A QVE-like Phenomenon in the Japanese Universal Construction
and Its Implications

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It has been reported in the literature that the interpretation of the Japanese
universal construction composed of indeterminate pronouns and the particle *mo*
interact with adverbs of quantification, resulting in a phenomenon similar to
what is known as the quantificational variability effect (QVE) found in English
indefinites. This paper points out the availability of another type of QVE-like
interpretation that has been overlooked in the literature. The interpretation in
question provides further support for what I refer to as the direct restrictor view
of the universal construction, while it is not expected in the standard semantics
of the universal construction where the particle *mo* solely quantifies over the
denotations of indeterminate pronouns. The paper also shows that the QVE-like
interpretation in the universal construction is rather marginal compared to the
QVE found in English indefinites or Japanese bare nouns, and points out a
challenge for analyses that treat *mo* as having no inherent quantificational force.

1. Introduction
One type of universal quantification in Japanese is expressed by the use of the
so-called indeterminate pronouns and the particle *mo* as shown in (1) (see

(1) a. Dono gakusei·mo odotta.
    which student·MO danced
    'Every student danced.'

b. [[Dono gakusei·ga teisyutusita] syukudai·mo
    which student·NOM submitted homework assignment·MO
    yuu·datta.
    A-was
    'For every student x, the homework assignment that x had handed in got an A.'

In (1)a, the indeterminate pronoun *dono gakusei* ‘which student’ and *mo* are in a
local relationship, whereas in (1)b, they are not.

The standard semantics of the universal construction in (1) assumed by many
authors is that the particle *mo* universally quantifies over the denotation of the
indeterminate pronoun as illustrated in (2) below (see, for example, Ohno 1989,

(2) a. ∀x[student(x) → dance(x)]
    b. ∀x[student(x) → get an A(y[homework assignment(y) & submit(y)(x)]])

According to this semantics, which I will refer to as the embedded restrictor view,
the non-local case involves a kind of quantification at a distance and the local
and non-local cases are related to each other in that the indeterminate pronouns
uniformly supply the domain of quantification for *mo*. 
An alternative to the standard semantics, which I will refer to as the direct restrictor view, is proposed in Shimoyama (1999, 2001), followed up by works such as Suzuki (2003), Yatsushiro (2004) and Tancredi and Yamashina (2005) with modifications. According to this view, what we called the non-local mo quantification is in fact not a case of quantification at a distance. Rather, the domain of quantification for mo is directly provided by its sister constituent, not by embedded indeterminates. Thus for the sentence in (1)b, the semantics in (3) is assigned.

\[(3) \forall x [x \in \{y | \text{homework assignment}(y) & \text{submit}(y)(z)]: \text{student}(z) \rightarrow \text{get an } A(x)]\]

The main arguments for the direct restrictor view over the embedded restrictor view presented in Shimoyama (ibid.) are not based on purely semantic considerations but primarily on issues surrounding the syntax-semantics interface, as well as on considerations of maintaining a uniform analysis of the mo quantification and the wh-question.

The goal of this short paper is to show, based on semantic considerations, that the direct restrictor view should be preferred over the standard embedded restrictor view. The evidence comes from a particular type of interpretation of the universal construction available with the occurrence of certain adverbs of quantification that has never been discussed in the literature to my knowledge. Section 2 introduces basic data where the addition of certain adverbs of quantification in the universal construction can induce an interpretation that is similar to a quantificational variability effect (Nishigauchi 1986, 1990, Ohno 1989). In section 3 I present examples that are similar to them but have a particular type of interpretation that has been overlooked in the literature. The interpretation in question can be accommodated in the direct restrictor view, while it is not expected in the embedded restrictor view. Section 4 contains a summary and remaining questions.

2. (Apparent) Quantificational Variability Effect

One type of argument that Ohno (1989) presents for the embedded restrictor view and against the unselective binding analysis due to Nishigauchi (1986, 1990) has to do with a phenomenon similar to what is known as the quantificational variability effect.

Let me first illustrate the quantificational variability effect (QVE) using typical examples from English and their Japanese counterparts with bare nouns. When an indefinite DP in English occurs with an adverb of quantification, it can take on the quantificational force of the adverb (Lewis 1975, Kamp 1981, Heim 1982, etc.). The sentence in (4)a, for example, can be interpreted as (4)b.

\[(4) \begin{align*}
a. & \text{Female birds usually care for their young.} \\
b. & \text{Most female birds care for their young.}
\end{align*}\]

Bare nouns in Japanese show a similar property. The sentence in (5)a has a reading that can be paraphrased by the sentence in (5)b.

\[(5) \begin{align*}
a. & \text{Nekorwa butuu namakemono da} \\
cat-TOP usually lazy COP.PRES \\
\text{‘Cats are usually lazy.’}
\end{align*}\]
b. *Hotondo-no neko-wa namakemono da*  
most-GEN cat-TOP lazy COP.PRES

‘Most cats are lazy.’

In the domain of the universal construction, a phenomenon similar to the quantificational variability effect is reported in Nishigauchi (1986, 1990), where he discusses sentences like (6).

(6) [[Dono gakusei-ga kaita] ronbun-mo taitei] saiyoos-are-ta.  
which student-NOM wrote paper-MO mostly were accepted

One reading of (6), perhaps the most prominent one, is ‘for every student x who wrote papers, most of the papers that x wrote were accepted’. Nishigauchi (ibid.) claims that there is another reading, represented in (7), in which *taitei* ‘mostly’ quantifies over pairs of individuals.

(7) Most x,y [student(x) & paper(y) & wrote(y)(x)] [accepted(y)]

This second reading is predicted to be true in a scenario where five students wrote one paper each and four of the papers were accepted (scenario (8)a). It is predicted to be false if only one of the papers was accepted (scenario (8)b). These predictions conform to our intuitions.

(8)  

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It is pointed out in Ohno (1989), however, that the translation in (7) is not quite adequate for sentence (6). Suppose that there are five students, four of them wrote a paper each, and the remaining one student wrote eleven papers. The eleven papers written by this one student were accepted, but no other papers were. In this situation, shown in (9)a, Nishigauchi’s (7) incorrectly predicts sentence (6) to be true. This is part of a general problem associated with the unselective binding analysis of adverbs of quantification (the proportion problem discussed in Kadmon 1987).

(9)  

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Ohno (ibid.) argues that this supports his analysis of the *mo* quantification, namely the embedded restrictor view. According to the embedded restrictor
view, only the indeterminate pronouns provide the domain of quantification, as opposed to both indeterminates and bare nouns (ronbun ‘paper’ in (6)) providing the domain. The embedded restrictor view thus gives the translation in (10), in which taitei ‘mostly’ only binds the student variable $x$ ($P(\alpha)$ is defined as $\forall x [x \leq \alpha \& \text{atomic}(x) \rightarrow P(x)]$). This translation correctly predicts that sentence (6) is judged to be false in scenario (9)a.

(10) Most $x$ [student($x$)] [*accepted(oy[paper($y$) & wrote($y(x)$)])]

Ohno (ibid.) also observes that sentence (6) is appropriate in the scenario in (9)b.

At this point an important question can be raised as to how an indeterminate within a mo-marked DP, as opposed to bare nouns, can end up with the quantificational force derived from taitei ‘mostly’. For now let us follow Nishigauchi (ibid.) and assume that the particle mo only takes on the universal quantificational force as default, when no adverb of quantification is available. This approach is followed more recently by Yamashina and Tancredi (2005). Some unresolved puzzles in this type of approach will be presented in section 4, which would suggest that the phenomenon at hand may not be a full-fledged QVE (hence my choice of the expression ‘QVE-like interpretation’ in what follows).

3. Another QVE-like Interpretation and Its Implications

3.1 A Challenge for the Embedded Restrictor View

We will now see that contrary to Ohno’s (1989) claim, this QVE-like phenomenon in the universal construction does not straightforwardly argue for the standard embedded restrictor view. More specifically, we will see that yet another type of QVE-like interpretation is available in appropriate contexts, which is not expected in the embedded restrictor view in which the quantification is solely over indeterminate denotations.

The relevant data have to do with examples like (11) and (12), which have the same overall structure as example (6).

(11) [Dare’ ga tukutta kazari] mo taitei kurisumasu’s-made motta.
    who’NOM made ornament’MO mostly Christmas ‘till lasted
    ‘(Lit.) [Ornaments made by who] mostly lasted till Christmas.’

(12) [Dare’ ga kaesita] hon mo taitei itandeita.
    who’NOM returned book’MO mostly were.damaged
    ‘(Lit.) [Books returned by who] were mostly damaged.’

Taking (11) as an example, suppose that ten children made the total of thirty Christmas ornaments on one day in November, collected them in one box, and donated them to a hospital. The next day someone at the hospital put them up on a tree, and during the period between that day and Christmas, only three out of the thirty ornaments got damaged. Then he or she can utter sentence (11) truthfully.

In this situation, the utterer of the sentence does not have any information about who made which ornament(s), yet the sentence is appropriate. This shows that taitei ‘mostly’ in (11) does not quantify over the denotation of dare ‘who’, but rather, it quantifies over the set of all the ornaments of whatever origin. If the quantification was solely over indeterminate pronoun denotations (people in this case), as the embedded restrictor view claims, this type of interpretation would
not be expected. Note in passing that Nishigauchi’s (1986, 1990) analysis fares better than the embedded restrictor view in predicting this type of interpretation, for it assumes that the quantification is over person-ornament pairs.

3.2 The Direct Restrictor View
I will now show that the direct restrictor view has a better chance of capturing the kind of interpretation we just encountered above, while preserving the advantage over Nishigauchi (1986, 1990) that Ohno (1989) presented.

The apparent quantification over the indeterminate pronoun denotation in examples like (6) is expected in the direct restrictor view. Assuming again that five students wrote papers, the relevant domain is the set in (13), namely, the set of (plural) individuals each of which is a paper/papers written by a student.

\[(13) \{\text{the paper(s) that student 1 wrote, the paper(s) that student 2 wrote, the paper(s) that student 3 wrote, the paper(s) that student 4 wrote, the paper(s) that student 5 wrote}\}\]

Since in the QVE-like interpretation of sentence (6) \textit{taitei} ‘mostly’ quantifies over this set, the sentence is correctly predicted to be true in the situations depicted in (8a) and (9a), and not true in (8b) and (9b) (see Berman 1991 and Lahiri 1991, 2002 for related discussions). It thus overcomes the problem Ohno (1989) points out for Nishigauchi’s (1986, 1990) analysis.

What about the ‘mashed’ interpretation that becomes available in suitable contexts as we observed in (11) and (12) above? Recall that in the interpretation in question of (11), for instance, the quantification is over the set of ornaments of whatever origin. This interpretation can be derived by forming a set of atomic individuals that are ornaments made by someone or other out of the set of plural individuals denoted by the sister constituent of \textit{mo}.

\[(14) \bigcup A = \{x : \exists y[y \in A \& x \leq y \& \text{atomic}(x)]\}, \text{ for any set of (plural) individuals }A.\]

\[(15) \bigcup\{[\text{dare-ga tukutta kazari}]\) = \bigcup\{\sigma[y[\text{ornament}(y) \& \text{made}(y)(z)] : \text{person}(z)]\) = \{x : \exists z[\text{person}(z) \& \text{ornament}(x) \& \text{made}(x)(z)]\} \]

The last line in (15) would then serve as the domain for \textit{taitei} ‘mostly’.

I have shown that the direct restrictor view has a better chance of explaining the mashed interpretation than the embedded restrictor view, while overcoming the proportion problem Nishigauchi’s analysis encounters. I have not asked many important questions, one of them being the question of when exactly this ‘mashed’ set of atomic individuals becomes available. Recall that sentence (6), in its QVE-like reading, is judged to be false in the situation in (9)a, indicating that the mashed set is not available. Contextual factors that play a role in this distinction should be spelled out in future studies.

3.3 The Clausal \textit{mo} Construction
Let me touch upon a similar range of interpretations found in the clausal counterpart of the \textit{mo} quantification we have been concerned with so far (see Lin 1996 for a similar construction in Chinese). The data support the line of analysis presented above that the domain of \textit{mo} quantification is provided by its sister constituent.
The sentence in (16), without *taitei* ‘mostly’, can be roughly paraphrased by the English translation below.

(16) Taro-wa [dare-ga denwasi-te]-mo (*taitei*) denakatta.
    Taro-TOP who-NOM call -TE-MO mostly did.not.answer
    ‘Whoever/no matter who called, Taro didn’t answer.’

When *taitei* ‘mostly’ does occur, the sentence is ambiguous in the same way in which sentence (6) is ambiguous. Two of the readings were first observed in Nishigauchi (1986, 1990), but the third reading has not been discussed. Suppose that there are four callers, Bill, Sue, Mary and Tom. One reading of (16) can be paraphrased as:

(17) When Bill called, in most cases Taro didn’t answer.
    When Sue called, in most cases Taro didn’t answer.
    When Mary called, in most cases Taro didn’t answer.
    When Tom called, in most cases Taro didn’t answer.

In this reading, the sentence is true in the scenario in (18)a, but false in scenarios (18)b and (18)c.

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In a QVE-like reading of sentence (16), it is judged to be true in the scenario in (18)b (Recall that the first reading is false in this scenario). This was taken by Nishigauchi (1986, 1990) as indication that *taitei* ‘mostly’ was quantifying over individuals. In the direct restrictor view, on the other hand, this can be considered as a case that involves quantification over the set {the situations in which Bill called, the situations in which Sue called, the situations in which Mary called, the situations in which Tom called}.

Sentence (16) has yet another QVE-like reading that is true in scenario (18)c, especially in a situation where it is not known who each call was from, similarly
to the ornament scenario earlier. Neither the first nor the second reading is true in this scenario. In this case *taitei* 'mostly' must be quantifying over the set of all ‘someone calling’ situations. Crucially, this reading is not expected in the embedded restrictor view where quantification is limited to the indeterminate pronoun denotations.

4. Summary

To summarize, I have shown that a QVE-like interpretation that has not been discussed is available in the *mo* quantification sentences when certain contextual conditions are met. The availability of this type of interpretation lends further support to the direct restrictor view of the *mo* quantification — though the availability of the first type of QVE-like interpretation is taken by Ohno (1989) to be an argument for the embedded restrictor view, this view does not predict the second type discussed in this paper.

What I did not do in this short paper, however, is to propose a precise mechanism for deriving the QVE-like interpretations. As I mentioned earlier, one could follow Nishigauchi (1986, 1990) and more recent work by Yamashina and Tancredi (2005) and assume that the particle *mo* does not have quantificational force inherently. Then adverbs of quantification would provide the quantificational force, or in the absence of such adverbs, a default universal (or distributive) operator kicks in. There are, however, some data that don’t quite fit with this idea. As Yamashina (1998) points out, this idea does not have an explanation for why the local *mo* construction in (19)b does not have a QVE-like interpretation.

\[(19) \]

\[\begin{align*}
a. \quad \text{Gakusei}-\text{wa} & \ \text{mettani} \ \text{benkyoosi}-\text{nai}. \quad \text{(Yamashina 1998)} \\
& \text{student-top} \ \text{rarely} \ \text{study-not} \\
& \text{‘(The) students seldom study.’} \\
& \text{‘Few students study.’} \\

b. \quad \text{Dono gakusei}-\text{mo} & \ \text{mettani} \ \text{benkyoosi}-\text{nai}. \quad \text{(local)} \\
& \text{which student-MO} \ \text{rarely} \ \text{study-not} \\
& \text{‘Every student seldom studies.’} \\
\end{align*}\]

Since (19)a (with a bare NP) does have a QVE interpretation ‘few students study’, Nishigauchi (1986, 1990) and Yamashina and Tancredi (2005) would predict that (19)b should, too, since *mo* is without its own quantificational force according to them. The following pairs of examples make the same point.

\[(20) \]

\[\begin{align*}
a. \quad \text{Neko}-\text{wa} & \ \text{hutuu} \ \text{namakemono da} \\
& \text{cat-TOP} \ \text{usually} \ \text{lazy} \ \text{COP.PRES} \\
& \text{‘Cats are usually lazy.’} \\
& \text{‘Most cats are lazy.’} \\

b. \quad \text{Dono neko}-\text{mo} & \ \text{hutuu} \ \text{namakemono da}. \quad \text{(local)} \\
& \text{which cat-MO} \ \text{usually} \ \text{lazy} \ \text{COP.PRES} \\
& \text{‘Every cat is usually lazy.’} \\
\end{align*}\]

\[(21) \]

\[\begin{align*}
a. \quad \text{Ka}-\text{wa} & \ \text{tamani} \ \text{nisi-nairu}-\text{wirusu}-\text{o motteiru}. \\
& \text{mosquito-TOP} \ \text{sometimes} \ \text{west-nile-virus-ACC} \ \text{COP.PRES} \\
& \text{‘Mosquitoes sometimes carry West Nile virus.’} \\
& \text{‘Some mosquitoes carry West Nile virus.’} \\
\end{align*}\]
b. Dono ka-mo tamani nisi-nairu-wirusu-o motteiru. (local)
   which mosquito-MO sometimes west-nile-virus-ACC carry
   ‘Every mosquito sometimes carries West Nile virus.’

It seems that the QVE·like interpretations are available only in a limited environment, which may suggest that they might as well turn out to be a different creature from what is known as QVE. Future studies should examine why this phenomenon is marginal in the universal construction, being allowed only in the non-local cases but not in the local cases. The phenomenon should also be examined further in the context of a larger variety of quantificational adverbs.

Endnotes
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