Towards an Analysis of Locative Inversion in English

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1. Introduction

This paper discusses the English locative inversion. In general, inversion is a process in which a certain element is displaced to the sentence-initial position and the subject and the verb are inverted. These are some examples of English inversion below.

(1) a. A man sat on the bench.
     b. On the bench sat a man.
(2) a. I have never seen such a beautiful rainbow.
     b. Never have I seen such a beautiful rainbow.
(3) a. Mary said, "I like listening to music."
     b. "I like listening to music," said Mary.

In (1), the prepositional phrase (PP) *on the bench*, which refers to a location, is in the beginning of the sentence, and the subject *a man* and the verb *sat* are inverted. Likewise, the negative phrase *never* in (2) and the quotation *"I like listening to music"* in (3) are displaced to the sentence-initial position, and the subject and the verb are inverted in each sentence. The inversion is classified according to a displaced element. The inversion phenomena as seen in (1), (2), and (3) are called the "locative inversion" (LI), the "negative inversion," and the "quotative inversion," respectively. In this paper, I will focus on the LI as in (1) and discuss its syntactic properties.

There are many types of LI in addition to (1). For example, the verb in (1) is unaccusative, but other types of verbs can take part in LI. (4) shows examples of LI with unergative verbs *work* and *sleep*.

(4) a. On the third floor WORKED two young women called Maryanne Thomson and Ava Brent, who ran the audio library and print room. [L. Colwin, *Goodbye without Leaving,* 54]
     b. At one end, in crude bunks, SLEPT Jed and Henry… [L. Bromfield, *The Farm,* 18]

(Levin and Rappaport Hovav, 1995, p.224)

Sometimes the subject and the verb are not inverted even when the locative PP is in the beginning of the sentence. In (5a, b), the locative PP *down the hill* and *through the hole* is in the sentence-initial position, but its subject and verb are in a usual order.

(5) a. Down the hill the baby carriage rolled.
     b. Through the hole the little rat ran.

(Coopmans, 1989, p.730)

However, I will not deal with such sentences, and I will just focus on the LI whose subject and verb are inverted as in (1) and (4). This paper will describe the syntactic structure of the LI and necessary conditions for grammatical LI.

This paper is organized in the following manner. Section 2 introduces three analyses concerning LI, Coopmans (1989), Rochemont and Culicover (1990), and Bowers (2002). The first half of Section 3 points out some problems with the three analyses by critically reviewing them. I will propose the most appropriate analysis of LI in the latter half of Section 3, and also mention remaining issues. The paper concludes in Section 4.

2. Previous Studies

In this section, I will introduce three analyses of LI, Coopmans (1989) in Section 2.1, Rochemont and Culicover (1990) in Section 2.2, and Bowers (2002) in Section 2.3, respectively. Coopmans (1989) assumes that a PP in LI does not move to the specifier position (Spec) of the inflectional phrase (IP), which means a subject position of the sentence, but to the complementizer position (COMP). Rochemont and Culicover (1990) suggest that LI is created by following three steps. Bowers (2002) explains the syntactic structure of LI introducing a new functional category, the predication phrase.

2.1. Coopmans (1989)

Before discussing Coopmans' (1989) analysis, I would like to mention some of his basic assumptions regarding the syntactic structure. He adopts the syntactic structure in which a sentence is composed of COMP and S which includes a noun phrase (NP) as a subject, an inflection (INFL), and a verb phrase (VP). This idea is schematized in (6).

(6)
```
              S'
            /    \
        COMP       S
                 / | \
               NP INFL VP
```
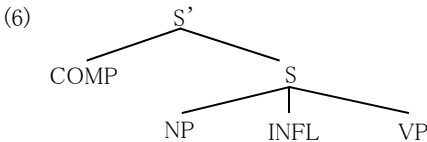
Based on this assumption, he proposes that the syntactic structure of LI is as in (7); e is an empty expletive, an NP which does not have any θ-role nor any phonetic content, and t is a trace, an original position of the indexed element.

(7)　[$_{COMP}$ PP]$_i$ [e$_i$ INFL [V NP t$_i$]]$_S$

<div align="right">(Coopmans, 1989, p.737)</div>

His analysis is unique mainly in two respects. First, there is no movement of the subject and the verb in the process of making LI, because he assumes that only unaccusative verbs can appear in LI. It is often said that their subject is base-generated in the canonical object position instead of the canonical subject position,

and non-inverted sentences can be derived by moving it from the object position to the subject position, i.e. Spec IP. In contrast, in the case of LI, he argues that the subject stays in the canonical object position where it is base-generated at the D-Structure (DS). With this character of unaccusative verbs, it can be explained how the inverted word order of the subject and the verb in LI is produced.

The second element of Coopmans' (1989) analysis is the landing site and the function of the PP. The locative PP is generated in the VP at DS and moves into COMP, the higher position than the subject. There is no element in the canonical subject position after this movement, but he explains why it can be grammatical as follows. First, a special process called COMP indexing occurs in COMP where the PP moves. COMP indexing is that COMP optionally inherits an index when it includes only an indexed element. COMP, which inherits an index of the PP by COMP indexing, then causes pro-drop, and it allows the canonical subject position to be occupied by an empty expletive. Pro-drop is a phenomenon where a subject does not have to be phonetically expressed when it can be inferred from the inflection of the verb. This phenomenon is noted in some languages such as Italian, but Coopmans (1989) claims that the same phenomenon exists in the English LI. In his analysis (7), the indexed COMP identifies the empty expletive in the canonical subject position after pro-drop; thus COMP and the empty expletive have the same index in the end. Through these processes, the canonical subject position in LI can be occupied by the empty expletive.

2.2. Rochemont and Culicover (1990)

Rochemont and Culicover (1990) claim that LI is generated by following three steps: the raising of V to I, VP topicalization, and the inversion of I containing V. I would like to describe these steps in this section.

For the first step "the raising of V to I," Rochemont and Culicover (1990) provide examples in (8) as evidence.

(8) a. They said John would walk into the room nude, and into the room nude he walked.
   b. *They said John would walk into the room nude, but into the room nude he RAN.

(Rochemont and Culicover, 1990, p.74-75)

Both of (8a, b) have the non-inverted type as in (5) to be precise, preceded by *and* and *but*, respectively. However, it is ungrammatical when the verbs of the two conjoined sentences are different as shown in (8b). Rochemont and Culicover (1990) say this is because the verb in the LI functions as an auxiliary verb. It would be better to see other examples below in order to understand their claim.

(9) a. He will go to the station, and I will, too.
   b. *He will go to the station, and I MUST, too.

As seen in (9a), the auxiliary verb *will* in the first sentence is repeated in the

conjoined sentence, and it is grammatical. In contrast, when the different auxiliary verb *must* is used in the conjoined sentence as in (9b), it becomes ungrammatical. Rochemont and Culicover (1990) think that the ungrammaticality of (8b) can be explained in the same way as that of (9b), and the verb in LI works as an auxiliary verb rather than a main verb. Therefore, they assume that a verb in LI moves to I after it is generated in VP.

They explain about the second step of making LI "VP topicalization" using examples with a predicate phrase *nude* as in (10a, b).

(10)　a. John walked into the room nude.
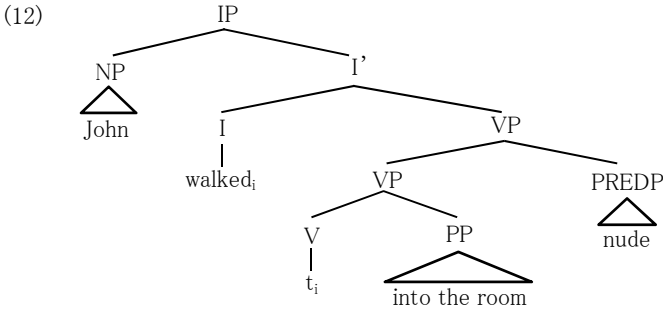　　　　b. Into the room nude walked John.

<div align="right">(Rochemont and Culicover, 1990, p.75)</div>

Rochemont and Culicover (1990) say that a predicate phrase is adjoined to VP as in (11). The predicate phrase is represented as *PREDP*.

(11)

```
          VP
        /    \
      VP     PREDP
     /  \
    V    PP
```
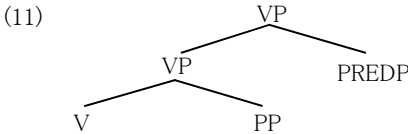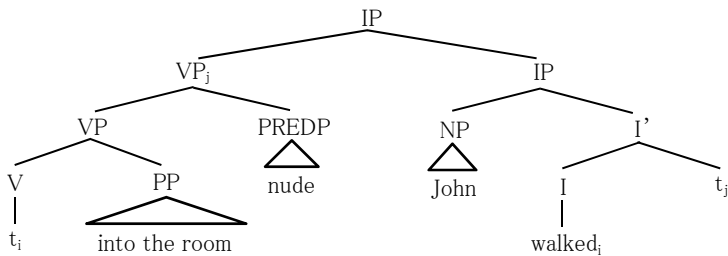
<div align="right">(Rochemont and Culicover, 1990, p.73)</div>

Therefore, when we try to make the LI (10b) from (10a), the syntactic structure of (10a) after undergoing the raising of V to I, the first step of making LI, is as described below.

(12)

```
              IP
            /    \
          NP      I'
          |      /  \
        John    I    VP
                |   /    \
           walked_i VP    PREDP
                   /  \    nude
                  V   PP
                  |   |
                  t_i into the room
```

If only the PP is displaced to the beginning of the sentence, the predicate phrase will remain in its original position and we cannot get the sentence starting with the PP and the predicate phrase as in (10b). In order to make it, we should move the VP, the constituent including both the PP and the predicate phrase, to the sentence-initial position as in (13).

(13)

```
                           IP
              _____
            VPj                          IP
         _____                   _____
       VP      PREDP              NP           I'
     _____      /\              /\          _____
    V    PP    nude           John         I       tj
    |   /__\                                |
    ti  into the room                    walkedi
```

  Therefore, Rochemont and Culicover (1990) conclude that what moves to the beginning of the sentence in LI is not the locative PP but the VP.

  Rochemont and Culicover (1990) argue that the last step to generate LI is "the inversion of I containing V." It might be possible to postpose the subject in order to make the inverted order of the subject and the verb. However, they deny the possibility using an example of the "presentational *there* insertion" (PTI). PTI is a kind of *there* construction in which *there* is followed by V, PP, and NP in this order as in (14).

(14) There walked into the room a tall man with blond hair.

<div align="right">(Rochemont and Culicover, 1990, p.1)</div>

  According to Rochemont and Culicover (1990), a process of making PTI includes postposing of the subject, and they apply this process to LI in order to show that postposing of the subject is inappropriate to generate a grammatical LI. The sentence (15b) is PTI originated from (15a), and (15c) is LI made from (15b).

(15) a. They all walked into the room.
   b. *There walked into the room them all.
   c. *Into the room there walked them all.

<div align="right">(Rochemont and Culicover, 1990, p.78)</div>

  As shown in (15b), the PTI which is generated through postposing of the subject in (15a) is ungrammatical, thus it is also ungrammatical to make the LI (15c) from the ungrammatical (15b). However, Rochemont and Culicover (1990) claim that (16) is not derived by postposing of the subject, and not ungrammatical.
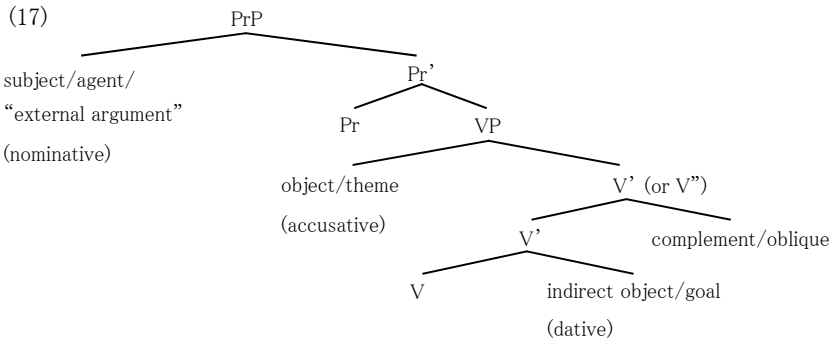
(16) ?Into the room walked them all.

<div align="right">(Rochemont and Culicover, 1990, p.78)</div>

  From these data, it can be said that postposing of a subject is inappropriate for the process of making LI, hence a verb should be preposed instead. Preposing of the verb means preposing of I, because a verb in LI first moves to I in Rochemont and Culicover's (1990) analysis. Therefore, the third step of making LI is moving I before the subject.
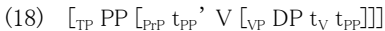
2.3. Bowers (2002)

Bowers' (2002) analysis is quite different from Coopmans' (1989) and Rochemont and Culicover's (1990) in that he introduces a new functional category in the syntactic structure. I would like to explain it before discussing his analysis of LI. He adopts the "predication phrase" (PrP), the functional category whose semantic function is predication (cf. Bowers 1993). PrP assigns a nominative case to its Spec, thus the subject appears in Spec PrP and moves to Spec IP. As for the verb, it moves to the head position of PrP after it is generated in VP. In addition, he argues that a subject, a direct object, an indirect object, and a complement are originated in Spec PrP, Spec VP, a sister of V, and a V'-adjoined position respectively under the syntactic structure with PrP. This idea is schematized in (17) below.

(17)

```
                              PrP
           ┌───────────────────┴────────────┐
  subject/agent/                           Pr'
  "external argument"              ┌────────┴────────┐
  (nominative)                     Pr               VP
                            ┌────────────────────────┴────────────┐
                      object/theme                          V' (or V")
                      (accusative)                   ┌───────────┴───────────┐
                                                    V'              complement/oblique
                                            ┌────────┴────────┐
                                            V       indirect object/goal
                                                          (dative)
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(Bowers, 1993, p.630)

Introducing PrP into the syntactic structure, Bowers (2002) analyzes the structure of LI as in (18). *DP*, *TP* and *t'* means a determiner phrase, a tense phrase and an intermediate trace, where the indexed element stops before moving to the landing site, respectively.

(18) [$_{TP}$ PP [$_{PrP}$ t$_{PP}$' V [$_{VP}$ DP t$_V$ t$_{PP}$]]]

What is unique to this analysis is a position of the subject DP and how the locative PP moves. First, Bowers (2002) says that a DP does not move from the original position at DS. That is because he makes the same assumption as Coopmans (1989) that only unaccusative verbs can be used in LI. He claims that the subject of unaccusative verbs is base-generated in the canonical object position, and moves to the canonical subject position at the S-Structure (SS). Note that "the canonical object position" here means Spec VP as in (17), and it is consistent with the position of the DP in (18). In LI, a DP does not move from this object position, and stays there.

Concerning the locative PP, as seen in (18), it is produced in VP, and moves to Spec PrP and Spec TP successively. This process is related to PrP and TP's Extended Projection Principle (EPP) features. The EPP feature is a feature that a head of the certain phrase requires a syntactic category in its Spec. There is no category in Spec

PrP nor Spec TP at DS, therefore some category needs to move there in order to satisfy their EPP features. In the case of LI, the PP moves to Spec PrP and Spec TP successively, and the PP and its trace satisfy the EPP features of TP and PrP, respectively. Bowers (2002) claims that LI is derived through these processes.

3. The Syntactic Structure of Locative Inversion

In the previous section, I introduced three analyses of LI, Coopmans (1989), Rochemont and Culicover (1990), and Bowers (2002), and described their features. This section will examine which is the most appropriate analysis of LI. In Section 3.1, I will critically review the three analyses, and point out some problems with them. After that, in Section 3.2, I will support Bowers (2002) as the most appropriate analysis of LI, and also mention verb types which are used in LI referring to Levin and Rappaport Hovav (1995). I will indicate remaining issues and also show future directions of the research in Section 3.3.

3.1. Problems with the Previous Analyses

In this section, I will try to apply each analysis to two types of LI in order to see whether the analyses introduced in Section 2 can explain the certain type of LI properly. The first type of LI is the one with verbs other than unaccusatives, and the second is the one with predicate phrases, which will be dealt with in Section 3.1.1 and Section 3.1.2, respectively. I will point out some problems with Rochemont and Culicover (1990) in Section 3.1.3 although this analysis can explain both types of the LI.

3.1.1. Locative Inversion with Various Types of Verbs

Some linguists suppose that verbs used in LI are unaccusative, but it is also a fact that some cases of grammatical LI include verbs that are not unaccusative as in (19a). The sentence (19b) is the non-inverted counterpart of (19a).
 (19) a. Into the room walked John.
       b. John walked into the room.

(Rochemont and Culicover, 1990, p.1)

The verb *walk* in these sentences is not unaccusative, but (19a) is considered to be grammatical. In this section, I will examine whether the syntactic structure of (19a) can be explained by the three analyses of LI.

Coopmans (1989) assumes that only unaccusative verbs can take part in LI, but on the other hand, he uses exactly the same sentence as (19a) in his paper, and deals with it as a grammatical LI. In order to explain this contradiction, he claims that intransitive verbs of locomotion like *walk* behave in the same way as unaccusative verbs when they are used with PPs which show direction. He uses examples with an unergative verb *telefoneren* 'telephone' and an unaccusative verb *arriveren* 'arrive'

in Dutch as evidence. In Dutch perfect constructions, a perfective auxiliary depends on a type of the verb used there, and an unergative verb and an unaccusative verb select *hebben* 'have' and *zijn* 'be' respectively. It is ungrammatical to use a perfective auxiliary *is* (*zijn*) in the perfect construction with the unergative verb *telefoneren* as shown in (20a), and it is also ungrammatical to use *heeft* (*hebben*) in the perfect construction with the unaccusative verb *arriveren* as seen in (20b).

(20)　a.　Jan heeft/*is getelefoneerd.

　　　　　'John has telephoned.'

　　　b.　Jan *heeft/is gearriveerd.

　　　　　'John has arrived.'

<div align="right">(Coopmans, 1989, p.741)</div>

　　However, when a directional PP is added to a perfect construction with an unergative verb, both of the perfective auxiliaries, *heeft* and *is*, are available. Examples in (21) are the perfect construction with the unergative verb *rennen* 'run' and the one with the directional PP *naar Engeland* 'to England.'

(21)　a.　Jan heeft/*is gerend.

　　　　　'John has run.'

　　　b.　Jan heeft/is naar Engeland gerend.

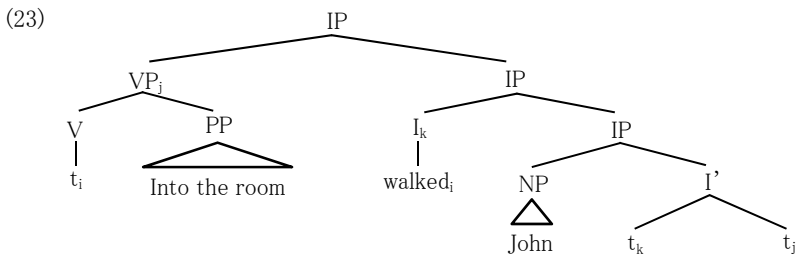<div align="right">(Coopmans, 1989, p.741)</div>

　　The perfective auxiliary *is*, which is supposed to be used with an unaccusative verb, can be selected in (21b), hence we can see that the unergative verb *rennen* is regarded as unaccusative. Therefore, it can be said that Dutch unergative verbs behave in the same way as unaccusative verbs when they are used with directional PPs.

　　Coopmans (1989) argues that the same phenomenon can occur in English, and LI with unergative verbs and directional PPs has the identical structure to the one with unaccusative verbs. Applying this analysis to (19a), its syntactic structure is as shown in (22).

(22)　[$_{COMP}$ Into the room]$_i$ [e$_i$ INFL [walked John t$_i$]$_{VP}$]$_S$

　　The verb *walk* is an unergative verb of locomotion, but its subject *John* is base-generated in the canonical object position like an unaccusative sentence, because there is the directional PP *Into the room.* The subject stays in the canonical object position at SS, and only the PP moves to COMP. It causes COMP indexing and pro-drop, and the empty expletive in the canonical subject position is identified by COMP. This is how the LI (19a) is completed, and we can see that Coopmans (1989) can account for LI with verbs other than unaccusatives.

　　On the other hand, Rochemont and Culicover (1990) claim that a subject is generated in the Spec IP regardless of verb types, thus LI whose verbs are not unaccusative can be derived by following the three steps, the raising of V to I, VP topicalization, and the inversion of I containing V. Based on their analysis, the structure of (19a) is as shown in (23) below.

(23)

```
                            IP
              ┌─────────────┴──────────────┐
            VPⱼ                            IP
         ┌───┴───┐                    ┌────┴────┐
         V       PP                  Iₖ          IP
         │    ┌──┴──┐              walkedᵢ    ┌───┴───┐
         tᵢ   Into the room                  NP       I'
                                            John   ┌──┴──┐
                                                   tₖ     tⱼ
```

In the case of Bowers (2002), he also assumes, as does Coopmans (1989), that only unaccusative verbs are used in LI and their subject is base-generated in the canonical object position. Therefore, when we try to derive (19a) under his analysis, the syntactic structure is as in (24).

(24) $[_{TP}$ ▲ $[_T [_{PrP}$ John walked $[_{VP}$ t$_V$ $[_{PP}$ into the room]]]]]

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         └──────────────×──────────────┘
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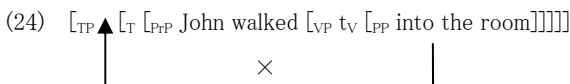
The subject is base-generated in Spec PrP, because the verb *walk* is not unaccusative. He does not suppose that postposing of the subject or preposing of the verb is included in the process of producing LI, thus the sentence with the inverted order of the subject and the verb as in (19a) cannot be derived. In addition, the locative PP cannot move to Spec TP because of the Minimal Link Condition (MLC), which is referred to as "shortest move" in Chomsky (2015). The MLC is a condition that when a certain element moves to a certain position, the nearest element to the position should be selected. Spec TP requires some element because of its head's EPP feature, and the nearest element to it is not the PP but the subject *John* in (24). Therefore, the PP cannot move to Spec TP.

However, Bowers (2002) can explain the LI (19a) if it is assumed, as in Coopmans (1989), that verbs of manner of motion with directional PPs behave like unaccusative verbs. Thus, it can be said that he can deal with LI whose verbs are not unaccusative on a certain condition.

3.1.2. Locative Inversion with Predicate Phrases

Some LI is accompanied by predicate phrases, and (10b) is one of the examples. In this section, I will examine whether such sentences can be explained by the three analyses, Coopmans (1989), Rochemont and Culicover (1990), and Bowers (2002). The sentences (10a, b) are repeated below.

(25) a. John walked into the room nude.
      b. Into the room nude walked John.

(Rochemont and Culicover, 1990, p.75)

Under Coopmans' (1989) analysis, the structure is as in (26) when we try to generate (25b). The predicate phrase is adjoined to VP, adopting the hypothesis of Rochemont and Culicover (1990) for convenience, for he does not mention where a predicate phrase appears in his paper.

(26) [COMPi [PP into the room]] [S ei INFL [VP [VP walked John ti] [PREDP nude]]]
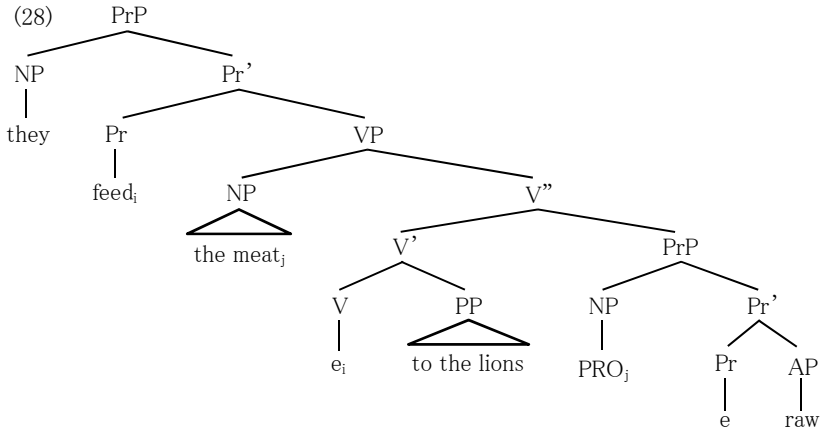
He claims that only PP moves to the beginning of the sentence to make LI. The sentence starting with the locative PP and the predicate phrase as in (25b) cannot be derived by moving only the PP, because the predicate phrase is adjoined to the syntactically higher VP than the PP. Therefore, Coopmans (1989) cannot explain how LI with predicate phrases is generated.

On the contrary, (25b) is derived from (25a) by following the three steps, the raising of V to I, VP topicalization, and the inversion of I containing V, which Rochemont and Culicover (1990) suggest. The PP and the predicate phrase can move together, because the whole VP moves to the sentence-initial position after the verb *walked* moved to I. Following shifting of I to the position before the subject, (25b) can be generated from (25a). Therefore, Rochemont and Culicover (1990) can explain LI with predicate phrases.
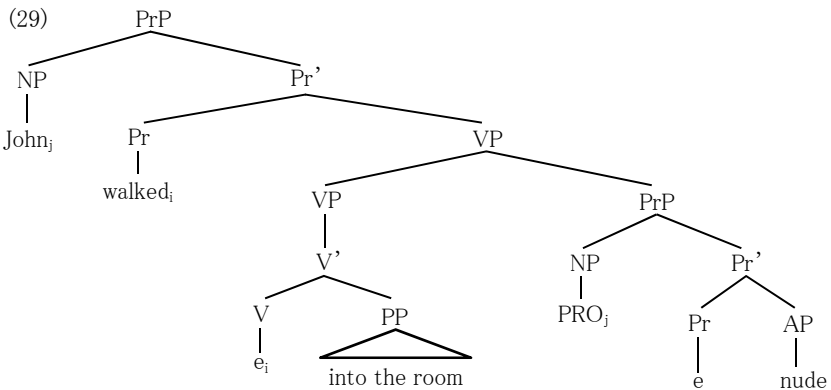
(27)
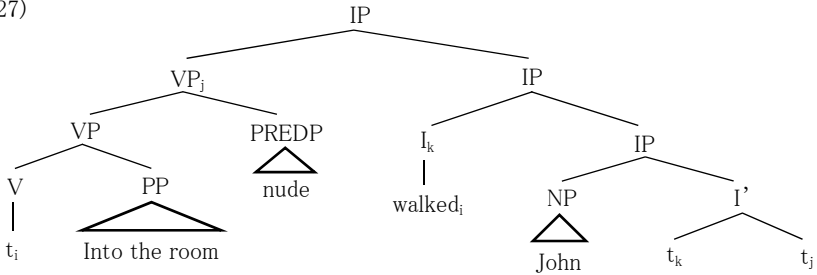
Under Bowers' (2002) analysis, predicate phrases can be treated as PrP. For example, Bowers (1993) says that a sentence *They feed the meat to the lions raw,* whose predicate phrase is *raw*, has a syntactic structure as in (28). *PRO* and *AP* mean a pronoun without phonetic content and an adjective phrase, respectively. The PrP, playing a role of the predicate phrase, is in the sister position of V'. PRO is in Spec PrP, and is c-commanded by the direct object *the meat*, thus *the meat* and PRO have the same index. As for the head position of the PrP, it has no phonetic element but is filled with an empty head *e* instead. This structure can imply the subject-predicate relation of *the meat* and *raw,* and that *raw* describes a state of *the meat*.

(28)

```
                    PrP
             ┌───────┴─────────┐
            NP                 Pr'
            │          ┌────────┴──────────────┐
           they       Pr                       VP
                       │            ┌───────────┴──────────────┐
                      feedᵢ        NP                          V"
                              ┌────△────┐         ┌─────────────┴────────┐
                                the meatⱼ        V'                      PrP
                                           ┌─────┴─────┐           ┌──────┴──────┐
                                           V          PP          NP            Pr'
                                           │       ┌──△──┐        │          ┌───┴───┐
                                           eᵢ     to the lions   PROⱼ        Pr      AP
                                                                             │       │
                                                                             e      raw
```

The tree (28) is reproduced below:

- PrP
  - NP → they
  - Pr'
    - Pr → feed$_i$
    - VP
      - NP → the meat$_j$
      - V"
        - V'
          - V → e$_i$
          - PP → to the lions
        - PrP
          - NP → PRO$_j$
          - Pr'
            - Pr → e
            - AP → raw

<div align="right">(Bowers, 1993, p.631)</div>

Likewise, following Bowers' (1993) analysis, the structure of (25a) is as in (29).

(29)

- PrP
  - NP → John$_j$
  - Pr'
    - Pr → walked$_i$
    - VP
      - VP
        - V'
          - V → e$_i$
          - PP → into the room
      - PrP
        - NP → PRO$_j$
        - Pr'
          - Pr → e
          - AP → nude

The position of the predicate phrase is different in (28) and (29), because the predicate phrase in (29) modifies the subject while the one in (28) the object. Hence, adopting Rochemont and Culicover's (1990) hypothesis again, the PrP as the predicate phrase is in the VP-adjoined position. As for PRO, it occupies the Spec PrP, and is c-commanded by the subject *John*. Consequently, PRO and *John* have the same index, and this means that *John* and *nude* are in the subject-predicate relation.

Based on the structure (29) and the process of generating LI proposed by Bowers (2002), the derivation is not successful. That is because the PP cannot move to Spec TP by virtue of the MLC. Even if possible, a predicate phrase cannot move together with the PP, because Bowers (2002) suggests that only PP is displaced to the sentence-initial position to make LI and the predicate phrase is not under the PP

syntactically. Therefore, it can be said that Bowers (2002) cannot explain LI with predicate phrases.

### 3.1.3. Rochemont and Culicover (1990)

In Section 3.1.1 and 3.1.2, I critically reviewed the three analyses of LI, Coopmans (1989), Rochemont and Culicover (1990), and Bowers (2002), and examined whether they can deal with two types of LI. Considering the results of the examination, Rochemont and Culicover (1990), which can explain both the LI with verbs other than unaccusatives and the one with predicate phrases, seem the most appropriate for an analysis of LI. However, they also have some theoretical problems. I will point out three of them in this section.

The first problem is about the first step of generating LI, the raising of V to I. They claim that verbs in LI behave like auxiliary verbs, but if it is true, as Nakajima (2001) points out, (30a) and (31a) should be possible as an interrogative sentence and a negative sentence originated from (19a), respectively.

(30)   a. *[$_I$ Walked] John into the room?
       b. Did John walk into the room?
(31)   a. *John [$_I$ walked] not into the room.
       b. John did not walk into the room.

The example (30a) is a sentence whose verb *walked* in I is moved to the sentence-initial position to make an interrogative sentence. This is clearly ungrammatical, and (30b) is the grammatical interrogative sentence. Likewise, (31a), in which *not* is inserted after the verb *walked* in I to make a negative sentence, is also ungrammatical, and the grammatical negative sentence is as seen in (31b) instead. Therefore, it seems difficult to adopt the hypothesis that verbs in LI function as auxiliary verbs rather than main verbs.

The second problem with Rochemont and Culicover (1990) is concerned with the trace of the verb. Reviewing (23), the syntactic structure of LI they suggest, we can see that the trace of the verb remains in the beginning of the sentence because of the second step of generating LI, VP topicalization. The structure (23) is repeated in (32) below.

(32)
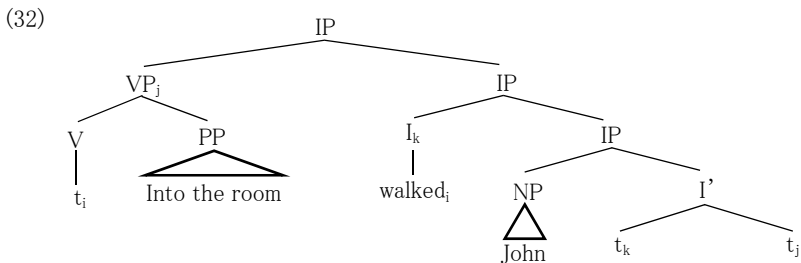
The Empty Category Principle (ECP) dictates that traces should be governed properly, but it is doubtful whether the trace and the antecedent *walked* are in the government relation under the syntactic structure (32). Therefore, Rochemont and Culicover's (1990) analysis might generate LI with the ECP violation.

The third problem has to do with the third step of making LI, the inversion of I containing V. In general, it is said that when a certain element is adjoined to the other, the process should be carried out between phrases or heads. However, in Rochemont and Culicover's (1990) analysis, a head I is adjoined to a phrase IP as seen in (32). It is also doubtful whether such an adjoining process is allowed grammatically.

Rochemont and Culicover (1990) may be the most appropriate to deal with LI seeing the results of the examination in Section 3.1.1 and 3.1.2. However, considering the three theoretical problems pointed out in this section, it seems difficult to adopt their analysis immediately. As a result, we should discuss again the proper analysis of LI.

3.2. Towards a Theory of Locative Inversion

I examined whether the three analyses of LI, Coopmans (1989), Rochemont and Culicover (1990), and Bowers (2002), can account for two types of LI, and indicated some theoretical problems with Rochemont and Culicover (1990). In this section, I will rethink how the process of producing LI is explained, and try to analyze LI accurately from two perspectives: the syntactic structure and the semantic function.

As for the syntactic structure, I would like to support Bowers (2002), because Rochemont and Culicover's (1989) analysis has some problems as mentioned before. The concrete structure of Bowers (2002) is as shown in (18), repeated in (33) below.

(33) $[_{TP} \text{ PP } [_{PrP} \text{ t}_{PP}' \text{ V } [_{VP} \text{ DP } \text{t}_V \text{ t}_{PP}]]]$

The subject DP stays in the original position, Spec VP, and the locative PP moves from the complement position of VP to Spec PrP and Spec TP successively. The verb is not displaced to the head of TP but to the head of PrP, thus it does not play a role of an auxiliary verb. In addition, all of the three traces in (33) are properly governed by their antecedent, and there is no adjoining process of phrases nor heads. Therefore, Bowers (2002) does not have the theoretical problems which were pointed out for Rochemont and Culicover (1990).

In Section 3.1.1, it was indicated that basically Bowers (2002) can treat only LI with unaccusative verbs, and cannot account for LI with other types of verbs. On the other hand, some linguists such as Culicover and Levine (2001) and Rizzi and Shlonsky (2006) argue that English LI has two syntactic structures according to verb types. The first one is with unaccusative verbs, whose subject stays in the VP-internal position at SS. The second is the one with unergative and some transitive verbs, whose subject is restricted to the heavy DP and moves to the sentence-final position at SS. Some examples of these two constructions are in (34)-(36). In (34), it is shown that LI with an unaccusative verb can hold both light and heavy subject DP. On the

contrary, as seen in (35) and (36), only a heavy subject DP is available in LI with an unergative and a transitive verb, but a light subject is not. Note that the verb *walk* is regarded as unaccusative, making the assumption that verbs of manner of motion behave like unaccusative verbs when they are used with directional PPs.

(34)   a. Into the room walked Robin carefully.

b. Into the room walked carefully the students in the class who had heard about the social psych experiment that we were about to perpetrate.

(35)   a. *In the room slept Robin fitfully.

b. In the room slept fitfully the students in the class who had heard about the social psych experiment that we were about to perpetrate.

(Culicover and Levine, 2001, p.292−293)

(36)   a. *Outside in the still upright hangar, were having deep sighs of relief the pilots.

b. Outside in the still upright hangar, were having deep sighs of relief the few remaining pilots who had not been chosen to fly in the worst hurricane since hurricanes had names.

(Rizzi and Shlonsky, 2006, p.351)

Culicover and Levine (2001) argue that LI with unergative and transitive verbs is derived by moving the subject to the sentence-final position, namely the IP-adjoined position. I would like to adapt this analysis to Bowers (2002) in order to make up for its weak point. Consequently, the derivation of LI with unergative and transitive verbs can be explained as follows: a heavy subject DP is base-generated in Spec PrP and subsequently moves to the TP-adjoined position. As for PP, it moves from the inside of VP to Spec TP, the same movement as the case of LI with unaccusative verbs. As a result, the syntactic structure of LI can be generalized as in (37).

(37)   a. LI with unaccusative verbs

$[_{TP}$ PP $[_{PrP}$ t_{PP}' V $[_{VP}$ DP t_V $t_{PP}]]]$

b. LI with unergative and transitive verbs

$[_{TP}$ $[_{TP}$ PP $[_{PrP}$ t_{DP} V $[_{VP}$ t_V $t_{PP}]]]$ DP$]$

A subject DP is limited to a heavy one.

Next, I would like to mention the semantic function of LI. Some linguists, including Coopmans (1989) and Bowers (2002), claim that LI can only take unaccusative verbs, but not all unaccusatives can be used in LI.

(38)   a. *On the streets of Chicago MELTED a lot of snow.

b. *On the backyard clotheslines DRIED the weekly washing.

(Levin and Rappaport Hovav, 1995, p.224)

The verbs *melt* and *dry* are unaccusative, but both of the examples are regarded as ungrammatical. In addition, they follow the syntactic structure (37a) and should have no problem, but actually they are ungrammatical. From these data, it can be said that the analysis (37) does not sufficiently explain the ungrammaticality of such sentences.

In other words, it would be better to consider a semantic aspect, especially verb types available for LI, as well as the syntactic structure in order to analyze LI more appropriately.

Levin and Rappaport Hovav (1995) mention what types of verbs are used in LI. Before discussing them, I would like to explain the semantic function of LI, which Levin and Rappaport Hovav (1995) refer to. They argue that LI has a "presentational function," a function that makes DP, which is located after a verb in LI, appear in a setting which is expressed by a locative PP. For example, in (19a), which is repeated in (39), the setting is *Into the room*, the assumption that "someone or something comes into the room," and *John* appears in this setting. To put it another way, the presentational function of LI interprets *John* as "someone who came into the room."

(39) Into the room walked John.

(Rochemont and Culicover, 1990, p.1)

As for verb types used in LI, Levin and Rappaport Hovav (1995) claim that verbs in LI have to be "informationally light." It means that the verbs just only make DP appear in a setting, and do not have a great influence on a meaning and a situation of the sentences. Typical examples of this type of verbs are verbs of existence such as *exist, remain*, and *thrive*, and verbs of appearance as *appear*, *arise*, and *emerge,* and other types of verbs are sometimes considered to be informationally light when they do not have much information in a context. As I mentioned before, LI has the presentational function, which means making DP appear in a setting. Therefore, it can be said that what is appropriate for such a construction is informationally light verbs which do not greatly influence a meaning and a setting of the sentences.

Let me see whether the analyses of the presentational function and the informationally light verbs can be really adjusted to the actual LI. In (39), the locative PP creates a setting that "someone comes into the room," and it is shown that the "someone" is *John*. Adding the verb *walk* does not greatly change the setting that "John came into the room"; thus *walk* in (39) is regarded as an informationally light verb and available for LI. In the case of (38a), a setting is *On the streets of Chicago,* and what appears there is *a lot of snow.* The sentence (38a) should mean like "there is a lot of snow on the streets of Chicago" because of the presentational function of LI, but the verb *melt* does not only imply that "snow is there" but also adds a meaning of change of state, "snow liquefies." Hence, *melt* cannot be considered as informationally light, and this is why (38a) is ungrammatical. Similarly, the verb *dry* in (38b) is not appropriate for LI because it carries a meaning of change of state, and consequently the ungrammaticality of (38b) can be explained. Therefore, informationally light verbs are important elements in the analysis of LI.

In this section, I discussed LI from the two perspectives: the syntactic structure and the semantic function. Summarizing the discussion so far, the necessary conditions for grammatical LI are as described in (40) and (41).

(40)　The Syntactic Condition

　　　　a. LI with unaccusative verbs

　　　　　[$_{TP}$ PP [$_{PrP}$ t$_{PP}$' V [$_{VP}$ DP t$_V$ t$_{PP}$]]]

　　　　b. LI with unergative and transitive verbs

　　　　　[$_{TP}$ [$_{TP}$ PP [$_{PrP}$ t$_{DP}$ V [$_{VP}$ t$_V$ t$_{PP}$]]] DP]

　　　　A subject DP is limited to a heavy one.

(41)　The Semantic Condition

　　　　Verbs used in LI have to be informationally light.

3.3. Remaining Issues

　　In Section 3.2, I proposed that the most appropriate analysis of LI is the one based on Bowers (2002) and Culicover and Levine (2001) as seen in (40). In addition, I also suggested that verbs in LI have to be "informationally light" as Levin and Rappaport Hovav (1995) argue, and grammatical LI can be generated only if both of the conditions, the syntactic one and the semantic one, are satisfied. However, one of LI cannot be accounted for by this proposal, thus I would like to mention it in this section.

　　Concretely, the LI which remains unexplained is the one with predicate phrases, which was discussed in Section 3.1.2. The example is repeated in (42).

(42)　Into the room nude walked John.

　　　　　　　　　　　　　　　　　　(Rochemont and Culicover, 1990, p.75)

　　In Bowers (2002), only PP moves to the sentence-initial position to derive LI, and such a movement cannot produce the sentence whose predicate phrase immediately follows the PP as in (42). Moreover, it is impossible to move only the predicate phrase after displacing the PP, because a possible landing site, such as Spec PrP, is already occupied with a trace of the PP. Note that the verb *walk* behaves like an unaccusative verb, because of the directional PP *Into the room.*

(43)　[$_{TP}$ [$_{PP}$ Into the room] [$_{PrP}$ t$_{PP}$' walked [$_{VP}$ John$_j$ t$_V$ t$_{PP}$ [$_{PrP}$ PRO$_j$ [$_{AP}$ nude]]]]]

Therefore, the proposal in Section 3.2 cannot account for LI with predicate phrases, and it will be necessary to reconsider how such a type of LI should be dealt with.

4. Conclusion

　　This paper discussed LI in English. As previous studies, I took up three analyses, Coopmans (1989), Rochemont and Culicover (1990), and Bowers (2002), and supported Bowers (2002) as the most appropriate analysis of LI, partly adapting Culicover and Levine (2001). To be more precise, I supposed that LI has two syntactic structures according to verb types. When unaccusative verbs are used in LI, DP stays in the canonical object position, namely Spec VP, even at SS, and the locative PP moves from the complement position of VP to Spec TP via Spec PrP. As for LI with the other types of verbs, unergative and transitive, DP, which has to be heavy, is displaced to the sentence-final position after it is base-generated in Spec PrP, and

the locative PP just moves from the complement position of VP to Spec TP. Besides, I pointed out it is not sufficient to consider only the syntactic structure in the analysis of LI, and thus focused also on the semantic perspective. Adopting Levin and Rappaport Hovav (1995), I proposed that verbs in LI have to be informationally light, which is compatible with the presentational function of LI. In sum, I concluded that grammatical LI can be derived only if both syntactic and semantic conditions are satisfied.

Nevertheless, this proposal still has a problem that it cannot explain, i.e. LI with predicate phrases as mentioned in Section 3.3. Hence, it is necessary to pursue a solution to this problem and examine whether the proposed conditions, namely (40) and (41), actually work with all types of LI. Moreover, it would be helpful for further research of the whole inversion in English, including not only LI but also negative inversion and quotative inversion as described in Section 1.

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