Synopsis: Japanese allows multiple scrambling (MS), which is traditionally analyzed as involving multiple instances of single scrambling. This paper examines scope and binding under MS and argues for the headless vP-fronting account of MS in line with Koizumi (2000). A typical objection to this account based on the Proper Binding Condition (PBC) is shown to dissolve under Takita’s (2010) Cyclic Linearization account of the PBC effects in Japanese.

Scope under MS: In a double object construction, a subject takes scope over an indirect object as in (1a). Scrambling the indirect object results in ambiguity as in (1b) ((1) is from Agbayani et al. (2015:69)):

(1) a. 3-tu-no ginkoo-ga Toyota-dake-ni monku-o itta.
   3-CL-GEN bank-NOM Toyota-only-DAT complaint-ACC said
   ‘Three banks made complaints only to Toyota.’
   three > only; *only > three

b. Toyota-dake-ni1 3-tu-no ginkoo-ga t1 monku-o itta.
   Toyota-only-DAT 3-CL-GEN bank-NOM complaint-ACC said
   ‘Only to Toyota, three banks made complaints t1.’
   three > only; only > three

MS of the direct object and the indirect object does not result in ambiguity ((2a) is from Agbayani et al. (2015:69)). Irrespective of the order of the scrambled elements, the sentences are unambiguous:

(2) a. Toyota-dake-ni1 monku-o2 3-tu-no ginkoo-ga t2 t3 itta.
   Toyota-only-DAT complaint-ACC 3-CL-GEN bank-NOM said
   ‘Lit. Only to Toyota, complaints2, three banks made t2 t3.’
   three > only; ??only > three

b. Monku-o2 Toyota-dake-ni1 3-tu-no ginkoo-ga t1 t3 itta.
   ‘Lit. Complaints: only to Toyota, three banks made t1 t3.’
   three > only; *only > three

The contrast between (1b) and (2) is surprising if MS involved multiple application of scrambling, as is widely assumed, since the IO would c-command the subject as a consequence of MS.

I propose in line with Koizumi (2000) that MS is derived via headless vP-fronting: what undergoes movement in MS is the vP which contains elements that the standard analysis assumes undergo scrambling and the trace of the verb. MS of the indirect object and the direct object is derived as follows (moved elements are underlined):

(3) a. [vP Subj [vP IO DO tv] V+tv]]
   b. [tP Subj [vP IO DO tv] t3]] [vP IO DO tv] t3]] V+tv+T]]
   c. [cP [vP isub] [vP IO DO tv] t3]] [cP [vP Subj [vP IO DO tv] t3]] V+tv+T]] C]]

Within vP, V undergoes movement to v. After T is introduced, the Subj and the V+tv complex move out of vP. Finally, headless vP-fronting takes place. Note that the IO never c-commands the Subj throughout the derivation. Therefore, MS of the indirect object and the direct object does not affect scope interpretation.

This analysis makes a further prediction. Suppose the indirect object and the direct object are quantifiable elements. Hoji (1985) argues the IO-DO order is the base order in Japanese, since the IO takes wide scope when it precedes the DO, while the sentence is ambiguous with the DO-IO order derived via VP-internal scrambling. Given this, the headless vP-fronting approach predicts that, when we have the IO-DO order under MS, the sentence should be unambiguous with the indirect object taking wide scope because the IO c-commands the DO. When we have the DO-IO order, on the other hand, the sentence should be ambiguous because the DO-IO order is derived via VP-internal scrambling. The prediction is borne out, as (4) shows. (4a) has the structure in (3c), and (4b) has the structure in (5):

(4) a. 3-tu-no kaisya-ni1 hon-dake-o2 Mary-ga t1 t3 itt.ka.
   3-CL-GEN company-DAT book-only-ACC Mary-NOM sent
   ‘Lit. Three companies; only books: Mary sent t1 t3.’
   three > only; *only > three

b. Hon-dake-o2 3-tu-no kaisya-ni1 Mary-ga t1 t3 itt.ka.
   ‘Lit. Only books; three companies: Mary sent t1 t3.’
   three > only; only > three

(5) [cP [vP isub] [vP DO IO t3 DO tv] t3]] [cP [vP Subj [vP IO DO tv] t3]] V+tv+T]] C]]

Binding under MS: Binding also confirms the proposed analysis. Kareziin is an anaphor that requires a local masculine antecedent. Thus, (6a) is excluded because Taroo, the only masculine noun phrase, is not close enough to the anaphor. (6b) shows that scrambling can create a new binding relationship. On the other hand, (6c) shows that MS cannot do so. This contrast is expected if MS involves vP-fronting, because movement of predicate phrases is known to fail to create a new binding relationship (Huang 1993, Heycock 1995).
   Taro0-NOM Hanako-NOM Naomi-DAT himself-ACC introduced that think
   ‘Taroo thinks that Hanako introduced himself to Naomi.’
   b. Karezisin-o Taroo-ga [Hanako-ga Naomi-ni t1 syookaisita to] omonde iru.
      himself-ACC Taroo-NOM Hanako-NOM Naomi-DAT introduced that think
      ‘Lit. Himself, Taroo thinks that Hanako introduced to with to Naomi.’
   c. ?? Naomi-ni karezisin-o Taroo-ga [Hanako-ga t1 t2 syookaisita to] omonde iru.
      Naomi-DAT himself-ACC Taroo-NOM Hanako-NOM introduced that think
      ‘Lit. To Naomi, himself, Taroo thinks that Hanako introduced to with to.’

**On the PBC:** The ‘standard’ vP-fronting is subject to the PBC, which demands that traces be bound:

(7) * [Bill-ni t1 watashi-sae] Mary-ga [John-ga okane-o2 t1 sita to] itta.
    Bill-DAT give-even Mary-NOM John-NOM money-ACC did that said
    ‘Lit. (Even give to Bill), Mary said that John did money: t1.’

In (7), the direct object has moved out of the vP and then the ‘standard’ vP-fronting takes place. This sentence is standardly assumed to be unacceptable because of a violation of the PBC caused by the trace of the direct object. Given this state of affairs, the headless vP-fronting approach to MS seems to predict that internal arguments should show PBC effects under MS. This prediction is not borne out, however:

    reason-even without Bill-DAT Mary-NOM John-NOM money-ACC gave that said
    ‘Lit. Without any reason: to Bill, Mary said that John gave that money: t1.’

I argue following Takita (2010) that PBC effects follow from Cyclic Linearization (Fox & Pesetsky 2005 (F&P)), and show that the contrast in question naturally follows from this version of the PBC.

Under the theory of cyclic Spell-Out (Chomsky 2000), F&P propose that linearization applies cyclically, at the timing of Spell-Out, and that orderings established at a given point of the derivation can be changed later. Information on linearization is expressed as ordering statements of the form $\alpha < \beta$, which roughly means $\alpha$ precedes $\beta$. I assume following F&P that VPs and CPs are Spell-Out domains.

Consider the derivation of (7), an example of ‘standard’ vP-fronting:

(9) a. [vp IO DO V] : Spell-Out of the VP
    b. [s Subj [v [vp IO DO tv] V+V]]
    c. [tp Subj [tp DO [s lsab] [v [vp IO tv] V+V] T]]
    d. [tp [s lsab] [v [vp IO tv] V+V] [tp Subj [tp DO tv T] C]] : Spell-Out of the CP

First of all, Spell-Out of the VP dictates that the IO precedes the DO, which in turn must precede V (IO < DO < V). Then, the v and the Subj are introduced into the derivation, and the Subj and the DO move out of the vP as in (9c). Importantly, the V+V complex remains within the vP here since this is an example of ‘normal’ vP-fronting. Finally, the v moves to [Spec, CP] and the Spell-Out applies. At this point we get the ordering statement IO < V < Subj < DO. This statement is inconsistent with what we got at the VP-level: Spell-Out of the VP required the DO to precede the V, whereas Spell-Out of the CP requires the DO to follow the V. Thus, (7) is correctly ruled out as a linearization failure.

Consider now MS with a remnant (8), whose derivation proceeds as in (10):

(10) a. [vp IO DO V] : Spell-Out of the VP
    b. [s Adv [s Subj [v [vp IO DO tv] V+V]]]
    c. [tp Subj [tp DO [s Adv [s lsab] [v [vp IO tv] tv] V+V+T]]]

The derivation at the VP-level is the same as before. Also, the Subj and the DO move out of the vP in the same way. An important step is the V-movement shown in (10c), which moves from the vP. This movement is required under the current approach to MS. Finally, headless vP-movement occurs and Spell-Out is triggered at the CP-level. At this point, we get the ordering statement Adv < IO < Subj < DO < V. Importantly, this is consistent with the ordering statement at the VP-level (IO < DO < V). Due to the V-movement, the V can stay at the end of the sentence, avoiding a linearization failure.

**Conclusion:** I have provided evidence that traditional multiple scrambling should be analyzed as headless vP-fronting. In addition to the binding/scope facts discussed above, the analysis also can capture the observation that elements undergoing multiple scrambling form a phonological unit (Agbayani et al. 2015) given that they are within the same vP. The analysis also provides evidence for the Cyclic Linearization approach to the PBC.

**Selected References:**