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PARAMETRIC VARIATION IN THE SEMANTICS OF
COMPARISON: JAPANESE VS. ENGLISH

This paper proposes a semantic analysis of comparison constructions in Japanese which is crucially different from the standard semantics of comparatives as developed for English and related languages. The interpretation of the Japanese comparison construction is determined to a larger extent by pragmatic strategies, as opposed to compositional semantics. The syntactically provided item of comparison (the constituent accompanying *yoru*) does not, in contrast to an English *than*-clause, have a degree semantics; it ultimately contributes an individual. From this item the real comparison has to be inferred. We argue that Japanese does not have English-style degree operators and probably lacks abstraction over degree variables in the syntax altogether. The proposed analysis accounts for a number of empirical differences between Japanese and English. A more general outcome is that the semantics of comparison is subject to crosslinguistic variation. A parameter of language variation is suggested as the source of the differences we observe.

1. INTRODUCTION

This paper investigates the semantics of comparative constructions in Japanese. Standard studies (Kikuchi, 1987; Ishii, 1991), assume that *yoru*-clauses and *-phrases* in Japanese play the same role as *than*-clauses and *-phrases* in English, and that (1a) and (2a) correspond fairly directly to English (1b) and (2b), respectively.

- (1) a. Mary-wa John-yori (motto) takusan-no
Mary-Top John-YORI (more) many-Gen
ronbun-o kaita.
paper-Acc wrote
b. Mary wrote more papers than John.
- (2) a. Mary-wa [John-ga kaita yori] (motto) takusan-no
Mary-Top John-Nom wrote YORI] (more) many-Gen
ronbun-o kaita.
paper-Acc wrote
b. Mary wrote more papers than John did.

There are, however, several unexpected differences between English comparatives and Japanese *yoru*-constructions under this assumption. We will

focus on three such differences: (i) variation in acceptability, (ii) lack of subcomparatives, and (iii) absence of English-like negative island effects.

Variation in acceptability is illustrated in (3) and (4) below – data and judgments from Ishii (1991).¹

- (3) a. Taroo-wa [Hanako-ga katta yori (mo)] takusan (-no)
 Taroo-Top [Hanako-Nom bought YORI (mo)] many (-Gen)
 kasa-o katta.
 umbrella-Acc bought
 b. Taroo bought more umbrellas than Hanako did.
- (4) a. ?*Taroo-wa [Hanako-ga katta yori (mo)] nagai
 Taroo-Top [Hanako-Nom bought YORI (mo)] long
 kasa-o katta.
 umbrella-Acc bought
 b. Taroo bought a longer umbrella than Hanako did.

We have not been able to replicate the strong ‘?’ judgment for (4a) reported by Ishii. The reactions we received ranged from ‘?’ (not quite straightforward, but not bad) to ‘??’ (questionable). Even so, this is puzzling; from the perspective of a language like English in which (4b) is perfectly fine, it is quite unclear how the status of (4a) could be questionable, and why a contrast should exist between (3a) and (4a).

Lack of subcomparatives in Japanese has been observed by Snyder et al. (1995); the contrast with English is exemplified by (5a) vs. (5b).

- (5) a. *Kono tana-wa [ano doa-ga hiroi yori (mo)]
 this shelf-Top [that door-Nom wide YORI (mo)]
 (motto) takai.
 (more) tall
 b. This shelf is taller than that door is wide.

The third difference between Japanese and English is illustrated by the contrast in (6) below.

- (6) a. John-wa [dare-mo kawa-naka-tta no yori]
 John-Top anyone buy-Neg-Past NO YORI
 takai hon-o katta.
 expensive book-Acc bought
 b. *John bought a more expensive book than nobody did.

Rendering (6a) as a standard comparative yields (6b), an unacceptable example – in fact, an almost incomprehensible sentence. Japanese (6a), however, is well-formed, and means something like (6'). Both its well-formedness and its interpretation are not expected under standard assumptions.

- (6') John bought a book that is more expensive than the book that nobody bought.

The structure of the paper is as follows: Section 2 lays out the standard semantic analysis of comparative constructions as developed for English and similar languages. We will see that the behavior of Japanese is indeed quite unexpected under this analysis. In Section 3 we develop an alternative approach to the semantics of Japanese *yor*i-constructions in which they are analyzed as context dependent. Variation in acceptability follows from this basic analysis. The details of the theory are further developed in Section 4, regarding the semantic contribution of the *yor*i-clause. We suggest that *yor*i-clauses do not describe degrees at all but are essentially relative clause-like. An interesting set of subcomparative data in Japanese is shown to follow from this, including the ungrammaticality of (5a). The absence of English-like negative island effects also follows from the non-degree semantics of *yor*i-clauses. Section 5 examines the semantics of the main clause in a *yor*i-construction in more detail. In conjunction with further data from comparison constructions in Japanese, there is evidence to suggest that there is no predicate of degrees formed in the main clause either. We conjecture that Japanese does not have abstraction over degrees in the syntax, and is thus unable to create degree predicates that are not the meanings of lexical items. *Yor*i-constructions are therefore semantically and syntactically very much unlike English-type comparatives. Section 6 concludes the paper with an outlook on crosslinguistic variation in the semantics of comparison.

2. THE STANDARD ANALYSIS OF COMPARATIVES

In this section we will introduce a version of the standard analysis of comparatives, going back to Stechow (1984). The version we will introduce is closest to Heim (2000); minor variations in the theory are irrelevant to the point made here.

Under such a theory, example (7a) has a Logical Form as in (7b).²

- (7) a. Taroo bought more umbrellas than Hanako did.
 b. [[-er [1 [than Hanako did ~~buy t₁ many umbrellas~~]]]
 [1 [Taroo bought t₁ many umbrellas]]]

At the level that is the input for compositional interpretation, the comparative morpheme forms a constituent with the *than*-clause, which is raised to (say) an IP-adjoined position. Unpronounced material is indicated by strike-out. Both the *than*-clause and the main clause with the gap contribute

properties of degrees. The comparative morpheme denotes a relation between two sets of degrees – the one in (8).

- (8) a. $[[\text{-er}]](\text{D1})(\text{D2}) = 1$ iff $\max(\text{D2}) > \max(\text{D1})$
 b. Let S be a set ordered by \leq . Then $\max(S) = \iota s[s \in S \ \& \ \forall s' \in S[s' \leq s]]$

The example thus has a semantic representation as indicated in (7'a), which amounts to the truth conditions in (7'b), paraphrased in (7'c).

- (7') a. $[[\text{-er}]](\lambda d.\text{H. bought } d\text{-many umbrellas})(\lambda d.\text{T. bought } d\text{-many umbrellas})$
 b. $\max(\lambda d.\text{T. bought } d\text{-many umbrellas}) > \max(\lambda d.\text{H. bought } d\text{-many umbrellas})$
 c. The degree d such that Taroo bought d -many umbrellas exceeds the degree d' such that Hanako bought d' -many umbrellas.

Details aside, the important ingredients of this analysis are that the comparison is between two degrees, and that both the *than*-clause and the main clause of a comparative construction provide a predicate of degrees. The degree ultimately contributed by the *than*-clause or *-phrase* (i.e., the maximum of that set) will be called the standard of comparison.

In the relevant respects, (3b) is completely parallel to (4b) and to the subcomparative example in (5b). The LF of (4b) is given in (9), and its semantics in (9').

- (9) a. Taroo bought a longer umbrella than Hanako did.
 b. $[[\text{-er} \ [1 \ [\text{than Hanako did buy a t1 long umbrella}]]] \ [1 \ [\text{Taroo bought a t1 long umbrella}]]]$

- (9') a. $[[\text{-er}]](\lambda d.\text{H. bought a } d\text{-long umbrella})(\lambda d.\text{T. bought a } d\text{-long umbrella})$
 b. $\max(\lambda d.\text{T. bought a } d\text{-long umbrella}) > \max(\lambda d.\text{H. bought a } d\text{-long umbrella})$
 c. The degree d such that Taroo bought a d -long umbrella exceeds the degree d' such that Hanako bought a d' -long umbrella.

Obviously, the only difference between (7') and (9') is in the choice of the adjective (*many* vs. *long*). The examples are otherwise identical. (10) and (10') below are the analysis of the subcomparative (5b).

- (10) a. The shelf is taller than the door is wide.
 b. $[[\text{-er} \ [1 \ [\text{than the door is t1 wide}]]] \ [1 \ [\text{the shelf is t1 tall}]]]$

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- (10') a. [[-er]] (λd . the door is d -wide) (λd . the shelf is d -tall)
 b. $\max(\lambda d$. the shelf is d -tall) > $\max(\lambda d$. the door is d -wide)
 c. The degree d such that the shelf is d -tall exceeds the degree d' such that the door is d' -wide.

Once more, the example is quite parallel to (7') above. The only difference is that we do not have to resolve an ellipsis. Thus the subcomparative case could actually be viewed as simpler, in a sense, than the others.

If we try to apply this analysis to Japanese *yori*-constructions, the differences observed above are problematic. The first problem is the fact that (4a), in contrast to (3a), is not fully acceptable. There is no reason to expect this. Moreover, its shaky status and variation between speakers are incomprehensible under this analysis. The unavailability of subcomparatives in Japanese is similarly unexpected.

Turning now to negative island effects in comparatives, these standard assumptions make available a semantic explanation for the ungrammaticality of data like (11). The expected semantics is given in (11').

- (11) a. *John bought a more expensive book than nobody did.
 b. [[-er [1 [than nobody did ~~buy a t1-expensive book~~]]]
 [1 [John bought a t1 expensive book]]]
- (11') a. [[-er]] (λd . nobody bought a d -expensive book) (λd . J bought a d -expensive book)
 b. $\max(\lambda d$. J. bought a d -expensive book) > $\max(\lambda d$. nobody bought a d -expensive book)
 c. The degree d such that John bought a d -expensive book exceeds the degree d' such that nobody bought a d' -expensive book.

It is well-known that combining negation with comparatives in this way is not acceptable (e.g., von Stechow 1984; Rullmann 1995). Rullmann's explanation is that the denotation of the item of comparison, (12) in our example, is in fact undefined: there is no maximal degree d such that nobody bought a d -expensive book. If nobody bought a book that cost as much as \$50, then it is also true that nobody bought a book that cost as much as \$51, \$52 and so on. The example is thus unacceptable because it does not have a well-defined interpretation.

- (12) $\max(\lambda d$. nobody bought a d -expensive book)

To this we could reply that perhaps the context can fix a particular set of degrees as the degrees of expense that are relevant for us to consider. Say we are considering a particular set of books, the most pricey of which is \$48.98.

Nobody bought a book that expensive. The sentence would then claim that John bought a book that cost more than \$48.98. That is, John bought a book more expensive than the contextually given maximum amount of money that nobody spent on a book.

It is not relevant for us whether this way of rescuing (11) actually exists (it does not seem possible for this English example). What is important is that even if we manage to save the sentence from uninterpretability in this way, the resulting interpretation is still not the intuitive meaning of the Japanese example (13a). (13a) entails that there is a particular book that nobody bought. The price of John's book is compared with the price of that book, as the paraphrase (13b) indicates. Thus both the acceptability and the interpretation intuitively associated with (13a) are unexpected under the standard semantic analysis of comparatives.

- (13) a. John-wa [dare-mo kawa-naka-tta no yori]
 John-Top anyone buy-Neg-Past NO YORI
 takai hon-o katta.
 expensive book-Acc bought
 b. John bought a book that is more expensive than the book
 that nobody bought.

We take these problems to show that Japanese calls for an analysis that is unlike the analysis of English comparatives in crucial respects. We will make a suggestion to that effect in the next section.

3. A CONTEXTUAL ANALYSIS

3.1. *Basic Idea*

We propose that the interpretation of Japanese *yor*i-constructions is governed to a lesser extent by compositional semantics and to a larger extent by pragmatic strategies than is the case under the standard analysis of comparatives. This explains fluctuation in the judgments. Our basic idea, illustrated on the basis of example (14), is that (14'b) or (14'c) are better English approximations of the meaning of (14) than (14'a).³

- (14) Hanako-wa [Taroo-ga katta yori (mo)] takusan (-no)
 Hanako-Top [Taroo-Nom bought YORI (mo)] many (-Gen)
 kasa-o katta.
 umbrella-Acc bought
- (14') a. Hanako bought more umbrellas than Taroo did.
 b. Compared to what Taroo bought, Hanako bought more umbrellas.
 c. Compared to what Taroo bought, Hanako bought many umbrellas.

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Thus the *yor*i-constituent is not like an English comparative *than*-clause or -phrase and more like the context setting 'compared to' phrase in the paraphrases. Some initial motivation for this idea comes from the fact that the distribution of *yor*i-phrases is less restricted than that of *than*-phrases, which are limited to genuine comparatives. Some relevant data are given in (15) and (16).

- (15) a. Watasi-wa Joe-yori (mo) Austin-o aisiteiru.
I-Top Joe YORI (mo) Austin-Acc love
b. Compared to Joe, I love Austin.
c. *Than Joe, I love Austin.
- (16) a. Sally-wa Joe-yori tensai-da.
Sally-Top Joe YORI genius-Cop
b. Compared to Joe, Sally is an genius.
c. *Than Joe, Sally is a genius.

The function of the 'compared to' phrase seems to be to set the context for the following sentence. Our analysis will pursue this understanding of the function of *yor*i and 'compared to'.

A cautionary note is in order before we do so. We call 'compared to' an approximation to *yor*i, and we mean this quite literally. Other phrases could play the role of a context setter, and may occasionally be a better fit for *yor*i. Examples include 'considering...', 'with regard to...', 'related to...'. These context setters are not completely interchangeable. A type of example in which 'compared to' is definitely not a good approximation is given in (17) (from an anonymous reviewer). Note that (17) still supports the claim that *yor*i-constituents are not limited to comparatives.

- (17) Ken-wa yooroppa-yori amerika-ni iku-koto-ni kimeta.
Ken-Top Europe-YORI America-to go-fact-Dat decided
'Ken decided to go to America rather than Europe.'

A detailed study of context setters would be interesting, but is beyond the scope of this paper. We will continue to make the connection between Japanese and English in terms of 'compared to', since this seems to be the best approximation to us overall. We will first develop an understanding of English 'compared to', and then we will apply it to Japanese *yor*i.

3.2. English 'Compared to'

Two environments for 'compared to' produce a semantic effect similar to a comparative construction: combination with a sentence with an adjective in the positive (i.e., unmodified, simple) form, and combination with a sentence

containing an adjective in the comparative form but without a *than*-phrase. Examples are given in (18a) and (18b) below; both times, the comparative in (19) comes close to paraphrasing the most salient interpretation.^{4,5}

- (18) a. Compared to Joe, Sally is tall.
b. Compared to Joe, Sally is taller.

- (19) Sally is taller than Joe.

Let us discuss the positive case first. Adjectives in the positive form are vague, or context-dependent. Depending on the utterance situation, (20a) could mean that Sally is tall for a six-year-old girl, or that Sally is tall for a player on the UConn basketball team. Thus, depending on context, the sentence can make rather different claims. The semantics suggested in (20) is from Heim and Kratzer (1998) (see also Hamann, 1991 and references therein for discussion).

- (20) a. Sally is tall.
b. $\exists d[\text{Sally is } d\text{-tall} \ \& \ d > c]$
(where c is the size standard made salient by the utterance context)
c. $\text{tall}_{\text{Pos}} = \lambda x. \exists d[x \text{ is } d\text{-tall} \ \& \ d > c]$
(where c is the size standard made salient by the utterance context)

(20a) out of the blue is somewhat underdetermined – we do not know what size standard we should consider. The role of the ‘compared to’ phrase in (21) is to tell us about the context. The most straightforward reading of (21a) is as in (21b).

- (21) a. Sally is tall, compared to Joe.
b. $\exists d[\text{Sally is } d\text{-tall} \ \& \ d > c]$
 $c =$ the size standard made salient by the utterance context
 $:=$ Joe’s height
c. Sally is taller than Joe.

This makes the most obvious interpretation of (21a) parallel to the comparative (21c). Note that the ‘compared to’ phrase is not integrated into the compositional semantics of the main clause at all. It functions purely as a context setter, narrowing down the options for the value of a free variable in the semantics of the main clause. Note also that the way in which the free variable is assigned a value is affected by the ‘compared to’ phrase, not determined by it directly. There is an inferential process at work that tells us that in a context in which Joe is relevant, the size standard is plausibly Joe’s height. Other options exist, though.⁶

Turning now to the comparative case, let's first examine the interpretation of examples like (22a) without a *than*-clause or -phrase. (22a) intuitively means that Mary wrote more books than some salient quantity, as indicated in (22b).

- (22) a. Mary wrote more books.
 b. $\max(\lambda d. \text{Mary wrote } d\text{-many books}) > c$
 (where c is the number made salient by the utterance context)

We see that these examples are also context dependent. We need a second, context-dependent version of the comparative morpheme for these cases; our suggestion is (23). The same version of the comparative morpheme is also at work in (24).

- (23) $[[\text{-er}_2]](c)(D) = 1$ iff $\max(D) > c$

- (24) a. Sally is taller.
 b. $[[\text{-er}_2c] [1 [\text{Sally is } t_1 \text{ tall}]]]$
 c. $[[\text{-er}_2]](c)(\lambda d. \text{Sally is } d\text{-tall})$
 d. $\max(\lambda d. \text{Sally is } d\text{-tall}) > c$
 (where c is the size standard made salient by the utterance context)

It thus makes sense to view the role of the 'compared to' phrase in (25) as essentially parallel to the positive case: setting the context, i.e., providing information about the value of a free variable.

- (25) a. Compared to Joe, Sally is taller.
 b. $\max(\lambda d. \text{Sally is } d\text{-tall}) > c$
 $c =$ the size standard made salient by the utterance context
 $:=$ Joe's height
 c. Sally is taller than Joe.

Hence (21a) and (25a) turn out to be almost equivalent.⁷

3.3. Japanese *Yori* as 'Compared to'

We will now apply our basic semantic analysis to Japanese *yori*-constructions. The most obvious cases are examples with *yori*-phrases, like (26). The standard translation of (26) is the comparative in (27).

- (26) Mary-wa John-yori (motto) takusan-no ronbun-o kaita.
 Mary-Top John-YORI (more) many-Gen paper-Acc wrote

(27) Mary wrote more papers than John.

Note that the main clause in (26) optionally contains the word *motto*, which has been regarded as the equivalent of the comparative morpheme and is accordingly glossed as *more*. We will discuss this issue in more detail in Section 5. For the moment, we note that the main clause in (26) might contain a positive or a comparative adjective, or perhaps have both options. Depending on which is the case, our suggested paraphrase for (26) is either (28a) or (28b).

- (28) a. Compared to John, Mary wrote more papers.
 b. Compared to John, Mary wrote many papers.

We saw above that (28a) and (28b) are almost equivalent. Their semantic analyses are given in (29a) and (29b), respectively, both of which provide suitable truth conditions for the Japanese example (26).

- (29) a. $\max(\lambda d. \text{Mary wrote } d\text{-many papers}) > c$
 $c =$ the number made salient by the utterance context
 $=$ the number of papers John wrote
 b. $\exists d[\text{Mary wrote } d\text{-many papers} \ \& \ d > c]$
 $c =$ the number made salient by the utterance context
 $:=$ the number of papers John wrote

The analysis of (26) and of *yor*i-phrases in general can follow straightforwardly in the footsteps of the English 'compared to' construction. More interesting are clausal *yor*i-constituents – an example is given in (30). (31) is the standardly assumed English translation as a comparative.

- (30) Mary-wa [John-ga kaita yori] (motto) takusan-no ronbun-o kaita.
 Mary-Top [John-Nom wrote YORI] (more) many-Gen paper-Acc wrote

(31) Mary wrote more papers than John did.

We suggest that (32a, b) come closer to the interpretation of (30). The example is different from (26) only in that the sister constituent of *yor*i looks like a clause, not an NP. We have preserved this in our suggested English approximations.

- (32) a. Compared to what John wrote, Mary wrote more papers.
 b. Compared to what John wrote, Mary wrote many papers.

We would like to associate (32a, b) and ultimately (30) with (33a, b). That is, the intended number standard is once more the number of papers written by John.⁸

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- (33) a. $\max(\lambda d. \text{Mary wrote } d\text{-many papers}) > c$
 $c =$ the number made salient by the utterance context
 $:=$ the number of papers John wrote
- b. $\exists d[\text{Mary wrote } d\text{-many papers} \ \& \ d > c]$
 $c =$ the number made salient by the utterance context
 $:=$ the number of papers John wrote

The linguistic means which trigger the inference of this number standard in English (32a, b) is the free relative clause 'what John wrote'. It is plausible to assume that in a context in which things written by John are relevant, and there is no reason to consider anything other than papers, the number standard will be the number of papers John wrote.

For the Japanese example (30), the question arises as to what the semantic contribution of the *yor*i-clause is, precisely. This issue will be discussed in detail in Section 4. For the moment, we will suppose (34), following up on the analogy to English (32a, b) and using the analysis by Jacobson (1995) of the semantics of free relative clauses.

- (34) [John-ga kaita] = what John wrote
 $= \max(\lambda x. \text{J. wrote } x)$

With this assumption, (30) becomes quite parallel to (32a, b). Note that in contrast to *than*-clauses in standard English comparatives (cf. Section 2), the *yor*i-construction does not involve degrees in the subordinate clause. This aspect of our analysis will become important in our explanation of some of the empirical properties specific to *yor*i-constructions (lack of subcomparatives, and negative island effects) and will be discussed in Section 4.

3.4. Explaining Variability

We are now in a position to discuss the first difference between English and Japanese to be addressed in this paper: variation in acceptability. Remember the contrast in (35a) vs. (36a) below (the judgment reported here reflects the range of intuitions that we have found for these data).

- (35) a. Taroo-wa [Hanako-ga katta yori (mo)] takusan (-no)
 Taroo-Top [Hanako-Nom bought YORI (mo)] many (-Gen)
 kasa-o katta.
 umbrella-Acc bought
- b. Taroo bought more umbrellas than Hanako did.

- (36) a. $?(?)$ Taroo-wa [Hanako-ga katta yori (mo)] nagai
 Taroo-Top [Hanako-Nom bought YORI (mo)] long
 kasa-o katta.
 umbrella-Acc bought
 b. Taroo bought a longer umbrella than Hanako did.

(37a, b) are our English approximations of (35a) and (36a):

- (37) a. Compared to what Hanako bought, Taroo bought a lot of umbrellas.
 b. $?$ Compared to what Hanako bought, Taroo bought a long umbrella.

English (37b) is, in fact, a little odd. The sentence is not ungrammatical: suppose that the context establishes that Hanako and Taroo went to a store and each bought an umbrella. (37b) is acceptable then, and the intuitive interpretation is that Taroo's umbrella is longer than the one Hanako bought. Out of the blue, however, (37b) is decidedly strange. This suggests that our approximation of Japanese *yori* as 'compared to' is on the right track. Quite generally, we expect that judgments for English 'compared to' should mirror Japanese *yori*-constructions. We will see some further evidence that confirms the analogy in a moment. First, let us try to be more precise about why there is such a contrast between (37a)/(35a) vs. (37b)/(36a).

The interpretation of (37a) and (37a) is given in (38). As indicated in (38b), the number standard, in order to get the desired, comparative-like interpretation, should be set to the number of umbrellas bought by Taroo. What semantic interpretation actually provides is, by hypothesis, (38c). Thus, the interpretation we are aiming for requires us to infer from the mention of what Hanako bought the number of umbrellas bought by Hanako.

- (38) a. $\exists n$ [Taroo bought n -many umbrellas & $n > m$]
 b. m = the number standard made salient by the utterance context
 := the # of umbrellas Hanako bought
 c. [Hanako-gakatta] = what Hanako bought = $\max(\lambda x.H. \text{ bought } x)$

(39) below goes through the same exercise for (37b) and (36a). From the mention of what Hanako bought, we need to infer the length of the umbrella Hanako bought, as the size standard relevant to (36b).

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- (39) a. $\exists d$ [Taroo bought a d -long umbrella & $d > c$]
 b. c = the size standard made salient by the utterance context
 := the length of the umbrella Hanako bought
 c. [Hanakō-gakatta] = what Hanako bought
 = $\max(\lambda x.H. \text{ bought } x)$

The contrast between (37a)/(35a) vs. (37b)/(36a) will come out if we can argue that the inference in (38) is easier than the one in (39). This seems most plausible. (40) and (41) give slightly more formal versions of the concepts involved. Suppose that 'what Hanako bought' denotes not the maximality of all the things bought by Hanako but, as is usually assumed, only the relevant things. Suppose furthermore that the context limits us to umbrellas in this respect. We can then assume that the information provided by the 'compared to' clause amounts to (40b). We would like to infer from (40b) either (41a) or (41b).

- (40) a. $\max(\lambda x.H. \text{ bought } x)$
 b. $\max(\lambda x. \text{ umbrella}(x) \ \& \ H. \text{ bought } x)$
- (41) a. $\max(\lambda d.H. \text{ bought } d\text{-many umbrellas}) =$
 $\text{card}(\max(\lambda x. \text{ umbrella}(x) \ \& \ H. \text{ bought } x))$
 b. $\max(\lambda d.H. \text{ bought a } d\text{-long umbrella})$

It seems to be a straightforward step to move from a set of objects to the number of things in that set. On the other hand, given a set of umbrellas, the step of inferring their maximal length is much less straightforward. Putting it differently, there is nothing to make (41b) particularly salient in the context of (37b) and (36a), yet this is the setting of the size standard that yields a meaningful utterance. Hence (37b) and (36a) are slightly odd. They improve when more context is provided. Variation between speakers is a result of how successful a given speaker is in adding (i.e., inventing) helpful context.

This pragmatic story receives further support when we look at a wider range of examples. (42a) is structurally quite analogous to (36a). Yet (42a) and (42b) are much better than (36a) and (37b).

- (42) a. Mary-wa [John-ga kaita yori] nagai ronbun-o kaita.
 Mary-Top [John-Acc wrote YORI] long paper-Acc wrote
 b. Compared to what John wrote, Mary wrote a long paper.

If the context in the form of the *yori*-clause establishes that what John wrote is relevant, inferring that the size standard is the length of John's paper

seems straightforward. It is thus the semantics of the particular predicate chosen that makes inference of a particular size standard easy or difficult. Another case in point is (43a), which is also minimally different from (36a) in having the adjective *expensive* instead of *long*. The example is fine.

- (43) a. Taroo-wa [Hanako-ga katta yori (mo)] takai
 Taroo-Top [Hanako-Nom bought YORI (mo)] expensive
 kasa-o katta.
 umbrella-Acc bought
 b. Compared to what Hanako bought, Taroo bought an expensive umbrella.

Our explanation is that when one talks about buying an umbrella, its price is salient, but its length is not. An anonymous reviewer provides us with the acceptable (44), an example which reverses the situation: when you measure an umbrella, its length is of course quite salient.

- (44) a. Taroo-wa [Hanako-ga hakatta yori] nagai
 Taroo-Top [Hanako-Nom measured YORI] long
 kasa-o hakatta/katta.
 umbrella-Acc measured/bought.
 b. Compared to what Hanako measured, Taroo measured/bought a long umbrella.

Thus we suggest a pragmatic account of variation in acceptability. The connection between the main clause of a *yori*-construction and the *yori*-constituent is not made by compositional semantics. Instead, the *yori*-constituent is a context setter and serves to derive a value assignment to a free variable, the standard of comparison, in the main clause. The inferential process at work here is affected by pragmatic considerations. This accounts for variation between examples and between speakers that would be unexpected under a classical compositional analysis like the one for English comparatives. We expect a general similarity between Japanese *yori*-constructions and English 'compared to' – rather than between *yori*-constructions and English comparatives.

4. YORI-CLAUSES

The purpose of this section is to examine the structure and interpretation of *yori*-constituents in more detail. We suggest that *yori*-clauses do not have a degree semantics (as anticipated in Section 3). We will see that general properties of the syntax-semantics mapping in Japanese justify this and that it explains the data on subcomparatives and on negative islands.

Section 4.1 presents an informal typology of *yor*i-constituents. Section 4.2 discusses the structure and interpretation of relative clauses in Japanese. We explain our view of the syntax-semantics mapping in *yor*i- and relative clauses in Section 4.3. The resulting analysis of *yor*i-clauses makes interesting predictions about subcomparatives and negative island effects, which are examined in Section 4.4. Finally, Section 4.5 makes the connection to previous work on *yor*i-constructions and relative clauses, specifically Kikuchi (1987), Ishii (1991), Murasugi (1991) and Watanabe (1992).

4.1. Types of Yori-Constituents

We already saw that *yor*i can be combined with a phrase – a simple example is given in (45a). Naturally, the phrase that is the sister of *yor*i can be more complex. (45b), where the sister of *yor*i is an NP containing a relative clause, is provided for future comparison with *yor*i-clauses.

- (45) a. Mary-wa John-yori nagai ronbun-o kaita.
 Mary-Top John-YORI long paper-Acc wrote
 ‘Compared to John, Mary wrote a long paper.’
 b. Mary-wa [[John-ga kaita] ronbun] yori nagai
 Mary-Top John-Nom wrote paper YORI long
 ronbun-o kaita.
 paper-Acc wrote
 ‘Compared to the paper that John wrote, Mary wrote
 a long paper.’

Turning now to clausal sisters of *yor*i, we repeat in (46) an example that we have already come across.

- (46) a. Mary-wa [[John-ga kaita] yori] nagai ronbun-o kaita.
 Mary-Top [John-Acc wrote YORI] long paper-Acc wrote
 b. Compared to what John wrote, Mary wrote a long paper.

This example of a *yor*i-constituent looks like a plain clause, with an empty object position – identical, in fact, to the relative clause above. It is possible to modify the sister of *yor*i by adding the morpheme *-no* to it, as in (47). This morpheme is glossed as Nominalizer (Shimoyama, 2001) or as ‘the one’ (Kikuchi, 1987). For data like (47) we will follow Kikuchi – see below for more discussion on *-no*.

- (47) a. Mary-wa [[[John-ga kaita]-no] yori] nagai
 Mary-Top [[John-Acc wrote]-NO] YORI] long
 ronbun-o kaita.
 paper-Acc wrote
 b. Compared to the one that John wrote, Mary wrote a long paper.

We will refer to the first type of *yor*i-clause as plain *yor*i-clauses, and to the second as *no-yor*i-clauses. Our terminology is purely descriptive – no theoretical claims about the analysis of these expressions and their actual syntactic category are implied.

Finally, there is a type of *yor*i-clause illustrated in (48a), occurring with adverbial comparisons, in which the *yor*i-clause is gapless. We suggest the paraphrase in (48b) in terms of Nominalization as an approach to its semantics. We will not provide a formal analysis for this type of example.

- (48) a. Mary-wa [Bill-ga hasi-tta (no)] yori (motto)
 Mary-Top [Bill-Nom run-Past (NO)] YORI (motto)
 hayaku hasitta.
 fast ran
 b. Compared to Bill's running, Mary ran fast.

The fact that Japanese has *pro* obscures the difference between gapless and other *yor*i-clauses. Both variants of (49a) are possible. We suggest the paraphrases in (49b) for the two versions, where the empty pronoun shows up as *it*.

- (49) a. Mary-wa [Bill-ga (situmon-ni) kotaeta (no)] yori (motto)
 Mary-Top [Bill-Nom (question-to) answered (NO)] YORI (motto)
 chuuibukaku /tegiwayoku /chitekini situmon-ni kotaeta.
 carefully /economically /intelligently question-to answered
 b. Compared to Bill's answering it (the question), Mary answered the question carefully/economically/intelligently.

The data seem to fit our general idea about the interpretation of *yor*i-constructions. These nominalizations aside, we suggest a close connection between relative clauses and *yor*i-clauses, which we will substantiate in the next subsections.

4.2. Relative Clauses in Japanese

The purpose of this and the following subsection is to argue that general facts about the syntax-semantics mapping in Japanese support an analysis of *yor*i-clauses as relative clauses.

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Let us begin by considering regular relative clauses in Japanese. (50a) means the same as English (50b) (ignoring the singular/plural distinction, which is irrelevant to us here).

- (50) a. John-wa [_{NP} [Mary-ga kaita] hon-o] katta.
 John-Top Mary-Nom wrote book-Acc bought
 b. John bought a/the book that Mary wrote.

There has been a fair amount of discussion regarding the syntax of these clauses in Japanese, in particular the question of what silent categories they may contain, and whether those are created by movement (see for example Kuno, 1973; Kikuchi, 1987; Murasugi, 1991). We will come back to this discussion later. What matters for our purposes here is that the NP in (51a) must have the interpretation in (51b). The interpretation in (51b) will be the input to further interpretational mechanisms in the larger structure of (51a) and will end up with either an existential or a referential interpretation ('a book that Mary wrote' or 'the book that Mary wrote').

- (51) a. [_{NP} [Mary-ga kaita] hon]
 Mary-Nom wrote book
 'book that Mary wrote'
 b. λx . book(x) & Mary wrote x

Note that Japanese has no relative pronoun or relative complementizer. For the relative clause, we only have a clause that is missing an object. More specifically, the relative clause will be assumed to have the structure in (52a) (this structure is analogous to the ones used in Kikuchi (1987); no importance is attached to the category labels chosen). This structure, with a silent variable denoting expression e_i and a silent operator Op_i that will semantically bind the variable, is suitable to derive the appropriate interpretation as given in (52b). Standard compositional mechanisms will yield an intersective interpretation with the head noun as in (51b) (compare e.g., Heim and Kratzer (1998) for a standard formalization of the semantic mechanisms of predicate abstraction and predicate modification).

- (52) a. [_{CP} Op_i [_{IP} Mary-ga e_i kaita]]
 b. λx . Mary wrote x

A final comment on the interpretation of the NP: Japanese has no overt definite determiner. Nonetheless, the NP can have the interpretation 'the book that Mary wrote'. We will work with the Fregean denotation in (54) for the semantics of the definite article (see once more Heim and Kratzer for the notation); 'the book that Mary wrote' will be associated with the semantic representation in (53b). Japanese must have an interpretational

mechanism that derives (53b) from (53a) without any overt element to represent the definite determiner. The same mechanism is at work in simple NPs as the object NP in (55), when understood as a definite.

- (53) a. λx . book(x) & Mary wrote x
 b. $\text{THE}_C(\lambda x$. book(x) & Mary wrote x)
- (54) $[[\text{THE}_C]] = \lambda P$: there is a unique $x \in C$ such that $P(x) = 1$.
 the unique $x \in C$ such that $P(x) = 1$
- (55) Mary-wa hon-o kaita.
 Mary-Top book-Acc wrote
 Mary wrote a/the book.

Next, we will look at another type of relative clause construction in Japanese: internally headed relative clauses. In addition to the regular, or externally headed relative clause in (50), Japanese can use the construction in (56) (Kuroda (1974, 1975/1976, 1976/1977)).

- (56) John-wa $[_{NP} [_{CP} [_{IP}$ Mary-ga hon-o kaita]] no-o] katta.
 John-Top Mary-Nom book-Acc wrote NO-Acc bought
 'John bought the book that Mary wrote/Mary wrote a book and John bought it.'

The difference is in the expression of the relativized NP. In (56), the relative clause does not appear to contain a gap; what was the head noun in (50) appears clause internally in (56). Outside of the relative clause, there is only the morpheme *-no*.

We are aware of basically two possible semantic analyses for these internally headed relative clauses (IHRs), alluded to by the two alternative paraphrases offered for (56). The first paraphrase anticipates a semantic analysis in the style of Basilico (1996) and Grosu and Landman (1998). The relative clause contributes a predicate, as indicated in (57b). That predicate is the input to a definite determiner, yielding (58b) as the meaning of the whole NP.

- (57) a. $[\text{Op}_i$ [Mary-ga hon-o_{*i*} kaita]]
 b. λx . book(x) & Mary wrote x
- (58) a. $[_{NP} [_{CP} [_{IP}$ Mary-ga hon-o kaita]] no]
 Mary-Nom book-Acc wrote one
 b. $\text{THE}_C(\lambda x$. book(x) & Mary wrote x)

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The second semantic analysis is Shimoyama's (2001) and anticipated in the biclausal paraphrase given as the second alternative in (56). Shimoyama argues that the IHR acts as an independent sentence and is raised out of the matrix clause at LF. The matrix clause contains an E-type pronoun ('it' in the paraphrase) that relates the two clauses via a pragmatically recovered property. This is illustrated in more detail in (59) (LF in (59a), interpretation in (59b)). The object NP in the matrix clause consists of a property variable, which will be assigned the salient property 'book that Mary wrote' (as indicated in (59c)), and an expression contributing the definite determiner (-*no* on Shimoyama's analysis).

- (59) a. $[[_{CP} [_{IP} \text{Mary-ga hon-o kaita}]] [_{NP} \text{John-wa } eP \text{ no-o}]] \text{ katta}$
 b. $\exists x[\text{book}(x) \ \& \ \text{Mary wrote } x] \ \& \ \text{bought} (\text{THE}_C(\lambda x. P(x)))$ (John)
 c. $P \rightarrow \lambda x. \text{book}(x) \ \& \ \text{Mary wrote } x$

Under either analysis, the IHR ultimately provides us with the property in (59c).

A last type of relative clause we need to consider is free relative clauses. What we have seen so far might lead us to expect that Japanese can use structures like (60a) in the same way as English uses free relatives (60b). This was possible in classical Japanese, cf. (61) (from Shibuya, 2001).

- (60) a. [Taroo-ga katta]
 Taroo-Nom bought
 b. what Taroo bought
- (61) pro pro [hito-no iimorasan]-o
 (Mr. Genji) (someone) [people-Nom reveal]-Acc
 kikituketaran toki nado oboetamou
 hear if and etc. wonders
 'Mr. Genji wonders if someone hears what people reveal etc.'

The free relative is analysed as in (62). Following Jacobson (1995), we add to the semantics of a regular relative clause an application of the maximality operator.

- (62) a. [hito-no iimorasan]
 b. $[Op_i [\text{hito-no } e_i \text{ iimorasan}]]$
 c. $\lambda x. \text{people reveal } x$
 d. $\max(\lambda x. \text{people reveal } x)$

Modern Japanese, however, is more restrictive, as witnessed by the ungrammaticality of (63a). Free relative-like uses of such clauses require the addition of the morpheme *-no*, cf. (63b).

- (63) a. *Watasi-wa [Taroo-ga katta]-ga suki da.
 I-Top [Taroo-Nom bought]-Nom fond Cop
 'I like what Taroo bought.'
 b. Watasi-wa [[Taroo-ga katta] -no]-ga suki da.
 I-Top [[Taroo-Nom bought]-NO]-Nom fond Cop
 'I like the one that Taroo bought.'

We conjecture that a syntactic constraint prevents structures like (63a) to occur freely as arguments in Japanese. Whatever that constraint is (Case?), addition of *no* seems to fix the problem.

4.3. *The Syntax-Semantics Mapping in Yori-Clauses*

Given these facts about the syntax-semantics mapping in relative clauses in Japanese, let's go back to *yori*-clauses. Beginning with plain *yori*-clauses with a gap, remember that we are concerned with structures like (64a). From what we have seen, it is clear that structures consisting of the overt material in (64a) are straightforwardly interpreted as in (64b). In Section 3, we paraphrased the contribution of these structures in terms of a free relative (64c), whose semantics is given in (64d).

- (64) a. [Taroo-ga katta]
 b. λx . T. bought x
 c. what Taroo bought
 d. $\max(\lambda x$. T. bought $x)$

Application of the maximality operator would yield the desired outcome. This is what we suggest happens in plain *yori*-clauses containing a gap. It is, in itself, plausible to assume such a 'free' application of the maximality operator. This is in fact how English (65) is analyzed:

- (65) a. I like [what_{*i*} [Taroo bought t_{*i*}]]
 λx . Taroo bought x
 b. $\max(\lambda x$. Taroo bought $x)$

The only problem that we see for this perspective is the contrast in (66), repeated from above. According to our suggestion, modern Japanese would permit genuine free relatives only in the context of a *yori*-clause. Combination with *yori* would circumvent whatever problem exists with *no*-less free relatives.

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- (66) a. *Watasi-wa [Taroo-ga katta]-ga suki da.
 I-Top [Taroo-Nom bought]-Nom fond Cop
 'I like what Taroo bought.'
 b. Watasi-wa [[Taroo-ga katta] -no] -ga suki da.
 I-Top [[Taroo-Nom bought] -NO] -Nom fond Cop
 'I like the one that Taroo bought.'

Our proposal describes the interpretational contribution of such *yor*i-clauses correctly. Therefore we suggest that the problem is syntactic, and maintain the assumption that what we know about the syntax-semantics interface in Japanese leads us to expect that (64a) can be interpreted to mean (64d). We have no concrete proposal regarding the syntactic explanation, and must leave the absence of *-no* here and only here as an open problem.

We turn next to *no-yori*-clauses with a gap; an example is (67):

- (67) a. Taroo-wa [Hanako-ga katta no yori (mo)]
 Taroo-Top [Hanako-Nom bought NO YORI (mo)]
 takai kasa-o katta.
 expensive umbrella-Acc bought
 b. Compared to the one that Hanako bought, Taroo bought an expensive umbrella.

The purpose of *-no* seems to be to provide an external head and to turn a clause into a proper NP; we will think of Kikuchi's gloss 'the one' as the best English approximation to the semantic effect of *-no*. Our precedent for this outside of the domain of comparison constructions are data like (66b).

While *-no* is optional in many cases of *yor*i-sentences, sometimes the presence vs. absence of *-no* makes a difference for the acceptability of the example.⁹ Remember the questionable sentence (68a); (68b) is a version with *-no*, which is clearly improved (we owe this observation to an anonymous reviewer and to Kazuko Yatsushiro).

- (68) a. ?(?) Taroo-wa [Hanako-ga katta yori (mo)] nagai
 Taroo-Top [Hanako-Nom bought YORI (mo)] long
 kasa-o katta.
 umbrella-Acc bought
 a'. ? Compared to what Hanako bought, Taroo bought a long umbrella.
 b. Taroo-wa [Hanako-ga katta no yori (mo)] nagai
 Taroo-Top [Hanako-Nom bought NO YORI (mo)] long
 kasa-o katta.
 umbrella-Acc bought
 b'. Compared to the one that Hanako bought, Taroo bought a long umbrella.

It is interesting that the English approximations we suggest behave in exactly the same way as the Japanese data. There is a clear contrast between, on the one hand, a plain clausal *yor*i-constituent and an English free relative and, on the other hand, phrasal constituents including *no-yor*i-constituents. Therefore, the effect of *-no* must be to turn its sister into a 'normal' NP (a genuinely phrasal constituent) and to make the *yor*i-constituent akin to 'the one' + relative clause. But while it is encouraging that the Japanese effects are replicated in our suggested English approximations, there remains a question as to why the contrasts we observe should exist in English in the first place; consider in this context also the contrast between (69a, b) versus (69c). We do not know the answer to that question.

- (69) a. Compared to Hanako, Taroo bought a long umbrella.
 b. Compared to the umbrella that Hanako bought, Taroo bought a long umbrella,
 b. ?Compared to what Hanako bought, Taroo bought a long umbrella.

We now turn to gapless *yor*i-clauses. Internally headed relative clauses are important for us in this context because *yor*i-clauses can include an internal head. An example for this is given in (70).

- (70) a. Taroo-wa [Hanako-ga kasa-o katta no
 Taroo-Top [Hanako-Nom umbrella-Acc bought NO
 yori (mo)] takai kasa-o katta.
 YORI (MO) expensive umbrella-Acc bought
 b. Compared to the umbrella that Hanako bought, Taroo bought an expensive umbrella.
 b'. ?# Compared to Hanako buying an umbrella, Taroo bought an expensive umbrella.

An interpretation that amounts to the meaning of the English approximation in (70b) can be derived by the mechanisms discussed above for IHRs. One way or another, the *yor*i-constituent will contribute 'the umbrella that Hanako bought'. We prefer this view of example (70a) to an analysis in terms of a Nominalization (paraphrased in (70b')), despite the fact that the *yor*i-clause contains no gap, because it seems to us to come closer to the intuitive interpretation of the example. We will come back to *yor*i-clauses with an internal head in Section 4.4¹⁰.

We should point out that we will not normally, for interpretational reasons, consider a Nominalization analysis for examples in which the *yor*i-clause contains a gap. A Nominalization analysis for (71a) would involve *pro* and lead to a semantics paraphrased in (71b'). While such a semantics

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may sometimes be possible (see (49) above), it is not intuitively appropriate for the data that interest us here. In the following, when we talk about *yor*-clauses, we will generally use the term to the exclusion of those *yor*-clauses that are most plausibly analyzed as Nominalizations.

- (71) a. Taroo-wa [Hanako-ga katta yori (mo)] takusan (-no)
 Taroo-Top [Hanako-Nom bought YORI (mo)] many (-Gen)
 kasa-o katta.
 umbrella-Acc bought
 a'. Compared to what Hanako bought, Taroo bought a lot of
 umbrellas.
 b'. # Compared to Hanako buying them, Taroo bought a lot of
 umbrellas.¹¹

In conclusion, we find a degree of similarity between *yor*-clauses and relative clauses that makes our assumptions about the syntax-semantics mapping plausible. In general terms, our view of *yor*-clauses makes two important predictions.

First, *yor*-clauses do not denote degrees or predicates of degrees. Rather, they denote individuals or properties of individuals. This contrasts with English *than*-clauses, cf. (72) vs. (73). The *yor*-clause contains a gap corresponding to an individual variable, and matching operator. A *than*-clause contains a gap corresponding to a degree variable, and a matching operator¹²

- (72) a. Mary-wa [[John-ga kaita] yori] nagai ronbun-o kaita.
 Mary-Top [[John-Nom wrote] YORI] long paper-Acc wrote
 b. [Op_i [John-ga e_i kaita]] yori]
 c. [λx . John wrote x]
- (73) a. Mary wrote a longer paper than John did.
 b. [than [Op_i [John did write a e_i-long paper]]
 c. [λd . John wrote a d -long paper]

Thus whatever behaviour characteristic of degree predicates English comparatives show should be missing in Japanese. This issue will be addressed in Section 4.4.

Secondly, *yor*-clauses of this kind are analysed as relative clauses. We thus expect a general parallel between them and relative clauses. This issue, and its connection to the analyses proposed in the literature for both constructions, is discussed in Section 4.5.

4.4. *Explaining Subcomparatives and Negative Islands*

The sentence in (74) exemplifies the ungrammaticality of subcomparatives in Japanese.

- (74) a. *Tana-wa [doa-ga hiroi (no) yori (mo)] (motto) takai.
 shelf-Top [door-Nom wide NO YORI (mo)] (more) tall
 b. The shelf is taller than the door is wide.

The example illustrates that Japanese in contrast to English does not permit what is called subcomparatives of degree (cf. Bresnan, 1972). Interestingly, as Ishii (1991) observes, we are able to find grammatical examples of so-called subcomparatives of number.

- (75) a. Hanako-wa [Taroo-ga ronbun-o kaita (no) yori]
 Hanako-Top [Taroo-Nom paper-Acc wrote (one) YORI]
 takusan hon-o kaita.
 many book-Acc wrote
 b. Hanako wrote more books than Taroo wrote papers.

The standard semantic analyses of the English subcomparatives are given in (76). The two examples are quite similar under this analysis, and once more the theory for English does not seem to help us with the contrast in Japanese.

- (76) a. $\max(\lambda d. \text{the shelf is } d\text{-tall}) > \max(\lambda d. \text{the door is } d\text{-wide})$
 b. $\max(\lambda d.H. \text{wrote } d\text{-many books}) > \max(\lambda d.T. \text{wrote } d\text{-many papers})$

Let's see what our alternative analysis has to say about these data. The subcomparative of degree example uses the *yori*-clause in (77). Given what we have said above, this could receive a relative clause-like interpretation, resulting in (78b) as the semantic contribution of the *yori*-clause.

- (77) [[*doa-ga hiroi (no) yori (mo)*]]

- (78) a. $\lambda x. \text{door}(x) \ \& \ x \text{ is wide}$
 b. (compared to) the wide door

If the interpretation of the example proceeded thus, (74a) would come close to English as in (79). Out of the blue, the sentence is fairly weird and it certainly does not have an interpretation like the subcomparative in (74b).

- (79) # Compared to the wide door, the shelf is tall.

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It is actually doubtful that we could interpret (74a) in this way. Internally headed relative clauses are subject to various restrictions, in particular constraints concerning which predicates can participate in an IHR. We should therefore check if this particular *yor*i-clause could be an IHR, which is done in (80) below. The example is in fact unacceptable.

- (80) *Watasi-wa [doa-ga hiroi/ookii]-no-o aketa.
 I-Top door-Nom wide/large-NO-Acc opened
 'I opened the door that was wide/large.'

This might make sentence (74a) ungrammatical altogether. For completeness, we ought to try to interpret the example as a Nominalization. Following our intuitive understanding of such cases, the example could be paraphrased as in (81):

- (81) # Compared to the door's being wide, the shelf is tall.
 # Compared to the fact that the door is wide, the shelf is tall.

Neither paraphrase comes close to an interpretation as a subcomparative. Thus we have no reason to expect data like (74a) to be well-formed and interpretable as subcomparatives of degree in our theory.

Turning now to subcomparatives of number, we propose the paraphrase in (82b) as an approximation for (82a). The semantics of (82b) is indicated below.

- (82) a. Hanako-wa [Taroo-ga ronbun-o kaita (no) yori]
 Hanako-Top [Taroo-Nom paper-Acc wrote (NO) YORI]
 takusan hon-o kaita.
 many book-Acc wrote
 b. Compared to the papers Taroo wrote, Hanako wrote a lot of books.
- (83) $\exists d$ [Hanako wrote d -many books & $d > c$]
 c = the number made salient by the utterance context
 $:=$ the number of papers Taroo wrote

For this analysis to carry over to Japanese, we need to assume (84) for the *yor*i-clause. This is nothing different from what we said about the interpretation of internally headed relative clauses above (as the immediate interpretation of the clause under a Basilico/Grosu and Landman style analysis, or mediated via an E-type pronoun under a Shimoyama-style analysis).¹³ Therefore we can safely assume that (82a) is predicted to be

analogous to English (82b), and appears to be an example of a subcomparative of number.¹⁴

- (84) [Taroo-ga ronbun-o kaita (no)] = the papers Taroo wrote
 = $\text{THE}_C(\lambda x. \text{paper}(x) \ \& \ T. \text{wrote } x)$

(85a) is another example of the same kind. We expect the example to be about as acceptable under a subcomparative-like interpretation as English (85b), which is fine.

- (85) a. Hanako-wa [Taroo-ga tue-o katta yori]
 Hanako-Top [Taroo-Nom stick-Acc bought YORI]
 takusan (-no) kasa-o katta.
 many- (Gen) umbrella-Acc bought
 b. Compared to the walking sticks Taroo bought, Hanako
 bought a lot of umbrellas.

We conclude that our analysis has an explanation for the absence of subcomparatives of degree in Japanese while at the same time being able to handle the seemingly surprising acceptability of subcomparatives of number. The key to our explanation is that the *yor*i-clause does not contribute a degree. Its semantics is relative clause-like and contributes (ultimately) an individual. This works out well in the number cases but not in the degree cases. Subcomparatives of degree involve a change of the dimension measured (the adjective) and therefore crucially require abstraction over degrees in the embedded clause.

The non-degree nature of the *yor*i-clause will also permit us to explain the absence of English-type negative island effects in *yor*i-clauses, illustrated by example (86).

- (86) John-wa [daremo kawa-naka-tta no yori] takai
 John-Top [anyone buy-Neg-Past NO YORI] expensive
 hon-o katta.
 book-Acc bought
 'John bought a book that is more expensive than the book that nobody bought.'

Instead of the unacceptable (87a), we offer the approximation in (87b), which is acceptable and has the intuitively appropriate interpretation.

- (87) a. *John bought a more expensive book than nobody did.
 b. Compared to the one that nobody bought, John bought an expensive book.

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The *yor*i-clause is interpreted as in (88). The interpretability problem of English (89) does not arise since we are not looking at a degree scale. Instead, the *yor*i-clause corresponds to (88c). Appropriately, (88c) presupposes that there is a particular book that nobody bought. The difference between English (87a) versus Japanese (86) and English (87b) exists because in the acceptable cases, the 'compared to' constituent contributes an individual. The undefinedness problem that (87a) poses due to the undefined (89b) does not arise since the 'compared to' constituent does not contribute a degree.

- (88) a. daremo kawa-naka-tta no yori
 anyone buy-Neg-Past NO YORI
 b. $[Op_i \text{ [[daremo } e_i \text{ kawa] naka-tta}]]$ -no
 c. $THE_C(\lambda x. \text{ nobody bought } x)$
 'the one that nobody bought'
- (89) a. than nobody did ~~buy a *d*-expensive book~~
 b. $\max(\lambda d. \text{ nobody bought a } d\text{-expensive book})$
 'the maximal degree *d* such that nobody bought a *d*-expensive book'

Two further comments are in order regarding this issue. First, the absence of degree-based negative island effects does not mean that Japanese has no negative island effect at all. Negative island effects exist outside of the domain of degree constructions. An example might be (90a) (which is the same as (86) except without *-no*) and its English equivalent (90b). Rullmann (1995) proposes that the Jacobson semantics for the free relative clause in this kind of example explains its unacceptability: there is no largest collection of things bought by nobody, i.e., (90c) is in general undefined. Compare Rullmann for a more detailed discussion of negative island effects.

- (90) a. ?? John-wa [dare-mo kawa-naka-tta yori] takai
 John-Top [anyone buy-Neg-Past YORI] expensive
 hon-o katta.
 book-Acc bought
 b. ?? Compared to what nobody bought, John bought an expensive book.
 c. $\max(\lambda x. \text{ nobody bought } x)$

Second, negative island contexts are simply the most striking illustration of the fact that *yor*i-clauses containing a quantificational element do not have the meanings that an analysis in terms of a standard degree semantics would predict. Consider (91).

- (91) Mary-wa [John-ga syottyuu yondeita no yori]
 Mary-Top [John-Nom often was-reading NO YORI]
 nagai hon-o yonda.
 long book-Acc read
 'Mary read a longer book than the one that John was often reading.'
- (92) a. Mary read a longer book than John often did.
 b. Compared to the one that John often read, Mary read a long book.

The standard comparative in (92a) makes available the standard of comparison given (very roughly) in (93). Note that (93) is compatible with John reading various books, and does not entail that he read any one book repeatedly. This is not the intuitively appropriate standard of comparison for (91): (91) compares the length of the book that Mary read with the length of the book that John read often. So once more, there is a presupposition in the Japanese example as well as the English 'compared to' approximation that there is a particular book John read often. The standard comparative has no such meaning component. This shows that Japanese (91) cannot be analysed by degree abstraction over the embedded clause as in (93).

- (93) $\max(\lambda d. \text{often (John read a } d\text{-long book)})$
 the maximal degree d such that John often read a d -long book

As a final illustration, consider (94).

- (94) Mary-wa [otokonoko zenin-ga yonda no yori] nagai
 Mary-Top [boy all-Nom read NO YORI] long
 hon-o yonda.
 book-Acc read
 'Mary read a book longer than the book that all the boys read.'
- (95) a. Mary read a longer book than all the boys did.
 b. Compared to the one that all the boys read, Mary read a long book.

Our analysis, amounting basically to (95b), captures the intuitive interpretation of (94), including the now familiar presupposition that there is one particular book that all the boys read. The comparative (95a) does not have this interpretation. We conclude that it is essential to give a non-degree semantics to *yori*-clauses. Our analysis in terms of relative clauses does that.

4.5. *Consequences*

We have argued above, on the basis of their semantic contribution and basic structure, that *yor*i-clauses are relative clauses. This leads us to expect that *yor*i-clauses should be syntactically parallel to relative clauses, perhaps modulo differences effected by the environment in which they are found. This section discusses the relevant empirical observations and theoretical suggestions made in the literature on *yor*i- and relative clauses.

Probably the most important issue to be addressed is the question of movement. Kikuchi (1987) argues that *yor*i-clauses exhibit overt A'-movement, and this suggestion has been very influential (e.g., Watanabe, 1992). On the other hand, there have been suggestions that relative clauses do not, or not always, involve movement (prominently, Murasugi, 1991, 2000). For both claims, (in-) sensitivity to movement constraints provides the key argument. (96) from Kikuchi supports the claim that there are movement constraints operative in *yor*i-clauses. (96a) shows a relative clause island and (96b) an adjunct island (island bracketed boldface in English translation).

- (96) a. *[[sono tukue-de e_i e yonde ita] hito-o_i John-ga
 [[that table-on read Asp] person John-Nom
 nagutta yorimo] Paul-wa takusan hon-o yonde ita.
 hit YORIMO] Paul-Top many book-Acc read Asp
 'Paul read more books [than John hit a person [who was
 reading _ at that table]]'
- b.* [[John-ga e yonde ita toki-ni zisin-ga oki-ta yorimo]
 [[John-Nom read Asp time-at] earthquake-Nom happened YORIMO
 Paul-wa harukani takusan-no hon-o yonde ita.
 Paul-Top far many-Gen book-Acc read Asp
 'Paul read more books [than an earthquake happened [when John was
 reading _]]'

Accordingly, the structure Kikuchi suggests for a *yor*i-clause involves movement and for an example like (97a) looks like (97b):

- (97) a. John-ga [Tom-ga e yonda yorimo] hon-o
 John-Nom [Tom-Nom read YORIMO] book-Acc
 takusan yonde ita.
 many read Asp
 'John read more books than Tom did.'
- b. [PP [CP Op_i [IP Tom-ga t_i yonda]] yorimo]

Example (98) supports Murasugi's claim that movement effects are (sometimes) absent in relative clauses. (98) shows that it is possible for relativization to cross over a relative clause boundary. The structure in (99a) that

we need for interpretation (99b) would then have to be generated without movement, perhaps using *pro* for the empty category *e*₁.

- (98) [[[[*e*₁*e*₂ kiteiru] yoohuku₂] -ga yogorete-iru] *sinsi*₁]
 wearing-is suit -Nom dirty-is gentleman
 'gentleman such that the suit [that he is wearing] is dirty'

- (99) a. [Op₁ [[Op₂ [*e*₁ *e*₂ kiteiru]] yoohuku]-ga yogoreteiru]
 b. λx_1 . THE_C(λx_2 . suit(*x*₂) and *x*₁ is wearing *x*₂) is dirty
 λx_1 . the suit that *x*₁ is wearing is dirty

What is the impact of our analysis on this discussion? First, it is important to realize that nothing we say above prejudices the issue of movement one way or another. Our analysis is in principle compatible with both a movement- and a non-movement-analysis. There is a difference between Kikuchi's assumptions and ours in that what moves for Kikuchi is a degree operator of some kind. This is not compatible with our analysis. If we were to argue that *yori*-clauses involve movement, it would be movement leaving behind an individual variable, not a degree variable. Notice, however, that the structure Kikuchi proposes does not contain any information to the effect that we are dealing with degree variables and degree operators. Nor do Kikuchi's observations hinge in any way on the degree nature of the moved element. The same holds for the properties of *yori*-clauses on which Watanabe (1992) relies. Modulo this change in our perception of what moves, then, our analysis is completely compatible with Kikuchi's and Watanabe's assumptions about the syntactic analysis of *yori*-clauses. (The same is not true of Ishii (1991) – we will come back to this in a moment.)

However, our suggestions affect the discussion in terms of the connection we make between relative clauses and *yori*-clauses. From the point of view of earlier work, it might have been possible to assume a movement analysis of *yori*-clauses and a non-movement analysis of relative clauses. This becomes decidedly unattractive, given our suggestion that *yori*-clauses *are* in fact relative clauses. *Prima facie*, we expect an essentially parallel behaviour of *yori*-clauses and (other) relative clauses and would prefer a parallel analysis.

With respect to movement constraints, we suggest that island sensitivity be reexamined. It is not clear that *yori*-clauses involving islands are uniformly bad. The example in (100) appears to be relatively acceptable despite the fact that the dependency in the *yori*-clause crosses a relative clause boundary.

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- (100) [[e₁e₂ ankisita] ee-tango-ga mattaku siken-ni
 [[memorized] English-vocabulary-Nom at.all exam-in
 denakatta] yori(mo) motto kawaisoona gakusee-ga ita.
 not-appear YORI(mo) 'more' unfortunate student-Nom existed
 (Tonarino hito-ga sikentyuuni kusyami-o siteita
 next person-Nom during_the_exam sneeze-Acc was_doing
 gakusee desu.)
 students Cop
 'There were more unfortunate students than the ones such that
 the English vocabulary [that they memorized] didn't appear in
 the exam at all.
 (There was a student whose neighbor was sneezing during the
 exam.)'

Furthermore, the situation in relative clauses is somewhat less clear than our remarks above would lead one to expect. A first complication is that different claims have been made about different kinds of relative clauses. For example, Watanabe (1992) assumes that IHRs do involve movement and cites (101) as an example of an island violating IHR. This is important insofar as *yori*-clauses, according to our analysis, correspond to various kinds of relative clauses.

- (101) *John-ga [subarasii ronbun-o kaita hito-o homete ita]
 John-Nom [excellent paper-Acc wrote person-Acc praised-had]
 no-ga shuppan-sareta.
 NO-Nom publish-Pass
 'An excellent paper which John had praised the person
 [who wrote_] was published.'

Note that we would prima facie expect a *yori*-clause to be about as acceptable as the *corresponding* relative clause (which may or may not be head internal, involve *-no*, ...).

Secondly, the claims about both kinds of relative clauses are in fact somewhat controversial. It seems that acceptable examples of prospective island violating IHRs can be found, as well as bad examples of island violating ordinary relative clauses. Some relevant examples are given in (102) and (103), respectively; compare Kuroda (1999), Mihara (1994), Murasugi (1991), Saito (1985) and Saito et al. (1988) for more examples and discussion.

- (102) [NP [shoogakkoo-no tomodati-ga doko-ni iru ka]
 secondary-school-Gen friend-Nom where-at live Q

wakaranakunatteita no] -ni battari deatta.
 didn't know] NO] to suddenly met
 I happened to meet a friend from secondary school who
 I didn't know [where s/he was]

- (103) * [_{NP} [_S Mary-ga [_{NP} [_S e₁ e₂ John-o sasita] hito₁]-o
 Mary-Nom John-Acc stabbed person-Acc
 aisiteiru] naifu₂]
 love knife
 'knife such that Mary loves the person [who stabbed John
 with it]'

Since there is considerable variation with respect to island sensitivity among the relative clauses, our expectations for *yor*i-clauses do not amount to across-the-board acceptability or universal unacceptability. Only a more detailed comparative study will reveal the exact relationship between *yor*i-clauses and relative clauses.

We conclude at this point that despite seemingly incompatible claims about *yor*i-clauses and relative clauses in the literature, the empirical picture is far from clear. Thus we express our hope that the data can be reconciled with a parallel analysis of *yor*i-clauses and their corresponding relative clauses – whatever the details of that analysis may be. Indeed, we suggest that it is the task of syntactic analysis to make available such a uniform analysis.

Turning next to Ishii's (1991) analysis of *yor*i-constructions, also in terms of movement, Ishii makes more specific assumptions about the movement involved. He associates (104) with essentially the same structure as Kikuchi; however, according to Ishii, the moved element corresponds to a floating quantifier (FQ).

- (104) a. John-ga [Tom-ga e yonda yorimo] hon-o
 John-Nom [Tom-Nom read YORIMO] book-Acc
 takusan yonde ita.
 many read Asp
 'John read more books than Tom did.'
 b. [_{PP} [_{CP} FQ_i [_{IP} Tom-ga t_i yonda]] yorimo]

The motivation for Ishii's suggestion comes from the fact that the constraints on floating quantifiers in Japanese mirror constraints on the gap in *yor*i-clauses. An example is the unacceptability of (105), claimed to be due to a ban on subject floating quantifiers with individual level predicates. This is illustrated in (106). Ishii then derives the ban from the interpretational

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mechanisms available to indefinite subjects of individual level predicates (see Ishii, 1991: chapter 3 for details).

- (105) ?* [kasikoi yori] takusan-no gakusei-ga baka-da.
 [smart YORI] many-Gen student-Nom silly-Cop
 'More students are silly than are smart.'
- (106) ?* Gakusei-ga san-nin kasikoi.
 student-Nom three-CL smart.
 'Three students are smart.'

While movement per se is compatible with our analysis, it is not compatible with our assumptions that the *yor*i-clause contains a floating quantifier-like element. Recall that we take the *yor*i-clause to be relative clause-like and involve abstraction over an individual variable. Such a variable could no more be associated with a floating quantifier than a proper name like *John* could be. Our position therefore has to be that the reason for the unacceptability of (105) is something other than what Ishii proposes. And more generally, Ishii's observations raise, for us, the question of the parallelism between floating quantifiers and *yor*i-clauses.

We acknowledge that both of these points remain unresolved under our analysis at present. Note first that the relevant parallel to the *yor*i-clause in (105) is not an example with floating quantifiers for us, but a relative clause like (107) below. Since (107) is acceptable, we have no concrete answer to the question of why (105) is unacceptable. Our approximation of (105) in (108) is slightly odd, but apparently not as strictly ungrammatical as (105).

- (107) [- kasikoi] -no -ga syootai-sareta.
 smart -NO -Nom invited-Pass
 'The one who is smart was invited.'

- (108) ? Compared to the ones that are smart, many students are silly.

Regarding the more general question of what the constraint is, exactly, that rules out (105), we suggest that Ishii's claim that individual level predicates give rise to the ungrammaticality be examined. The example in (109) is acceptable, as is the parallel example with a floating quantifier in (110) – despite the individual level predicate it uses.

- (109) (kono kurasu-dewa) [[eigo-ga hanas-eru] yori (mo)]
 (this class-in) English-Nom speak-can YORI (mo)

takusan-no hito-ga furansugo-ga hanas-eru.
 many-Gen people-Nom French-Nom speak-can
 'In this class, more people can speak French than can speak
 English.'

- (110) Gakusei-ga san-nin eigo-ga/o hanas-eru.
 student-Nom three-CL English-Nom/Acc speak-can
 'Three students can speak English.'

We are therefore skeptical of Ishii's analysis of the nature of the constraint involved. We must admit, however, that our own analysis sheds no light on the issue and leaves this problem unresolved.

Beyond the issue of movement, according to our assumptions there should be parallels in other respects between relative clauses and the corresponding *yori*-clauses. We are at this point aware of two effects in relative clauses one should look to find in *yori*-clauses as well: Nominative/Genitive conversion and constraints on IHRs.

Nominative/Genitive conversion is possible for the subject of a relative clause in Japanese. An example is given in (111).

- (111) Hanako-wa [Taroo-no kaita] hon-o katta.
 Hanako-Top [Taroo-Gen wrote] book-Acc bought
 'Hanako bought the book that Taroo wrote.'

The same possibility exists for *yori*-clauses (thanks to Kazuko Yatsushiro for the example):

- (112) Hanako-wa [Taroo-no kaita yori] nagai hon-o kaita.
 Hanako-Top [Taroo-Gen wrote YORI] long book-Acc wrote
 'Hanako wrote a longer book than Taroo did.'

This is interesting insofar as other types of clauses do not permit this conversion, cf. (113) below. The possibility of conversion can therefore be considered an argument in favor of our suggestions.

- (113) Hanako-wa [[Taroo-ga/*-no kuru] to] omotteiru.
 Hanako-Top [[Taroo-Nom/*-Gen came] that] think
 'Hanako thinks that Taroo came.'

Finally, it has been noted that there are constraints on the predicates of IHRs that do not exist for regular relative clauses. Uchibori (1991) observes that IHRs do not in general permit individual level predicates. An example is (114) below (provided by an anonymous reviewer).

- (114) *Ken-wa [Erika-ga gaikokugo-ga zyoozuni
 Ken-Top [Erika-Nom foreign_languages-Nom well

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hanas-eru]-no-o benkyoo-site-iru.
speak-can]-NO-Acc study-do-be.
'Ken is studying the foreign language that Erika can speak well.'

It is not clear why there should be such a constraint. The effect may be connected with the fact that there has to be a particular aspectual connection between the IHR and the main clause (this is mentioned, for example, in Shimoyama, 2001). The connection does not appear to be well understood.

As far as *yor*i-clauses are concerned, we might expect that those (and only those) *yor*i-clauses that have to be IHRs share the constraints on the predicate in the IHR. A relevant example would be (115), brought to our attention by an anonymous reviewer. The examples is in fact fine, providing a contrast with (114) above.

- (115) Ken-wa [Erika-ga indo-yooroppa gengo-o hanas-
Ken-Top Erika-Nom Indo-European language-Acc speak
eru yori] (motto) takusan-no ajia gengo-o hanas-eru.
can YORI (more) many-Gen Asian language-Acc speak can
'Compared to the IndoEuropean languages that Erika speaks,
Ken can speak a lot of Asian languages.'

From this, it would appear that our stance has to be that whatever aspectual constraints rule out (114) still permit (115). However, a further complicating factor is the option of an analysis as a Nominalization. This is possible in (115), and the English approximation in terms of Nominalization can to some extent be interpreted analogously to a subcomparative of number.

- (116) ? Compared to Erika speaking Asian languages, Ken can speak
a lot of IndoEuropean languages.

The Nominalization would not be expected to share any IHR specific constraints. We do not see a way of ruling out the possibility of a Nominalization analysis for the relevant data. We must leave the issue for future consideration.

To summarize this section, our proposal is that *yor*i-clauses have a nominal-like semantics rather than a degree semantics. This connects them with relative clauses instead of *than*-clauses. We have addressed some consequences of this proposal. Its overall repercussions are a subject for further research.

5. DEGREE CONSTRUCTIONS IN JAPANESE

We have now addressed the three puzzling questions raised about Japanese in the introduction: why there is variation in acceptability between different

but structurally parallel examples of Japanese *yor*i-constructions, why this construction cannot express subcomparatives of degree, and why it does not exhibit the same negative island effects as familiar comparatives. While we have developed an analysis in which these puzzles are resolved, our analysis raises some questions of its own. Foremost among them is the question of why *yor*i-clauses do not have a degree analysis, which this section approaches.

Section 5.1 explains the issue, and outlines our eventual answer to this question. In Section 5.2, we take a closer look at the main clause in a *yor*i-construction and try to understand its semantics better. We propose that the main clause cannot construct a predicate of degrees, either. Section 5.3 provides the crucial argument for this proposal. We will also relate our findings to the bigger picture of how Japanese deals with (what are in English) other degree constructions besides comparatives (in Section 5.4), and address some remaining issues concerning *yor*i-constructions (in Section 5.5).

5.1. *The Issue*

Let us consider once more the internal composition of the *yor*i-clause in the case of subcomparatives (example repeated in (117) below).

- (117) a. *Tana-wa [doa-ga hiroi yori (mo)] (motto) takai
 shelf-Top [door-Nom wide YORI (mo)] (more) tall
 b. The shelf is taller than the door is wide.

We claimed that subcomparatives such as this candidate example are impossible because the *yor*i-clause does not have a degree semantics. Let us spell out what such a degree semantics would look like for the *yor*i-clause:

- (118) a. [[1 [doa-ga e₁ hiroi]] yori (mo)]
 b. λd . the door is d -wide
 c. $\max(\lambda d$. the door is d -wide)
 d. (compared to) how wide the door is

If this semantic derivation were available in Japanese, the sentence should permit an interpretation similar to the meaning of the following English example:

- (119) Compared to how wide the door is, the shelf is tall.

English (119) is fine on an interpretation very like the subcomparative. Our analysis of *yor*i as a context setter therefore does not, as such, exclude a

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degree semantics: English, which can construct degree predicates, can combine them with context setters. However, Japanese (117a) does not have this interpretation. The facts tell us, therefore, that the derivation in (118) cannot be possible – hence the analysis we propose in terms of a non-degree semantics for *yori*-clauses. Our next task is to find an explanation for why (118) is excluded.

To rule out (118), we will claim that abstraction over degree variables is more limited in Japanese than in English. An important question that comes out of our approach is in what way degree abstraction is limited. We will pursue here the strongest hypothesis, which is that Japanese has no abstraction over degree variables in the syntax at all. That is, we propose that there is the following point of parametric variation between languages:

(120) Degree Abstraction Parameter (DAP):

A language {does/does not} have binding of degree variables in the syntax.

This implies that there are no syntactically constructed properties of degrees in any Japanese construction that is, in English and related languages, a degree construction. Examples are: the main clause of comparative constructions, equatives, degree questions, and comparison constructions with *too* or *enough*. We will follow up on this implication in the following subsections.

5.2. The Matrix Clause and Motto

According to standard assumptions, compositional interpretation of the main clause of a comparative in English proceeds as indicated in (121). The main clause contains a gap, which is translated as a degree variable and is abstracted over before the comparative morpheme is applied.

- (121) a. Taroo bought a more expensive umbrella than Hanako did.
b. $[[[-er [1 [than Hanako did buy a t_1 expensive umbrella]]] [1 [Taroo bought a t_1 expensive umbrella]]]]$
c. $[[[-er]] (\lambda d.H. bought a d-expensive umbrella)$
 $(\lambda d.T. bought a d-expensive umbrella)$
d. $\max(\lambda d.T. bought a d-expensive umbrella) >$
 $\max(\lambda d.H. bought a d-expensive umbrella)$

The same is true in cases without an overt item of comparison like (122a):

- (122) a. Taroo bought a more expensive umbrella.
 b. $[[\text{-er}_2] (c) [1 [\text{Taroo bought a } t_1 \text{ expensive umbrella}]]]$
 c. $[[\text{-er}_2]] (c) (\lambda d.T. \text{ bought a } d\text{-expensive umbrella})$

Suppose that we assumed that the main clause of a Japanese *yoru*-construction contained a comparative morpheme, possibly *motto* (as suggested by the gloss as *more*) and that we wanted to tell the same story about the main clause in Japanese as in English. The main clause in example (123) would be interpreted as indicated in (124). This is a suitable input to the context-dependent version of the comparative morpheme repeated in (125) and results in an appropriate interpretation, (124c).

- (123) a. Taroo-wa [Hanako-ga katta yori(mo)] takai
 Taroo-Top [Hanako-Nom bought YORI(mo)] expensive
 kasa-o katta.
 umbrella-Acc bought
 b. Compared to what Hanako bought, Taroo bought a more expensive umbrella.
- (124) a. $[\text{motto} (c) [1 [\text{Taroo-wa } e_1 \text{ takai kasa-o katta}]]]$
 more Taroo-Top expensive umbrella-Acc bought
 b. $[[\text{-er}_2]] (c) (\lambda d.T. \text{ bought a } d\text{-expensive umbrella})$
 c. $\max (\lambda d.T. \text{ bought a } d\text{-expensive umbrella}) > c$
 (where c is the contextual standard, i.e., the price of Hanako's umbrella)
- (125) $[[\text{-er}_2]] (c)(D) = 1 \text{ iff } \max(D) > c$

In our discussion in Section 3, we have left the possibility open that Japanese indeed proceeds in a parallel way to English in this respect. However, the hypothesis that Japanese does not have degree abstraction implies that we should come up with a way of deriving an appropriate semantics for the main clause in (123) that does not make use of degree abstraction in the syntax, as well as, ideally, some arguments to the effect that that is the right way to go about things.

Note that one obvious option is to go with the positive version of the adjective, which as we saw leads to almost the same truth conditions as the comparative version. The positive has not to our knowledge been regarded as a scope-bearing element and has not been associated with abstraction over degrees in the syntax. An analysis of the main clause of (123), repeated as (126a), could then follow the steps in (126b). This is the same as (126c), the desired result.

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- (126) a. [Taroo-wa [takai kasa-o] katta]
 [Taroo-Top [expensive umbrella-Acc] bought]
 b. expensive_{pos} -> $\lambda x. \exists d[x \text{ is } d\text{-expensive} \ \& \ d > c]$
 [expensive umbrella] -> $\lambda x. \exists d[x \text{ is an umbrella} \ \& \ x \text{ is } d\text{-expensive} \ \& \ d > c]$
 [T. bought an expensive umbrella] -> $\exists x \exists d[T. \text{ bought } x \ \& \ x \text{ is an umbrella} \ \& \ x \text{ is } d\text{-expensive} \ \& \ d > c]$
 c. $\exists d[T. \text{ bought a } d\text{-expensive umbrella} \ \& \ d > c]$
 (where *c* is the contextual standard, i.e., the price of Hanako's umbrella)

In this derivation, the degree argument of the positive adjective is bound from the outset. Thus we see that there is a straightforward way to derive an appropriate interpretation for the main clause without degree abstraction.

Our next question is whether there is any reason to believe that Japanese, in addition, has a comparison operator like the English comparative morpheme.

Part of answering that question is our understanding of *motto*, the element that has been glossed as *more*, and is the Japanese candidate for an overt comparative morpheme. It turns out, though, that *motto* is not really very similar to the English comparative morpheme in its semantic effect. Compare (127a) and (127b).

- (127) a. Sally-wa Bill-yori kasikoi.
 Sally-Top Bill-YORI smart
 b. Sally-wa Bill-yori motto kasikoi
 Sally-Top Bill-YORI "more" smart

Our translation of (127) is (128a). There is a semantic difference between (127a) and (127b), however, that we have ignored thus far: (127a) asserts that Sally's IQ exceeds Bill's IQ; (127a) does not have any relevant presuppositions. (127b), on the other hand, asserts that Sally's IQ exceeds Bill's IQ and presupposes that Bill is smart – i.e., (127b) is inappropriate if Bill is not a fairly smart person. The effect of adding *motto*, therefore, seems to come close to adding a purely presuppositional element like *even*, as in (128b).

- (128) a. Compared to Bill, Sally is smarter.
 b. Compared to Bill, Sally is even smarter.

Moreover, it is possible in English and related languages to combine a comparison construction with a measure of difference; this holds for regular

comparatives as well as for ‘compared to’ comparatives, cf. (129a, b). In Japanese *yor*i-constructions, this possibility exists too – interestingly, only in the example without *motto*:

- (129) a. Sally is 5 cm taller than Joe.
 b. Compared to Joe, Sally is 5 cm taller.
- (130) a. Sally-wa Joe-yori 5 cm se-ga takai.
 Sally-Top Joe-YORI 5 cm back-Nom tall
 b. *Sally-wa Joe-yori motto 5 cm se-ga takai.
 Sally-Top Joe-YORI “more” 5 cm back-Nom tall
 ‘Sally is 5 cm taller than Joe.’

It appears that *motto* plays the role of some sort of an intensifier, and occupies the syntactic position for the difference degree. Thus *motto* does not seem to be a good candidate for a comparative morpheme in Japanese. Ishii (1991) comes to the same conclusion for different reasons (cf. his discussion in Section 3.6). We will leave the details of its analysis to another occasion and concentrate on the (for us) more important question of whether Japanese has a comparative form of the adjective.

At this point, then, there is no morpheme that would plausibly be the equivalent of English *-er*. The intuitively correct truth conditions of our regular comparison data come out using the positive form of the adjective. However, we are grateful to Irene Heim for pointing out to us that the example in (130a) provides an argument that Japanese might still have a comparative form of the adjective. The measure phrase 5 cm is interpreted as the degree of difference between Sally’s height and Joe’s height. This is only possible in comparative constructions like English (129). Such an interpretation is not possible in the corresponding data with the positive form of the adjective, given in (131).

- (131) a. # Compared to Joe, Sally is 5 cm tall.
 b. # Sally is 5 cm tall.

To be on the safe side, we will therefore tentatively assume that while *motto* is something else, Japanese does have an invisible comparative morpheme.¹⁵ An analysis of the main clause of (123) that still makes do without degree abstraction could then look as follows:

- (132) a. [Taroo-wa [[[-er]_J(c)] takai] kasa-o] katta]
 [Taroo-Top [expensive umbrella-Acc] bought]

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- b. expensive $\rightarrow \lambda d.\lambda x.x$ is *d*-expensive
 [-er_J (c) expensive] $\rightarrow \lambda x.\max(\lambda d.x$ is *d*-expensive) $> c$
 [-er_J (c) expensive umbrella] \rightarrow
 $\lambda x.$ [umbrella (x) & $\max(\lambda d.x$ is *d*-expensive) $> c$]
 [T. bought -er_J (c) expensive umbrella] \rightarrow
 $\exists x$ [T. bought x & umbrella (x) & $\max(\lambda d.x$ is *d*-expensive)
 $> c$]
 c. $\exists x$ [T. bought x & x is an umbrella & $\max(\lambda d.x$ is *d*-expensive)
 $> c$]
 (where *c* is the contextual standard, i.e., the price of Hanako's umbrella)

We rely on a comparative morpheme that combines directly with an adjective meaning, not a syntactically derived predicate of degrees. We call this morpheme -er_J.

$$(133) \quad [[-\text{er}_J(c)]] = \lambda P.\lambda x.\max(\lambda d.P(d)(x)) > c$$

(where *P* is of type $\langle d, \langle e, t \rangle \rangle$, an adjective meaning)

This analysis is in the spirit of Kennedy (1997) who argues, contra the standard analysis, that the comparative is not an operator. Instead of moving at LF and taking scope, it combines directly with an adjective. The analysis in (133), like Kennedy's, predicts that the comparative will not scopally interact with other elements in any interesting way (which is the basis of Kennedy's argument). We will examine this prediction in the next subsection.

5.3. The Scope Issue

There has been much interesting discussion recently regarding the question of whether or not comparatives (and other degree operators) scopally interact with other scope-bearing elements (compare in particular Kennedy, 1997; Stateva, 2000; Heim, 2000; Schwarzschild and Wilkinson, 2002 and Sharvit and Stateva, 2002). What emerges from that discussion is that data like (134a) and (136a) with an intentional verb provide a crucial test case. It is argued (especially in Heim, 2000) that reading (134'c) of (134a) requires that the comparative morpheme takes scope over the intensional verb (as can be seen from the LF in (134b)) and hence provides an important argument for an analysis of the comparative as a scope-bearing, and variable-binding, operator in English. Reading (134'c) is true in situation (135),

where both (134'a) and (134'b) are false, and indeed the English sentence (134a) can be judged true in that situation.

- (134) a. Laura needs to climb a less high mountain than Pete.
 b. [less [than [1 [Pete needs to climb a t1 high mountain]]]
 [1 [Laura needs to climb a t1 high mountain]]]
 c. $\max(\lambda d. \text{Laura needs to climb a } d\text{-high mountain}) <$
 $\max(\lambda d. \text{Pete needs to climb a } d\text{-high mountain})$
 d. [[-less]] (D1)(D2) = 1 iff $\max(D2) < \max(D1)$
- (134') a. Laura has an obligation to do the following: climb a less high mountain than Pete.
 b. There is a mountain that Laura needs to climb that is less high than any mountain of Pete's,
 c. The height d such that Laura needs to climb a d -high mountain is less than the height d' such that Pete needs to climb a d' -high mountain.
- (135) Laura and Pete want to qualify for an Anapurna expedition. In order to be permitted to join the team, one has to have climbed a set of mountains whose altitude adds up to at least 22,000'. Everyone can choose his or her own mountains. Given what Laura has already done, she still needs to climb a 7000' mountain. Pete, in order to qualify, still needs to climb a 9000' mountain. Neither needs to climb a specific mountain, nor is Laura under any obligation to compete with Pete.

Similarly, English (136a) from Heim (2000) has the reading paraphrased in (136c), which requires the LF in (136b) – in which once more the comparative morpheme takes scope over the modal verb.

- (136) a. (This draft is 10 pp long.)
 The paper needs to be exactly 5 pp longer than that,
 b. [[5 pp -er than that] [1 [need [the paper be t1 long]]]]
 c. $\max(\lambda d. \text{the paper needs to be } d\text{-long}) = 5 \text{ pp} + 10 \text{ pp}$
 d. the length that the paper reaches in all situations meeting the requirements is 15 pp – i.e., the minimal length that would be satisfactory is 15 pp.

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These two types of facts – the readings permitted by sentences which combine an intentional verb with a *less*-comparative, and with a comparative plus difference degree – are according to our knowledge the best argument¹⁶ that English comparatives are scope-bearing elements and should receive an analysis as operators.

If an English-style derivation like (134) and (136), with movement of the degree operator and degree abstraction, were an option in Japanese, then we would expect similar scope effects. We have tested the two examples in (137) and (138). Note that Japanese does not have *less*-comparatives, hence the change to (137). The corresponding English comparative (137'a) does allow the relevant reading (137'b) (which suggests that there is an analysis of comparatives like *smaller* in terms of *less big* – compared Rullmann (1995) and unpublished work by Heim (1998) for such proposals).

- (137) Laura-wa Pete yori(mo) sukunai kazu-no roosoku-o
 Laura-Top Pete YORI(MO) small number-Gen candle-Acc
 kawa-nakerebanaranai.
 buy-required
 'Laura is required to buy a smaller number of candles than Pete.'

- (137') a. Laura needs to buy a smaller number of candles than Pete.
 b. The minimal number of candles that would satisfy the requirements imposed on Laura is smaller than the minimal number of candles that, would satisfy the requirements imposed on Pete.

- (138) (Sono sitagaki-wa 10 peeji desu.)
 (That draft-Top 10 page Cop)
 Sono ronbun-wa sore yori(mo) tyoodo 5 peeji
 that paper-Top that YORI(MO) exactly 5 page
 nagaku-nakerebanaranai.
 long-be_required
 'The paper is required to be exactly 5 pp longer than that.'

We have found that, in contrast to English, the relevant reading is impossible in both (137) and (138). There is thus no evidence for an operator status of the hypothesized Japanese comparative morpheme and no evidence for the formation of degree predicates in the syntax. It is interesting that there is such crosslinguistic variation – we hope that this will shed some light onto possible explanations for the English scope facts. In fact, to the extent that the reader is convinced by our arguments that English and Japanese differ in terms of availability of degree abstraction, the difference

in scope between English and Japanese is an argument for a movement analysis of English: this particular difference follows from the DAP just in case English uses degree abstraction in these examples and Japanese cannot.

We conclude that a closer inspection of the main clause of *yor*i-constructions supports our view that the construction is unlike English-type comparative constructions. There is reason to believe that the main clause, just like the subordinate clause, does not involve binding of a degree variable.

5.4. Other 'Degree' Constructions in Japanese

The question of whether or not Japanese has abstraction over degree variables should be investigated in a larger setting than just comparative constructions. In English, besides comparatives, constructions that have been argued to involve abstraction over degrees are degree questions, equatives, superlatives, and constructions with *too*, *enough* and *so that* (compare for example Stechow (1984), Rullmann (1995), Stateva (2000) and Meier (2001)). Some relevant examples are given below, including a translation into Japanese. The English examples under (a) are assumed to involve the creation of the predicate of degrees under (c).

- (139) a. How smart is John?
 b. John-wa dore-kurai kasikoi no?
 John-Top which degree smart *Q*
 'To which degree is John smart?'
 c. λd . John is *d*-smart
- (140) a. John is as clever as Mary is.
 b. John-wa Mary to onaji kurai kasikoi.
 John-Top Mary with same degree smart
 'John and Mary are smart to the same degree.'
 c. λd . Mary is *d*-clever
- (141) a. John bought too big a book to carry.
 b. John-wa hakob-e-nai hodo ookina hon-o katta.
 John-Top carry-can-neg degree big book-Acc bought
 'John bought a book so big that he cannot carry it.'
 c. λd . John bought a *d*-big book

It is striking that the Japanese data all employ a noun 'degree' or 'extent'. This is suggestive of an analysis in which an individual variable associated with the noun 'degree' is manipulated, rather than (like in English) a degree variable associated with an adjective. Should that turn out to be the case, it

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would support our idea that the degree argument of an adjective itself cannot be manipulated as freely in Japanese as in languages like English. Needless to say, the issue ultimately requires a more careful and thorough analysis of the data in (139)–(141) than we will be able to provide here.

The data do support the analysis of *yori*-constructions we develop above: given the relevant facts about Japanese, there is no reason to expect that derivations such as (142) are possible. That is, there is no evidence whatsoever from other “degree constructions” to indicate that degree abstraction is available where we do not want it to be: Japanese structures like (142a) are *never* associated with a predicate of degrees as in (142b).

- (142) a. *doa-ga hiroi*
 door-Nom wide
 b. *λd. the door is d-wide*

Further evidence pointing in the same direction is the impossibility in Japanese of what is called an amount relative (cf. Grosu and Landman (1998)). An example is given in (143). The ‘identity of substance’ reading in (143’a) is possible, but pragmatically odd. The amount reading in (143’b) is possible and pragmatically more plausible.

- (143) It will take us the rest of our lives to drink the champagne they spilled on the floor.
- (143’) a. They spilled champagne on the floor. It will take us the rest of our lives to drink it (i.e., to drink the very champagne that they spilled).
 b. It will take us the rest of our lives to drink as much champagne as they spilled on the floor (i.e., to drink that amount of champagne).

In the corresponding Japanese example (144), only the pragmatically odd reading is available. The amount reading is impossible. In order to get the amount reading, the example has to be changed by explicitly adding a noun meaning ‘amount’ or ‘degree’, as in (145).

- (144) *Karera-ga yuka-ni kobosita shanpan-o nomuni-wa issyoo*
 They-Nom floor-on spilled champagne-Acc drink-Top all-life
 kakaru darou.
 take will
 ‘It will take us the rest of our lives to drink the champagne that they spilled on the floor.’

- (145) Karera-ga yuka-ni kobosita ryoo-no/dake-no
 They-Nom floor-on spilled amount-Gen/degree-Gen
 shanpan-o nomuni-wa issyoo kakaru darou.
 champagne-Acc drink-Top all-life take will
 'It will take us the rest of our lives to drink the amount of
 champagne that they spilled on the floor.'

Grosu and Landman give an analysis of the amount reading of the English example in terms of abstraction over degrees. The fact that the corresponding reading is unavailable in Japanese suggests once more that abstraction over degrees is not possible.¹⁷

5.5. *Residua in Yori-constructions*

In this subsection we will mention a couple of further observations regarding *yori*-constructions that seem relevant but cannot be discussed in depth. First, it is interesting that the *yori*-constituent cannot be a name for a degree:

- (146) ?? Mary-wa 7-satu-yori motto takusan-no hon-o katta.
 Mary-Top 7-CL-YORI MOTTO many-Gen book-Acc bought

This is remarkable because of the contrast with English comparatives, where the item of comparison can be a degree – cf. (147a). In this matter, the analogy to English 'compared to' is confirmed once more, cf. the unacceptability of (147b). It is not clear to us, though, why (147b) is so strange.

- (147) a. Mary bought more than seven books.
 b. ??Compared to seven, Mary bought a lot of books.

Finally, an anonymous reviewer points out to us that a negation in the matrix clause of a *yori*-construction does not have the effect one would expect in a standard comparative:

- (148) Kono hon-wa ano hon yori omosiroku-nai.
 this book-Top that book YORI interesting-Neg
 'This book is less interesting than that one.'

- (149) a. This book isn't more interesting than that one.
 b. Compared to that book, this book is not interesting.

The comparative in (149a) denies that this book is more interesting than that book. This is not an appropriate description of the intuitive meaning of the

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Japanese sentence (148). (148) makes the stronger claim indicated by the translation. Interestingly, this is also the intuitive interpretation of our English approximation (149b).

It is very encouraging that once more, our approximation in terms of 'compared to' shows a parallel behavior. At the same time, we have to acknowledge that it is not clear why (149b) is interpreted the way it is. Given what we say above, we expect (149b) to have the interpretation in (150), but (150) is too weak. The desired interpretation is more like what we get for (151). It might be an option to change our minds about the positive so that (149b) comes out as (152).

- (150) a. $\neg\exists d$ [this book is d -interesting & $d > c$]
b. c : = the degree to which that book is interesting

(151) Compared to that book, this book is uninteresting.

- (152) a. $\neg\exists d$ [this book is d -interesting & $d \geq c$]
b. c : = the degree to which that book is interesting

6. CONCLUSION AND CONSEQUENCES

6.1. Summary

We have developed a semantic analysis of Japanese comparative constructions that is motivated specifically by facts about Japanese. The analysis is of necessity different from theories developed for English comparatives in crucial respects. We argue that Japanese *yor*i-constructions are not degree comparisons in the same way as more familiar comparatives. Instead of providing a degree-denoting expression as the standard of comparison, Japanese offers a context setter (the *yor*i-constituent) that allows the inference of a standard of comparison. The denotation of the *yor*i-constituent is not a degree. It follows that *yor*i-constructions behave differently from English comparatives due to the pragmatic element in their interpretation (resulting in variation in acceptability) and the non-degree nature of the *yor*i-constituent (resulting in lack of subcomparatives of degree and absence of degree-related negative island effects). We have suggested that the non-degree nature of the *yor*i-constituent is one effect of a general lack of degree abstraction in Japanese, leading to a different expression of standard degree constructions in this language in general, and to a lack of genuine, scope bearing degree operators. We propose that English vs. Japanese exemplify the following point of crosslinguistic variation:

(153) Degree Abstraction Parameter (DAP):

A language {does/does not} have binding of degree variables in the syntax.

The setting of this parameter will determine a set of properties for a language: (non)-existence of subcomparatives of degree, degree-related negative island effects, scope interaction in comparatives, and genuine degree constructions for questions and the like. Our prediction is that these properties will show up in a cluster, since they are all governed by the setting of one parameter.

Further investigation will have to show if the generalization from comparatives to all degree constructions in Japanese is correct. We hope that our proposals can be a starting point for future research in this area.

The pervasive parallel to English context setters makes us optimistic that an analysis of *yori*-constructions as context setters is on the right track. The reader will have noticed, however, that we reached the limit of our understanding of both the Japanese and the English construction at certain points in the paper. We take this to indicate that what we have called context setters here are deserving of more attention.

On a more general level, we have seen that a detailed semantic analysis can offer an interesting new perspective on crosslinguistic variation. A more precise understanding of the interpretation of Japanese comparison constructions enabled us to develop an alternative to the standard theory, accounting for the differences between Japanese and English-type languages.

6.2. Other Languages

Our results raise the more general question whether there is further support for our idea that the differences between Japanese and English comparative constructions are indicative of an underlying parameter of language variation like the DAP.

Most work on comparison constructions has focused on English or closely related languages. A notable exception is Stassen (1985), who provides a typological overview of how languages express the concept of comparison. Stassen's study aims for breadth rather than in-depth syntactic and semantic analysis. It seems likely that the various comparison constructions Stassen examines are not, in a formal grammatical sense, variants of one construction type at all (i.e., degree constructions). In a basic conceptual sense, they are used to make comparisons, but the grammatical means they use vary widely. For example, it seems probable that the verbal

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comparison construction that many languages use does not employ an English-style degree semantics. Below is an example Stassen gives from Margi (a chadic language spoken in northeastern Nigeria).

- (154) Naja ga mdia -da de dzegam-kur.
he Subj exceed -me with tall-Abstr.Noun
He is taller than me/he exceeds me in height.

An obvious candidate for the semantics is something roughly like (154'), which does not make use of degrees in any way.

- (154') exceed (h,s)
(where h is the type < e > object that corresponds to the height of the referent of 'he', and s is the type < e > object that corresponds to the height of the speaker)

It is thus clear from Stassen's work that there is substantial crosslinguistic variation in how comparisons are expressed.

However, the mere existence of the 'exceed' comparison strategy exemplified in (154) is not evidence for a specific underlying parameter of grammar. It is not, in particular, evidence for the concrete proposal that we have made in this paper concerning a point of parametric variation between languages (the DAP) that affects how they express comparatives. One may speculate that a language that uses the 'exceed'-strategy replaces genuine degree constructions in that way. However, alternatives to this explanation exist: for example, it is possible that the language does have degree constructions and that only comparatives are not expressed that way (English, after all, permits the 'exceed' version of a comparison, despite the fact that it has the positive setting of the DAP). Alternatively, one could imagine that a language does not have adjectives with an English-style degree semantics to begin with; in that case, the point of parametric variation would be, so to speak, 'earlier' than our proposed parameter (in the lexicon).

Concrete evidence for the DAP would come from languages that behave like Japanese with respect to the cluster of properties that we have investigated (lack of subcomparatives, lack of scope effects, absence of degree negative island effects, etc.). At the same time, the language should have adjectives with a degree semantics and should make the structures available that test our properties. Three promising candidates for such languages are Korean, Mandarin Chinese and Thai. In all three languages, subcomparatives of degree are unacceptable:

- (155) *i-chaekjang-un ce-moon-i nelp-un kes bota(tu)
 this-bookshelf-Top that-door-Nom wide-PN one than(more)
 nop-ta.
 tall-Decl
 'This shelf is taller than one that door is wide.' [Korean]
- (156) *Zhe ge jiazi bi na ge men hen kuan(yao) gao.
 this CL shelf compare that CL door very wide(YAO) tall
 'This shelf is taller than the door is wide.' [Mandarin Chinese]
- (157) *hing na_sii nii suung kwaa pratuu nan thii kwang.
 shelf book this tall more door that Comp wide
 'The book shelf is taller than the door is wide.' [Thai]

At the same time, all three languages have what looks like clausal comparatives:¹⁸

- (158) Mary-nun John-i ilk-un kes bota (tu) mahn-un
 Mary-Top John-Nom read-PN one than (more) many-PN
 chaek-ul ilk-ess-tta.
 book-Acc read-pst-Decl
 'Mary read more books than John did.' [Korean]
- (159) Mary bi John xie de wenzhang duo.
 Mary compare John write DE paper more
 'Mary wrote more papers than John did.' [Mandarin Chinese]
- (160) Nit khiian na_sii maak kwaa thii John khiian.
 Nit write book many more Comp John write
 'Nit wrote more books than John did.' [Thai]

Moreover, these three languages have adjectives with a familiar degree semantics, as shown by (161)–(163).¹⁹ This makes it plausible that the point of variation lies in availability of degree abstraction, rather than availability of a degree semantics for adjectives in the first place.

- (161) John-un 2 cm kuta.
 John-top 2 cm tall.
 'John is taller by 2 cm.' [Korean]
- (162) John shen gao 2 cm.
 John body tall 2 cm.
 'John is 2 cm tall.' [Mandarin Chinese]

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- (163) Nit suung kwaa 2 cm.
Nit tall more 2 cm.
'Nit is taller by 2 cm' [Thai]

If we are on the right track here, these languages should have the same absence of a degree-induced negative island effect, also a lack of scopal ambiguities with intensional verbs, and so on.

We have not followed up on all these predictions and should stress that any conclusions about Korean, Mandarin Chinese, and Thai are extremely tentative. That said, we conjecture that the comparison construction in these languages has the same fundamental properties as the Japanese one, obviously quite different from English. This supports our idea that there is crosslinguistic variation in the availability of degree abstraction. Languages that share the negative setting of the DAP with Japanese would be Mandarin Chinese, Thai, and Korean. As for the positive setting, it is clear that at least English, Dutch, and German exhibit it.

The next step in developing a comparative theory of comparison should be a more in-depth investigation of the language types Stassen has found, which should lead to interesting conclusions regarding how the grammar of these languages formally differs. The results will be a test for the DAP we have suggested. Perhaps we will also find an indication of why there should be such parametric variation.

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NOTES

¹ *Yori*-constituents may be combined with the morpheme *-mo*, which is indicated as optional in Ishii's data. The role of this morpheme will not be addressed in this paper.

² In our terminology, the Logical Form of a sentence is the syntactic structure that is the input to compositional interpretation. We rely on a theory of semantic interpretation like Heim and Kratzer's (1998), in which the mechanisms of semantic composition are function application, predicate abstraction and predicate modification. In particular, we use Heim and Kratzer's notation for variable abstraction, in which an index like 1 in (7b) is the variable binder for all variables bearing that index (in this case, the trace t1). Compositional interpretation of a sentence ultimately yields a full specification of the truth conditions of that sentence; sometimes we will in addition illustrate intermediate steps in the calculation.

³ Unpublished work by Snyder, Wexler and Das (1994, handout for WCCFL 13) informally puts forth a similar idea.

⁴ For many speakers, a 'compared to' construction plus comparative like (18b) seems to be a somewhat dispreferred way of expressing comparatives like (19). The data seem to become more natural when there is some discourse related reason to use 'compared to', as in (i).

- (i) Compared to Joe, Sally is taller but slower.

⁵ An interpretational aspect that we will ignore are the implicatures that sometimes arise with data like (18a). Expressing the comparison between Sally and Joe in this way often suggests that Sally would not normally be considered tall – just in comparison to Joe. The implicature is cancellable. It does not seem to arise with all examples or with all context setters.

⁶ That is, mentioning Joe in our example could make size standards other than Joe's height salient, depending on the complete utterance context. A particularly straightforward example of this kind is (ia), brought to our attention by the audience at University of Delaware. Beside the interpretation in (ib), the example also easily permits readings like (ic).

- (i) a. Compared to me, my son is tall.
 b. My son's height exceeds my height.
 c. My son is taller than I was at his age.

⁷ That is, they are true in exactly the same situations. The only difference between (25b) and (21b) is that (25b) may be undefined in situations in which (21b) is false. This will not play a role for us in this paper.

⁸ We will assume, for simplicity, that in both the English and the Japanese example, John also wrote papers rather than something else. This may not necessarily be the case. In English (i), without further supporting context, we certainly tend to assume that John also wrote a review. This need not be the so, however. Imagine that the class assignment is to write either a review or a research paper. John could have written a research paper, which is shorter than Mary's review.

- (i) Compared to what John wrote, Mary wrote a long review.

An anonymous reviewer suggests that in Japanese, it is obligatory that the property denoted by the noun is shared between the matrix clause and the 'compared to' clause. We have not been able to confirm the reviewer's judgment that Japanese is different in this respect from English. The speakers we consulted accepted the possibility that the nominal property is not shared between the two clauses. An example for which this was possible is given in (i').

- (i') Mary-wa [John-ga kaita (no) yori] nagai ribyuu-o kaita.
 Mary-Top John-Nom wrote (NO) YORI long review wrote
 Compared to what John wrote, Mary wrote a long review.

Note that our analysis, as it stands, predicts that Japanese is like English in this respect, agreeing with the judgments that we have obtained. On the other hand, if we go with the

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judgment reported by the reviewer, some additional constraint has to apply in Japanese that does not apply in English. We are reminded of Shimoyama's (2001) observation that in an IHR (like her example (45), p. 129), the 'head noun' is obligatorily shared. Our hope would be that whatever constraint derives that fact would also derive it for *yoru*-clauses. In view of the variation between speakers that we observe, however, we must leave this point open.

⁹ Kikuchi (1987) also observes a contrast between presence vs. absence of *-no*. His data are given in (i).

- (i) a. [[e₁e₂ okasita] tumi-ga omoi no yorimo]
 committed crime-Nom serious NO YORIMO
 ooku-no keehanzai-syuuzin-ga iru.
 many-Gen minor-offence-prisoners-Nom are
 'Compared to the ones whose crimes are serious, there are many
 minor offence prisoners.'
- b. *[e₁e₂ okasita] tumi-ga omoi yorimo] ooku-no
 committed crime-Nom serious YORIMO many-Gen
 keehanzai-syuuzin-ga iru.
 minor-offence-prisoners-Nom are
 ??'Compared to whose crimes are serious, there are many minor
 offence prisoners.'

Kikuchi suggests that the contrast arises because *-no* indicates that relativization is involved, and relativization has a non-movement analysis. By contrast, the comparison construction obligatorily involves operator movement and hence is sensitive to the relative clause boundary in (i).

An analysis in terms of presence vs. absence of movement is only open to us if it is plausible that *-no* can indicate such a difference between two types of relative clause (compare Section 4.5 for more discussion). We are not aware of any arguments to that effect. Notice, however, that the presence vs. absence of *-no* could make a difference unrelated to movement issues. In that connection, it is interesting to note that the English approximations we offer also differ in acceptability. We conjecture that the existential construction in (i) is involved in this contrast, rather than movement.

¹⁰ An anonymous reviewer points out to us that the fact that IHRs can be multiply headed is likely to help with the interpretation of data like the following:

- (i) [Keikan-ga doroboo-o oikaketeita] -no yori(mo)] takusan
 [policeman-Nom thief-Acc chasing-was] NO YORI(MO)] many
 sensei-ga seito-o oikaketeita.
 teacher-Nom student-Acc chasing-were.
 'Compared to the policemen chasing the thieves, many teachers were
 chasing many students.'

The interpretation of (i) seems to be similar to English (ii), and indeed so is our approximation. An example of a multiply headed IHR is given in (iii).

- (ii) More teachers were chasing more students than policemen were chasing thieves.
- (iii) [Keikan-ga doroboo-o oikaketeita] -no-ga kawa-ni otita.
 [policeman-Nom thief-Acc chasing-was] -NO-Nom river-in fell.
 'A policeman was chasing a thief, and both of them fell into the river.'

¹¹ The paraphrase with a referential pronoun might be improved upon if it can be argued that Japanese has an indefinite empty pronoun (cf. Ishii (1991), Hoji (1998), Tomioka (2002)). The semantics would then amount to (i). (i) however still does not strike us as a very good comparison of number. We will not pursue the issue further.

- (i) ?? Compared to Hanako buying ones, Taroo bought a lot of umbrellas.

¹² Both descriptions are phrased with the assumption that any ellipsis has already been resolved and the relevant parts of the structure are represented; we expect both Japanese and English to be able to employ their usual kinds of ellipsis and other phonologically empty material.

¹³ The two analyses are distinguishable in particular by the predictions they make for examples in which the internal head of the IHR is quantificational. Shimoyama shows on the basis of such data that her biclausal analysis is superior to a direct analysis. While we are convinced by her arguments as far as ordinary IHRs are concerned, it has turned out that the relevant data are ungrammatical as *yoru*-clauses. We are not sure what conclusions to draw from this and have left open the possibility of a direct analysis of *yoru*-clauses as well as a biclausal one in the text.

¹⁴ For completeness, we should note that for these examples, an analysis in terms of a nominalization might also be possible. The approximation in (i) might have the relevant subcomparative-like interpretation, although it seems clearer that the analysis suggested in the text yields the desired result.

- (i) Compared to Taroo writing books, Hanako wrote a lot of papers.

¹⁵ Alternatively, Japanese could have one form of the adjective that is neither like the English positive or like the English comparative. According to the information we have collected, this could be (ia) or (simplified) (ib) (existential binding of the difference degree in (ia) yields (ib)).

- (i) a. $[[\text{tall}]] = \lambda d'. \lambda x. \max(\lambda d. \text{tall}(d)(x)) = c + d'$
 b. $[[\text{tall}]] = \lambda x. \max(\lambda d. \text{tall}(d)(x)) > c$

The idea would be that adjectives are always born into the syntax with this interpretation. We will leave this possibility open.

¹⁶ The issue is controversial. For discussion compare the literature referred to in this section.

¹⁷ There is one other fact about degree constructions in Japanese that is at least suggestive in the present context and ought to be mentioned. Measure phrases like '2 m' that can, in English, associate with a plain adjective cannot do so in Japanese, (ib) is acceptable, but can only be interpreted as a comparative where '2 m' fills the difference degree argument of the comparative morpheme. Snyder (1995) has connected this fact with non-availability of subcomparatives of degree.

- (i) a. 2 m long
 $[\lambda d. \lambda x. x \text{ is } d\text{-long}](2 \text{ m}) = \lambda x. x \text{ is } 2 \text{ m-long}$
 b. 2-meetoru nagai
 $= 2 \text{ m longer}$
 $\neq 2 \text{ m long}$

It is conceivable that an extension of our analysis would be able to connect lack of measure phrases with our other observations. The work of Schwarzschild (2001) makes us a little uncertain that the role of measure phrases is appropriately captured by the picture just sketched. See also the crosslinguistic data in Section 6.2, which indicate that the connection between impossibility of measure phrases and negative setting of the DAP should not be too immediate. We thus limit ourselves to pointing out the promising potential connection.

¹⁸ As for (159) in Chinese, however, it might be the case that they are phrasal comparatives with relative clauses.

¹⁹ Note that the way in which measure phrases are interpreted varies among the languages that we hypothesize to have the negative setting of the DAP. This is another motivation not to tie measure phrases too directly to the parameter.

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