**Japanese *Mo* 'Also': Anti-negative Scope and Multidimensional Semantics**
(Quantification Session: Semantics, Pragmatics, Japanese)

**1. Issue** As pointed out by Hasegawa (1991), the scope of the Japanese additive phrase NP-*mo* 'also' shows anti-negativity. For instance, NP-*mo* cannot take scope below clause-mate negation (Neg), as shown in (1), though a universal quantifier (UQ) generally can. In other words, while presupposing that there is someone else than Bill that John met, (1) cannot assert that it is not the case that John met Bill.

(1) *John-wa* *Bill-ni-**mo*** *awa-**nakat**-ta*. ✓(NP-*mo* > Neg) *(Neg > NP-*mo*)
John-Top Bill-Dat-also meet-Neg-Past
'John did not meet Bill, too.'

A number of syntactic proposals have been made to deduce the anti-negativity of NP-*mo*. Among others, Miyagawa (2010) proposes a unified account, under which any focused XP, including NP-*mo*, must be scrambled to the edge of TP (and this can be string-vacuous), so that it must be interpreted above the scope of Neg. However, there is a problem with this type of syntactic account. Consider (2).

(2) *John-wa* ***zen'in**-ni-**wa*** *awa-**nakat**-ta*. *(UQ-*wa* > Neg) ✓(Neg > UQ-*wa*)
John-Top everyone-Dat-Top meet-Neg-Past
'John did not meet everyone.'

In (2), the UQ is focused due to the presence of the contrastive (topic) particle *wa*, and must take scope below Neg. This is unexpected under the syntactic account, because the focus nature of UQ-*wa* would require it to go to the edge of TP. On the other hand, Hara (2006) has derived the negativity of UQ-*wa* in purely semantic terms. The goal of this paper is to do the same thing to the anti-negativity of NP-*mo*.

**2. Claim** Potts (2005) establishes a theory of multidimensional semantics, under which entailment is divided into two levels, *primary* and *ancillary*, and only the former can be included in the scope of external propositional operators, such as Neg. Along these lines, we propose the semantics of *mo* as follows. (3a) splits the entailment of *mo* into the primary content (the left of **,**) and the ancillary content (the right of **,**), and the latter is combined with the possibility operator ◇, where ◇(*p*) means *p* can be true. (3b) shows the presupposition of *mo*, where CS (*context set*) is the intersection of every $p \in$ CG (*common ground*), the set of every true *p* that the speaker assumes to be shared with the hearer at the time of utterance (see Stalnaker 1978). Importantly, (ii) and (iii) force parallelism between the entailment and the presupposition, as the two entities x, y share a predicate anaphora **Π** (cf. Shudo 2002).

(3) a. $[\![mo_i]\!] = \lambda P.\lambda Q. <$ $\underset{\textbf{(i) PRIMARY}}{\exists x. [P(x) \wedge Q(x)]}$ , $\underset{\textbf{(ii) ANCILLARY}}{\Diamond(\exists x. [P(x) \wedge \mathbf{\Pi}_i(x)])}$ >

b. $[\![mo_i]\!](P)(Q)$ is defined iff CS entails [ $\underset{\textbf{(iii) ADDITIVITY}}{\exists y. [\neg P(y) \wedge \mathbf{\Pi}_i(y)]} \wedge \underset{\textbf{(iv) RESTRICTION ON } \mathbf{\Pi}}{\exists z. [Q(z) \rightarrow \mathbf{\Pi}_i(z)]}$ ].

Assuming with Partee (1987) that any terms of type e (e.g., $[\![Bill]\!] = \mathbf{b}$) can be shifted to identity predicates of type <e, t>, we now show how to deduce the anti-negativity of NP-*mo* in (1). Let us assume that the dative NP-*mo* may be scrambled to the edge of VP or TP. Then, when it is at the edge of TP, it can derive the possible reading of (1), with the VP-internal copy of the subject selected for interpretation, as shown in (4). Here, we ignore the semantic contribution of T and the word order in the structure.

(4) a. $[_{TP}\ NP_2\text{-}mo\ [_{T'}\ T\ [\ Neg\ [\ NP_1\ V\ t\ ]]]]]$ $([\![NP_2]\!] = \lambda x. [x = \mathbf{b}], [\![T']\!] = \lambda y. [\neg \mathbf{meet(j)}(y)])$
b. $[\![TP]\!] = [\![mo_i]\!]([\![NP_2]\!])([\![T']\!]) = < \exists x. [x = \mathbf{b} \wedge \neg \mathbf{meet(j)}(x)]$ , $\Diamond(\exists x. [x = \mathbf{b} \wedge \mathbf{\Pi}_i(x)]) >$

At this point, suppose that the anaphor $\mathbf{\Pi}_i$ is assigned the value of $\lambda x. [\neg \mathbf{meet(j)}(x)]$, then we obtain assertion (5a) and presupposition (5b), and they have no problem; (5b) is satisfied if CS entails that there is someone else than Bill that John didn't meet, which makes the second conjunct trivially true.

(5) a. $[\![TP]\!] =$ $< \exists x. [x = \mathbf{b} \wedge \neg \mathbf{meet(j)}(x)]$ , $\Diamond(\exists x. [x = \mathbf{b} \wedge \neg \mathbf{meet(j)}(x)]) >$
b. Presupposition: $\exists y. [y \neq \mathbf{b} \wedge \neg \mathbf{meet(j)}(y)] \wedge \exists z. [\neg \mathbf{meet(j)}(z) \rightarrow \neg \mathbf{meet(j)}(z)]$

On the other hand, what happens if NP-*mo* is at the edge of VP, as shown in (6)? This structure allows it to be included under the scope of Neg, so that it seems possible to derive the impossible reading of (1), which presupposes that John met someone else than Bill, and asserts that he didn't meet Bill.

(6) a. $[\ Neg\ [_{VP}\ NP_2\text{-}mo\ [_{V'}\ NP_1\ V\ t\ ]]]$ $([\![V']\!] = \lambda y. [\mathbf{meet(j)}(y)])$
b. $[\![VP]\!] = [\![mo_i]\!]([\![NP_2]\!])([\![V']\!]) = < \exists x. [x = \mathbf{b} \wedge \mathbf{meet(j)}(x)]$ , $\Diamond(\exists x. [x = \mathbf{b} \wedge \mathbf{\Pi}_i(x)]) >$

In fact, we predict that it is indeed impossible. Let $\Pi_i$ = λx. [**meet**(**j**)(x)] in this case, then we obtain assertion (7a), where Neg is only applied to the primary content (i), with the ancillary content (ii) intact.

(7) a. ⟦Neg⟧(⟦VP⟧) = < ¬(∃x. [x = **b** ∧ **meet**(**j**)(x)]) , ◇(∃x. [x = **b** ∧ **meet**(**j**)(x)]) >
b. Presupposition: ∃y. [y ≠ **b** ∧ **meet**(**j**)(y)] ∧ ∃z. [**meet**(**j**)(z) → **meet**(**j**)(z)]

The problem is that (i) and (ii) are contradictory, because (i) says that it is not true that there is x such that x was Bill and John met x, while (ii) says that it can be true that there is such x. Thus, if NP-*mo* is under the scope of Neg, it ends up with a contradictory proposition, which we cannot truthfully assert.

**3. Support** Our proposal (3) makes further predictions. First, (8) is infelicitous, as the truth of the first clause forces the NP-*mo* clause to make a presupposition like ∃y. [y ≠ **b** ∧ **run**(y)], but this requires the NP-*mo* to be under the scope of Neg, resulting in a contradictory assertion; its primary content is □(¬∃x.[x = **b** ∧ **run**(x)]), where the necessity operator □ comes from the present tense (which can act like *will*), and its ancillary content is ◇(∃x.[x = **b** ∧ **run**(x)]). In contrast, (9) is felicitous, where the NP-*mo* clause occurs in a conditional antecedent (e.g., Hasegawa 1991). This is predicted, because the conditional antecedent allows the primary content of the NP-*mo* clause to be *false* (i.e., [if *p*, *q*] is true iff *p* is false or *q* is true) and thus to be compatible with its ancillary content.

(8) # *John-wa* *hasit-ta-kedo*, [*Bill-**mo*** *hasira-**na**-i*]-*yo*.
John-Top run-Past-but Bill-also run-Neg-Pres-End.particle
'John ran, but Bill will not run, too.'

(9) *John-wa* *hasit-ta-kedo*, [*Bill-**mo*** *hasira-**na**-i*]-*to* *komar-u*.
John-Top run-Past-but Bill-also run-Neg-Pres-if be.in.trouble-Pres
'John ran, but if Bill does not run, too, I will be in trouble.'

Second, consider (10), where the two entities **j**, **b** hold different predicates, thus not sharing a literally identical one at overt syntax (e.g., Shudo 2002). While the standard semantics of *also* would require them to hold the same predicate overtly as in (11), we predict that they need not, because we can identify the value of $\Pi_i$ with something like λx. [**happy**(x)], assuming that CS at least entails that **find.job**(**j**) ∧ **happy**(**j**) ∧ [**marry**(**b**) → **happy**(**b**)]. In other words, if we let $\Pi_i$ = λx. [**happy**(x)], then the presupposition of the NP-*mo* clause looks like ∃y. [y ≠ **b** ∧ **happy**(y)] ∧ ∃z. [**marry**(z) → **happy**(z)], and this is entailed by the above CS. In this way, we predict that the two entities **j**, **b** actually hold the same predicate λx. [**happy**(x)], in the presupposition and the ancillary assertion of the NP-*mo* clause, respectively.

(10) *John-wa* *syusyoku-si-ta-si,* [*Bill-**mo*** *kekkon-si-ta*].
John-Top finding.job-do-Past-and Bill-also marriage-do-Past
'John found a job, and Bill married, too.'

(11) *John-wa* *syusyoku-si-ta-si,* [*Bill-**mo*** *syusyoku-si-ta*].
John-Top finding.job-do-Past-and Bill-also finding.job-do-Past
'John found a job, and Bill found a job, too.'

**4. Conclusion** We have proposed a multidimensional semantics approach to the anti-negativity of NP-*mo*, making further correct predictions, which shows that it is independently supported. If our approach is on the right track, then the nature of NP-*mo* makes no conclusive argument for the idea that Japanese scrambling is focus-driven. All we can suggest is that it may optionally apply to "repair" semantically problematic structure, given that Hara's (2006) account of UQ-*wa* is also on the right track.

**References** **Hara, Y. 2006.** *Grammar of Knowledge Representation: Japanese Discourse Items at Interfaces*, Ph.D. dissertation, University of Delaware. **Hasegawa, N. 1991.** Affirmative Polarity Items and Negation in Japanese, *Interdisciplinary Approaches to Language: Essays in Honor of S.-Y. Kuroda*, 271-285, Kluwer. **Miyagawa, S. 2010.** *Why Agree? Why Move? Unifying Agreement-based and Discourse Configurational Languages*, MIT Press. **Partee, B. 1987.** Noun Phrase Interpretation and Type-Shifting Principles, *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*, 115-143, Foris Publications. **Potts, C. 2005.** *The Logic of Conventional Implicatures*, Oxford University Press. **Shudo, S. 2002.** *The Presupposition and Discourse Functions of the Japanese Particle Mo*, Routledge. **Stalnaker, R. 1978.** Assertion, *Syntax and Semantics 9: Pragmatics*, 315-332, Academic Press.