

On Clausal Comparison in Japanese and Relativization of Semi-lexical Nominals*

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This paper investigates the syntax and semantics of the clausal comparatives in Japanese. It is argued that the apparent clausal comparatives in Japanese must be (re-)analyzed as a phrasal comparative which is derived via relativization. We observe, however, that the clausal standard of comparison in Japanese does not always involve a variable of type e. Thus, I propose a hidden relative clause structure of the clausal comparatives in Japanese with a covert semi-lexical nominal Head. The gap of the raised semi-lexical nominal Head within the clausal standard is not interpreted as the variable of the type e because, despite its nominal property, it only denotes a quantity or a degree. On the basis of the syntax and semantics of numeral quantifiers, I claim the (covert) semi-lexical Heads are restricted to the two types: (i) kazu 'number' or ryoo 'amount' for the comparison of quantity, and (ii) teido 'degree' for the comparison of deviation.

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1. Introduction

In clausal comparatives (CCs), the standard of comparison is expressed by the clause which is marked by a “standard marker” such as *than* in English. Look at the examples in (1).

- (1) a. John is taller [than I am].
 b. John bought a {longer/more expensive} umbrella [than Mary did].
 c. John bought more umbrellas [than Mary did].

(1a) is the English example of the predicative comparatives (PredCCs), and (1b-c) are those of the attributive comparatives (AttCCs). (1c) expresses a comparison of quantity, and (1a) and (1b) a comparison of gradability. The CCs are considered to be derived via A'-movement of an operator which binds a degree variable, represented as *d* in (1) (cf. Bresnan (1973), Carlson (1977), Chomsky (1977), and Jackendoff (1977)).

- (2) a. John is taller [than [Op_i [I am $\langle [_{AP} d_i \text{ tall} \rangle$]]]].
 b. John bought a longer umbrella [than [Op_i [Mary did $\langle \text{buy } [_{DP} [d_i \text{ long}] \text{ umbrella} \rangle$]]]].
 c. John bought more umbrellas [than [Op_i [Mary did $\langle \text{buy } [_{DP} [d_i \text{ many}] \text{ umbrellas} \rangle$]]]].

In Japanese, the phrases marked by the locative/temporal reference-point tracking postposition *yori*(*mo*) provide the standard of comparison.¹ The examples in (3) are the Japanese CCs.

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¹ It is worth noticing that we have (at least) two types of *yori* in Japanese. Look at the example (i).

- (i) Taroo-wa [[Hanako] *yori*(*mo*)] {*zutto/motto/yori*(**mo*)} *se-ga takai*.
 Taroo-TOP Hanako THAN by.far height-NOM be.tall

The one with the emphasizing suffix *-mo* is considered to be a standard marker, whereas the one which is incompatible with *-mo* is to be an intensifier. Hereafter I use *yorimo* as the standard marker in Japanese.

- (3) a. ? Taroo-wa [[kare-no titi-ga se-ga takakatta] yorimo] (zutto) se-ga takai.
 Taroo-TOP he-GEN father-NOM height-NOM be.tall.PAST THAN (by.far) height-NOM be.tall
 ‘(Lit.) Taroo is taller than his father was tall’
- b. Taroo-wa [[Hanako-ga ~~{nagai/takai}~~ kasa-o] katta] yorimo] {nagai/takai}
 Taroo-TOP Hanako-NOM {long/expensive} umbrella-ACC bought THAN {long/expensive}
 kasa-o katta.
 umbrella-ACC bought
 ‘Taroo bought a {longer/more expensive} umbrella than Hanako did.’ (cf. Beck et al. (2004: 302))
- c. Taroo-wa [[Hanako-ga ~~kasa-o~~ katta] yorimo] (takusan) kasa-o katta.
 Taroo-TOP Hanako-NOM umbrellas-ACC bought THAN many umbrellas-ACC bought
 ‘Taroo bought more umbrellas than Hanako did’ (cf. Beck et al. (2004: 290))

(3a) is the example of the PredCC of gradability, (3b) is the AttCC of gradability, and (3c) is the AttCC of quantity.^{2,3}

The English PredCCs and AttCCs in (1a-c) constitute analytic “direct” comparatives which express a comparison of the degree to which the target of comparison possesses some property (e.g., *tallness* in (1a)). The Japanese AttCCs in (3b-c) are also direct comparatives. On the other hand, what is compared in (3a) is not just the degree of *tallness*. It is rather the degree of deviation from a standard that is being compared. This type is called “indirect” comparatives (Bartsch and Vennemann (1972)): “[the sentence (3a)] would be true if and only if the degrees to which [*Taroo*] exceeds a relevant standard of tallness are more numerous than the degrees to which [*I*] exceed a relevant standard. (Rett (2008: 112)).”

There is another difference between the English CCs and Japanese CCs. In English, so-called “Comparative Deletion” is obligatorily applied (Lechner (2001, 2004)), whereas in Japanese it seems to be optional in the case of the AttCCs that express the comparison of quantity, as shown in (4).⁴

² Whether the deletion sites in (3) involve the attributive adjectives or quantifiers as well as in the English examples (2) would be one of the important issues in the Japanese CCs. One thing I have to notice is that the AttCCs of “quantity” in Japanese do not have to involve the matrix quantifier *many*, as exemplified in (i).

- (i) Taroo-wa [[Hanako-ga kinoo ~~ringo-o~~ kattekita] yorimo] ringo-o kattekita.
 Taroo-TOP Hanako-NOM yesterday apples-ACC bought.come THAN apples-ACC bought.come
 ‘Taroo bought more apples than Hanako bought yesterday.’

What is important is that (i) cannot express the comparison of some gradable property which *the apples* possess, but only expresses that of quantity.

³ Some of the speakers report that such PredCCs in Japanese exemplified in (3a) seems to be a bit awkward when the embedded predicate is in the present tense.

- (i) ?? Taroo-wa [PP[kare-no titi-ga] se-ga takai yorimo] se-ga takai.
 Taroo-TOP he-GEN father-NOM height-NOM be.tall THAN height-NOM be.tall
 ‘Taroo is taller than me.’

It would be worse because the clausal comparison is incompatible with the individual-level predicate in Japanese, as argued in Ishii (1991). The acceptability, however, improves when the predicate is in the past form, as shown in (3a). The acceptability also improves when “-*ki* type” adjective *takai* (*taka-(k)i*) ‘high’ is replaced with “-*da* type” adjective *noppo-da* ‘high’ (cf. Nishiyama (1999)), as shown in (ii).

- (ii) Hanako-wa [[Kanojo-no haha-ga noppo-na] yorimo] noppo-da.
 Hanako-TOP she-GEN mother-NOM be.tall THAN be.tall
 ‘Hanako is taller than her mother is (tall).’

It is also lifted up when the clause which involves a variable is embedded under the bridge verb, as shown in (iii).

- (iii) Taroo_i-wa [[CP_ikimi-ga [CP_{pro_i} se-ga takai to] omotteru] yorimo] (zutto) se-ga takai.
 Taroo-TOP you-NOM height-NOM be.tall C be.thinking THAN by.far height-NOM be.tall
 ‘(Lit.) Taroo is taller than you claim that he is tall.’

In this paper, I assume that one reason why the sentence seems to be bit awkward at first site is because of redundancy.

⁴ It is also sometimes reported that the example (4b) seems to be bit awkward because of the redundancy. The acceptability improves when the sortal of the quantity which is compared is differentiated.

- (4) a. John bought more umbrellas than Mary bought (*[many umbrellas]).
 b. Taroo-wa [[Hanako-ga ([kasa-o]) katta] yorimo] (takusan) kasa-o katta.
 Taroo-TOP Hanako-NOM umbrellas-ACC bought THAN (many) umbrellas-ACC bought
 ‘Taroo bought more umbrellas than Hanako did’

However, when DP *kasa-o* ‘umbrella-ACC’ in the clausal standard is undeleted in the case of (3c), which is the AttCC that expresses the comparison of gradability, the sentence is virtually unacceptable in Japanese, as well as in English.⁵

- (5) a. John bought a longer umbrella than Mary bought (*[the long umbrella]).
 b. Taroo-wa [[Hanako-ga (?*[nagai]kasa-o) katta] yorimo] nagai kasa-o katta.
 Taroo-TOP Hanako-NOM long umbrella-ACC bought THAN long umbrella-ACC bought
 ‘Taroo bought a longer umbrella than Hanako did.’

This paper considers syntax and semantics of CCs in Japanese. The paper is organized as the following. In Section 2, I will first examine the relativization analysis of Japanese CCs proposed by Beck et al. (2004), Kennedy (2007), and Beck et al. (to appear). I will then argue that although the Japanese CCs must involve relativization, the analysis proposed by them is insufficient to account for the properties of the Japanese CCs. In Section 3, I will propose that in the Japanese CCs, the relativization of semi-lexical nominals, e.g., *kazu* ‘number’ or *teido* ‘degree’ is involved, other than that of the lexical nominals, e.g., *kasa* ‘umbrella.’ In Section 3, I will also consider the problem of the relativization of degree nominals suggested by Sudo (2009), taking a close look at the syntax and semantics of numeral quantifiers in Japanese and the extractability of the quantifiers from within DP. In Section 4, I will (re)examine the possibility of so-called “comparative subdeletion” constructions in Japanese. Section 5 is a conclusion.

2. Previous Studies

2.1. Relative Clauses and Clausal Comparatives

The subordinate clauses such as the restrictive relative clause in (6a) and the comparative clause in (6b) are considered the clausal modifiers. The operators undergo A'-movement to the left periphery of the clause in the Narrow Syntax, as shown in (i) (cf. Bresnan (1973), Carlson (1977), Chomsky (1977), and Jackendoff (1977)). They involve a variable which is bound by the operator, and function as a one-place predicate, as shown in (ii) (Partee (1975), Rullmann (1995)).

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- (i) [[Hanako-ga [ringo-o] mottekita] yorimo] Taroo-wa (takusan) mikan-o mottekita.
 Hanako-NOM apples-ACC brought THAN Taroo-TOP many oranges-ACC brought
 ‘Taroo brought more oranges than Hanako brought apples.’

⁵ The reason why the sentences are not totally unacceptable even without deletion would be because of the possibility of the comparison of deviation. See Hayashishita (2007) for the detailed discussion.

Bhatt and Takahashi (2008) observe that the attributive subcomparatives also show the same asymmetry both in English and Japanese.

- (i) a. Taroo-wa [[Hanako-ga [hon-o] katta] yori] ookuno zassi-o katta.
 Taroo-TOP Hanako-NOM books-ACC bought THAN many-GEN magazines-ACC bought
 ‘Taroo bought more magazines than Hanako bought books.’
 b. *Taroo-wa [[Hanako-ga [syoosetu-o] kaita] yori] omosiroi ronbun-o kaita.
 Taroo-TOP Hanako-NOM novel-ACC wrote THAN interesting paper-ACC wrote
 ‘*Taroo wrote a more interesting paper than Hanako wrote a novel.’

The contrast is most accounted for if we assume that the degree abstraction is possible in (ia) whereas it is not in (ib). In this paper, I will argue that relativization of the hidden Head is possible only in (ia). See also the discussion about sub-comparatives in Section 5.

- (6) a. The man [_{CP} that I saw yesterday] is her uncle.
 (i) [_{CP} [_{Op}]_i that_C [_{TP} I saw *t*_i yesterday]]
 (ii) λx . I saw *x* yesterday.
 b. John is taller than [_{CP} Bill is].
 (i) [_{CP} [_{Op}]_i than_C [_{TP} Bill is *d*_i-tall]]
 (ii) $max(\lambda d$ [tall(Bill,*d*))

The relative clauses and the comparative clauses therefore differ, depending on how the operator functions. The relative clause is interpreted as a property denoting open clause by translating *Op* as a lamda-operator. The comparative clause is, on the other hand, made into a degree denoting open clause by translating *Op* as the iota-operator, and is treated as a definite description of degrees (*ιd*. Bill is *d*-tall.). Rullmann (1995) further claims that the comparative clause in (6b) is not just the definite description but is interpreted as saying that John is in the *tall*-relation to such a degree such that is greater than the maximal degree to which Bill is tall.

2.2. Japanese Clausal Comparatives Involve Relativization

2.2.1. Degree-abstraction versus Relativization

Comparatives has the interpretation that it has by making use of the specialized morphology of each language (Stassen (1985)). Thus the issue of how to map its syntactic structure onto semantics has come to fore. Kikuchi (1987) argues that the derivation and structure of the Japanese CCs are analyzed on a par with the English clausal comparatives. He argues that the Japanese CCs also involve A'-movement of the degree operator yielding the degree-abstraction structure because they exhibit the island effects. Consider the examples illustrated below.

- (7) a. [_{Op}]_i [[John-ga *t*_i yonda to] iwareteiru to] minna-ga omotteiru]] yorimo
 John-NOM read C be.said C everyone-NOM think THAN
 Mary-wa takusan hon-o yondeiru.
 Mary-TOP many books-ACC has.read
 'Mary has read more books than everyone thinks that it is said that John read.' (Kikuchi (1987: 4))
 b. * [_{Op}]_i [sono tukue-de *t*_i yondeita hito]-o John-ga nagutta] yorimo
 that table-at be.reading.PAST person-ACC John-NOM hit THAN
 Paul-wa takusan hon-o yondeita.
 Paul-TOP many books-ACC has.read
 '(Lit.) Paul has read more books than John hit the person who read at that table.' (Kikuchi (1987: 4))

As shown in (7a) the A'-movement involved in the Japanese CCs is considered to be unbounded, and as shown in (7b) it is sensitive to the Complex-NP island.

Beck et al. (2004), however, claim that the analysis of the comparatives in English cannot be adopted for Japanese CCs. First, they argue that, in contrast to English CCs, Japanese CCs do not support the comparative subdeletion configuration, as shown in (8a).⁶ Second, the acceptability of them differs in terms of lexical properties of gradable adjectives and depending on the context, as shown by the variability of the judgments, as shown in (8b).

⁶ As I will discuss later, the example (8a) is problematic in itself because the gradable adjective *wide* in English does not correspond to the Japanese adjective *hiroi* 'large, spacious, broad.' The unacceptability of (8a) would come from the problem that we cannot compare a square measure with a length. See the discussion in Section 5.

- (8) a. *Kono tana-wa [ano doa-ga hiroi yori (mo)] (motto) takai.
 this shelf-TOP that door-NOM be.wide YORI (mo) (more) be.tall.
 ‘This shelf is taller than that door is wide.’ (Beck et al. (2004: 290))
- b. Taroo-wa [[Hanako-ga katta] yori] {^{ok}takai/{[?]/^{??}/^{/?*}}nagai} kasa-o katta.
 Taroo-TOP Hanako-NOM bought YORI expensive/long umbrella-ACC bought
 ‘Taroo bought a {more expensive/longer} umbrella than Hanako did.’ (Beck et al. (2004: 290, 302))

Although languages like Japanese have (semantically) gradable adjectives of sorts as the examples show, Beck et al. (2004) claim that they do not have binding of degree variables in the syntax.

- (9) *Degree Abstraction Parameter* (Beck et al. (2004: 325):
 A language {does, does not} have binding of degree variables in the syntax.

Notice that the degree variable is considered to be in the position of measure phrase (MP) within AP or DP. In fact, it is well known that Japanese gradable adjectives cannot host MP both in the predicative use and the attributive use as shown in (10), whereas the derived (deadjectival) nominals can as shown in (11).⁷

- (10) a. Kono biru-wa [(^{*}[_{MP}20meetoru]) takai].
 this building-TOP 20m be.tall
 ‘This building is (*20m) tall.’
- b. Kono [(^{*}[_{MP}20meetoru]) takai] biru
 this 20m be.tall building
 ‘this (*20m-)tall building’
- (11) a. Kono biru-wa [[_{MP}20meetoru-no] taka-sa] da.
 this building-TOP 20m-GEN tall-N COP
 ‘This building is 20m high.’
- b. Kono [[_{MP}20meetoru-no] taka-sa]-no biru
 this 20m-GEN tall-N-GEN building
 ‘This 20m-high building’

As discussed in Section 1, the Japanese AttCCs sometimes involve the individual gaps within the *yori*-marked clauses, as shown in (12).

- (12) a. Taroo-wa [[Hanako-ga *e* katta] (no) yori] takai kasa-o katta.
 Taroo-TOP Hanako-NOM bought NO YORI expensive umbrella-ACC bought
 ‘Taroo bought a more expensive umbrella than Hanako did.’
- b. Taroo-wa [[Hanako-ga *e* kaita] (no) yori] nagai ronbun-o kaita.
 Taroo-TOP Hanako-NOM wrote NO YORI long paper-ACC wrote
 ‘Taroo wrote a longer paper than Hanako did.’ (Beck et al. (2004: 301-302))

Note that they can also involve so-called “nominalizer” *no* at the right edge of the clause. Thus Beck et al. (2004)

⁷ On the other hand, Snyder et al. (1995) claim that AdjPs in Japanese are impoverished. They lack the position to host a degree variable, as illustrated in (i).

- (i) a. English: [_{AdjP} ____ [_{Adj'} A]]
 b. Japanese: [_{AdjP} A]

Both of the analyses come basically from the observation that the *-ki* type adjectives in Japanese cannot co-occur with the measure phrases which express the absolute value. Both Snyder et al.’s (1995) analysis and Beck et al.’s (2004) analysis entail that no operator-variable chain with respect to degree is established in the syntax of Japanese.

and Kennedy (2007) argue that the *yor*i-marked clauses do not denote a degree, or predicates of degrees, but individuals or properties of individuals and involve a corresponding matching operator. It indicates that they claim the clausal complements of *yor*i in (12) are (free) relatives that denote the maximality of the individual entity. Then the A'-movement which is involved in the Japanese CCs is relativization. According to the relativization analysis of the complement of *yor*i(*mo*), all comparatives in Japanese are phrasal since the apparent clausal complement of *yor*i(*mo*) is (re)analyzed as DP (cf. Ueyama (2004), Bhatt and Takahashi (to appear)).

- (13) a. English: [CP Op_i [TP ... ~~[DP t_i ~~adj~~ NP]] ...]]
▲ | Op-movement + Comparative Deletion~~
- b. Japanese: [DP [CP Op_i [TP ... [DP-NP] _{t_i} ...]]]
▲ | Op-movement

2.2.2. Free Relatives versus (Normally-)Headed Relatives

It is worth pointing out that Beck et al. (2004) also claim (12a) is not interpreted as “Taroo bought a more expensive umbrella than the maximum price of *what Hanako bought*,” but as “the maximum price of *the umbrella(s) that Hanako bought*.” Then relativization within the Japanese CCs must involve relativization of the individual sortal of the degree, as shown below.

- (13b)' Japanese: [DP [CP Op_i [TP ... [DP-NP] _{t_i} ...]] [NP HEAD] _{j} D⁰]
▲ | Op-movement (Relativization)

It leads us to conclude that they are relative clauses with their Head deleted under the identity condition, as shown in (14). Such a deletion is applied optionally in general.

- (14) a. Taroo-wa [[Hanako-ga t_i katta] ~~kasa _{t_i}~~ yorimo] takai kasa _{t_i} -o katta.
 b.(?) Taroo-wa [[Hanako-ga t_i katta] ~~kasa _{t_i}~~ yorimo] nagai kasa _{t_i} -o katta.
 Taroo-TOP Hanako-NOM bought THAN long umbrella-ACC bought
 ‘Taroo bought a longer umbrella than Hanako did.’
 c. Taroo-wa [[Hanako-ga t_i kaita] ~~ronbun _{t_i}~~ yorimo] nagai ronbun _{t_i} -o kaita.
 Taroo-TOP Hanako-NOM wrote THAN long paper-ACC wrote
 ‘Taroo wrote a longer paper than Hanako did.’

Shimoyama (2008) observes that the PredCCs in (15a) and (16a) are ungrammatical unless we add the nominalizer *no* or the nominal Head in the right edge of the embedded clause.

- (15) a. * Hanako-wa [Taroo-ga yatotta] yori kasikoi.
 Hanako-TOP Taroo-NOM hired THAN be.smart
 b. * Hanako is smarter than Taro hired.
 c. Hanako is smarter than the one(s) Taro hired.
 (16) a. * Kono hon-wa [Hanako-ga katta] yori takai.
 this book-TOP Hanako-NOM bought THAN be.expensive
 b. * This book is more expensive than Hanako bought.
 c. This book is more expensive than what Hanako bought.

Shimoyama claims that this is unexpected if these CCs are the free relatives, as paraphrased in (15c) and (16c), and they are thus considered to have the degree abstraction structure. The ungrammaticality of (15a) and (16a) then comes from a failure of ellipsis which is also observed in the English CCs, as shown in (15b) and (16b). If

relativization within the Japanese CCs involves the movement of the nominal Head which will be deleted under identity condition, however, the ungrammaticality of (15a) and (16a) can also be accounted for by the lack of the identical nominal antecedent in the matrix clause.⁸

2.2.3. On the Interpretative Ambiguity

Let us next consider the variability of the judgment. Following Beck et al. (2004), Kennedy (2007) first assumes that the clausal complement of *yoru* is “a relative clause that denotes the maximum plurality of things that *Hanako bought/wrote.*” Consider the example (8b) repeated below.

- (8b) Taroo-wa [[Hanako-ga katta] yori] ^{ok}{takai/^{/?/?/*}nagai} kasa-o katta.
 Taroo-TOP Hanako-NOM bought YORI expensive/long umbrella-ACC bought
 ‘Taroo bought a {more expensive/longer} umbrella than Hanako did.’ (Beck et al. (2004: 290, 302))
- (17) (#) $\lambda x. \max\{d' \mid \text{long}(x) \geq d'\} > \max\{d'' \mid \text{long}(\max\{y \mid \text{Hanako bought } y\}) \geq d''\}$ (Kennedy (2007))

He claims that “this DP can be used to refer to a plurality of long umbrellas, but it is extremely hard to understand it (except maybe as a joke) as referring to a long line of umbrellas ordered end-to-end.” Kennedy further argues that one way to do that is to ensure that the complement of *yoru* is singular, and this can be achieved through the definiteness effect of the nominalizer *no*, as observed in (12). Kennedy argues further that the acceptability of (12b), which too involves the adjective *nagai* ‘long,’ can be accounted for in terms of the contribution of the incremental theme verb *write*.

- (12b) Taroo-wa [[Hanako-ga kaita] (no) yori] nagai ronbun-o kaita.
 Taroo-TOP Hanako-NOM wrote NO YORI long paper-ACC wrote
 ‘Taroo wrote a longer paper than Hanako did.’ (Beck et al. (2004: 301-302))

The interpretation of the complement as the maximum plurality of incremental objects (which corresponds to a single atomic object) is created over the course of the event described by the verb.

It is worth noticing, however, that Beck et al. (2004) has reported that they have not been able to replicate the strong “?*” judgment for (8b) with *nagai* ‘long.’ The sentence sits in the range of “? (not quite straightforward, but not bad)” to “?? (questionable).” In fact, the occurrence of the nominalizer *no* is not necessary for the definite individual interpretation, as illustrated in (18).

- (18) a. [[_{DP} [Hanako-ga (kinoo) nakusita] \emptyset /no/(sono) kasa] yorimo] takai kasa
 Hanako-NOM yesterday lost \emptyset /NO/(that) umbrella THAN
 ‘a more expensive umbrella than (the umbrella that) Hanako lost yesterday’
- b. [[_{DP} [Hanako-ga (kinoo) nakusita] \emptyset /no/(sono) kasa] yorimo] nagai kasa
 ‘a longer umbrella than (the umbrella that) Hanako lost yesterday’

⁸ It seems that (16a) is much better (even near perfect to me) than (15a) even without the nominalizer or the overt Head. The asymmetry between them is accounted for if we postulate the relativization of the (covert) $N_{\text{semi-lex}}$ *gaku* ‘amount’ of *kin-gaku* ‘money-amount (price).’

(i) a. Hanako-wa sono hon-o {1000yen/sono gaku}-de {katta/*nakusita}.
 Hanako-TOP that book-ACC {1000yen/that price}-by {bought/*lost}

b. (Nihon-de-wa) kono hon-wa [_{DP}[Hanako-ga *pro* t_i {[?]katta/*nakusita}](gaku_i)] yorimo takai.
 Japan-at-TOP this book-TOP Hanako-NOM bought/lost price THAN be.expensive
 ‘(Lit.) In Japan, This book is more expensive than (the price that) Hanako {[?]bought/*lost} (it).’

See the discussion in Section 3. See also the analysis of *Half* Relatives (Ishii (1991)) proposed in Inada (2009a, b).

- c. [[_{DP} [Hanako-ga (kinoo) nakusita] Ø/no/(sono) ronbun] yorimo] nagai ronbun
 ‘a longer paper than (the paper that) Hanako lost yesterday’

Moreover, the maximality interpretation of the example (8b) is also possible (as a joke as Kennedy notes by himself), as illustrated in (19). Notice that the examples in (19) are two-way ambiguous: (i) the distributive interpretation and (ii) the maximality interpretation, as shown below.⁹

- (19) a. [[_{DP} [Hanako-ga (koremadeni) katta] Ø/no/**kasa**] yorimo] takai kasa
 Hanako-NOM ever bought Ø/NO/umbrellas THAN
 (i) ‘a more expensive umbrella than any other umbrellas that Hanako ever bought’
 (ii) ‘a more expensive umbrella than (the total price of) all the umbrellas that Hanako ever bought in total’
- b.(#)[[_{DP} [Hanako-ga (koremadeni) katta] Ø/no/**kasa**] yorimo] nagai kasa
 (i) ‘a longer umbrella than any other umbrellas that Hanako ever bought’
 (ii) ‘a longer umbrella than (the total length of) all the umbrellas that Hanako ever bought in total’
- c. [[_{DP} [Hanako-ga (koremadeni) kaita] Ø/no/**ronbun**] yorimo] nagai ronbun
 (i) ‘a longer paper than any other papers that Hanako ever wrote’
 (ii) ‘a longer paper than (the total length of) all the papers that Hanako ever wrote in total’

The same ambiguity is observed even without any overt Head. Therefore, without the overt Head, Japanese CCs can be three-way ambiguous: (18), (19i), and (19ii). We can now safely conclude that the variability of the acceptability observed in (8b) is the matter of pragmatic computation, not the syntax or semantics of CCs.

Note that there appear to be some cases where the maximality interpretation in (19ii) is obligatory. Look at the examples of the AttCCs of quantity, as shown in (20).

- (20) a. Taroo-wa [[_{DP}[Hanako-ga katta] Ø/??no] yorimo] takusan(-no) kasa-o katta.
 Taroo-TOP Hanako-NOM bought THAN many(-GEN) umbrellas-ACC bought
 ‘Taroo bought more umbrellas than Hanako (bought umbrellas).’ (cf. Beck et al. (2004: 302))
- b. Taroo-wa [[_{DP} [Hanako-ga (koremadeni) katta] **kasa**] yorimo] takusan(-no) kasa-o katta.
 ‘(Lit.) Taroo bought more umbrellas than the umbrellas that Hanako ever bought in total.’
- c. * Taroo-wa [[_{DP} [Hanako-ga (kinou) nakusita] (sono) **kasa**] yorimo] takusan(-no) kasa-o katta.
 ‘(Lit.) Taroo bought more umbrellas than the umbrella that Hanako lost yesterday.’

In the AttCCs of quantity, what is compared is always the maximum number of the umbrella that Hanako and Taroo each bought.

2.3. Problem with the Relativization Analysis: Optionality of the Individual Gaps

In the studies of the Japanese CCs, much attention is focused on the examples which have already involved the gap within the embedded clause which corresponds to the individual sortal of the degree. The reason would be because the obligatory deletion of the embedded nominal sortal of the degree in English (a.k.a., Comparative Deletion) is kept in mind. Therefore, as argued in Beck et al. (2004) and Kennedy (2007), the impossibility of adjectival subdeletion indicates that standards cannot be degree abstraction structures, while the possibility of subdeletion indicates that they can be.

⁹ The “maximality” reading would be obtained through the operator max as illustrated in (i).

(i) $\lambda x. \max \{n \mid \text{many}(x) \geq n\} > \max \{m \mid \text{many}(\max \{x \mid \text{Hanako bought } x\}) \geq m\}$ (Kennedy (2007))

- (21) a. Complex standards in Japanese are (only) type *e*.
 b. Complex standards in English are (potentially) type *d*. (Kennedy (2007: (26)))

First of all, however, the individual gaps are not necessarily involved in the embedded clause marked by *yorimo* in Japanese, as we have observed in Section 1.

- (22) a. ?Taroo-wa [[kare-no titi-ga se-ga takakatta] yorimo] (zutto) se-ga takai.
 Taroo-TOP he-GEN father-NOM height-NOM be.tall.PAST THAN (by.far) height-NOM be.tall
 ‘(Lit.) Taroo is taller than his father was tall’
 b. Taroo-wa [[Hanako-ga kasa-o katta] yorimo] (takusan) kasa-o katta.
 Taroo-TOP Hanako-NOM umbrellas-ACC bought THAN (many) umbrellas-ACC bought
 ‘(Lit.) Taroo bought more umbrellas than Hanako bought umbrellas.’

As has been discussed above, if the Japanese CCs involve relativization, the question arises as to how the well-formed examples in (22), which involve no individual gaps in the standard, are accounted for. In other words, there must be another hidden Head of the relative clause, i.e., other than the type *e* standard such as *kasa* ‘umbrella’ in (22b), if relativization is the only way to derive the CCs in Japanese.

With this in mind, the possibility of the comparative subdeletion constructions in Japanese must be reconsidered. Let us first look at the English examples of the comparative subdeletion shown in (23).

- (23) a. This table is longer than it is wide. (Kennedy (2007: 142))
 b. That dinner was more expensive than it was tasty. (Rett (2008: 4))

The parallel examples are observed in Japanese as shown in (24).

- (24) a. ?Kono terebi-wa [[*pro* tate-ni nagai] yorimo] (zutto) yoko-ni hiroi.
 This TV-TOP vertical-in be.long THAN (by.far) horizontal-in be.wide
 ‘This TV display is wider than it is tall.’
 b. ?Sakuban-no yuusyoku-wa [[sore-ga oisi-katta] yorimo] (zutto) taka-katta.
 last.night-GEN dinner-TOP it-NOM be.tasty-PAST THAN (by.far) be.expensive-PAST
 ‘Yesterday’s dinner was more expensive than it was tasty.’

Both in English and Japanese, the comparative subdeletion constructions are possible constituting the comparison of deviation (indirect comparatives).¹⁰

Note that the “gapless” CCs in Japanese cannot be considered as an instance of the Head internal relatives (Kuroda (1999)). In the “gapless” PredCCs, there is no possible DP involved which can be considered as a Head in-situ, as illustrated in (25).

- (25) a. [[DP [CP Hanako-ga se-ga takakatta] **no**] yori] (zutto) se-ga takai
 b. * [[DP [CP *Op*_i Hanako-ga *t*_i takakatta] **se**] yori] (zutto) se-ga takai

Kawahara (to appear) argues that the example like (22b) cannot be analyzed as an instance of the Head internal relatives, neither. Consider the examples in (26).

¹⁰ The acceptability of the comparative subdeletion construction in Japanese will be lifted up when the standard marker is replaced with *izyooni* ‘than,’ which is a specialized marker for the comparison of deviation. See the discussion in Hayashishita (2007).

- (26) a. * Ichiroo-wa [[Hideo-ga ronbun-o kakeru] no]-o yonda.
 Ichiroo-TOP Hideo-NOM papers-ACC write.can NO-ACC read
 ‘Ichiroo read papers that Hideo can write.’
- b. Ichiroo-wa [[Hideo-ga ronbun-o kakeru] (no) yori] takusan hon-o kakeru.
 Ichiroo-TOP Hideo-NOM papers-ACC write.can (NO) YORI many books-ACC write.can
 ‘Ichiroo can write more books than Hideo can write papers.’ (Kawahara (ms.: 19))

As shown in (26), with the individual-level predicate *kakeru* ‘able to write,’ the phrase involving the Head in-situ cannot be counted as DP, while it can still be allowed in the complement of *yori*. Then, the Head of the relative clauses within the CCs in (22) (and the subcomparatives in (24)) must be something else.

3. Relativization of Semi-lexical Nominals

3.1. The Hidden Structure of the Japanese CCs

So far we have observed that the degree variable is considered to be in the position of measure phrase (MP), and Japanese gradable adjectives cannot host MP. Therefore, Japanese “lacks a syntactic binding of the degree variable,” and we cannot dispense with relativization from the derivation of the Japanese CCs. If so, one could argue that the ill-formedness of (5b) repeated below is due to the requirement that there should be a nominal gap that corresponds to the deleted Head of the relative clause in the base position.

- (5b) Taroo-wa [[Hanako-ga (?*[(nagai)kasa-o]) katta] yorimo] nagai kasa-o katta.
 Taroo-TOP Hanako-NOM long umbrella-ACC bought THAN long umbrella-ACC bought
 ‘Taroo bought a longer umbrella than Hanako did.’

However, we have also observed that the Japanese CCs can be “gapless” from the perspective of the relativization analysis, as repeated below.

- (22) a. ? Taroo-wa [[kare-no titi-ga se-ga takakatta] yorimo] (zutto) se-ga takai.
 Taroo-TOP he-GEN father-NOM height-NOM be.tall.PAST THAN (by.far) height-NOM be.tall
 ‘(Lit.) Taroo is taller than his father was tall’
- b. Taroo-wa [[Hanako-ga kasa-o katta] yorimo] (takusan) kasa-o katta.
 Taroo-TOP Hanako-NOM umbrellas-ACC bought THAN (many) umbrellas-ACC bought
 ‘(Lit.) Taroo bought more umbrellas than Hanako bought umbrellas.’

The question thus arises as to how the well-formedness of the examples in (22), which involve no individual gap in the clausal standard, is accounted for if the Japanese CCs must involve relativization.¹¹

In this paper, extending the analysis by Beck et al. (2004), I propose a hidden relative clause structure with a (covert) semi-lexical nominal (henceforth, $N_{\text{semi-lex}}$) *teido* ‘degree’ for the PredCCs, and *kazu* ‘number’ or *ryoo*

¹¹ The same paradigm is observed when the adjectives in the matrix clause are predicative, as shown in (i).

- (i) a. [[Taroo-no mottekita] ringo]-wa [[Hanako-ga [ringo-o] mottekita] yorimo] ooi.
 Taroo-GEN brought apples-TOP Hanako-NOM apples-ACC brought THAN be.many
 ‘The apples Taroo brought outnumber those that Hanako brought’
- b. ?*[[Taroo-no mottekita] ringo]-wa [[Hanako-ga [(akai) ringo-o] mottekita] yorimo] akai.
 Taroo-GEN brought apple-TOP Hanako-NOM red apple-ACC brought THAN be.red
 ‘The apple that Taroo brought is redder than the apple that Hanako brought.’

‘amount’ for the AttCCs of quantity, as the possible Head.¹²

- (27) ? Taroo-wa [PP[DP[TP kare-no titi-ga t_i se-ga takakatta] [N(teido)]_i] yorimo] (zutto)
 Taroo-TOP he-GEN father-NOM height-NOM be.tall.PAST THAN (by.far)
 se-ga takai.
 height-NOM be.tall
 ‘(Lit.) Taroo is taller than the degree that his father was tall’
- (28) a. Taroo-wa [PP[DP[TP Hanako-ga [DP t_i kasa-o] katta] [N(kazu)]_i] yorimo] takusan
 Taroo-TOP Hanako-NOM umbrellas-ACC bought number THAN many
 kasa-o katta.
 umbrellas-ACC bought
 ‘(Lit.) Taroo bought more umbrellas than the number that Hanako bought.’
- b. Taroo-wa [PP[DP[TP Hanako-ga [DP t_i mizu-o] nonda] [N(ryoo)]_i] yorimo] takusan
 Taroo-TOP Hanako-NOM water-ACC drank amount THAN many
 mizu-o nonda.
 water-ACC drank
 ‘(Lit.) Taroo drank more water than the amount that Hanako drank.’

These Heads are small nouns, which are considered to be semi-lexical items with functional meaning. They can be covert in various languages (Corver and Riemsdijk (2001), Kayne (2005)). Relativization of *teido* ‘degree (of deviation)’ yields the indirect comparison and that of *kazu* ‘number’ or *ryoo* ‘amount’ yields the direct comparison of quantity. Ueyama (2004) also argues that the CCs in Japanese can be (re)analyzed as the “NP comparatives” with postulating (covert) *Keishiki Meishi* ‘Formal Nouns,’ e.g., *toki* ‘time,’ *baai* ‘case,’ *sassuu* ‘number (of the books),’ at the right edge of the clause. Sudo (2009) claims that the CCs in Japanese involve relativization of the hidden “degree nominals,” such as *teido* ‘degree,’ *ryoo* ‘amount,’ *nagasa* ‘length,’ *takasa* ‘height/price’ etc., which are deleted under an aboutness relation. Following Kayne’s (1994) Head-raising analysis of the derivation of the relative clause, I assume that the hidden relative clauses are derived via overt A'-movement of the semi-lexical nominal Head. Ueyama (2004) observes that the Japanese CCs exhibit the island sensitivity when we put the overt $N_{\text{semi-lex}}$ Head at the right edge of the embedded clause in (7), as illustrated in (29).

- (29) a. [[[John-ga *ec* yonda to] iwareteiru to] minna-ga omotteiru] kazu] yorimo
 John-NOM read C be.said C everyone-NOM think number THAN
 Mary-wa takusan hon-o yondeiru.
 Mary-TOP many books-ACC has.read
 ‘(Lit.) Mary has read more books than the number that everyone thinks that it is said that John read.’
 (cf. Ueyama (2004: 54))
- b. * [[[sono tukue-de *ec* yondeita hito]-o John-ga nagutta] kazu] yorimo
 that table-at be.reading.PAST person-ACC John-NOM hit number THAN
 Paul-wa takusan hon-o yondeita.
 Paul-TOP many books-ACC has.read
 ‘(Lit.) Paul has read more books than the number that John hit the person who read at that table.’
 (cf. Ueyama (2004: 55))

The unacceptability of (29b) indicates that the Japanese CCs with the overt $N_{\text{semi-lex}}$ Head involve the overt

¹² The nominals *teido* ‘degree’ (or *ryoo* ‘amount’) and *kazu* ‘number’ are considered to be the instances of $N_{\text{semi-lex}}$. They are also referred to as *Keishiki Meishi* ‘Formal Nouns’ in the traditional literature. On the other hand, the “degree nominals,” e.g., *nagasa* ‘length’ and *takasa* ‘height,’ are deadjectival nominals which consist of the adjectival root *naga* of *nagai* ‘long’ or *taka* of *takai* ‘high’ plus the derivational suffix *-sa*.

relativization.

With a (covert) semi-lexical Head, the various properties of the Japanese CCs are accounted for. First is that the adjectives involved in the complement of *yor*i of the predicative comparatives are in the adnominal form (cf. Miyagawa (1993), Maki and Uchibori (2008), Sudo (2009)). The form is not detectable with the *ki*-type adjectives as shown in (30), but it can be observed explicitly with the *da*-type adjectives as shown in (31).

- (30) a. Hanako-wa *taka-i*. <Sentence-final form>
 Hanako-TOP be.tall-FINAL
 ‘Hanako is tall’
 b. [_{DP} *taka-i* otoko] <Adnominal form>
 be.tall-ADNOMINAL man
 ‘a tall man’
- (31) a. Hanako-wa *noppo-da*. <Sentence-final form>
 Hanako-TOP be.tall-FINAL
 ‘Hanako is tall’
 b. [_{DP} *noppo-na* otoko] <Adnominal form>
 be.tall-ADNOMINAL man
 ‘a tall man’

If we postulate the (covert) Head of the relative clause, the complement of *yor*i is (re)analyzed as DP. Then, the occurrence of the adnominal form in the example (32) follows.¹³

- (32) Taroo-wa [[_{DP}[Hanako-ga *noppo*{-*na*/*-*da*}] (teido)] yorimo] zutto se-ga takai.

As their forms show, the adjectives are followed by $N_{\text{semi-lex}}$ even if it is invisible. Second property of the CCs which we concern is that the subjects of the clausal standard can be assigned a genitive Case as shown in (33).

- (33) a. [_{PP} [_{DP} [_{TP} Hanako {-ga/-no} katta] Ø/kasa] yorimo] Taroo-wa takai kasa-o katta.
 b. [_{PP} [_{DP} [_{TP} Hanako {-ga/-no} noppo-na] Ø/teido] yorimo] Taroo-wa zutto noppo-da.
 Hanako {-NOM/-GEN}

Maki and Uchibori (2008) argue that the genitive Case is licensed if the clause modifies the nominal. The genitive-marking is possible even within the apparent gapless clausal standard such as in (33b). Postulating relativized $N_{\text{semi-lex}}$ as a modified Head, it is accounted for straightforwardly.¹⁴

13 The *da*-type adjectives followed by the postposition which can take a proposition as its direct complement are in the sentence-final form, as illustrated in (i). In such cases, the genitive-marked subject is not allowed.

- (i) a. [_{PP} [_{CP} Taroo-ga/*-no ki-ta/-ta] kara] paatii-o hajimeyoo.
 Taroo-NOM/-GEN come-PAST-FINAL/PAST-ADNOMINAL because party-ACC let.us.start
 ‘Let us start the party because Taroo has come.’
 b. [_{PP} [_{CP} Taroo-ga/*-no se-ga taka-i/-i] kara] ano hako-o totte morao.
 c. [_{PP} [_{CP} Taroo-ga/*-no noppo-da/*-na] kara] ano hako-o totte morao.
 Taroo-NOM/-GEN be.tall-FINAL/-ADNOMINAL because that box-ACC take let.us.get
 ‘Let us get Taroo to take that box because he is tall.’

14 Maki and Uchibori (2008) originally assume the presence of $N_{\text{semi-lex}}$ *teido* ‘degree’ as a Head of the relative clause, to account for the licensing of the genitive-marked subject shown in (i).

- (i) John-wa [Mary-ga/no yonda teido/no yori] takusan-no hon-o yonda.
 John-TOP Mary-NOM/GEN read degree/NO YORI many-GEN books-ACC read
 ‘John read more books than Mary read.’ (Maki and Uchibori (2008))

Considering the possibility of “crisp judgment” of the Japanese CCs observed in Kennedy (2007), however, the hidden Head of the AttCC in (i) would presumably be *kazu* ‘number’ rather than *teido* ‘degree.’

There remains, however, one problem we have to consider. The relativization of $N_{\text{semi-lex}}$ does not yield the AttCCs of gradability, since we have observed that they cannot be “gapless,” as illustrated below.

- (34) a. ?* Taroo-wa [PP[DP[TP Hanako-ga [DP t_i (nagai/takai) kasa-o] katta] [$N \emptyset$] $_i$] yorimo]
 Taroo-TOP Hanako-NOM (long/expensive) umbrella-ACC bought THAN
 nagai/takai kasa-o katta.
 long/expensive umbrella-ACC bought
 ‘Taroo bought a {longer/more expensive} umbrella than Hanako bought.’
- b. ?* Taroo-wa [PP[DP[TP Hanako-ga [DP t_i (tumetai) mizu-o] nonda] [$N \emptyset$] $_i$] yorimo]
 Taroo-TOP Hanako-NOM (cold) water-ACC drank THAN
 tumetai mizu-o nonda.
 cold water-ACC drank
 ‘Taroo bought more umbrellas than Hanako bought.’

In the examples (34), it seems to be possible to postulate the deleted “(deadjectival) degree nominal” Head such as *nagasa* ‘length’ or *tumetasa* ‘coldness.’ Nevertheless, they are illegitimate. Kawahara (to appear) also argues that the Sudo’s (2009) analysis wrongly predicts that the example like (35a) is unacceptable, because with the overt degree nominal the example turns out to be unacceptable, as shown in (35b).

- (35) a. Taroo-wa [[Hanako-ga katta] yori] takai kasa-o katta.
 Taroo-TOP Hanako-NOM bought YORI expensive umbrella-ACC bought
 ‘Taroo bought a more expensive umbrella than Hanako did.’ (Beck et al. (2004: 302))
- b. * Ichiroo-wa [[Hideo-ga t katta] (takasa) yori] takai kasa-o katta.
 Ichiroo-TOP Hideo-NOM bought expensiveness YORI expensive book-ACC bought
 ‘Ichiroo bought a more expensive book than Hideo did.’ (from Kawahara (ms.: 33-34))

Then the problem we have to solve is as to why the relativization of the $N_{\text{semi-lex}}$ which denotes quantity is possible whereas that of the “degree nominal” is impossible. The “aboutness relative” analysis of the Japanese CCs says nothing about the question as to why *kazu* ‘number’ can be the (hidden) Head of the Japanese CCs on the one hand and *nagasa* ‘length’ cannot be on the other hand. Nor does the standard “degree abstraction” analysis. In the following sections, I argue that the contrast is only accounted for by assuming that the Japanese CCs involve the overt A'-movement of (covert) $N_{\text{semi-lex}}$.¹⁵

3.2. Measure Phrases, Quantifier Floating, and Word Orders within DP

3.2.1. DP-internal Word Order and the Structure of DP

The properties such as “length” and the “cardinality” of the entity seem to be expressed syntactically in the same way, by the numeral quantifier (NQ), as shown in (36).

- (36) a. [60-cm-no kasa-o] Hanako-wa katta.
 60-CL-GEN umbrella-ACC Hanako-TOP bought
 ‘Hanako bought the umbrella which was 60cm long.’

-
- (ii) John-wa [Mary-ga/no yonda ({kazu/*teido}) yorimo] 1satsu ooku hon-o yonda.
 John-TOP Mary-NOM/GEN read {number/degree} THAN 1-CL many book-ACC read
 ‘(Lit.) John read one more book than Mary read.’

¹⁵ The claim that the clausal complement of *yorimo* is “nominalized” cannot account for the question, neither.

- b. [5-hon-no kasa-o] Hanako-wa katta.
 5-CL-GEN umbrellas-ACC Hanako-TOP bought
 ‘Hanako bought 5 umbrellas.’

It is worth pointing out, however, that “length” or “price” of NP *kasa* ‘umbrella’ is non-monotonic while the cardinality of *kasa* is monotonic (Schwarzchild (2002)). Let us first consider the property of QP in Japanese. Ishii (1991) observes that quantifier floating phenomena (FQ) in Japanese are allowed with stage-level predicates as shown in (37a), while FQ is not allowed with individual-level predicates as shown in (37b). Moreover, he observes that the acceptability of the sentences with FQ correlates with that of the comparatives, as shown in (38).

- (37) a. (San-nin-no) gakusei-ga (san-nin) eigo-o hanasi-ta.
 3-CL-GEN students-NOM English-ACC spoke-PAST
 ‘Three students (three of the students) spoke English.’
 b. (San-nin-no) gakusei-ga (??san-nin) eigo-ga umai.
 3-CL-GEN students-NOM English-NOM well
 ‘Three students (three of the students) are good at English’ (Ishii (1991: 109))
- (38) a. Kono kurasu-dewa [[eigo-o hanasita] yori] takusan-no hito-ga furansugo-o
 this class-in English-ACC spoke YORI many-GEN people-NOM French-ACC
 hanasita.
 spoke
 ‘More people spoke French than spoke English.’
 b. ?* Kono kurasu-dewa [[eigo-ga umai] yori] takusan-no hito-ga furansugo-ga umai.
 this class-in English-NOM good YORI many-GEN people-NOM French-NOM good
 ‘More people are good at French than are good at English.’ (Ishii (1991: 118))

Ishii (1991) suggests that the deviance of (37b) with MP *3-nin* in the post subject position can be explained by the restriction that prohibits individual-level predicates from taking a nonspecific subject (Diesing (1992)). As for the relation between specificity and the word order, Watanabe (2008b) observes based on Kamio (1977) that the word order in the example (39b) only allows the nonspecific reading of DP whereas (39a) does not.

- (39) a. John-wa ni-dai-no piano-o kai-tagatta.
 John-TOP 2-CL-GEN piano-ACC buy-wanted
 b. John-wa piano-o ni-dai kai-tagatta.
 John-TOP piano-ACC 2-CL buy-wanted
 ‘John wanted to buy two pianos.’ (Watanabe (2008b: 520))

This semantic difference typically arises when the presence of a relative clause turns the nominal into a definite expression, as pointed out by Inoue (1978).

- (40) a. [Mae-o hasitteita] ni-dai-no kuruma-ga tukamatta.
 front-ACC were.running 2-CL-GEN car-NOM got.caught
 ‘The two cars that were driving (ahead of us) got caught.’
 b. [Mae-o hasitteita] kuruma-ga ni-dai tukamatta.
 front-ACC were.running car-NOM 2-CL got.caught
 ‘Two of the cars that were driving (ahead of us) got caught.’ (Inoue (1978))

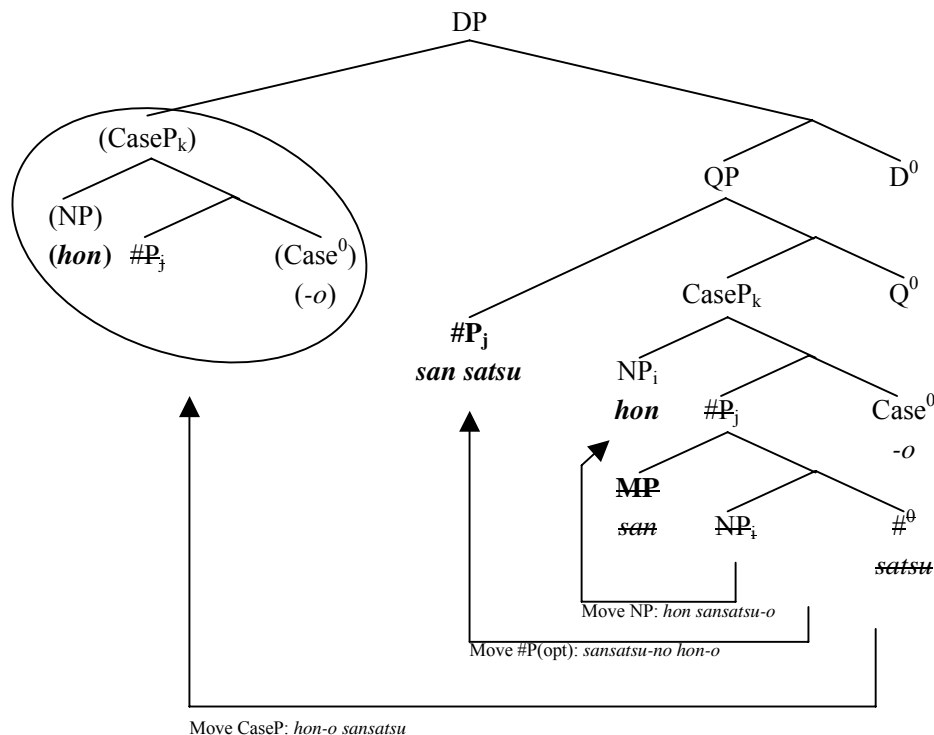
As shown in the English translation of the example (40b), the cars that were running are referring to the specific entities, while the (two) cars that got caught are nonspecific, i.e., we do not care which one of the cars was caught.

To uniformly account for the interpretative property and the word order within the noun phrase which involves measure phrases, Watanabe (2008b) claims that the word orders in (41) are derived from the same base (41)'.

- (41) a. [DP san satsu-no hon -o]
 three CL-LINK book -ACC
 b. [DP hon -o san satsu]
 book -ACC three CL
 'three books'

(Watanabe (2008b: 517))

(41)'



The most embedded NP *hon* 'book' obligatorily moves to [Spec,CaseP] to check the Case feature. Then, #P can optionally move to [Spec,QP], yielding the word order (41a). CaseP can move up to [Spec,DP] optionally. If it does after #P movement, the word order (41b) will be derived. Insofar as specificity is a property of D, Watanabe also claims that the movement of CaseP to [Spec,DP] is triggered by the properties of D, which ensure the nonspecific reading of this DP.

3.2.2. Floatable Numeral Quantifiers and (Non)monotonicity

Now let us consider the examples below.

- (42) a. [1000-yen-no kasa-o] Hanako-wa katta.
 1000-CL-GEN umbrella-ACC Hanako-TOP bought
 'Hanako bought the umbrella which cost 1000yen.'
 b. [60-cm-no kasa-o] Hanako-wa katta.
 60-CL-GEN umbrella-ACC Hanako-TOP bought
 'Hanako bought the umbrella which was 60cm long.'
 c. [200-peeji-no ronbun-o] Hanako-wa kaita.
 200CL-GEN paper-ACC Hanako-TOP wrote
 'Hanako wrote the paper which was 200-pages-long.'

- d. [5-hon-no kasa-o] Hanako-wa katta.
 5-CL-GEN umbrellas-ACC Hanako-TOP bought
 ‘Hanako bought 5 umbrellas.’

FQ is impossible in the case of (42a) and (42b) even with the stage-level predicates, as shown in (42)’.

- (42)’ a. [{1000-yen-no} kasa-o {*1000-yen}] Hanako-wa {*1000-yen} katta.
 b. [{60-cm-no} kasa-o {*60-cm}] Hanako-wa {*60-cm} katta.
 c. [{200-peeji-no} ronbun-o {200-peeji}] Hanako-wa {200-peeji} kaita.
 d. [{5-hon -no} kasa-o {5-hon}] Hanako-wa {5-hon} katta.

Notice that the NQs *1000 yen* in (42’a) and *60 cm* in (42’b) do not express the cardinality of NP *kasa* ‘umbrella,’ but the properties of NP. On the other hand, *5 hon* ‘5-CL’ in (42’d) expresses the cardinality of the NP. Schwarzschild (2002) argues that such a “pseudopartitive” may be interpreted in terms of a measurement system if the denotation of NP comes with a part whole relation and the basis for the measurement is monotonic. Given that singular count nouns never provide a non-trivial part-whole relation, they will always be bad in pseudopartitives as shown in (43a), and they will always be good in compounds as shown in (43b).

- (43) a. * 2 hours of job, * 2 pages of story
 b. a 2-hour-job, a 2-page-story (Schwarzschild (2002: 228))

With this in mind, based on the structural analysis proposed by Watanabe, we can conclude that movement of CaseP does not yield the “FQ-like” order in (42’a) and (42’b) since both *1000 yen* in (42’a) and *60 cm* (42’b) are not involved in (remnant) QP in (41), but in NP.¹⁶ Therefore, they must be always pre-nominal.

One thing we have to consider is that *200 peeji* ‘200 pages’ in the example (42’c) cannot be considered as a cardinality or plurality of NP *ronbun* ‘paper,’ but also a non-monotonic restrictive property of the paper, i.e., “a 200-page-long paper.” The intuition is most clearly revealed in the extensionality context, as illustrated in (42)’.

- (42)’ a. [Sono {1000-yen-no} kasa-o {*1000-yen}] Hanako-wa {*1000-yen} nakusita.
 that 1000-CL-GEN umbrella-ACC Hanako-TOP lost
 b. [Sono {60-cm-no} kasa-o {*60-cm}] Hanako-wa {*60-cm} nakusita.
 c. [Sono {200-peeji-no} ronbun-o {*200-peeji}] Hanako-wa {*200-peeji} nakusita.
 d. [Sono {5-hon-no} kasa-o {5-hon}] Hanako-wa {5-hon} nakusita.

Kennedy (2007) argues that the acceptability of (42’c) can be accounted for in terms of the contribution of the incremental theme verb *write*. He claims that the complement is interpreted as the maximum plurality of incremental objects created over the course of the event. In other words, *ronbun* ‘paper’ in (42’c) is interpreted as ‘one page of writing paper’ (at least for us). Such a (re)interpretation is impossible in the context which forces the definite singular interpretation of the object, as in (42)’. The same infelicity is observed in (44a) with the “NQ-NP-Case” order.

16 The FQ in (42’a,b) is acceptable in the interpretation of “sell-by-measure,” where the proper part is still considered as denoting a specific entity. In other words, these numerals are in fact measure phrases when the modified nominal is a mass noun.

- (i) a. Roopu-o (60cm) Hanako-wa (60cm) katta.
 rope-ACC 60cm Hanako-TOP bought
 b. Taroo-wa [[Hanako-ga roopu-o katta] (ryoo) yorimo] nagai ito-o katta.
 Taroo-TOP Hanako-NOM rope-ACC bought amount THAN long string-ACC bought

- (44) a. # Taroo-wa kinoo 20-peeji-no ronbun-o kaita ga mada kaki-owar-anai.
 Taroo-TOP yesterday 20-CL-GEN paper-ACC wrote but yet write-finish-NEG
 ‘(Lit.) Taroo wrote the 20-pages-long paper yesterday but the paper has not set yet.’
 b. Taroo-wa kinoo ronbun-o 20-peeji kaita ga mada kaki-owar-anai.
 Taroo-TOP yesterday paper-ACC 20-CL wrote but yet write-finish-NEG
 ‘Taroo wrote 20pages (of the paper) yesterday but the paper has not set yet.’

As discussed above, the “NQ-NP-Case” order in (44a) tends to yield the interpretation that the entity that entire DP denotes is specific, i.e., “the paper that is 20 pages long.” On the other hand, the derived “NP-Case-NQ” order in (44b) is due to movement of CaseP to [Spec,DP] to yield the nonspecific reading of DP. We are reinterpreting the word *ronbun* ‘paper’ as a mass noun. We can thus conclude that the extraction of *200 peeji* ‘200 pages’ is possible only if NP *ronbun* is reinterpreted as the “plural writing papers.”

3.2.3. Extractability of Numeral Quantifiers and Relativization of “NUMBER” versus “PROPERTY”

Finally, I argue that what undergoes A'-movement within the CCs is QP of the derived structure in (41b). The resulting configuration is illustrated in (45).¹⁷

- (45) a. [DP [CaseP [NP *x-CL-no-N*]] [QP [#P *y-CL*] *t*_{CaseP}]]
 ← Relativization
 b. [[DP [Hanako-ga [DP [CaseP [kasa]_{NP -o}] *t*_i] nakusita] [QP[#Pkazu/Ø_{number}]_i D⁰] yorimo]
 (takusan) kasa-o Taroo-wa nakusita.
 c. # [[DP [Hanako-ga [DP [CaseP[(*x-cm-no*)kasa]_{NP -o}] *t*_i] nakusita] [QP]_i D⁰] yorimo]
 nagai kasa-o Taroo-wa nakusita.

In (45c), however, nothing provides the definite description of the standard of comparison via relativization (A'-movement of QP to [Spec,CP]), since the desired standards are not involved in QP; QP provides the standard only in (45b). Thus only the cases like (45b) are regarded as instances of relativization of N_{semi-lex}. We do not have

17 There arises a question as to whether we can consider A'-movement of QP as relativization. Under the raising analysis of the relative clause by Kayne (1994), the projection of the Head itself is also at issue. Kayne originally claims that the raised Head constitutes NP, whereas Inada (2008) has claimed that the Head constitutes at least #P since the scope construal of the two quantifiers in (i) can be linked inversely.

(i) John will interview the *two* patients that *every* doctor would examine *e*.

(*two* > *every*, *every* > *two*)

(ii) [DP the [CP [DP [FP *two* patients] D⁰ *t*_{FP}] that [IP *every* doctor would examine [DP D⁰ [~~FP *two* patient~~]]]]]

The universal quantifier *every* cannot have scope out of the clause. Thus, to obtain the inverse linking, the projection of the promoted Head, FP, must project #P at least, as illustrated in (ii). For the detailed discussion of the interaction between QR, the syntactic reconstruction (copy-interpretation), and the semantic wide-scope taking (choice function application), see Inada (2008).

Notice that under the raising analysis the modification by the relative clause is obtained via complementation. Watanabe (personal communication) points out that the attributive adjective such as *nagai* ‘long’ can be considered as being in the complement of N in (45c) because it is often argued that the Japanese attributive adjectival phrases are the (reduced) relative clause. On the other hand, Hirose and Suzuki (to appear) claim that the numeral quantifier in (45c) is adjoined to NP whereas that in (45b) is adjoined to NumP.

Tada (personal communication) also points out the possibility that the cardinality of the object can be interpreted as the plurality of the event. It indicates that there might appear some asymmetry between the comparison of the quantity of the object and that of the subject. Further researches will be needed.

to consider the cases that the Head of the relative clause consists of only a “length” or “price” of the umbrella.¹⁸⁻¹⁹

The overt extraction of QP is possible in the Japanese CCs under “Chain Uniformity Condition (Chomsky (1995))” discussed in Biberauer and Richards (2008). A chain must be uniform with regard to phrase structure status. Thus only [+maximal] projections are able to raise to specifier (= nonprojecting) positions. They argue that therefore the prerequisite of the (left-branch) extraction of QP is that the extracted *wh*-words are phrasal by themselves. Look at the examples below. The extraction of the *wh*-words is possible in Russian since it is phrasal, let’s say QP, by itself.

- (46) a. [Č’ju knigu] ty čital?
 whose book you read
 ‘Whose book did you read?’
 b. Č’ju ty čital [t knigu]?
 ‘*Whose did you read book?’
(Biberauer and Richards (2008: (28)))

Such an extraction is also possible in Classical Greek as shown in (49), but is impossible in Modern Greek as shown in (48).

- (47) a. [Tiina dynamin] echei?
 what.ACC.FEM.SG power.ACC.FEM.SG have.3SG
 b. Tiina echei [t dynamin]?
(Biberauer and Richards (2008: (31)))
 (48) a. [Ti dinami] exi?
 which.ACC.FEM.SG power.ACC.FEM.SG have.3SG
 b. *Ti exi [t dinami]?
(Biberauer and Richards (2008: (32)))

In Classical Greek, the *wh*-words and indefinites had the same morphological make-up, with *tis* meaning both ‘who/what’ and ‘some x’ or ‘any x.’ It indicates that the *wh*-words are QPs. On the other hand, in Modern Greek *ti* is unambiguously a determiner, i.e., a D-head comparable to English *wh*-determiners like *which*. Moreover, in standard Arabic, the quantifier of the construct state “Q-NP” cannot float, as shown in (49b), while only that of “QP of NP” can, as shown in (50b).

- (49) a. [kull-u t-tullaab-i] žaa?-uu.
 all-NOM the-students-GEN come.PAST-3M.PL
 ‘All the students came.’
 b. * [t-tullaab-i] žaa?-uu kull-u.
(Biberauer and Richards (2008: (33)))

18 As expected, the sentence like (45a) also turns out to be unacceptable in the context where the extraction of QP is impossible, when it occurs with the individual-level predicate, as repeated below.

- (i) a. ?*Kono kurasu-de-wa [[eigo-ga umai] yori] takusan-no hito-ga furansugo-ga umai.
 this class-in-TOP English-NOM good YORI many-GEN people-NOM French-NOM good
 ‘In this class, more people are good at French than are good at English.’ (Ishii (1991: 118))
 b. ?*Kono kurasu-de-wa [[gakusei-ga eigo-ga umai] yori] takusan furansugo-ga umai.
 this class-in-TOP student-NOM English-NOM good YORI many French-NOM good
 ‘In this class, more student are good at French than are good at English.’

19 The analysis predicts that (45b) can also be interpreted as the comparison of quantity. The prediction is borne out, as shown below.

- (i) [[DP[Hanako-ga [DP[[takai] kasa]_{NP} -o] t_i] nakusita] [QP(kazu)]_i] yorimo] (takusan)
 Hanako-NOM expensive umbrellas-ACC lost number THAN many
 takai kasa-o Taroo-wa nakusita.
 expensive umbrellas-ACC Taroo-TOP lost
 ‘(Lit.) Taroo bought more numbers of the expensive umbrella than Hanako bought umbrellas.’

- (50) a. [t-tullaab-u kull-u-hum] žaa?-uu.
 the-students-NOM all-NOM-them come-PAST-3M.PL
 ‘All of the students came.’
- b. [t-tullaab-u] kaan-uu kull-u-hum ya-drus-uun.
 the-students-NOM be-PAST-3M.PL all-NOM-them 3-study-M.PL
 ‘The students were all studying.’ (Biberauer and Richards (2008: (34)))

Now let us consider A'-movement of only QP which we have assumed in the case of the AttCCs of quantity in Japanese. At first sight, both QP and the expressions that denote the non-monotonic property of NP seem to be phrasal with regard to phrase structure status.

- (51) a. Hanako-wa [{[QP sono kazu]-no} kasa]-o {[sono kazu]} nakusita.
 Hanako-TOP that number-GEN umbrellas-ACC lost.
- b. Hanako-wa [{[XP sono nagasa]-no} kasa]-o {*[sono nagasa]} nakusita.
 Hanako-TOP that length-GEN umbrella-ACC lost.

However, only *wh*-phrases involving the $N_{\text{semi-lex}}$ of quantity can be scrambled out apart from NP, as shown in (52a), whereas the “degree nominal” which expresses the non-monotonic property of NP cannot be, as shown in (52b) (cf. Watanabe’s (1992, 1993) overt A'-movement analysis of the *wh*-in-situ languages like Japanese).

- (52) a. Dorekurai-no kazu {-no kasa-o} Hanako-wa {kasa-o} nakusita no?
 how.many-GEN number-GEN umbrellas-ACC Hanako-TOP umbrellas-ACC lost Q
 ‘How many umbrellas did Hanako lose?’
- b. Dorekurai-no nagasa {-no kasa-o} Hanako-wa {*kasa-o} nakusita no?
 how.much-GEN length-GEN umbrella-ACC Hanako-TOP umbrella-ACC lost Q
 ‘How long was the umbrella that Hanako lost?’

Remember that as argued in Schwarzchild (2002) such a non-monotonic property and NP constitute a compound, and thus cannot be a target of movement separately. This observation leads us to claim that QPs in Japanese can undergo A'-movement (“Chain Uniformity Condition (Chomsky (1995), Biberauer and Richards (2008))”), and serve as a standard in the case of the quantity comparison, as illustrated in (53d), but not in (53a-c).

- (53) a. *[[DP [Hanako-ga [DP [CaseP kasa_{NP} -o] t_i] nakusita] [QP j_i] yorimo] takai kasa-o
 Taroo-wa nakusita.
- b. *[[DP [Hanako-ga [DP [CaseP kasa_{NP} -o] t_i] nakusita] [QP j_i] yorimo] nagai kasa-o
 Taroo-wa nakusita.
- c. *[[DP [Hanako-ga [DP [CaseP ronbun_{NP} -o] t_i] nakusita] [QP j_i] yorimo] nagai ronbun-o
 Taroo-wa nakusita.
- d. [[DP [Hanako-ga [DP [CaseP kasa_{NP} -o] t_i] nakusita] [QP [_# KAZU/ \emptyset _{NUMBER}]] j_i] yorimo]
 (takusan) kasa-o Taroo-wa nakusita.

When QP cannot serve as a standard appropriately, relativization of entire DP *kasa-o* “umbrella-_{ACC}” is required. Relativization of entire DP then results in providing the standard of comparison, as illustrated in (54).

- (54) a. [[DP [Hanako-ga t_i nakusita] [DP [NP(kasa)] j_i] yorimo] takai kasa_j-o
 b. [[DP [Hanako-ga t_i nakusita] [DP [NP(kasa)] j_i] yorimo] nagai kasa_j-o
 c. [[DP [Hanako-ga t_i nakusita] [DP [NP(ronbun)] j_i] yorimo] nagai ronbun_j-o
 d. [[DP [Hanako-ga t_i nakusita] [DP \emptyset _{NUMBER} [NP(kasa)] j_i] yorimo] (takusan) kasa_j-o

In the case like (54d), the entire DP is pied-piped by the standard of comparison and undergoes A'-movement. Then, the appropriate standard is semantically provided as a consequence in any way the phrasal comparatives are interpreted.^{20,21}

3.3. Bare NP Adverbs and Adverbial Relatives

So far we have argued that the hidden Head *kazu* 'number' of the AttCCs of quantity base-generates in [Spec,#P] within DP. We also have to consider the base position of the $N_{\text{semi-lex}}$ *teido* 'degree (of deviation)' within the clausal standard. I assume that, within the apparent gapless clausal standard, $N_{\text{semi-lex}}$ *teido* functions as a DP adverb (Larson (1985)) when reconstructed, as shown in (55).

- (55) Hanako-wa (se-ga) [aru **teido**] takai.
 Hanako-TOP (height-NOM) a.certain degree be.tall
 'Hanako is tall to a certain degree (above the average).'

DP involving $N_{\text{semi-lex}}$ *teido* 'degree' denotes the definite description of the degree "to the extent (Hanako is tall)." It provides the standard of the comparison when sitting in the complement position of *yori*.

Larson (1985) examines a class of noun phrases in English that have the ability to function as adverbial modifiers (bare-NP adverbs). He argues that bare-NP adverbs have the capacity to receive Case and thematic role through the lexical properties of their own heads, and they can be the Heads of the adverbial relative clause in

20 I have argued that, since $N_{\text{semi-lex}}$ can generally be covert, the relativization of it yields the hidden relative clause structure, which lacks the phonetically realized Head. As argued above, however, I'd like to point out that it is natural to claim that the deletion of the lexical NPs would be possible only under the identity condition, as seen in the cases like (54); otherwise the problem which concerns with the asymmetry between the quantity and the gradability reemerges. Thus the silent Head of the hidden relative clause should not be a non-identical deleted lexical NP.

21 The CCs in the Romance languages would make the same point. Matos and Brito (2008) observe that Italian, Spanish, and European Portuguese have two types of the comparatives. One is the "canonical comparatives" as shown in the *a*-examples, and the other is "relative comparatives" as shown in the *b*-examples of (i)-(ii). (The brackets are mine.)

- (i) a. Juan compró más periódicos [que novelas (compró) Maria]. Spanish
 Juan bought more newspapers that novels bought Maria
 'Juan bought more newspaper than Mary (bought) novels.'
 b. Juan compró más periódicos [de los **que** novellas compró Maria].
 Juan bought more newspapers OF the.M.PL that novels bought Maria
 'Juan bought more newspaper than Mary (bought) novels.' (Brucart (2003: 32))
- (ii) a. Ela come mais chocolates [do que tu come biscoitos]. European Portuguese
 she eats more chocolates OF.THE WHAT you eat cookies
 'She eats more chocolates than you eat cookies.'
 b. Ela come mais chocolates num [do que os **que** tu come biscoitos ano]].
 she eats more chocolates in.a.day OF.THE WHAT those that you eat cookies in.a.year
 'She eats more chocolates in a day than you eat cookies in a year.' (Matos and Brito (2008: 313))

The relative comparatives involve the demonstratives or the definite determiners, and are introduced by the relative particles. Notice that the quantity of the second term of comparison is expressed by the number of the Head. It is plural when countable nouns are involved as in (ib) and (iib). Note that it is singular when it is a PredCC as in (iiib).

- (iii)a. Este miúdo é mais preguiçoso [do que tu és trabalhador]. European Portuguese
 this kids is more lazy OF.THE WHAT you are hard.working
 'This kids is lazier than you are hard-working.'
 b. Este miúdo é mais esperto [do que **aquilo que** tu és].
 this kids is more smart OF.THE WHAT that that you are
 'This kids is smarter than you are.' (Matos and Brito (2008: 313))

Notice that the apparent clausal standard can be Headed by a demonstrative *aquilo* 'that' even if it does not involve any individual gaps.

English.

- (56) a. John arrived [that moment/minute/hour/day/week/month/year]. <Time>
b. ... [the previous April/March 12th/Sunday/the Tuesday that I saw Max].
c. ... [sometime next week/few times that I can recall].
d. ... [yesterday/tomorrow/now]. (Larson (1985: 596))
- (57) a. You have lived [someplace warm and sunny]. <Location>
b. ... [few places that I cared for].
c. ... [every place that Max has lived]. (p.597)
d. ... [here/there] (Larson (1985: 597))
- (58) We were headed [that direction/(?)some way] <Direction>
(Larson (1985: 597))
- (59) You pronounced my name [that way/every way one could imagine]. <Manner>
(Larson (1985: 598))

Not all NPs designating a period of time, location, direction/path of travel, and manner, can function as bare NP adverbs. Compare the following with the examples above.²²

- (60) ... [* (on) that occasion/ *(during) this vacation/ *(during) that period of his life]. <Time>
(Larson (1985: 596))
- (61) a. ... [* (on) 43rd St./ *(in) Germany] <Location>
b. ... [* (near) every street]
c. ... *(at) [some location/address/area]. (Larson (1985: 597))
- (62) ... *(on) [that course/some path] <Direction>
(Larson (1985: 597))
- (63) ... *(in) [this fashion/the prescribed manner] <Manner>
(Larson (1985: 598))

Larson (1985) observes that these bare-NP adverbs interact with the syntax of the non-*wh* adverbial relative clauses in English, where the gap that corresponds to the Head is in the adjunct position.

- (64) a. the [month/day/year] (that) you traveled to France *t*.
b. the [place] (that) you live *t*.
c. the [way/direction] (that) we are traveling *t*.
d. the [way] (that) you talk *t*. (Larson (1985: 616))
- (65) a. * the [vacation/occasion] that you traveled to France *t*.
b. * the [location/street] (that) you live *t*.
c. * the [course/path] (that) we are traveling *t*.
d. * the [manner/fashion] (that) you talk *t*. (Larson (1985: 616))

Only bare-NP adverbs such as *day*, *place*, and *way* can head non-*wh* adverbial relatives without preposition

²² Larson claims that there are two notions of Case to correspond to two basic possibilities for Case-assignment available to natural languages: Case-assignment in the syntax under government, and Case-assignment in the lexicon. The latter option is not available in English in general. Therefore, Case-assignment of NPs like *that way* or *few places* is not lexical because they are phrasal. At the same time, the assignment is not structural. Then he assumes that the assignment of the oblique-Case, which certain classes of NPs can assume in the absence of any structural Case-assigner, is optional and is ignored when a genuine Case-assigner is present. For the detailed discussion of the adverbial relatives, see also Haegeman (2009, 2010).

stranding. The Operator in the relative clause can bind a variable, creating an open sentence interpretation only if it has some means of receiving Case (hence the gap is nominal).

We have already argued QPs in Japanese are nominal by themselves. As regards the nominal property of $N_{\text{semi-lex}}$ *teido*, it functions as an adverbial DP (Larson (1985)) as repeated in (66a). Such a nominal can also function as a predicative noun, a subject DP, and an object DP respectively, as illustrated in (66b)-(66d) respectively. The nominal projection of $N_{\text{semi-lex}}$ *teido* ‘degree’ denotes the definite description of the degree, even though it is nominal.

- (66) a. Hanako-wa (se-ga) [aru **teido**] takai.
 Hanako-TOP (height-NOM) a.certain degree be.tall
 ‘Hanako is tall to a certain degree. (above the average)’ <Bare-NP Adverbial>
- b. Hanako-no se-no takasa-wa [aru teido] da.
 Hanako-GEN height-GEN tallness-TOP certain degree COP
 ‘Hanako’s height is to a certain degree. (above the average)’ <Predicative>
- c. ? [Hanako-no se-no takai teido]-ga yosou-izyoo datta.
 Hanako-GEN height-GEN be.tall degree-NOM expectation-above COP.PAST
 ‘The degree of the Hanako’s height has exceeded my expectation.’ <Subject>
- d. ? Taroo-wa [Hanako-no se-no takai teido]-o mikubitteita.
 Taroo-TOP Hanako-GEN height-GEN be.tall degree-ACC underestimated
 ‘Taroo has underestimated the (extent of) Hanako’s height.’ <Object>

Since they are nominal, they are Case-marked inherently even in the case of (66a), and can undergo A'-movement. Then it provides the standard of the comparison when sitting in the complement position of *yori* via relativization.

4. On Relativization of *Teido* and the Comparative Subdeletion

Beck et al. (2004) and Kennedy (2007) observe that sub-comparatives such as in English example (67a) are not allowed in Japanese, as shown in (67b). They argue that the ungrammaticality results from the assumption that Japanese lacks the syntactic binding of the degree (*d*-type) variable.

- (67) a. The table is longer than it is wide. (Kennedy (2007: (6)))
 b. *Kono tana-wa ano doa-ga hiroi yori takai
 this shelf-TOP that door-NOM wide YORI tall
 ‘This shelf is taller than that door is wide.’ (Kennedy (2007: (7)))

If an operator-variable chain with respect to the degree is established in syntax, the sub-comparatives can be allowed in principle, as illustrated in (68).

- (68) This shelf is taller [*wh* than that door is *t* wide].
 $\|more\|(\| [wh \text{ than that door is } t \text{ wide}] \|)(\| tall \|)$
 $\lambda x.max\{d' / tall(x) \geq d'\} > max\{d'' \mid wide(that \text{ door}) > d''\}$ (Kennedy (2007: (19)))

As I have discussed in footnote 6, however, the example (67b) is problematic in itself. The gradable adjective *wide* in English does not correspond exactly to the Japanese adjective *hiro* ‘large, spacious, broad.’ This can be shown by the infelicity of the predicative use of it, as exemplified in (69a). Without the support of *haba* ‘width,’ the sentence is interpreted as talking about the square measure of the door (the width would be great as a consequence). Thus the derived nominal *hiro-sa* which stems from the adjective *hiro* is incompatible with the measure phrase of the length, as illustrated in (69b).

- (69) a. Kono doa-wa #(haba-ga) hiroi
 this door-TOP width-NOM large.
 ‘This door is wide.’
- b. Kono heya-no hiro-sa-wa {*5meetoru/20-heihoo-meetoru}-da
 This room-GEN large-ness-TOP 5m/20m²-COP.
 ‘(Lit.) This room’s largeness is {*5m/20m²}.’

The analysis presented in this paper predicts the opposite of what Beck et al (2004) and Kennedy (2007) have claimed. Since they assume relativization of only $N_{\text{semi-lex}}$, the sortals of the degree do not have to be identical.

When the relativization of only the $N_{\text{semi-lex}}$ is possible, it is predicted that two sets of ‘degree (of deviation)’ or ‘number’ which differ in their ordering can be compared in Japanese (which yields “sub-comparatives”), in the same way as in English. The well-formedness of examples in (24) demonstrates that this prediction is borne out, as repeated below.

- (24) a. Kono terebi-wa [[*pro* tate-ni nagai] yori] (zutto) yoko-ni hiroi.
 This TV-TOP vertical-in be.long YORI by.far horizontal-in be.wide
 ‘This TV display is wider than it is tall.’
- b. Sakuban-no yuusyoku-wa [[sore-ga oisi-katta] yori] (zutto) taka-katta.
 last.night-GEN dinner-TOP it-NOM be.tasty-PAST YORI by.far be.expensive-PAST
 ‘Yesterday’s dinner was more expensive than it was tasty.’

The sub-comparative constructions in (24) is obtained via relativization of $N_{\text{semi-lex}}$ *teido* yielding the comparison of deviation.

As for the attributive sub-comparatives, the following contrast is observed in Bhatt and Takahashi (2008).

- (70) a. Taroo-wa [[Hanako-ga [hon-o] katta] yori] ookuno zassi-o katta.
 Taroo-TOP Hanako-NOM books-ACC bought THAN many-GEN magazines-ACC bought
 ‘Taroo bought more magazines than Hanako bought books.’
- b. *Taroo-wa [[Hanako-ga [syoosetu-o] kaita] yori] omosiroi ronbun-o kaita.
 Taroo-TOP Hanako-NOM novel-ACC wrote THAN interesting paper-ACC wrote
 ‘*Taroo wrote a more interesting paper than Hanako wrote a novel.’

The contrast is accounted for by the present analysis, since the extraction of $N_{\text{semi-lex}}$ *kazu* ‘number’ is possible in (70a) serving as the standard of comparison, whereas nothing provides the standard appropriately in (70b).

It is worth pointing out that Kennedy notes that the language like Japanese sometimes allows sub-comparatives with deadjectival nominal such as *taka-sa* ‘height,’ as shown in (71).

- (71) Kono tana-no taka-sa-wa ano doa-no haba yori ookii.
 this shelf-GEN height-SA-TOP that door-GEN width YORI great
 ‘The shelf’s height is greater than the door’s width’ (Kennedy (2007: 143))

In the example in (71), the evaluative reading is not forced and thus it is not considered as the comparison of deviation. The question is why they are acceptable. The deadjectival nominal derived by the suffixation of *sa* is compatible with MPs with absolute reading. Look at the examples below.

- (72) a. 3meetoru takai
 3.CL tall
 # ‘3m tall’

- b. 3meetoru-no takasa-da / takasa 3meetoru -da
 3.CL-GEN tall.SA-COP
 ‘3m tall’

6. Concluding Remarks

The following table shows the summary.

(73)

		Relativize(<i>kazu</i> _{QP})	Relativize(DP)	Relativize(<i>teido</i>)
Predicative	gradability comparison (/non-monotonic)	*(no DP)	*(no DP)	ok _{indirect}
Attributive	gradability comparison (/non-monotonic)	*(failure)	ok	(ok _{indirect})
	quantity comparison (/monotonic)	ok	ok	(ok _{indirect})

The PredCCs do not involve DP which expresses the individual sortal of the degree (although semantically the subject would be interpreted as the sortal). Thus only relativization of $N_{\text{semi-lex}}$ *teido* ‘degree (of deviation)’ provides the standard, and yields the comparison of deviation from the standard. In the case of the AttCCs, on the other hand, relativization of entire DP provides the standard in the same way as in the phrasal comparatives. In addition, when the quantity is compared, relativization of $N_{\text{semi-lex}}$ *kazu* ‘number’ (A'-movement of QP) can also provide the standard. Notice that A'-movement of QP is always possible in the AttCCs, although it fails to provide the appropriate standard in the case of the comparison of gradability.

Relativization of $N_{\text{semi-lex}}$ *teido* is always available. It implies that the comparison of deviation is always possible, since the bare-NP adverb which denotes a degree of deviation can be considered to occur in virtually every sentence. As argued in Hayashishita (2009), “the standard of comparison in *yor*i-comparatives is contextually inferred from the denotation of the complement of *yor*i (p.87).”

- (74) John-wa [[Mary-ga [[(sore-o) katta] otoko]-ni (teineini) aisatusita] yori] takai
 John-TOP Mary-NOM it-ACC bought man-DAT politely greeted YORI expensive
 kuruma-o katta.
 car-ACC bought
 ‘(Lit.) John bought a [more] expensive car than Mary (politely) greeted the customer who bought (it).’
 # [Context: Mary is very patient and does not normally complain about what others do.]
^{ok} [Context: Mary is an unfriendly car saleswoman and rarely greets customers unless they buy an extremely expensive car.] (Hayashishita (2009: 88-89), slightly modified)

This paper has shown that the variables in the base position of the $N_{\text{semi-lex}}$ are not “type” *e* because they only denote a degree or quantity, nevertheless they are nominals. The analysis casts doubt on the parametric analysis based on the type-theoretic notion of the standard of comparison proposed by Kennedy (2007). Languages like Japanese, which lack the degree projection within AdjP, do not necessarily lack binding of the type *d* variable, since Japanese is endowed with the relativization of the $N_{\text{semi-lex}}$ which leaves the gap that corresponds to the type *d* variable.

This brings to mind immediately that there is a relative clause which apparently modifies the degree in English -- so called “Amount Relatives (ARs).” Look at the example in (75), where the relative clause is potentially ambiguous between restrictive relative (RR) reading and AR reading.

- (75) It would take days to drink [_{DP} the champagne [_{CP} they spilled that evening]]. (Heim (1987: 38))
RR reading: to drink the spilled champagne
AR reading: to drink as much amount of champagne as they spilled

Carlson (1977) claims that AR reading of the relative clause is obtained via A'-movement of the degree operator *d*, as well as the comparative clause. Grosu and Landman (1998) and McNally (2008) point out, however, that the relativization out of an existential construction, which is also considered to be an instance of the ARs, requires not only the identity-of-quantity but also the identity-of-individuals as in (76).

- (76) I read all the books there were on the table.
 (# 'When there were five books on the table and I read five books, but not those that were on the table.')

If so, A'-movement of only *d* cannot derive ARs, but the movement of DP is required which involves both the degree and the nominal sortal (of the degree) does. It is shown by the infelicity with the comparative subdeletion in (77b). On the other hand, such an "identity-of-sort requirement" is not imposed on comparatives, as shown in (77c).

- (77) a. It will take us the rest of our lives to drink the champagne [that they spilled that evening].
 b. # It will take us the rest of our lives to drink the *champagne* [that they spilled *beer* that evening].
 c. It will take us the rest of our lives to drink as much *champagne* [as they spilled (*beer*) that evening].
 (Grosu and Landman (1998))

The fact that the independent embedded sortal on the degree is prohibited even with AR reading shows that the Head involves the sortal *champagne* and provides an embedded sortal on the degree.

Both clausal comparatives and ARs require A'-movement of *d*, to modify the amount/degree. However, as briefly discussed above, ARs do involve more, -- the nominal sortal of the degree -- and thus they are considered to be an instance of the restrictive relative clause, with the special, "maximality (maximal plurality)" interpretation. In this respect, the Head of the gapless CCs is considered as denoting only a degree, not an individual entity. The construction is therefore two-faced: it is a relative clause (modifying nominal) which is interpreted like a (genuine) comparative clause (modifying degree). There is no contradiction involved in the derivation through "relativization" or "comparative clause formation." The former involves A'-movement of DP to form an open predicate modifying DP, while the latter involves "A'-movement of *d*," which can also be DP in the languages like Japanese.

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