T/SM and Binding Paradox in Japanese[1]

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1. T/SM Restriction

Psychological predicates (Psych predicates) have strange properties. One of the interesting properties is that it highlights the point where the principles of natural language do not work as in the normal way. This paper specifically focuses on the points where the θ-Criterion and the Binding Principle break down. Let us discuss the θ-related issue first. According to Belletti and Rizzi (1988), psych predicates are classified as in the following.

(1)   I：<Experiencer-NOM, Theme-ACC>

　　　　　e.g. John loves Mary.

　　Ⅱ：<Theme-NOM, Experiencer-ACC>

　　　　　e.g. The show amused John.

　　Ⅲ：<Theme-NOM, Experiencer-DAT>

　　　　　e.g. The idea appealed to Mary.

However, Pesetsky (1987, 1995) finds evidence that the Theme in I is actually the Target of Emotion, or Subject Matter (T/SM), and that the Theme in Ⅱ and Ⅲ is actually a Cause.[2] Thus, the following sentence (2) is not contradictory.

(2)   The article angered Bill, but he wasn't angry at the article.[3]

　　　[Cause]　　　　　[Exp]　[Exp]　　　　　　[T/SM]

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2) See also Landau (2003) for an introduction to the T/SM restriction.

3) Exp＝Experiencer. We assume that in *John is angry at Mary*; *John* is assigned Exp, and *Mary* is assigned T/SM.

In（２）, *the article* in the first conjunct is assigned [Cause], and *the article* in the second conjunct is assigned [T/SM]. Thus,（２）means that *the article* was a trigger (cause) of Bill's anger, but that the actual target of his anger was not the article, but something else, e.g., the government. This is why（２）is not contradictory. However, [Cause] and [T/SM] cannot coexist in a simple sentence. This is what Pesetsky calls a T/SM restriction.

（３）　*The article in the Times angered Bill at the government.
　　　　[Cause]　　　　　　　　　　　　[Exp]　　　　　[T/SM]

This is the point where the θ-Criterion breaks down.[4]

This article is organized in the following manner. I first review Pesetsky's（1995）solution of the T/SM restriction. In Section 2, the T/SM restriction in Japanese is presented. I then show how the T/SM restriction in Japanese is accounted for. In Section 3, I introduce new examples that might not be explained by the T/SM restriction in Japanese, and I call it the T/SM paradox. In Section 4, I provide a solution for the T/SM paradox. In Section 5, I introduce the binding paradox that is connected to psych predicates. In Section 6, I provide a solution for the binding paradox. In Section 7, a summary is presented.

Let us review now how Pesetsky（1995）accounts for the T/SM restriction in English. First, the following example has the derivation in the initial stage, as in（５）.

（４）　The article angered Bill.

（５）

The preposition CAUS assigns *the article* [Cause]. At a later stage, CAUS adjoins to V to satisfy the Stray Affix Filter (SAF)[5], and [＋NOM] is checked off, and *the article* is raised to [Spec, TP] by EPP feature. Now let us consider a sentence that shows the T/SM restriction.

4）θ-Criterion＝def. θ and an argument have a 1-to-1 relation.
5）Stray Affix Filter (SAF)＝def. An affix must not stray.

（6）*The article angered Bill at the government.

The above example has the initial structure as in the following.

（7）
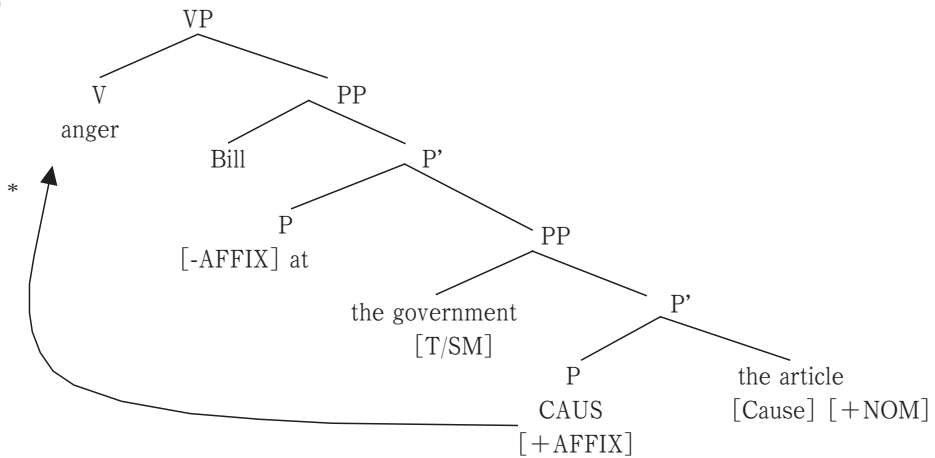
CAUS must adjoin to V to satisfy the SAF. However, this movement violates the Relativized Minimality（RM）since the higher P is closer to V. Thus, the movement of CAUS is interrupted by the intervening preposition *at* that bears [-AFFIX].[6] Thus, the T/SM restriction is another case that obeys an economy-（locality-）related principle.

2. T/SM Restriction in Japanese

The following represent the modified classification of psych predicates.

（8） I：<Exp-NOM, T/SM-ACC>

          e.g., John loves Mary.

     II：<Cause-NOM, Exp-ACC>

          e.g., The article angered John.

     III：<Cause-NOM, Exp-DAT>

          e.g., The idea appealed to Mary.

The corresponding paradigm in Japanese is the following.

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6) For RM, see Rizzi（1990）. The point is that the movement violates a locality principle. This might be another case of the Defective Intervention Effect（DIE）（Chomsky 2000, 2001）.
    Defective Intervention Effect＝def. A closer inactive intervener blocks movement.
    See Landau（2003：9）for potential problems with the DIE.

（9）　Ⅰ：<Exp-NOM, T/SM[7]-ACC/DAT>

　　　　　e.g., John-ga　　Mary-o　aisiteiru

　　　　　John-NOM Mary-ACC love

　　　　　'John loves Mary.'

　　　　　　　　　John-ga　　sono　kizi-o/ni　　　kanasi-m-da

　　　　　　　　　John-NOM the article-ACC/DAT be sad-infix-past

　　　　　　　　　'John was disappointed at the article.'

　　　Ⅱ：<Cause-NOM, Exp-ACC>

　　　　　e.g., sono kizi-ga　　John-o　　kanasi-m-ase-ta

　　　　　　　 the　article-NOM John-ACC be sad-infix-caus-past[8]

　　　　　　　 'The article disappointed John.'

　　　Ⅲ：<Cause-NOM, Exp-DAT>

　　　　　e.g., sono idea-ga　　Mary-ni　uttae-kake-ta

　　　　　　　 the　idea-NOM Mary-DAT appeal-hang-past

　　　　　　　 'The idea appealed to Mary.'

If（9）is correct, it is predicted that the Japanese example corresponding to（2）is not contradictory. The prediction is borne out.

（10）　sono kizi-wa　John-o　　kanasi-m-ase-ta　　　ga　kare-wa sono kizi-ni

　　　　the article-TOP John-ACC be sad-infix-caus-past but he-TOP the article-DAT

　　　　　[Cause]　　　 [Exp]　　　 [Exp]　　　　 [T/SM]

　　　　kanasi-m-da-no-de-wa-na-i

　　　　be sad-infix-past-fact-be-TOP-not-present

　　　　'The article disappointed John, but it is not the case that he was disappointed at the article.'

In the above example, *kizi* "article" in the first conjunct is assigned Cause, and the article in the second conjunct is assigned T/SM. Therefore, the sentence is not contradictory.

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7) In Teramura（1982）, *John* in *Mary hit John,* and *John* in *Mary loves John* are assigned two distinct θ-roles. *John* in the former is assigned the role of *buturi-teki hataraki-kake-no uke-te ,* "the receiver of physical action," whereas *John* in the latter is assigned the role of *aru taisyou-o mezasite-no kankaku-kanzyou-no ugoki-no meate* "the target that is directed by sensational and emotional movement towards something." We assume that the latter role corresponds to T/SM.

8) infix＝an infix that turns an adjectival stem into a verb. caus＝causative predicate

Does Japanese have the T/SM restriction? Consider the following paradigm.

(11)   a．John-ga   seihu-no genzyou-ni   kanasi-m-da

John-NOM government-GEN present condition-DAT be sad-infix-past

[Exp]   [T/SM]

'John was disappointed at the present condition of the government.'

    b．sono kizi-ga   John-o   kanasi-m-ase-ta

the article-NOM John-ACC be sad-infix-caus-past

[Cause]   [Exp]

'The article disappointed John.'

    c．*sono kizi-ga   John-o   seihu-no   genzyou-ni

the article-NOM John-ACC government-GEN present condition-DAT

[Cause]   [Exp]   [T/SM]

kanasi-m-ase-ta

be sad-infix-caus-past

'The article disappointed John at the present condition of the government.'

(11 c) is the T/SM restriction.[9)] Before we consider (11 c), let us consider the structures of (11 a) and (11 b). The initial structure of (11 a) is the following.[10)]

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9) Pesetsky (1995) argues that the following sentence exhibits the T/SM restriction in Japanese.
 (i) *John-wa Mary-ni [zibun-ga gan-ni   kakar-ta koto]-o
     John-TOP Mary-DAT self-NOM cancer-DAT have-past fact-ACC
     kanasi-m-ase-ta
     be sad-infix-caus-past
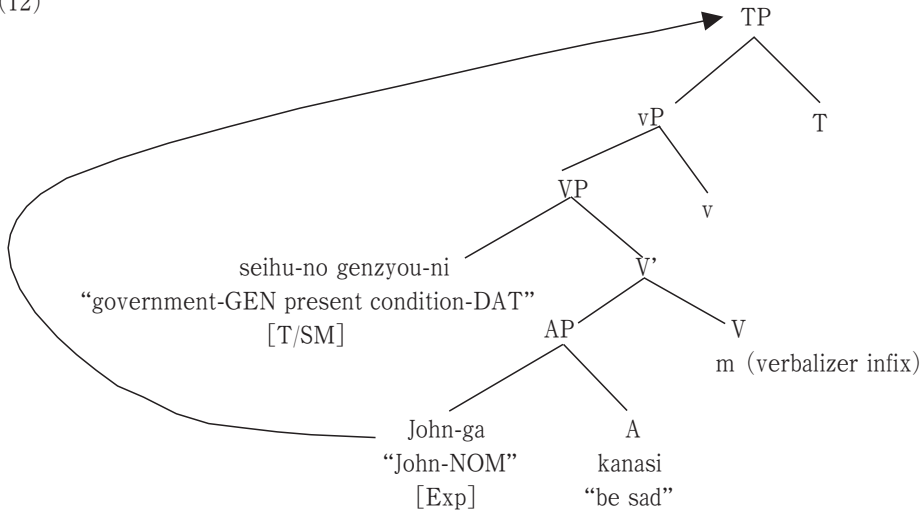   'John disappointed Mary at the fact that he had cancer.'
 However, Exp of V[-intention]＋Caus does not take a DAT in Japanese.
 (ii) a．*Mary-wa   kodomo-ni nak-ase-ta
        Mary-TOP child-DAT cry-caus-past
        'Mary made the child cry.'
     b．*Mary-wa   milk-ni   kusar-ase-ta
        Mary-TOP milk-DAT rot-caus-past
        'Mary made the milk rot.'
 Thus, (i) is excluded by whatever principle that excludes (ii) independently of the T/SM restriction. This is supported by the fact that (i) improves if a DP bearing an Exp has an ACC marker. The ACC marker of a T/SM-bearing DP is changed to *de* "at" to avoid the double ACC constraint.
 (iii) John-wa Mary-o   [zibun-ga gan-ni   kakar-ta koto]-de
      John-TOP Mary-ACC self-NOM cancer-DAT have-past fact-at
      kanasi-m-ase-ta
      be sad-infix-caus-past
      'John disappointed Mary at the fact that he had cancer.'

（12）

TP

vP — T

VP — v

seihu-no genzyou-ni
"government-GEN present condition-DAT"
[T/SM]

V'

AP — V
　　　　m（verbalizer infix）

John-ga
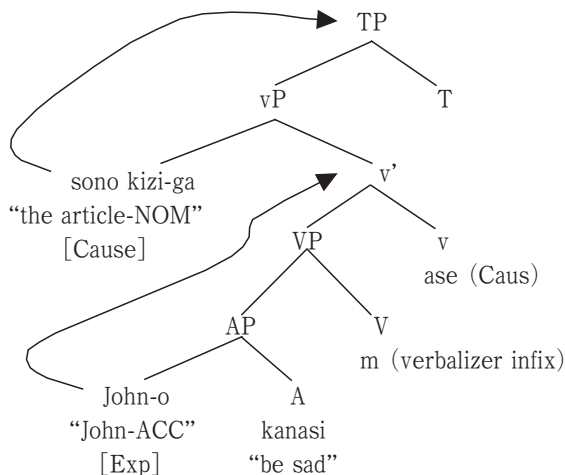"John-NOM"
[Exp]

A
kanasi
"be sad"

The adjectival stem assigns [Exp] to DP-NOM, and the verbalizer infix *m* assigns [T/SM] to DP-DAT. We assume that the verbalizer infix *m* checks [DAT] off. At a later stage, T attracts DP-NOM for [EPP]-checking. Crucially, DP-DAT in [Spec, VP] does not block the DP-NOM movement. I argue that the DP-NOM movement takes place in the next strong phase, and that the DP-DAT in the former phase does not count as an defective intervener. Let us define the Cyclic DIE, which is the stricter version of the DIE.

（13）　Cyclic Defective Intervention Effect（Cyclic DIE）
　　　　DIE is effective within a strong phase.

The initial structure of （11 b) is the following.

（14）

TP

vP — T

sono kizi-ga
"the article-NOM"
[Cause]

v'

VP — v
　　　　ase（Caus）

AP — V
　　　　m（verbalizer infix）

John-o
"John-ACC"
[Exp]

A
kanasi
"be sad"

The causative predicate assigns [Cause] to the DP-NOM, and the adjectival stem assigns [Exp] to the DP-ACC. At later stages, the causative predicate attracts the DP-ACC, and T attracts the DP-NOM both for [EPP]-checking. We assume that the DP-ACC tucks in under the externally-merged position of DP-NOM.[11] Now consider the derivation of (11 c).

(15)
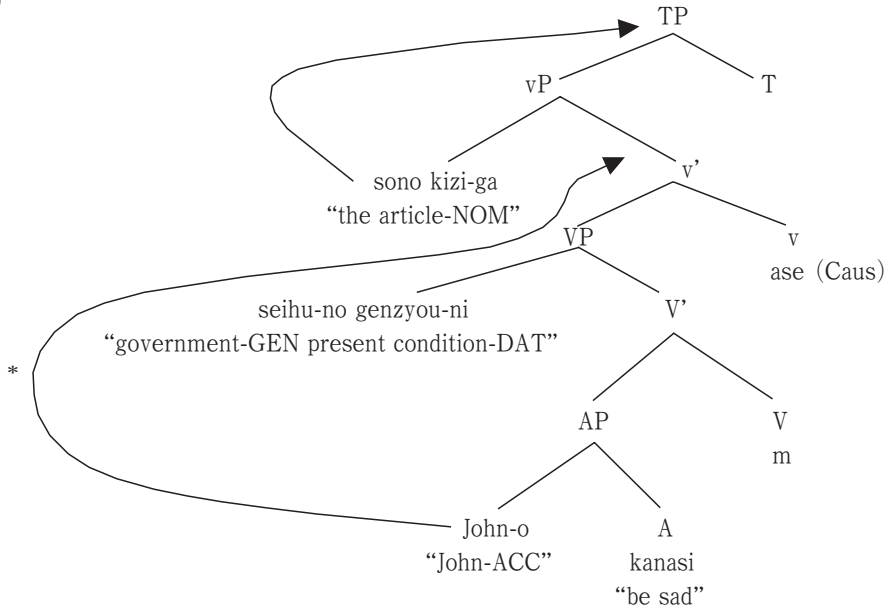
The light verb v attracts the DP-ACC for [EPP]-checking, and the DP-ACC tucks in under the externally-merged DP-NOM. T attracts the DP-NOM for [EPP]-checking. I argue that the DP-DAT blocks the DP-ACC movement due to the Cyclic DIE: [DAT]-checking and [ACC]-checking take place within the same strong phase vP; therefore the DP-DAT still behaves as an inactive intervener for DP-ACC movement. Thus, the T/SM restriction in Japanese also obeys an economy (locality-related) principle. It follows that the T/SM restriction and the following unacceptable examples can be subsumed under the same economy principle violation.

(16)   a . *John1 seems it is certain to be t1 here. (super-raising)

        b . *What1 do you think who bought t1? (WH island)

        c . *What1 did Bill wonder where we put t1? (WH island)

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10) We omit the detailed mechanism of an uninterpretable-feature (uF) deletion for ease of exposition. That is, we omit the uF-activation, feature-matching and agreement, uF-valuation followed by uF-deletion (Chomsky 2000, 2001).

11) See Richards (1997) for the tucking-in mechanism.

ｄ．*Who1 did you give what to t1?（superiority）　　（Pesetsky 2004）

In all examples in（16）, an inactivated intervener blocks the relevant movement.（16 a , b , c ）obeys the DIE, and（16 d ）obeys the Cyclic DIE. Thus, the head-intervention induces the T/SM restriction in English, whereas the DP-intervention induces the T/SM restriction.

3. The T/SM Paradox in Japanese

The following examples in Japanese pose a problem for the above analysis.

（17）　ａ．sono kizi-ga　　John-o　　seihu-no genzyou-ni

the article-NOM John-ACC government-GEN present condition-DAT

［Cause］　　　　［Exp］　　　［T/SM］

odorok-ase-ta

surprise-caus-past

'The article surprised John at the present condition of the government.'

ｂ．sono kizi-ga　　John-o　　seihu-no genzyou-ni

the article-NOM John-ACC government-GEN present condition-DAT

［Cause］　　　　［Exp］　　　［T/SM］

gakkari-s-ase-ta

disappoint-caus-past

'The article disappointed John at the present condition of the government.'

ｃ．sono zizitu-ga John-o　　taiou-ni komar-ase-ta

the fact-NOM John-ACC reaction-DAT perplex-caus-past

［Cause］　　　　［Exp］　　［T/SM］

'The fact perplexed John at the reaction.'

（18）　ａ．sono kizi-ga　　John-o　　seihu-no genzyou-nitaisite

the article-NOM John-ACC government-GEN present condition-toward

［Cause］　　　　［Exp］　　　［T/SM］

kanasi-m-ase-ta

be sad-infix-caus-past

'The article disappointed John toward the present condition of the government.'

ｂ．sono kizi-ga　　John-o　　seihu-no genzyou-nituite

the article-NOM John-ACC government-GEN present condition-about

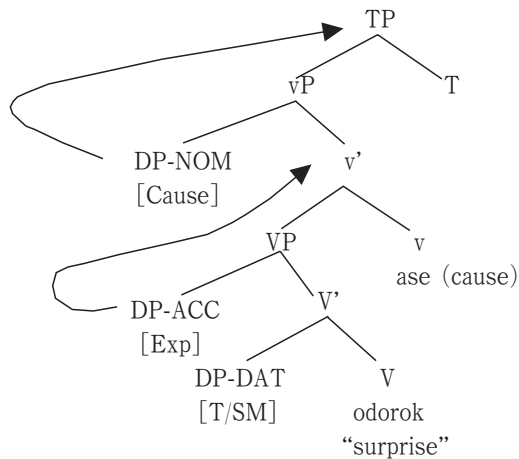［Cause］　　　　［Exp］　　　［T/SM］

kanasi-m-ase-ta

be sad-infix-caus-past

'The article disappointed John about the present condition of the government.'

In the above examples, the T/SM restriction is ameliorated. Why is the T/SM restriction absent in the above examples?

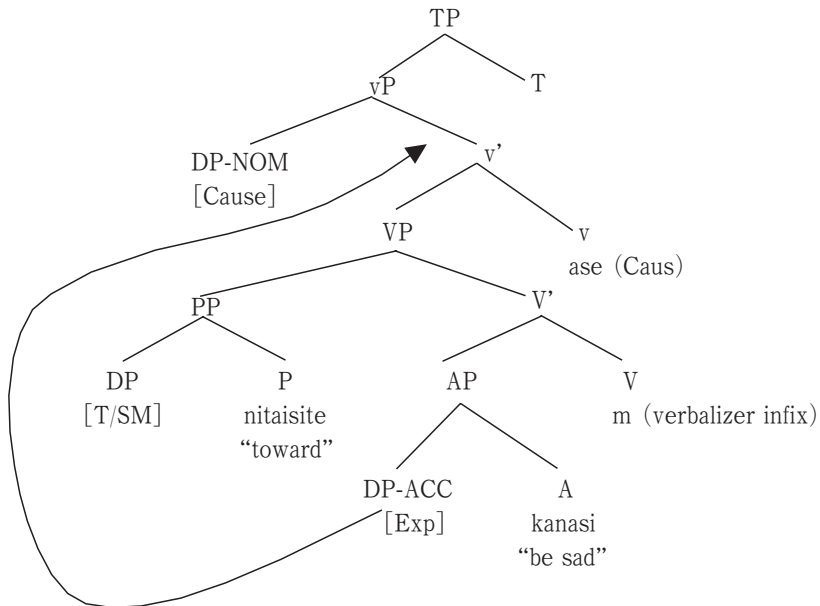## 4. A Solution

Consider the structure of (17 a).

(19)

TP

vP   T

DP-NOM   v'
[Cause]

VP   v
ase (cause)

DP-ACC   V'
[Exp]

DP-DAT   V
[T/SM]   odorok
"surprise"

There is no AP-complement of V, and there is no verbalizer infix. The verb V assigns [Exp] to the DP-ACC, and the [T/SM] to the DP-DAT. The causative predicate v attracts the DP-ACC, and T attracts the DP-NOM both for [EPP]-checking. Notice that the DP-DAT does not intervene between the v and DP-ACC. Therefore, (17 a) is permitted. The same reasoning applies to (17 b) and (17 c).

Consider the structure of (18 a).

（20）

TP
├ vP
│ ├ DP-NOM [Cause]
│ └ v'
│   ├ VP
│   │ ├ PP
│   │ │ ├ DP [T/SM]
│   │ │ └ P nitaisite "toward"
│   │ └ V'
│   │   ├ AP
│   │   │ ├ DP-ACC [Exp]
│   │   │ └ A kanasi "be sad"
│   │   └ V m (verbalizer infix)
│   └ v ase (Caus)
└ T

I argue that the DP-complement of PP in （20） is not an intervener between the v and DP-ACC. I argue that the postposition P assigns the ［T/SM］ and the inherent Case to the DP-complement of PP. The non-structural Case property of ［T/SM］-DP immunizes the DP from the Cyclic DIE. The same principle is at work in the following example.

（21）　John1 is preferred for it to be certain to be t1 here.　　（Pesetsky 2004）

The potential intervener expletive *it* is assigned an inherent Case by the preposition *for*, which makes the sentence immune from the DIE.

5. The Binding Paradox

Pesetsky （1995） presents the following kind of examples as the binding paradox for English and Japanese.

（22）　Each other1's remarks made ［John and Mary］1 angry.
（23）　［zibunzisin1-ga gan-kamosirenai-koto］-ga John1-o　kanasi-m-ase-ta[12]

　　　　self-NOM　　　cancer-may be-fact-NOM　John-ACC be-sad-infix-caus-past

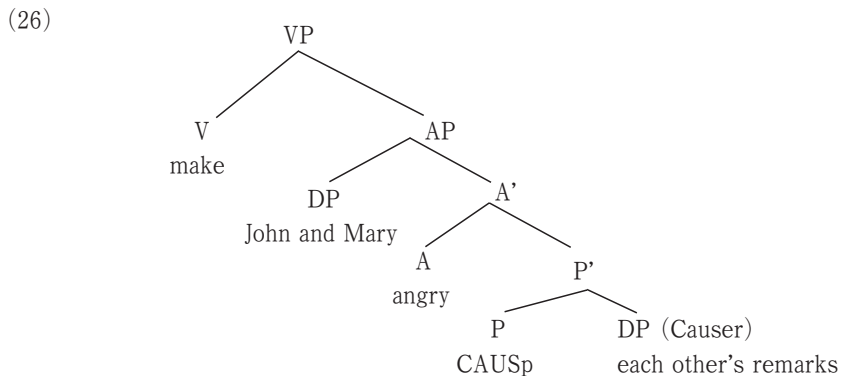　　　'（lit.） The fact that self may have a cancer disappointed John.'

　　　　　　　　　　　　　　　　　　　　　　（Akatsuka 1969, 1976）

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12）*Zibun-zisin* "self-self," which we assume is a genuine anaphor, is used. Saito and Hoji （1983） give the

The examples in (22-23) are acceptable since the anaphor is not c-commanded by the antecedent. This is a paradox since an anaphor must be c-commanded by the antecedent as in the following examples.

(24) *[their1 mother] criticized each other1

(25) *[Mary1-no titioya]-ga   zibunzisin1-o hihans-ita
     Mary-GEN father-NOM self-ACC   criticize-past
     'Mary1's father criticized self1.'

The examples in (24-25) are unacceptable since the antecedent does not c-command the anaphor. Pesetsky (1995) supports the initial structure of (22) as in the following.

(26)

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                    VP
                   /  \
                  V    AP
                make  /  \
                    DP    A'
              John and Mary  /  \
                          A    P'
                        angry / \
                             P   DP (Causer)
                          CAUSp  each other's remarks
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The binding principle (A) is satisfied at this initial stage. At a later stage, T attracts the Causer DP for [EPP]-checking. Crucially, Pesetsky (1995) adopts the derivational definition of the c-command. Therefore, the c-command relation, in which the antecedent c-commands the anaphor in (26), is not affected by the new c-command relation, which is defined at the next stage where the Causer DP raises to [Spec,TP].[13] The CAUSp adjoins to the V.

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following examples as backward binding (the binding paradox).
(i) John1-ga   zibun1/2-no kuruma-o kowas-ita-koto-ga   Mary2-o   odorok-ase-ta
       John-NOM self-GEN   car-ACC   break-past-fact-NOM Mary-ACC surprise-caus-past
       'The fact that John1 broke self1/2's car surprised Mary2.'
   However, with a genuine anaphor, a contrast appears:
(ii) John1-ga   zibunzisin1/*2-no kuruma-o kowas-ita-koto-ga   Mary2-o   odorok-ase-ta
       John-NOM self-GEN   car-ACC   break-past-fact-NOM Mary-ACC surprise-caus-past
       'The fact that John1 broke self1/*2's car surprised Mary2.'
   I argue that (i) does not constitute a true binding paradox.
13) See Epstein et al. (1998) for the application of the derivational definition of the c-command to LCA cases.

Can we analyze the binding paradox in Japanese as in (23) in the same way? Evidence from the floating numeral quantifier (FNQ) facts suggests that we cannot. Assume the following condition:

(27)　The Mutual C-Command Requirement (MCR)

　　　The FNQ and its associate (or its trace) must c-command each other.

<div align="right">(Miyagawa 1989)</div>

The MCR is based on the simplest symmetrical structural relationship available in the computational system of human natural language. Consider the following examples.

(28)　a.*dorobou-ga [VP kuruma-o 3-nin nusum]-da[14)

　　　　thief-NOM　　　car-ACC　3-CL steal-past

　　　　'Three thieves stole a car.'

　　　b.*gakusei-ga [VP office-de 2-ri　waraw]-ta

　　　　student-NOM　office-at　2-CL laugh-past

　　　　'Two students laughed at the office.'

In the above examples, the associate and the FNQ do not c-command each other, and there is no trace of the associate DP-NOM that mutually c-commands the FNQ within VP. Thus, the MCR is violated in (13). Consider the following:

(29)　a.kuruma1-ga [VP dorobou-ni t1 3-dai nusum-are]-ta

　　　　car-NOM　　　thief-by　　　3-CL steal-passive-past

　　　　'Three cars were stolen by a thief.'

　　　b.gakusei1-ga [VP office-ni t1 2-ri　ki]-ta

　　　　student-NOM　office-at　2-CL come-past

　　　　'Two students came to the office.'

In the above examples containing passive and unaccusative predicates, the associate does not mutually c-command the FNQ, but there is a trace of the associate DP-NOM that mutually c-commands the FNQ within VP. Thus, the MCR is satisfied in (14). Now if the DP-NOM in (23) originates within the VP and leaves its trace there, it is predicted that the DP-NOM will allow the

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14) CL＝classifier

FNQ. The prediction is not borne out.

(30) *iyana-koto-ga [$_{VP}$ John-o   3-tu   kanasi-m-ase]-ta

      horrible-fact-NOM   John-ACC 3-CL   *be sad-infix-caus-past*

      'Three horrible things disappointed John.'

The fact that the DP-NOM cannot host the FNQ in (15) indicates that the DP-NOM does not originate within the VP. It follows that (23) does not have the initial structure in which the DP-ACC c-commands the anaphor, as in the proposed analysis for the binding paradox in English as in (22).

6. A Solution

I propose the following derivation solution for (23).

(31)
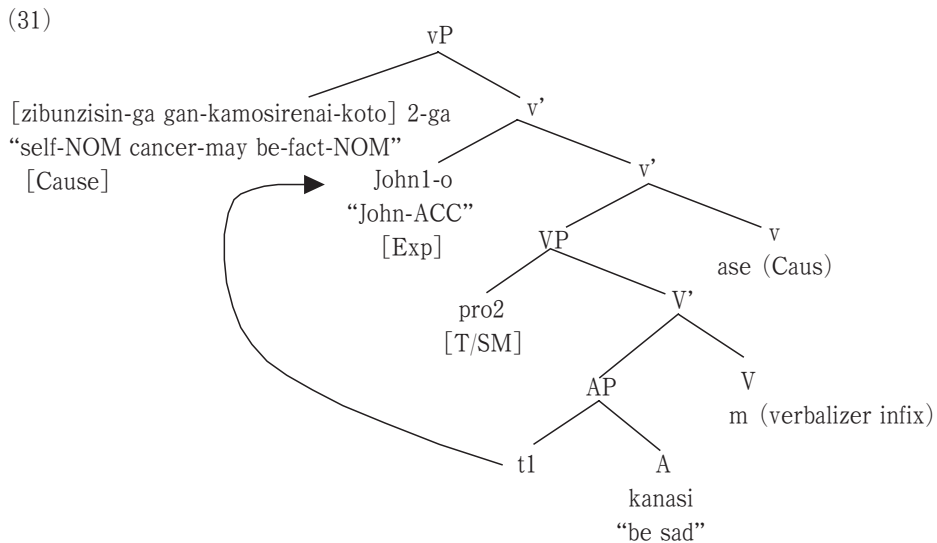
The adjectival stem A assigns [Exp] to *John-ACC*; the verbalizer infix assigns [the T/SM] to pro2, which is coindexed with the DP-NOM, which is assigned [Cause] by the causative predicate. *John-ACC* tucks in under the DP-NOM. The DP-NOM2 contains the anaphor, and *John-ACC* c-commands pro2, which is coindexed with the DP-NOM2 that contains the anaphor, the antecedent of which is *John-ACC*. I argue that the structural relationship is sufficient for anaphor-binding.

(32)　［［_DP anaphor1... ］2　［...DP1　［...pro2...］］］

I argue that (32) is obtained by generalizing the notion of chain-binding (Barss 1986) to binding dependency as well as to movement dependency.

The above analysis provides two advantages. First, we can account for the lack of the T/SM restriction in (23) (=31). The structure of (31) is potentially the T/SM restriction-inducing structure. However, the pro2, which lacks phonetic features, does not count as an intervener between the v and DP-ACC. That is, the pro does not induce the cyclic DIE. Second, the structure in (31) explains (30) while accounting for backward binding. That is, the pro does not satisfy the MCR. Although the DP-NOM2 and pro2 are coindexed, they are assigned distinct θ-roles. The pro2 does not satisfy the MCR because the pro2 is not connected with the DP-NOM2.

7. Summary

I have argued that both English and Japanese exhibit the T/SM restriction. The working mechanisms in these two languages are distinct in specifics, but they share common principles. That is to say, the head movement is responsible for the T/SM restriction in English, but the DP movement is responsible for it in Japanese. However, the general principle at work is the economy principle of derivation.

I have also introduced new Japanese data that challenge the T/SM restriction, called the T/SM paradox. I have argued that the paradox is not real, since the data is consistent with the proposed analysis, given the distinct morphological and syntactic nature of the relevant predicates.

I also provided a solution to the long-standing paradox of binding with respect to psych predicates. In addition, I introduced Pesetsky's (1995) solution for the binding paradox in English, which does not seem to operate in Japanese. I have shown a purely syntactic solution to the binding paradox in Japanese, which scholars (Akatsuka 1969, 1976, Pesetsky 1995, Landau 2003) have claimed is impossible.

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T/SM and Binding Paradox in Japanese

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A sentence with a psychological (psych) predicate exhibits many peculiar properties. Mysteriously, its acceptability is unpredictable by natural language principles. This article examines two examples that are acceptable but seemingly violate such principles. One is the θ -Criterion, and the other is the Binding Principle (A). Pesetsky (1995) argued that the apparent violation of the θ -Criterion (his Target/Subject Matter, or the T/SM Restriction) can be accounted for by the Economy Principle. In particular, he claimed that an example with the T/SM Restriction is unacceptable because the head movement involves an uneconomical step. It follows that a sentence with the T/SM Restriction does violate a natural language principle. Thus, the unacceptable sentences with the T/SM Restriction are no longer a mystery because they violate natural language principles. I argued that the Japanese examples with the T/SM Restriction violate the Economy Principle in terms of the DP-movement, not the head-movement. I also presented new Japanese examples that do not show the T/SM Restriction (the T/SM Paradox), and argued that the psych predicates of those examples have a different structure. The apparent violation of the Binding Principle (A) (the Binding Paradox) in English was explained by the derivational definition of c-command (Pesetsky 1995). However, the same explanation does not hold for the Binding Paradox in Japanese. I provided a solution that is consistent with the Mutual C-Command Requirement (MCR) (Miyagawa 1989) and the Chain-Binding Mechanism (Barss 1986). Thus, the Binding Paradox also dissolves into a predictable phenomenon that obeys the natural language principles.