

A Uniform Analysis of ECM/Transitive and Bridge Verb Constructions*

Toru Ishii
Meiji University

1. Introduction

Chomsky (2015) and Epstein, Kitahara and Seely (EKS) (2016) discuss the transitive/ECM construction (1) and the bridge verb construction (2) under Chomsky's (2013; 2015) labeling theory:

- (1) a. Transitive Construction
John likes the dog.
b. ECM Construction
They expected John to win.
- (2) Bridge Verb Construction
 - a. He thought [that it was somehow going to work out to his benefit].
 - b. I think [that God is on your side].

They claim that these two constructions should be analyzed differently as to whether there is a copy of root (R) that induces ϕ -agreement with an element in its Spec. Contrary to what Chomsky and EKS claim, this paper proposes a uniform analysis of ECM/transitive and bridge verb constructions, where not only the transitive/ECM construction but also the bridge verb construction has a copy of R that induces ϕ -agreement. Under our analysis, labeling requires that the CP complement of a bridge verb should either have its Spec position realized as expletive *it*, or undergo displacement leaving a variable behind. It is shown that our analysis is supported by *wh*-extraction, proper binding condition, parasitic gap, and word order facts. Our uniform analysis is theoretically desirable in that it makes v^*P phases completely parallel to CP phases with respect to feature inheritance: (i) Feature inheritance from a phase head to the head of its complement, *i.e.* from v^*/C to R/T, always takes place (contra EKS), and (ii) inherited features on R/T are always visible to labeling (contra Chomsky).

The organization of this paper is as follows. Section 2 investigates two previous analyses of the transitive/ECM and bridge verb constructions, *i.e.* Chomsky (2015) and EKS (2016). Section 3 proposes a uniform analysis of the transitive/ECM and bridge verb constructions. Section 4 presents supporting evidence for our uniform analysis. Section 5 makes a concluding remark.

2. Previous Analyses

This section investigates two previous analyses of the transitive/ECM and bridge verb constructions under Chomsky's (2013; 2015) labeling theory, *i.e.* Chomsky (2015) and EKS (2016). It is shown that under their analyses, the transitive/ECM and bridge verb constructions are analyzed differently in that the former has a copy of R that induces ϕ -agreement with an element in its Spec while the latter does not.

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2.1. Labeling Algorithm

Before turning to previous analyses, let us explicate Chomsky (2013; 2015)'s labeling algorithm (LA) (3) that licenses syntactic objects for interpretation at the interfaces:

(3) Labeling Algorithm (LA) (Chomsky 2013, 2015)

LA is a special case of minimal search.

- (4) a. $SO = \{H, XP\}$
- b. $SO = \{XP, YP\}$

According to Chomsky's LA (3), when a syntactic object (SO) is of $\{H, XP\}$ type as shown in (4a), where H is a head and XP is a non-head, its label can be easily identified by minimal search; LA (3) selects H as the label. When a syntactic object is of symmetric $\{XP, YP\}$ type as shown in (4b), on the other hand, its label cannot be determined by LA (3), since minimal search is ambiguous, locating the two heads X and Y. If nothing happens to SO in (4b), it has no label and thus cannot be interpreted at the interfaces. There are two ways in which this syntactic object can be labeled. First, a syntactic object can be modified for labeling by raising one of its immediate constituents, either XP or YP, so that there is only one visible head, X or Y, which counts as its label. Second, when XP and YP share a prominent feature via agreement, that feature is the label.

As an illustration of how LA (3) works, let us consider (5), which is the structure of a clause under the predicate-internal subject hypothesis:

- (5) a. $SO_i = \{v, VP\}$
- b. $SO_j = \{\alpha DP, \{v, VP\}\}$
- c. $SO_k = \{DP, \{T, \{\alpha DP, \{v, VP\}\}\}\}$

In (5a), minimal search identifies v as the label of SO_i . In (5b), which is of symmetric $\{XP, YP\}$ type, minimal search is ambiguous, locating two heads D and v . As mentioned above, one way to label α ($=SO_j$) in (5b) is to raise the subject DP, which results in (5c). At this stage, α is labeled as v . This is because Chomsky argues that α does not contain every occurrence of the subject DP so that the subject DP is taken not to be within α in (5c). In other words, the lower copy of the subject DP, part of the discontinuous element, is invisible to minimal search. Minimal search identifies the only visible head v as the label of α . Then, SO_k as a whole, which is also of symmetric $\{XP, YP\}$ type, is labeled in terms of agreement; the subject DP and T share ϕ -features, which are identified as the label of SO_k .

2.2 Chomsky's (2015) Analysis

Chomsky (2015) analyzes the transitive/ECM constructions (1a, b) (repeated here as (6a, b)) as represented in their matrix v^*P phase structures (7a, b), where R is root and v^* is a phase head:

- (6) a. Transitive Construction
 John likes the dog.
- b. ECM Construction
 They expected John to win.

- (7) a. Transitive Construction
 [SUBJ(*John*) [<R(LIKE), v^* > [α (= { ϕ , ϕ }) OBJ(*the dog*)_i [R(LIKE) [β t_i]]]]]]
 b. ECM Construction
 [SUBJ(*They*) [<R(EXPECT), v^* > [α (= { ϕ , ϕ }) SUBJ(*John*)_i [R(EXPECT) [β t_i ...]]]]]]

In (7a), R is root LIKE, and t_i is the copy of the object (OBJ) *the dog*. The object *the dog* undergoes internal Merge to the Spec of R. Given feature inheritance from a phase head to the head of its complement, R inherits ϕ -features from v^* , and the object then agrees with R. Although R is universally too weak to label, α is labeled as { ϕ , ϕ } through ϕ -agreement between R and the object, thereby valuing the Case feature of the object. Chomsky assumes that v^* , which is affixed to R in internally pair-Merged <R, v^* >, is invisible for labeling. Since v^* , being invisible, no longer functions as a phase head, the phase head status is activated on the copy of R and the complement of R, *i.e.* β , undergoes Transfer. (7b) proceeds exactly like (7a) except that the embedded subject (SUBJ) *John*, instead of the object *the dog*, undergoes internal Merge to the Spec of R. It should be noted that in (6), the copy of R in α is visible to labeling.

The bridge verb construction (2) (repeated here as (8)), on the other hand, is analyzed as represented in its matrix v^* P phase structure (9) under Chomsky's analysis:

- (8) Bridge Verb Construction
 a. He thought [that it was somehow going to work out to his benefit].
 b. I think [that God is on your side].

- (9) [SUBJ [<R(THINK), v^* > [α R(THINK) [β (=CP) C ...]]]]]

In (9), since β (=CP) does not have any ϕ -features, no element induces ϕ -agreement with R. We cannot label α as { ϕ , ϕ }; α is not assigned any label. To avoid this labeling problem, Chomsky stipulates that the copy of R in (9) is invisible to labeling so that α can be labeled as CP. It should also be noted that since v^* becomes invisible by internal pair-Merge of R to v^* , the unvalued ϕ -features on v^* do not induce crashing at the interface.

2.3 Epstein, Kitahara and Seely's (2016) Analysis

Epstein, Kitahara and Seely (EKS) (2016) argue that Chomsky's analysis is paradoxical, since the copy of R is visible to labeling in the ECM/transitive construction but invisible in the bridge verb construction. In other words, there is an asymmetry with feature inheritance from a phase head to the head of its complement in that the inherited ϕ -features on a R-copy are visible to labeling in the transitive/ECM construction but not in the bridge verb construction. To eliminate this paradoxical asymmetry with a R-copy, EKS propose that in the bridge verb construction, R (THINK) and v^* should be taken directly from the lexicon and externally pair-Merged as <R, v^* >. <R, v^* > is then externally set-Merged with β (=CP) as shown in (10). Since there is no copy of R in (10), there does not arise any problem of (in)visibility of R's copy:

- (10) [SUBJ [<R(THINK), v^* > [β (=CP) C ...]]]

EKS argue that external pair-Merge of heads, though a new type of rule application, is entailed by the theory. In the minimalist program, there are four types of rule application, *i.e.* external and internal set-Merge, and external and internal pair-Merge. They claim that although only

external pair-Merge of non-heads has been employed to create adjunction structures (Chomsky 1995; 2004), there is nothing to ban external pair-Merge of heads.

EKS further argue that external pair-Merge of R and v^* is only possible when there is no need to transmit the ϕ -features of v^* for Case valuation as in the case of the bridge verb construction. In the transitive and ECM constructions like (6a, b), on the other hand, if R and v^* are externally pair-Merged, the Case feature of the object *the dog* in (6a) and that of the embedded subject *John* in (6b) remain unvalued, which causes their derivations to crash. Hence, in the transitive and ECM constructions like (6a, b), external set-Merge of R and its complement applies first, and then internal pair-Merge of R to v^* takes place, as represented in (7a, b).

Although EKS eliminates the paradoxical asymmetry with the visibility of a R-copy, there is still an asymmetry with feature inheritance in that feature inheritance from a phase head to the head of its complement, *i.e.* from v^* to R, takes place in the transitive/ECM construction but not in the bridge verb construction.

3. A Proposal

Although Chomsky (2015) and EKS (2016) differ from each other in their analyses of the bridge verb construction, both of them agree in that the transitive/ECM and bridge verb constructions should be analyzed differently, *i.e.*, a copy of R induces ϕ -feature agreement in the transitive/ECM construction whereas no such agreement-inducing copy of R appears in the bridge verb construction. Contrary to their view, I propose a uniform analysis of the transitive/ECM and bridge verb constructions. More specifically, I argue that there is a copy of R that induces ϕ -feature agreement not only in the transitive/ECM construction but also in the bridge verb construction. It is shown that the proposed analysis is theoretically desirable in that it eliminates the asymmetry with feature inheritance, claiming that feature inheritance from a phase head to the head of its complement, *i.e.* from C/ v^* to T/R, always takes place.

I propose that the bridge verb construction should have "transitive-like" and "ECM-like" derivations. I argue that the CP complement of a bridge verb either (i) has its Spec position realized as expletive *it* as shown in (11) (the "ECM-like" derivation), or (ii) undergoes displacement leaving a variable behind as shown in (12) (the "transitive-like" derivation). Expletive *it* or a variable left by CP displacement induces ϕ -agreement with R by moving to the Spec of R, yielding $\{\phi, \phi\}$ labeling:

- (11) a. He thought **it** that it was somehow going to work out to his benefit. (Kim and Sag 2005: 252)
 b. I think **it** that God is on your side. (Kim 2014: 341; COCA 2012 SPOK)
 c. I thought **it** that it would be nearly impossible for the filmmakers to sustain such a level of excitement through the rest of the movie. (Kim and Sag 2005: 262)
 d. They suspected **it** that he was a spy.
 e. I never supposed **it** that they would help. (Rothstein 1995: 523)
- (12) a. He thought ***t_i*** [CP that it was somehow going to work out to his benefit]_{*i*}.
 b. I think ***t_i*** [CP that God is on your side]_{*i*}.
 c. I thought ***t_i*** [CP that it would be nearly impossible for the filmmakers to sustain such a level of excitement through the rest of the movie]_{*i*}.
 d. They suspected ***t_i*** [CP that he was a spy]_{*i*}.
 e. I never supposed ***t_i*** [CP that they would help]_{*i*}.

Let us first consider (11), where expletive *it* appears in the embedded Spec of C. The matrix v^*P phase structure of (11a), for example, is represented in (13), which is basically the same as the ECM structure (7b):

(13) [SUBJ(*He*) [$\langle R(\text{THINK}), v^* \rangle$ [$\alpha (= \{\phi, \phi\})$ *it*_i [R(THINK) [$\beta (=CP)$ *t*_i [C ...]]]]]]

In (13), expletive *it* is base-generated in the Spec of C and then undergoes internal Merge to the Spec of R, where it agrees with R's ϕ -features inherited from v^* . α is labeled as $\{\phi, \phi\}$ through ϕ -feature agreement between R and expletive *it*, which values the Case feature of *it*. Let us now turn to (12), where the CP complement undergoes displacement. The matrix v^*P structure of (12a), for example, is represented in (14), which is parallel to the transitive structure (7a):

(14) [SUBJ(*He*) [$\langle R(\text{THINK}), v^* \rangle$ [[$\alpha (= \{\phi, \phi\})$ *t*_i [R(THINK) *t*_i]] [CP_i ...]]]]

In (14), the CP complement undergoes displacement, leaving variable *t*_i behind, as advocated by Stowell (1981). Given that the variable left by CP displacement is a DP (which is called the DP requirement), variable *t*_i in (14) undergoes internal Merge to the Spec of R. Then, ϕ -feature agreement between R and variable *t*_i takes place and the Case feature of the variable is valued; α is labeled as $\{\phi, \phi\}$ through ϕ -feature agreement. Hence, both the transitive/ECM and bridge verb constructions can be accommodated under the labeling theory without stipulating any asymmetry with feature inheritance.

Before leaving this section, let us explicate the DP requirement concerning the variable left by CP displacement. The DP requirement is supported by the fact that CPs can only leave traces in positions where DPs are otherwise allowed (see Williams 1981, Webelhuth 1992, Postal 1998, Alrenga 2005, Davies and Dubinsky 2010, Takahashi 2010, Moulton 2013, 2015 *inter alia*). Although adjectives like *happy* and passive/unaccusative verbs like *be expected* can take CP complements as shown in (15), they do not allow those CP complements to undergo displacement as shown in (16). This follows from the DP requirement that the variables left by CP-displacement is a DP, since these adjectives and passive/unaccusative verbs do not take DP complements as shown in (17):

(15) a. I am happy [CP that it will finally rain]. (Moulton 2013: 256)

b. It was expected [CP that the Giants would lose]. (Alrenga 2005: 176)

(16) a. * [CP That it will finally rain], I am happy *t*. (Moulton 2013: 256)

b. * [CP That the Giants would lose], it was expected *t*. (Alrenga 2005: 193)

(17) a. * I am happy [DP that].

b. * It was expected [DP the Giant's loss].

There have been proposed two types of account of the DP requirement, *i.e.* the DP shell account (Davies and Dubinsky 2010; Takahashi 2010) and the null operator account (Alrenga 2005). Under the DP shell account, English has a covert definite determiner which can take a CP as its complement, as represented in (18):

(18) [DP DET [CP ...]]

When a CP complement appears to undergo overt movement, the DP consisting of a covert D and its CP complement actually moves. The derivation of (12a), for example, would proceed as represented in (19):

(19) He thought [DP t_i] [DP DET [CP that it was somehow going to work out to his benefit]]_i.

Under the null operator account, on the other hand, a CP complement is base generated in the right peripheral position. A null DP operator originates in the complement position of a bridge verb and then undergoes null operator movement to the Spec of C to be associated with the base-generated CP complement. The derivation of (12a), for example, would proceed as represented in (20):

(20) [CP OP_i [He thought [DP t_i]] [CP that it was somehow going to work out to his benefit]]_i.

I do not investigate which account of the DP requirement should be preferable, since the issue is outside the scope of this paper. I simply assume for an expository purpose that the variable left by CP displacement is a DP.

The DP requirement gives us an account of the contrast between (15) and (16, 17). In (15), adjectives like *happy* and passive/unaccusative verbs like *be expected* are accompanied by the intransitive/unaccusative light verb v but not by the transitive light verb v^* . Since the intransitive/unaccusative light verb v does not have any ϕ -features, there are no ϕ -features to be inherited by R. Hence, the derivation of (15) does not yield crashing at the interface without CP displacement. The derivations of (16) and (17), on the other hand, result in crashing at the interface. Since R does not have any inherited ϕ -features, there is no way of valuing the Case feature of the trace left by CP-displacement, which is a DP by the DP requirement, in (16) or that of the DP complement in (17).

4. Evidence for our Uniform Analysis

This section presents evidence in favor of our uniform analysis of the transitive/ECM and bridge verb constructions. Specifically, I adduce arguments for the proposal that the CP complement of a bridge verb either (i) has its Spec position realized as expletive *it* (the "ECM-like" derivation), or (ii) undergoes displacement leaving a variable behind (the "transitive-like" derivation).

4.1 Evidence for Expletive *It* in the Spec of C

Let us first look at evidence supporting our claim that the CP complement of a bridge verb can have its Spec position realized as expletive *it* as represented in (13) (repeated here as (21)):

(21) [SUBJ(*He*) [<R(THINK), v^* > [α (= { ϕ , ϕ }) *it*_i [R(THINK) [β (=CP) t_i [C ...]]]]]]]

First, while *wh*-extraction is allowed out of the CP complement of a bridge verb as shown in (22), it is not allowed when expletive *it* appears as shown in (23) (see, among others, Stroik 1996):

- (22) a. **To whose benefit** did he think [that it was somehow going to work out *t*]?
 b. **How** did he think [that it was somehow going to work out to his benefit *t*]?
 (23) a.?* **To whose benefit** did he think [*it* that it was somehow going to work out *t*]?]

- b. * **How** did he think [**it** that it was somehow going to work out to his benefit **t**]?

In (22a), for example, the *wh*-phrase *to whose benefit* undergoes successive cyclic movement from its original position to the matrix Spec of C through the embedded Spec of C. The derivation of (22a) proceeds as represented in (24):

- (24) a. [CP **to whose benefit**₁ [C' that [TP it was somehow going to work with *t*₁]]]
 b. [_{<R(THINK), v*>} [[RP [R(THINK) [CP *t*₂]]] [CP **to whose benefit**₁ [that [TP it was somehow going to work with *t*₁]]]₂]]
 c. [_{<R(THINK), v*>} [[RP **to whose benefit**₁ [R(THINK) [CP *t*₂]]] [CP *t'*₁ [that [TP it was somehow going to work with *t*₁]]]₂]]
 d. [CP **to whose benefit**_i [C-did [TP he [_{<R(THINK), v*>} [RP *t''*₁ [R(THINK) [CP *t*₂]]]]]] [CP *t'*₁ [that [TP it was somehow going to work with *t*₁]]]₂]]]]]

The *wh*-phrase *to whose benefit* undergoes movement to the embedded Spec of C within the embedded CP phase (24a). Then, within the matrix RP phase, the CP complement clause undergoes displacement to the right edge of the matrix RP, and the *wh*-phrase *to whose benefit* undergoes further movement to the matrix Spec of R, as shown in (24b, c). It should be noted that we claim that CP displacement to the right edge of the matrix RP and *wh*-movement from the embedded Spec of C to the matrix Spec of R take place simultaneously within the matrix RP phase (see, among others, Chomsky 2008 for simultaneous applications of movement operations within a phase). Although *wh*-extraction takes place out of a displaced domain in (24c), there is no "freezing effect" thanks to the simultaneous applications of CP displacement and *wh*-movement. Finally, the *wh*-phrase *to whose benefit* undergoes movement from the matrix Spec of R to the matrix Spec of C within the matrix CP phase, as shown in (24d). Hence, we can correctly predict that (22a) is acceptable. In (23a), on the other hand, expletive *it* originates in the embedded Spec of C and then undergoes movement to the Spec of the matrix R. Since the copy (trace) of expletive *it* stays in the embedded Spec of C, it prevents the *wh*-phrase *to whose benefit* from moving through the embedded Spec of C as represented in (25), which results in an island violation:

- (25) [CP **to whose benefit**₁] [C-did [TP he [[<R(THINK), v*> [RP **t'**_I] [**it**₂ [R(THINK) [CP **t**₂ [that [TP it was somehow going to work with **t**_I]]]]]]]]]]]

Second, movement of a *that*-clause over expletive *it* is not allowed, as exemplified by (26):

- (26)*[That it was somehow going to work out to his benefit], he thought it.

Under the proposed analysis, (26) is assigned structure (27):

- (27)*_{[CP t₁ That it was somehow going to work out to his benefit]₂, he}
- [[<R(THINK), v*>
[_{RP} it₁ [_R(THINK) [_{CP} t₂]]]]]

In (27), the copy (trace) of expletive *it* in the embedded Spec of C is not c-commanded by its antecedent, *i.e.* expletive *it* in the matrix Spec of R. This violates the Proper Binding Condition on a par with (28) (see Fiengo 1977 and Saito 1985 *inter alia*):

- (28)*[***t*₁** to have left angrily]₂, Bill believes **John**₁ quite sincerely *t*₂.

Third, when adverbials like *obviously* and *seriously* modify bridge verbs like *think*, the adverbials must appear after expletive *it*, as shown in (29):

- (29) a. He thought **it obviously** that it was somehow going to work out to his benefit.
 b. I think **it seriously** that God is on your side.

Let us consider (29a) as an example. Under our analysis, the structure of (29a) is represented in (30):

- (30) He [\langle R(THINK), v^* \rangle [RP **it**₁ [obviously [R(THINK) [CP **t**₁ [that [it was somehow going to work out to his benefit]]]]]]]]

In (30), expletive *it* is base-generated in the embedded Spec of C and then undergoes movement to the matrix Spec of R, crossing the adverbial *obviously*. Hence, our analysis can correctly predict that expletive *it* precedes matrix adverbials like *obviously* and *seriously* in the bridge verb construction.

4.2 Evidence for CP Displacement

Let us turn to evidence supporting our claim that the CP complement of a bridge verb undergoes displacement, leaving a variable, as shown in (14) (repeated here as (31)):

- (31) [SUBJ(*He*) [\langle R(THINK), v^* \rangle [[α ($=\{\phi, \phi\}$) **t**'_i [R(THINK) **t**_i]]] [CPi...]]]

First, the CP complement of a bridge verb licenses a parasitic gap (PG) as exemplified by (32):

- (32) He thought **t**₁ [before mentioning **PG**₁ to his wife] [CP **that it was somehow going to work out to his benefit**]₁.

In (32), the CP complement *that it is was somehow going to work out to his benefit* licenses the parasitic gap within the adjunct clause. Given that a parasitic gap is only licensed by so called "A'-movement" (see Engdahl 1983 and Chomsky 1986 *inter alia*), this shows that the CP complement undergoes "A'-displacement." This is in contrast with (33), which indicates that the CP complement *that it is was somehow going to work out to his benefit* cannot license a parasitic gap when expletive *it* appears:

- (33)*He thought **it** [before mentioning **e**₁ to his wife] [CP **that it was somehow going to work out to his benefit**]₁.

Recall that under our analysis, when expletive *it* appears in the bridge verb construction, ϕ -feature agreement takes place between R and expletive *it*. There is no need for the CP complement to undergo displacement, leaving a variable which induces ϕ -feature agreement with R. Hence, no CP displacement takes place in (33), which results in a failure of parasitic gap licensing.

Second, the proposed analysis predicts that when a parasitic gap is licensed in the bridge verb construction, *wh*-extraction should be allowed out of the CP complement. This prediction is borne out as shown in (34):

- (34) a. **To whose benefit**₂ did he think *t*₁ [before mentioning *PG*₁ to his wife] [CP that it was somehow going to work out *t*₂]₁?
 b. **How**₂ did he think *t*₁ [before mentioning *PG*₁ to his wife] [CP that it was somehow going to work out to his benefit *t*₂]₁?

Legitimacy of a parasitic gap in (34) indicates that the CP complement undergoes "A'-displacement." Under our analysis, the derivations of (34a, b) proceed in the same way as those of (22a, b). Hence, we can correctly predict that when a parasitic gap is licensed, *wh*-extraction out of the CP complement is allowed.

Third, the CP complement of a bridge verb must follow other subcategorized complements as exemplified by (35) (see, among others, Stowell 1981):

- (35) a.?? He thought [CP that it had been his fault all along] [PP to himself].
 b. He thought [PP to himself] [CP that it had been his fault all along].

The contrast between (35a) and (35b) indicates that the CP complement *that it had been his fault all along* must follow the PP complement *to himself*. This ordering between the CP and PP complements straightforwardly follows from our analysis where the CP complement is forced to "A'-displacement" to the right edge of RP phase in the bridge verb construction because of labeling.

5. Conclusion

This paper has proposed a uniform analysis of transitive/ECM and bridge verb constructions. I have argued that there is a copy of R that induces ϕ -feature agreement not only in the transitive/ECM construction but also in the bridge verb construction. It was shown that the bridge verb construction has "transitive-like" and "ECM-like" derivations; the CP complement of a bridge verb either (i) has its Spec position realized as expletive *it* (the "ECM-like" derivation), or (ii) undergoes displacement leaving a variable behind (the "transitive-like" derivation). Expletive *it* or a variable left by CP displacement induces ϕ -agreement with R by moving to Spec-R, yielding $\{\phi, \phi\}$ labeling. The proposed analysis is theoretically desirable in that it eliminates the asymmetry with feature inheritance from v^* to R assumed in Chomsky (2015) and EKS (2016), making v^*P phase completely parallel to CP phase with respect to feature inheritance. It was also shown that the proposed analysis receives support from the *wh*-extraction, proper binding condition, parasitic gap, and word order facts.

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Toru Ishii
 School of Arts and Letters
 Meiji University
 1-1 Kandasurugadai, Chiyoda-ku
 Tokyo 101-8301 JAPAN
 tishii@meiji.ac.jp