrote book also library-in   is
          'For every x, x a person, (also) a book that x wrote is in the library.'

b.

```
        FP              →              FP
       /  \                           /  \
      /    \                         /    \
```

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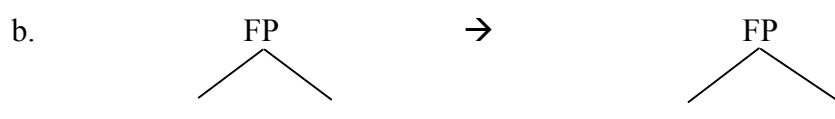
[6] Saito (2014) argues that multiple subjects are ruled out in English because of failure in labeling in the sense of Chomsky (2013). As the discussion of this would take us too far afield, I must refer the reader to the paper.

[7] As the category of *mo* is not crucial in this context, I simply use F in (50b).

NP   *mo*   *dare*   F'
      [Conjunctive]   [Op: Conjunctive]

                             NP   *mo*

..... *dare* ......   [Conjunctive]
    [Op: _]

                             ..... *t* .....

Dare 'who' moves and has its operator feature valued as conjunctive.[8] As it is widely assumed and often noted, it does not seem to be an accident that *mo* is associated with universal force. As shown in (51), this particle is employed for conjunction.

(51)   Hanako-mo   Taroo-mo   Ziroo-mo   soko-ni   ita
        Hanako-also   Taroo-also   Ziroo-also   there   was
        'Lit. Also Hanako, also Taroo, also Ziroo were there.
        = Hanako, Taroo and Ziroo were there.'

Universal quantification is equivalent to conjunction of all individuals in the domain of discourse. Thus, (52) holds when the set of persons in the domain of discourse is {a, b, c, ...}.

(52)   Everyone was there = [a and b and c and ...] were there

I assumed in (50) that this conjunctive meaning of *mo* turns *dare* 'who' into a universal quantifier.

    Similarly, the existential particle *ka* in (53a) is employed for disjunction as in (53b).

(53) a.   Dare-kara-ka   tegami-ga   todoita
          who-from-or   letter-NOM   arrived
          'A letter arrived from someone or other.'

      b.   [Hanako-ka   Taroo-ka   Ziroo-ka]-ga   soko-ni   ita
           Hanako-or   Taroo-or   Ziroo-or-NOM   there   was
           'Hanako, Taroo or Ziroo was there.'

---

[8] *Dare* 'who' is extracted out of a relative clause in (50b) and this raises the question why no island effect is observed with the example, as the reviewer points out. Although I do not have a concrete proposal to make here, there are two factors that seem relevant. The first is that Japanese relative clauses are defective as CPs and are arguably TPs, as shown by Murasugi (1991), and the second is that the final landing site is within the extended projection of the NP. Given these, it is at least not obvious that an island effect is predicted with the movement in (50b).

This is not surprising either because existential quantification is equivalent to disjunction of elements in the domain of discourse, as illustrated in (54).

(54)   Someone was there = [a or b or c or ...] was there

One advantage of the analysis proposed here is that there is no ambiguity in the interpretation of quantificational particles. For example, *ka* as a C is always interpreted as a question marker and *mo* as 'also, even'. Thus, the same *mo* occurs in both (55a) and (55b).

(55) a.   [[Taroo-ga   kite] mo]   boku-wa *pro* au
             Taroo-NOM come even   I-TOP   meet
           'Even if Taroo comes, I will meet him.'

     b.   [[Dare-ga   kite]   mo]   boku-wa *pro* au
             who-NOM come even I-TOP   meet
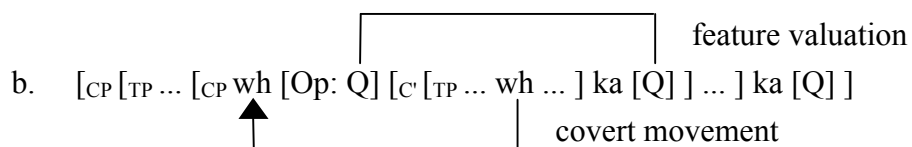   'For any x, x a person, even if x comes, I will meet x.'

It is straightforwardly interpreted as 'even' in (55a), and the same interpretation applies in (55b) as indicated in the translation. There is no need to assume that there are two *mo*'s, and that one is interpreted as 'also, even' and the other as 'every'. It is just that the *mo* in (55b) assumes an additional function, that is, it values the operator feature of *dare* and turns the wh-expression into a universal quantifier.

The analysis also provides a reason for the covert phrasal movement of wh-expressions. As noted in Section 2, Nishigauchi (1990) proposes that the movement takes place in order for unselective binding to obtain. But it is unclear why unselective binding should impose a locality requirement on the binder and the bindee. According to the analysis just presented, a wh-expression moves so that its operator feature is valued. It was shown above that a wh-expression cannot occur in the absence of a quantificational particle. If the operator feature of a wh-expression remains unvalued, the wh-expression cannot receive an interpretation. Then, it follows also that a wh-expression requires a quantificational particle that values its operator feature.

The wh-island effect examined in Nishigauchi (1990) also receives a straightforward explanation. Let us consider (3c), repeated below as (56a).

(56) a.   [[Hanako-ga   sono toki [[dare-ga   kuru] ka] tazuneta] ka] osiete kudasai
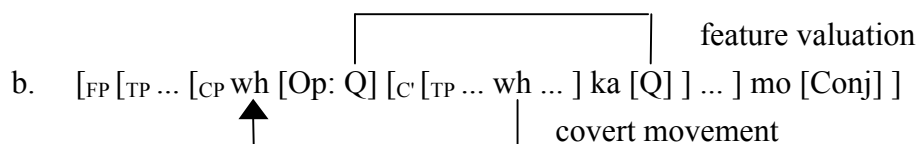   Hanako-NOM that time   who-NOM come Q   asked   Q   teach please

A. Please tell me if Hanako asked then who was coming.

B. ??Please tell me who Hanako asked then if she/he is coming.

b. $[_{CP} [_{TP} ... [_{CP}$ wh [Op: Q] $[_{C'} [_{TP} ...$ wh ...] ka [Q]] ...] ka [Q]]

feature valuation

covert movement

If CPs constitute phases as proposed in Chomsky (2000), then *dare* in (56a) must move to the edge of the most deeply embedded CP as in (56b) even if the final landing site is the edge of the higher CP. But its operator feature is valued as 'Question' at this point. Further, it can be interpreted properly as an interrogative-operator in this position. Hence, there is no need for it to move on to the edge of the higher CP. Then, the wh-island effect is a clear instance of Rizzi's (2010) criterial freezing. Once an operator moves to a position where its operator feature is properly interpreted, it cannot move further.

The island effect in (17c), repeated below as (57a), is stronger.

(57) a.   Taroo-wa [[dare-ga   kuru ka] kiite] mo   ikanai daroo

Taroo-TOP   who-NOM come Q   hear   even go-not will

A.   Taroo won't go even if he hears who is coming.

B.   *For every x, x a person, Taroo won't go even if he hears if x is coming.

b. $[_{FP} [_{TP} ... [_{CP}$ wh [Op: Q] $[_{C'} [_{TP} ...$ wh ...] ka [Q]] ...] mo [Conj]]

feature valuation

covert movement

This is also expected under the proposed analysis. *Dare* moves to the edge of the most deeply embedded CP and its operator feature is valued as 'Question'. As *dare* is properly interpreted as an interrogative-operator in this position, further movement is prohibited just as in the case of (56). In addition, in this case, if *dare* moves to the edge of the higher CP in violation of criterial freezing, then the result simply fails to be interpreted. This is so because the higher CP is not a question and an interrogative wh-operator can only be interpreted as part of a question. Hence, the interpretation in (57B) should be totally impossible.

To summarize, I argued in this section that wh-expressions in Japanese are unvalued operators that need to covertly move to obtain quantificational force from particles. The analysis allows the particles to be interpreted uniformly whether they appear in the presence or absence of wh-expressions. It accounts for why wh-expressions require particles whereas the

particles can be interpreted without wh-expressions. Finally, it provides a reason for the covert movement of wh-expressions and a straightforward explanation for the wh-island effects that the movement exhibits.

5. Conclusion

In this paper, I suggested an analysis of wh-expressions in Japanese. As it requires covert phrasal movement of wh-expressions, it resembles Nishigauchi's (1990) as well as Tsai's (1999) in some respects. Also, the arguments relied heavily on Takahahashi's (2002) criticism of the standard unselective binding analysis. He showed that quantificational particles do not create quantificational structures independently of wh-expressions. The analysis in this paper develops this insight and proposes, along the lines hinted at in Nishigauchi (1990), that wh-expressions in Japanese are operators that require their quantificational forces to be determined by the associated particles. This accounts for the fact that wh-expressions, unlike indefinites, require quantificational particles. I argued that the quantificational force of a wh-expression is determined by a quantificational particle through covert phrasal movement.

Despite its similarities with the proposals in the literature, the analysis in this paper makes a novel claim on the status of wh-expressions in Japanese. It denies the widely assumed proposal of Kuroda (1965) that Japanese wh-expressions are 'indeterminate pronouns', which receive interpretation as variables. The present analysis asserts that they are operators, along the lines of Huang (1982), Lasnik and Saito (1984), and Richards (2000). But it departs from these works in the claim that they are operators without specific quantificational force. Another consequence of the analysis concerns the valuation of operator feature. As illustrated with Chomsky (2000) and Bošković's (2007) analyses of ϕ-feature agreement and Case valuation, the proposed cases of feature valuation apply to uninterpretable features. For example, ϕ-features on Tense and Case features on DPs are not subject to semantic interpretation and only have effects on PF. On the other hand, the valuation of operator feature proposed in this paper not only has effects on semantic interpretation but is required for semantic interpretation. Then, if the analysis in this paper is on the right track, the mechanism of feature valuation is employed more extensively than generally assumed.

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