

DEGREE NOMINALS IN JAPANESE AND CHINESE COMPARATIVES*

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1 Introduction

Some recent studies of comparatives have contributed to crosslinguistic variations through the implications and issues stemming from relevant constructions in individual languages (Beck et al 2004, Oda 2008, Hayashishita 2009, Bhatt and Takahashi 2011, Shimoyama 2012, Sudo 2009, 2014, and many others). However, the precise nature of the variation is highly controversial and has been widely disputed. The purpose of this paper is to offer a novel syntactic and semantic analysis in Japanese clausal comparatives while pointing out similarities with Chinese comparatives.

One of the long-standing debates over comparatives in Japanese lies in whether apparently clausal comparatives are genuinely clausal. Our basic stance is consistent with Beck et al (2004), Oda (2008) and Sudo (2009, 2014) in that Japanese, unlike Chinese, allows seemingly clausal comparatives, which in fact are not clausal, but in actuality, are the complex nominals that head relative clauses. In this paper we mainly shed light on the contrast in acceptability between ‘amount’ and ‘non-amount’ comparatives, observed first by Ishii (1991).

- (1) a. John-wa [Mary-ga katta]-yori **takusan-no** kasa-o katta
John-Top [Mary-Nom bought]-than many-Gen umbrella-Acc bought
‘John bought more umbrellas than Mary bought.’
b. ??John-wa [Mary-ga katta]-yori **nagai** kasa-o katta
John-Top [Mary-Nom bought]-than long umbrella-Acc bought
‘John bought a longer umbrella than Mary bought.’

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Along the lines taken by some previous studies including the references above, we claim that seemingly clausal nominals are not in fact clausal, but the complex nominals that head relative clauses.

What has made our analysis novel is as follows: (i) the deleted head nominals are insistently degree nominals, not individual nominals; (ii) the grammatical degradation observed among (seemingly) clausal comparatives in Japanese and Chinese is due to the violation of Specificity Island Constraint (SIC); (iii) amount comparatives rely on an alternative strategy without degree operator movement which may circumvent the SIC violation.

2 Backgrounds

It has been revealed through recent studies that comparative constructions have crosslinguistic variations across languages. Many languages including English have two kinds of comparative constructions: phrasal and clausal comparatives.

- (2) a. John is taller than Mary. (Phrasal Comparative)
 b. John is taller than Mary is (tall). (Clausal Comparative)

On the other hand, for example, Chinese only allows the standard of comparison to be phrasal, as in (3):

- (3) a. Mohri [bi Tei] xie le gengduode lunwen.
 Mohri than Tei write PT more paper
 ‘Mohri wrote more papers than Tei.’
 b. *Mohri [bi Tei xie] xie le gengduode lunwen.
 Mohri than Tei write write PT more paper
 ‘Mohri wrote more papers than Tei did.’

It is also noticeable that Japanese has only a phrasal comparative in adjectival predicates, as shown in the contrast between (4a) and (4b):

- (4) a. John-wa Mary-yori takai.
 John-Top Mary-than tall
 ‘John is taller than Mary.’
 b. *John-wa Mary-ga takai-yori takai.
 John-Top Mary-Nom tall-than tall
 ‘John is taller than Mary is (tall).’

When adjectival predicates are used both in the matrix and embedded clauses, the sentence is utterly ungrammatical in Japanese. The English gradable predicate in (2b), *tall*, can remain there with contrastive stress. In Japanese, on the other hand, neither the deletion of the predicate nor stress suffices to save (4b).

Let us next see some English cases in which a degree argument is involved in an object DP, as shown in (5).

- (5) a. John scored more goals than Bill did/ scored.
 b. John kicked a longer ball than Bill did/ kicked.

Following the standard treatment, we assume that the comparative morpheme is a determiner of type $\langle dt, \langle dt, t \rangle \rangle$, which takes two sets of degrees and compares the maximal values of these two sets, as in (6).

- (6) $[[\text{-er}]] = \lambda D. \lambda D' \max(D') > \max(D)$ (Hackl 2000:50)

Semantically, the comparative determiner requires two maximal degrees on a relevant scale to be compared. In order to yield such semantic calculation, we need to construct an appropriate syntactic structure, as shown in the LF structures (7a) and (7b).

- (7) a. $[_{\text{DegP}} \text{-er than Op}_2 \text{ Bill scored } [d_2\text{-many goals}]]_1 [_{\text{TP}} \text{ John scored } [_{\text{DP}} d_1\text{-many goals}]]$
 b. $[_{\text{DegP}} \text{-er than Op}_2 \text{ Bill kicked } [a d_2\text{-long ball}]]_1 [_{\text{TP}} \text{ John kicked } [_{\text{DP}} a d_1\text{-long ball}]]$

The DegP, which is a generalized quantifier over degrees, undergoes movement, leaving a degree variable behind. Note also that a null operator Op is raised in the embedded clause to yield degree descriptions.

It is well known that Japanese comparatives show some unique characters that would fail to be explained with the analysis based on degree movement. To account for variation in comparatives across languages, Beck et al. (2004) propose a parameter that governs the presence /absence of degree movement, as follows:

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

Due to the negative setting of the parameter, Japanese does not have degree movement nor degree abstraction in syntax. In fact, some linguists, including Beck et al. and Oda (2008), have presented convincing evidence to contend that degree arguments do not undergo movement in Japanese.

First it has been pointed out since Snyder (1995) that Japanese does not allow the so-called subcomparatives of degrees, as follows:

- (9) a. *Kono tana-wa doa-ga hiroi yori (motto) takai.
 this shelf-Top door-Nom wide than (more) tall
 b. The shelf is taller than the door is wide. (Oda 2008: 18)

The truth conditions of these examples require that the two maximal degrees on scales in different dimensions be compared. Unlike the English counterpart (9b), the Japanese sentence is degraded. If the standard of comparison is computed independently of the matrix clause, using its own adjective, we would expect (9a) to be equally fine, contrary to fact. It follows thus that the degree operator analysis would have to give a stipulation to the reason why the sub-comparative configuration is not possible in Japanese.

Examples of intentional verbs with comparatives, too, show that degree arguments do not undergo movement in Japanese. As pointed out by Heim (2000: 224), when a DegP gets into

scope interaction with an intentional verb, the sentence gives rise to ambiguous interpretations. However, at least in Japanese, such ambiguity cannot be observed (cf. Beck et al. 2004 and Oda 2008).

- (10) (Sono sitagaki-wa 10 peeji desu.)
 (that draft-Top 10 pages copula)
 Sono ronbun-wa sore yori(mo) tyoodo 5 peeji nagaku-nakerebanaranai.
 that paper-Top that than exactly 5 pages long-be_required
 ‘The paper is required to be exactly 5 pages longer than that.’
 (OK be_required > -er, *-er > be_required) (Beck et al. 2004: 331)

In cases such as (10) it would make two possible interpretations if the DegP can stay either below or above the necessity operator introduced by the intentional verb. However, exemplified above, we cannot obtain the reading in which the DegP moves beyond the necessity operator.

Finally, we make reference to the possibility of long-distance movement of degree arguments. Suppose in (11) that the degree arguments of the adverb *fast* and its Japanese counterpart *hayaku*, undergo movement, respectively.

- (11) a. John ran faster than Mary thinks Bill did/ ran.
 b. *John-wa Mary-ga Bill-ga hasiru-to omou yori hayaku hasitta.
 Maki-Top Mary-Nom Bill-Nom run-Comp think than fast ran

- (12) $\text{Max}\{d: \exists e. \text{Agent}(e)=j \wedge \text{run}(e) \wedge \text{fast}(e)(d)\} >$
 $\text{Max}\{d: \text{think}(m, \forall w' \text{Acc}_w \rightarrow \exists e' \text{Agent}(w')(e')=b \wedge \text{run}(w')(e') \wedge \text{fast}(e')(d)\}$

The truth conditions of (12) for the sentences in (11a-b) say that the maximal degree d such that John ran d -fast exceeds the maximal degree d such that Mary thinks Bill ran d -fast. Since the verb *think* in the *than*-clause in (11a) is a bridge verb, the degree operator is predicted to successfully rise to the sentence-initial position. Analogously, the same syntactic derivation would be expected to take place in (11b) as well. Nevertheless, (11b) is utterly ungrammatical.

Given the negative setting of DAP, we do not have to resort to the explanation based upon the movement of degree arguments. The above-mentioned data are all taken to be a natural consequence from the assumption that Japanese lacks degree abstraction in syntax.

However, in fact, in Japanese it is possible to construct a clausal *yori*-complement as in (13). Note that unlike adjectival predicates like *takai* ‘tall’ in (4), the predicates, *keru* ‘kick’ and *nobiru* ‘grow’ have eventuality in their interpretations. This kind of predicate is more likely to allow clausal comparison.

- (13) a. John-wa Mary-ga nobita yori (se-ga) nobita.
 John-Top Mary-Nom grew than (height-Nom) grew
 ‘John grew taller than Mary did/ grew.’
 b. John-wa Mary-ga ketta yori takusan booru-o ketta.
 John-Top Mary-Nom kicked than many ball-Acc kicked
 ‘John kicked more balls than Mary did/kicked.’

Most notably, acceptability fluctuates in accordance to the type of compared degrees. More specifically, ‘amount’ degree comparatives are relatively acceptable in Japanese, in contrast to the other types of comparatives (cf. Beck et al. 2004, Bhatt and Takahashi 2011, and many others).

- (14) a. John-wa Mary-ga katta yori takusan-no hon-o katta.
 John-Top Mary-Nom bought than many-Gen book-Acc bought
 ‘John bought more books than Mary did/ bought.’
- b. ??John-wa Mary-ga katta yori omosiroi hon-o katta.
 John-Top Mary-Nom bought than interesting book-Acc bought
 ‘John bought a more interesting book than Mary did/bought.’
 (Originally cited from Ishii (1991), but slightly changed)

Suppose that (15a) and (15b) below are the underlying LF structures for (14a) and (14b), respectively, where the degree operators undergo movement and then the object NPs are deleted. However, if this is the case, we will not be able to find any reason why the grammatical difference appears.

- (15) a. John-wa [Op₁ Mary-ga [d₁-takusa hon-o] katta-yori takusan-no
 John-Top Mary-Nom many book-Acc bought-than many-Gen
 hon-o katta.
 book-Acc bought
 ‘John bought more books than Mary did/ bought.’
- b. *John-wa [Op₁ Mary-ga [d₁-omosiroi hon-o] katta-yori omosiroi hon-o katta.
 John-Top Mary-Nom interesting book-Acc bought-than interesting book-Acc bought
 ‘John bought an interesting book than Mary did/bought.’

According to Beck et al. the sentences in (14) have a relative clause headed by a nominal, as shown in (15). Due to the negative setting of the DAP, Japanese does not allow degree abstraction in the syntax, so the apparent clausal comparison is underlyingly a phrasal comparison. However, as pointed out by Ishii (1991), this analysis fails to explain why only amount comparatives exhibit the possible deletion of the nominal.

2.1 Two Types of Accounts to Japanese Clausal Comparatives

Japanese clausal comparatives show some unique properties, which are not observed in English and other Indo-European languages that allow underlyingly clausal comparatives. Crosslinguistically, those properties have been explained away with recourse to various approaches in the linguistic literature. Roughly we can divide the authors that examined this issue into two types: some researchers including Kikuchi (1987), Ishii (1991), Hayashishita (2009), Bhatt and Takahashi (2011) and Shimoyama (2012) postulate that Japanese clausal comparatives are in fact clausal (Clausal Approach); on the other hand, some including Beck et al. (2004), Oda (2008), Kennedy (2009), and Sudo (2009, 2014) claim that Japanese clausal

comparatives exhibit the feature found in DP complex nominals with relative clauses (Non-clausal Approach).¹

The latter approach originates from Beck et al. (2004), according to which the *yori*-clauses in Japanese clausal comparatives are analyzed as DP-forming (free) relative clauses. Sudo (2014) proceeds along the lines of Non-clausal Approach, claiming that they involve a nominal structure whose nominal head is deleted by a syntactic deletion operation. What is noteworthy in his analysis is, first of all, that the deleted nominal cannot only be an individual nominal, but also a degree nominal. The clausal comparative in (16) below has two possible underlying structures as in (17a) and (17b):

- (16) John-wa [Bill-ga katta]-yori takusan hon-o katta
 John-Top [Bill-Nom bought]-than many book bought
- (17) a. John-wa [Bill-ga katta **ryoo**]-yori takusan hon-o katta
 John-Top [Bill-Nom bought amount]-than many book-Acc bought
 b. John-wa [Bill-ga katta **hon**]-yori takusan hon-o katta
 John-Top [Bill-Nom bought book]-than many book-Acc bought

Furthermore, Sudo claims that given the deletion analysis, the presence of another occurrence of the deleted noun is required for the deletion to be licensed.

- (18) *John-wa [Mary-ga yatotta **hito**]-yori kasikoi
 John-Top [Mary-Nom hired person]-than smart
 ‘John is smarter than the person Mary hired.’

The degradation of (18) can be attributed to the lack of a licenser for the deleted nominal, that is, its overt antecedent. Note also that the deletion analysis has a beneficial result: it can resolve the puzzle stemming from Beck et al. (2004). They propose a configuration of free relatives for seemingly clausal comparatives, but, unlike Sudo, do not postulate syntactic deletion. What has been puzzling from their analysis is why the free relative with a covert head can only appear in the complement of *yori*. As exemplified below, it cannot appear in any other (argument or non-argument) position:

- (19) a. [Mary-ga katta]-yori
 [Mary-Nom bought]-than
 ‘than what Mary bought’
 b. *John-wa [Mary-ga katta]-ga hosii.
 John-Top Mary-Nom bought]-Nom want

It seems obvious that likewise with (18), the degraded status of (19b) is due to the lack of a licenser for the deleted nominal.

¹ Sudo (2009) is an earlier version of Sudo (2014), but the latter brings forth more elaborated proposal of the syntactic deletion of the head nominal in the *yori*-complement.

3 Our Proposal

Based upon the analysis of Sudo (2014), our discussion will proceed with Non-clausal Approach: apparent clausal comparatives in Japanese are not in fact clausal, but the complex nominals that head relative clauses; the seemingly clausal look of a Japanese clausal comparative is analyzed as the result of syntactically deleting the head noun of the complex nominal complement of *yori*, leaving behind the relative clause (Sudo 2014). What makes our analysis crucially different from Sudo, however, is that the head (covert) nominals should be uniformly treated as ‘degree’ nominals; otherwise the gradable acceptability in (20) is dealt with as ‘subtle’ or ‘weak’ difference or ignored.

- (20) a. John-wa [Mary-ga katta]-yori **takusan-no** kasa-o katta
 John-Top [Mary-Nom bought]-than many-Gen umbrella-Acc bought
 ‘John bought more umbrellas than Mary bought.’
 b. ??John-wa [Mary-ga katta]-yori **takai** kasa-o katta
 John-Top [Mary-Nom bought]-than expensive umbrella-Acc bought
 ‘John bought an expensive umbrella than Mary bought.’

Given Sudo’s deletion analysis as it is, the observed difference is not predictable because the underlying constructions before the deletion are both grammatically fine.

- (21) a. John-wa [Mary-ga katta **kasa**]-yori **takusan-no** kasa-o katta
 John-Top [Mary-Nom **Error! Bookmark not defined.**umbrella]-than many-Gen
 umbrella-Acc bought
 ‘John bought more umbrellas than the umbrellas Mary bought.’
 b. John-wa [Mary-ga katta **kasa**]-yori **takai** kasa-o katta
 John-Top [Mary-Nom bought umbrella]-than expensive umbrella-Acc bought
 ‘John bought a more expensive umbrella than the umbrella Mary bought.’
 (Sudo 2014: 48)

On the other hand, if the deleted head nominals are degree nominals, the grammatical difference in (20) is a natural consequence, as shown below²:

- (22) a. John-wa [Mary-ga katta **honsuu**]-yori **takusan-no** kasa-o katta
 John-Top[Mary-Nom bought number]-than many-Gen umbrella-Acc bought
 ‘(Lit.) John bought more umbrellas that the number of umbrellas Mary bought.’
 b. ??John-wa [Mary-ga katta **nedan**]-yori **takai** kasa-o katta
 John-Top[Mary-Nom bought price]-than expensive umbrella-Acc bought
 ‘(Lit.) John bought a more expensive umbrella than the price of the umbrella Mary bought.’

² We assume that degree nominals such as *nedan* ‘price’ and *honsuu* ‘number’ are predicates of degrees. In addition to those nominals, degree nominals in Japanese are productively derived with the *sa*-suffix attached.

(i) *omosirosa* ‘interestingness’, *kasikosa* ‘smartness’, *umasa* ‘skillfulness’, *oisisa* ‘deliciousness’

Where does the degraded status of (20b) come from? We argue that it can be attributed to the failure with the syntactic derivation of the relative clause³. Let us prove that our argument will be on the right track. We assume first that degree nominals are lexically a predicate of degrees (of type $\langle d, t \rangle$), and that those in (22) combine with the modifying relative clauses to derive complex nominals. Note that they need to combine in an appropriate manner. As specifically assumed in Sudo (2014: 42), it should be appropriate to rely on a manner in which the two predicates are conjoined while maintaining their semantic type. Sudo resorts to Heim and Kratzer's (1998) Predicate Modification, claiming that the two degree predicates combine to yield a complex degree nominal, which is finally taken as the argument for a covert definite article. Alternatively, it can also be assumed that the degree argument slots of the degree nominals are 'restricted' via Chung and Ladusaw's (2003) Restriction. Either way, the point is that the relative clauses need to be degree relative clauses, which are subject to abstraction over degrees.

Here we assume with Sudo (2014: 42) that the LF representation for the *yoru* complement in (22b) is depicted schematically as in (23).

$$(23) [_{DP} \text{ the } [_{DegP} [_{CP} \lambda d. \text{ Mary bought the } d\text{-expensive umbrella}]] [\text{ price}]]$$

Semantically, (23) is composed as a result of degree abstraction over the relative clause, and via Predicate Modification. Furthermore, we also assume that degree nominals such as *nedan*, 'price' and *ryoo* 'amount' and the nominals derived from dimensional adjectives, such as *omosirosa* 'interestingness' and *kasikosa* 'smartness', all have the denotation (24), where \mathbf{m}_A is a measure function associated with the degree nominals or the original adjectives (cf. Watanabe 2014).

$$(24) [[\text{nom}_{deg}]] = \lambda x. \lambda d. \mathbf{m}(x) = d: \langle e, \langle d, t \rangle \rangle$$

Suppose that the degree nominal *nedan* 'price' in (22a) has its first argument x saturated with a free variable, which is thus interpreted with respect to the assignment function g . In this case the value of x is identical with the umbrella that Mary bought, and is given the following interpretation:

$$(25) [[\text{price}]]^g = \lambda d. \mathbf{m}_{\text{price}}(g(x)) = d = \lambda d. \mathbf{m}_{\text{price}}(\lambda y. \text{umbrella}(y)) = d$$

Next we turn to the syntactic and semantic representations of the relative clause, whose LF structure is denoted as the CP in (26).

$$(26) \text{ a. } [[\text{CP}]]^g = [\text{Op}_1 \text{ Mary bought } d_1\text{-expensive umbrella}] \\ \text{ b. } [[1 \text{ CP}]]^g = \lambda d [[\text{CP}]]^{g/d/1} = \lambda d. \text{ Mary bought } d\text{-expensive umbrella}$$

In order to implement the compositionality between the relative clause and its head degree noun, we need to shift the relative clause to a predicate of type $\langle d, t \rangle$. Put differently, by applying degree abstraction in syntax, as represented in (26b), we obtain the appropriate denotation of

³ As discussed thoroughly in Sudo (2014), the deletion of the head nominal requires its licenser, that is, a relevant adjective. I assume, with Sudo (2014: 13) that the degree nominal *honsnu* 'number' can be deleted in relation to the gradable adjective *takusan* 'many'. Apparently they are not identical, but they underlyingly share a common root and have become obscured by idiosyncratic spell-out rules.

type $\langle d, t \rangle$. Thus, the same type of two predicates combine via Predicate Modification, to yield another predicate without type-shifting. The resultant complex predicate, as it is, becomes an argument for a (covert) iota, whose application yields the maximal degree as a standard of complement in the *yori*-complement, as shown in (27):

(27) (the) [_{DegP} [_{CP} λd . Mary bought d-expensive umbrella] price]]

This approach apparently runs contrary to Beck et al's DAP, but we claim that degree abstraction should be implemented in syntax (as part of general operation for the formation of relative constructions).⁴ Of course, the abstraction operation without resorting to the operator movement in syntax may be possible, as is assumed by Takeda (1999). However, we dare to say that the availability of degree abstraction in syntax has to do with acceptability in (apparent) clausal comparatives. In other words, if this degree abstraction is blocked due to a syntactic constraint, then Predicate Modification is also blocked, and as a consequence, the complex degree nominal fails to be formed.

Apparently, the LF structure (27) for the *yori*-complement in (22b), repeated (but slightly modified) in (28), is semantically fine, but (22b) is grammatically degraded. This degradation, we claim, should be attributed to the failure in degree abstraction in syntax.

(28) ??John-wa [Mary-ga pro katta (nedan)]-yori **takai** kasa-o katta
 John-Top [Mary-Nom pro bought (price)]-than expensive umbrella-Acc bought
 '(Lit.) John bought a more expensive umbrella than the price of the umbrella Mary bought.'

More specifically, the degree operator is blocked from moving out of the DP, as represented below, because the DP forms a specificity island. In this case, note that the umbrella Mary bought in the *yori*-clause, whose price is the standard of comparison in the *yori*-complement, is given a unique interpretation in a contextually restricted situation.

(29) (the) [λd . Mary bought [DP the d-expensive umbrella] expensiveness

It has been observed that in determiner-less languages, their nominals may appear bare or with demonstratives depending on the type of definiteness (cf. Jenks 2015). Japanese, a determiner-less language, has its definite nominals appear bare except when they receive familiar or anaphoric interpretations --- they usually appear with the demonstrative *sono*. We do not enter into the discussion of whether the DP object is null, represented as *pro* in (28), or deleted, but assume that in LF the degree operator undergoes movement out of a definite nominal. Given the discussion so far, the movement should be blocked due to the Specificity Island Condition (SIC), and thus the appropriate degree nominal fails to be derived.

(30) [_{CP} Op₁ Mary bought [DP the d₁-expensive umbrella]] ❗SIC violation

⁴ If this is the case, we have to admit to the degree movement in syntax, which is apparently in conflict with the DAP. However, as Sudo suggests, this abstraction pertains only to the formation of (degree) relative clauses, never supporting the DAP nor the existence of clausal comparatives in Japanese.

Our argument here will also be strengthened by the following example, i.e., the contrast with a habitual situation, as shown below:

- (31) John-wa [Mary-ga (hudan) pro kau (nedan)]-yori **takai** kasa-o katta
 John-Top [Mary-Nom (usually)pro buy (price)]-than expensive umbrella-Accbought
 ‘(Lit.) John bought a more expensive umbrella than the price of an umbrella Mary usually buys.’

(31), slightly different from (28), describes a habitual situation, which improves the acceptability substantially. Why does it have its acceptability improved?

Let us just take a look at the example (32a) and its truth conditions:

- (32) a. Mary buys an umbrella (when it rains).
 b. Gens [C(s)] $\exists x, s' [s' < s \wedge \text{Agent}(m, s') \wedge \text{buy}(x, s') \wedge \text{umbrella}(x, s')]$

Note incidentally that (31) says that the price of an umbrella Mary usually buys in a nonspecific situation s is compared to the one that John bought at the utterance situation. Let us say that the matrix clause in (31) is asserted on the presupposition (32a) that Mary usually buys an umbrella under the situation in which it rains, which is truth-conditionally denoted above in (32b). The umbrella Mary buys in a relevant situation s' may denote the unique individual, but in the situation of the embedded CP, the umbrella whose price is to be compared should not be specific. It can also be conceived that in a wider situation s the umbrellas Mary has bought are numerous, and any of those umbrellas, more precisely, any price of them can be a standard of comparison. Given the discussion here, we assume that in (31) the degree operator moves out of the DP, as shown in (33a). Note that this movement is not subject to the SIC because the DP does not form a specificity island, thus feasibly yielding a predicate of degrees (of type $\langle d, t \rangle$). That is, the derived degree predicate successfully combines with the degree nominal via Predicate Modification, as denoted in (33b):

- (33) a. [_{CP} Op₁ Mary usually buys [_{DP} a d₁-expensive umbrella]]
 b. (the) [λd . Mary usually buys [_{DP} a d-expensive umbrella]] price

Similar facts seem to hold in Mandarin Chinese. Recall that as touched upon earlier in this paper, Chinese does not even allow seemingly clausal comparatives. Setting this fact aside, let us see a difference in acceptability observed when amount or non-amount degree nominals appear as the standard of comparison, as shown in (34).

- (34) a. ??John mai le bi Mary mai DE jiage haiyao guide san.
 John buy PT than Mary buy RC price more expensive umbrella
 ‘John bought more expensive umbrella than Mary did.’
 b. John mai le bi Mary mai DE shuliang haiyao duode san.
 John buy PT than Mary buy RC amount more many umbrella
 ‘John bought more umbrellas than Mary did.’

Furthermore, the contrast between episodic and habitual environments in the *yori*-complement can be extended to Chinese as well:

- (35) John mai le bi Mary pingshi mai DE jiage haiyao guide san.
 John buy PT than Mary usually buy RC price more expensive umbrella
 ‘John bought more expensive umbrella than Mary usually does.’

Note that (35), where a habitual interpretation is yielded with the adverb *pingshi* ‘usually’, shows a substantial improvement. This fact, too, is straightforwardly accounted for by assuming that there is abstraction over degrees in syntax. In (35) the habitual context in the complement of *bi* makes it possible for the degree operator to undergo movement: it is a movement out of the non-specific DP, which is not subject to the SIC.⁵

⁵ The following examples are all cases in which degree operators undergo movement from VP-adverbials.

- (i) a. John-wa [Mary-ga hasiru]-yori **tookuni** hasitta.
 John-Top [Mary-Nom runs]-than far ran
 ‘John ran farther away than Mary ran.’
 b. John-wa [Mary-ga aruita]-yori **nagaku** aruita.
 John-Top [Mary-Nom walked]-than long walked
 ‘John walked longer than Mary walked.’
 (ii) a. John-wa [Mary-ga amu]-yori **kiyooni** mahuraa-o anda.
 John-Top [Mary-Nom knits]-than dexterously scarf-Acc knitted
 ‘John knitted a scarf more dexterously than Mary does.’
 b. John-wa [Mary-ga tukutta]-yori **tegiwayoku** omuretu-o tukutta.
 John-Top [Mary-Nom cooked]-than adeptly omelet-Acc cooked
 ‘John cooked an omelet more adeptly than Mary did.’

These examples, too, are derived uniformly as a consequence of degree nominals being deleted by a syntactic deletion operation. Thus, their underlying structures are assumed to be the ones whose *yori*-complements are relative structures headed by degree nominals, as shown below:

- (iii) a. John-wa [Mary-ga hasiru **kyori**]-yori **tookuni** hasitta.
 John-Top [Mary-Nom runs distance]-than far ran
 ‘John ran farther away than Mary ran.’
 b. John-wa [Mary-ga aruita **jikan**]-yori **nagaku** aruita.
 John-Top [Mary-Nom walked time]-than long walked
 ‘John walked longer than Mary walked.’
 (iv) a. John-wa [Mary-ga amu **teido**]-yori **kiyooni** mahuraa-o anda.
 John-Top [Mary-Nom knits degree]-than dexterously scarf-Acc knitted
 ‘John knitted a scarf more dexterously than Mary does.’
 b. John-wa [Mary-ga tukutta **tegiwayosa**]-yori **tegiwayoku** omuretu-o tukutta.
 John-Top [Mary-Nom cooked adeptness]-than adeptly omelet-Acc cooked
 ‘John cooked an omelet more adeptly than Mary did.’

What appear as head nominals, *kyori* ‘distance’, *jikan* ‘time’, *teido* ‘degree’ and *tegiwayosa* ‘adeptness’, are all categorized as degree nominals, being a predicate of degree (of type <d,t>). As you can also see from the verbal forms in the *yori*-complement, irrespectively of generic or episodic statements those examples are all relatively fine. Note also that some of them are fine despite the fact that they are non-amount comparatives.

We assume that likewise, these *yori*-comparatives, too, are derived from the degree modification. What differs is that the degree operator does not move out of the object DPs but the adverbials. Without delving into the details of further compositionality, we assume that the resultant LF structure for (iia) is (v) below, where the lambda abstraction in the relative clause, concomitant with the degree operator movement, makes it possible for the relative clause to combine with the degree nominal, *dexterousness*.

3.1 Rescue Operation: An Event Abstraction-based Solution

The discussion so far has resolved the puzzle stemming from the difference between episodic and habitual contexts in the Japanese *yor*i-complement and the Chinese counterpart, the *bi*-complement. In a nutshell, the strategy we rely on imposes restriction on syntax, i.e. availability of degree operator movement in syntax. However, we have not yet provided any solution to a bigger puzzle, i.e., the contrast in acceptability between ‘amount’ and ‘non-amount’ comparatives, as touched upon earlier in this paper, repeated again below:

- (36) a. John-wa [Mary-ga katta]-yori **takusan-no** kasa-o katta
 John-Top [Mary-Nom bought]-than many-Gen umbrella-Acc bought
 ‘John bought more umbrellas than Mary bought.’
 b. ??John-wa [Mary-ga katta]-yori **nagai** kasa-o katta
 John-Top [Mary-Nom bought]-than long umbrella-Acc bought
 ‘John bought a longer umbrella than Mary bought.’

Even some of the informants who judge (36b) as acceptable seem to find it mildly degraded than (36a). Where does this degradation come from? Given the syntax-based approach here, the degree movement in the *yor*i-complement in (36a) should give rise to the violation of the SIC constrain, and likewise should be judged unacceptable, contrary to fact.

Here we propose that an alternative operation should apply to derive a degree predicate in the *yor*i-complement as a ‘rescue strategy’: it should take effect as a last resort. Note that what are compared in (36a-b) are the numbers of the umbrellas and the lengths of the umbrellas, respectively. As for (36a), the degrees (cardinalities) of the umbrellas in question change in accordance to the accumulation of the relevant event. In other words, as the umbrella-buying events proceed and their amount accumulates, the number of the umbrellas bought by Mary will increase. For instance, the number of three umbrella-buying events will correspond to the number of umbrellas measured in the individual domain, i.e., three umbrellas. On the other hand, such a correlation does not hold in (36b): even though the relevant events proceed and their amount accumulates, the length of an umbrella will not be greater. Through the overview of comparatives in Japanese, it turns out that the clausal comparatives that are judged somewhat acceptable are the cases in which the standard of comparison in the *yor*i-complement is closely related to the gradable property of an event.

It thus follows that the standard of comparison in the amount comparative (36a), that is, the amount of the denotation of the DP object can also be derived from the amount of the event. How can it be, however? What has to be compared as the standard of comparison in the *yor*i-complement is the cardinality of the umbrellas Mary bought, not Mary’s umbrella-buying event.

In order to solve this dilemma, we would like to follow the analysis taken by Krifka (1989) and Nakanishi (2007) and introduce a homomorphism *h*, that is, a structure-preserving function.

- (v) (the) [_{DegP}[_{CP} λd. M [_{VP} knits the scarf d-dexterously]]] dexterousness

Since the degree operator movement out of the adverbs, unlike that out of the object DPs, are not subject to the SIC, the complex nominals are successfully derived. This is obviously treated as evidence to strengthen our claim that the *yor*i-complement in (seemingly) clausal comparatives is uniformly a relative clause headed by a ‘degree’ nominal. In other words, the fluctuation of grammaticality obviously has to do with the availability of degree abstraction in the relative clause.

This function maps elements in a domain to those in another domain while maintaining the structural relations in a monotonic fashion.⁶

$$(37) h(e_1 \cup_E e_2) = h(e_1) \cup_I h(e_2)$$

This mechanism is not particular to Japanese comparatives, but should be conceived as a general option in natural language when a dilemma occurs between modifiers and the denotations of the modified objects. A verbal phrase (VP) is said to denote a predicate of events after the individual argument slots are all saturated (cf. Kratzer 1996). Let us examine the mechanism of this function with the following example:

(38) John was sleeping for two hours.

As Krifka points out, *for two hours*, which is adjoined to a VP segment, does not measure the amount of John's sleeping event, but the run time of the event. Thus, in order to get the adverbial modifier to function appropriately, Krifka proposes to introduce the structure-preserving function, h , which maps a set of events to a set of times for sleeping events in a monotonic fashion. After the function h 's application, the denotation of the VP has been mapped to a set of times, so the temporal adverbial nicely combines with the VP. Thus, with the help of h , the PP in (38) ends up measuring the run time of the event, but not the amount of the event.

One more important thing we should not forget is that we need to look at the semantic side of the temporal adverbial. It is generally assumed (cf. Schwarzschild 2002) that what measures the run time via h is not the adverbial itself, a measure function μ , which is a function that maps objects to degrees on a relevant scale. While the adverbial directly modifies the verbal predicate syntactically, it is mediated by a measure function μ semantically. According to Krifka, a measure function μ for time, for instance, can be associated with another measure function, that is, the one for event μ' , as defined in (39):

$$(39) \forall e[\mu'(e) = \mu(he)] \quad (\text{Krifka 1989: 97})$$

(39) says that for all events, the amount of the event e measured by μ' in E (Event domain) has to be equal to the amount of $h(e)$ measured in the individual domain.

The discussion so far gives us a hint of how we derive the complex nominal in (36a). With the help of the structure-preserving function h and a measure function for event, we will be able to work out a rescue operation in cases when degree abstraction fails to apply. Put differently, what we are claiming is that in a case like (36a), event abstraction applies to the *yoru*-complement instead of degree abstraction as a 'last resort' to yield a predicate of degrees. We assume, with Kratzer (1996), that the denotation of a verb includes an event argument, and also that T(ense) existentially quantifies over the event variable (cf. Higginbotham 1985). Thus the embedded CP complement denotes a proposition with the event argument existentially closed off, as shown in (40). However, obviously it is not an appropriate denotation for the application of h .

⁶ Measure functions must be monotonic relative to the given part-whole structure. Monotonicity is defined, for example, on an individual domain, as follows: iff there are at least two individuals x, y in I such that x is a proper subpart of y (i.e., $x < y$), for all x, y in I such that $x < y$, $\mu(x) < \mu(y)$ (see Nakanishi 2007:267 for more concrete discussion).

$$(40) \llbracket \text{CP} \rrbracket = \exists e. \text{Agent}(m, e) \wedge *bought(\text{the umbrella}, e)$$

What is required for (40) is to disclose the event argument that has been existentially closed off. Thus, we appeal to existential disclosure (Dekker 1993), a mechanism designed to access implicit arguments, as follows:

$$(41) \llbracket \text{CP} \rrbracket = \exists e [\text{Agent}(m, e) \wedge *bought(\text{the umbrella}, e)] \\ \text{— existential disclosure } \rightarrow \lambda e' \exists e [\text{Agent}(m, e) \wedge *bought(\text{the umbrella}, e) \wedge e' = e]$$

In this way, by exploiting existential disclosure, we can obtain the LF structure with the event argument λ -abstracted, as shown below:

$$(42) \llbracket \text{CP} \rrbracket = \lambda e. \text{Mary bought}(e) \text{ the many umbrellas}$$

Due to the structure-preserving function h , furthermore, it will be shifted to a predicate of degrees, as in (43b). As a consequence, the derived CP denotation successfully combines with the degree nominal (42a) via Predicate Modification.

$$(43) \text{ a. } \llbracket \text{NP} \rrbracket = \lambda d. \text{amount}(d) \\ \text{ b. } \llbracket \text{CP} \rrbracket = \lambda d. [\text{Mary bought}(e) \text{ the many umbrellas} \wedge \mu'(e) = \mu_{\text{amount}}(h(e)) = d] \\ \text{ c. (the) } [\lambda d. \text{Mary bought}(e) \text{ the many umbrellas} \wedge \mu'(e) = \mu(h(e)) = d] \text{ amount}$$

Here again, a covert definite determiner applies to this complex predicate and returns the maximal degree, as shown in (43c).

The discussion here has dealt with the question of why amount clausal comparatives maintain their grammatical status although the degree movement is predicted to be blocked. What we have been claiming is that an alternative abstraction operation, that is, an event abstraction, should work as a last resort. This option itself might seem to be particular to Japanese comparatives at first blush, but it is not. The operation developed here should be considered an extended practice of the domain-shift operation by a homomorphism h , which is a general option available in the syntax-semantics interface.

4 Conclusion

We have presented our argument that seemingly clausal comparatives in Japanese are in actuality relative clauses headed by syntactically deleted degree nominals (cf. Sudo 2014). The grammatical degradation observed in some Japanese and Chinese comparatives can be commonly attributed to the violation of Specificity Island Constraint (SIC). We have also proposed that the amount-typed clausal comparative in Japanese can rely on an alternative without degree operator movement, that is, an event-abstraction strategy, which may circumvent the SIC violation.

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