

How to Apply Successful Labeling and Agreement to {Non-DP, TP} and the VP-Internal Subject: Revisiting Locative Inversion in Terms of the Refined POP Framework

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Abstract: This paper aims to elaborate on the POP (Problems of Projection) framework advocated by Chomsky (2013, 2015a) by conducting a reminiscent consideration of Locative Inversion, a construction with the idiosyncratic grammatical array and information structure. Traditionally, the construction has been given a syntactic derivation in which the locative PP undergoes movement to SPEC-T, while the subject DP remains within the VP-domain. This derivation poses two crucial questions for the POP framework: i) how the VP-internal subject undergoes φ -agreement with T and ii) what kind of agreement takes place in {PP, TP}. By refining the POP framework, this paper proposes that i) the POP framework maintains long-distance agreement such as in the Agree framework of Chomsky (2000, 2001) and ii) {PP, TP} receives a label of <Top, Top> as the result of topic-feature agreement via topic-feature inheritance from C by T. In addition, this paper attempts to clarify the interaction between syntax and information structure that is observable in Locative Inversion. Specifically, it demonstrates to what extent the syntactic derivation affects the unambiguous information structure in which the locative PP counts as a topic, while the postverbal subject is presented with focus. This paper argues that this peculiar information structure is associated with the syntactic derivation where {PP, TP} undergoes topic-feature agreement and obtains a label of <Top, Top>. The discussion in this paper suggests that the topic agreement/labeling is reflected in two ways: it helps the syntactic derivation converge and it guarantees that the locative PP functions as the topic of the sentence.*

Key words: Locative Inversion, Problems of Projection (POP), Labeling, Agreement, VP-internal subject

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1. Introduction

This paper attempts to develop the theoretical framework that has been put forth by Chomsky (2013, 2015a) through revisiting Locative Inversion (hereafter, LI), which has drawn considerable attention from researchers to the idiosyncratic grammatical array and information structure. The aim of this paper is to clarify how the latest syntactic framework should be revised in light of the marked grammar and information structure found in LI. At the same time, by retrospectively shedding light on the interface of syntax and discourse in LI, this paper aims to demonstrate how and to what degree the syntactic derivation interacts with the information structure.

Under the name Problems of Projection (hereafter, POP), Chomsky (2013, 2015a) advocates a theoretical framework that departs from the previous frameworks in significant ways. What this paper calls the POP framework, however, lacks detailed discussion in many regards and faces empirical as well as theoretical problems. How to implement ϕ -agreement is a situation in which the framework at issue gives rise to empirical problems. Chomsky's (2013, 2015a) discussion of ϕ -agreement is confined to quite simple examples in which the relevant agreement is executed under the spec-head or sisterhood relation between DP and T(P). As noted by Miyagawa, Wu and Koizumi (2018), a question remains as to how the original framework accommodates constructions with a VP-internal subject/nominative where ϕ -agreement must be held under the distant relation between the VP-internal DP and T. Of particular interest is the case in which the non-subject XP in SPEC-T does not exhibit ϕ -agreement with T(P), though XP and TP have a sisterhood relation.

One of the crucial examples involved in this case is LI such as (1a), in which the locative PP is followed by the sequence of the main verb and the subject DP.¹

- (1) a. Under the bed lie two cats.
 b. [PP T [V DP t_{PP}]]

The traditional analysis of LI is that in (1b), where the locative PP is displaced to SPEC-T while the subject DP remains within the VP-domain (Hoekstra and Mulder (1990), Bresnan (1994), Collins (1997), Culicover and Levine (2001), Dogget (2004)). As for the locative PP, previous studies have offered considerable discussion regarding what kind of feature agreement takes place between PP and T. Since there is no apparent sign showing that agreement holds between PP and T, the bizarre structure of {PP, TP}, a case of {Non-DP, TP}, has been a challenging issue for syntactic researchers. Another controversial issue is the landing site of the locative PP. A certain number of previous studies argue that the locative PP is further displaced from SPEC-T to the topic position above TP (Stowell (1981), den Dikken and Næss (1993), Nishihara (1999), Tanigawa (2009)). As for the

¹ LI accepts directional PPs such as *into the room*, but this paper refers to the preverbal PP as the locative PP for simplicity. Examples with directional PPs are briefly discussed in section 4.1.

subject DP, its most striking property is the manifestation of ϕ -agreement with T. Although the subject DP remains within the VP-domain and distant from T, it exhibits ϕ -agreement with T, as is clear from the plural inflection of the verb in (1a). In sum, LI poses two questions for the POP framework to address: i) how the VP-internal subject undergoes ϕ -agreement with T and ii) what kind of agreement {PP, TP} undergoes to obtain a label.

This paper attempts to answer these two questions by elaborating on the mechanism of agreement and labeling that Chomsky (2013, 2015a) does not delve into deeply. With respect to the first question, this paper adopts Kinjo's (2018) proposal on agreement by Minimal Search, claiming that long-distance agreement such as in the Agree framework of Chomsky (2000, 2001) is maintained in the POP framework. Regarding the second question, this paper argues that {PP, TP} is assigned a label of <Top, Top> as the result of topic-feature agreement. Specifically, this paper proposes an analysis in which the topic feature of the locative PP undergoes agreement with the matching topic feature inherited from C by T.

In addition, this paper argues that syntactic derivation has some determinant effects on the peculiar informational property of LI, although they are seemingly unrelated or independent. As has been discussed for a long period of time, the locative PP is analyzed as a topic in that it carries given information provoked in the preceding context. This paper claims that the topic labeling of {PP, TP} subsequently elicits the topic interpretation of the locative PP. Put another way, the topic status of the locative PP is predestined in syntax when {PP, TP} triggers topic feature agreement and obtains a label of <Top, Top>. Thus, the topic agreement/labeling provides a two-way contribution to LI: it helps the syntactic derivation converge, and it also guarantees that the locative PP functions as the topic of the sentence.

This paper is organized into five sections. Section 2 gives a brief overview of the informational and syntactic properties of LI that have been well attested in the literature. Section 3 elaborates on the POP framework. After raising two problems with the framework in light of LI, this section refines the POP framework. Section 4 analyzes LI in terms of the refined POP framework and demonstrates that the refined framework leads a successful derivation to LI while well-capturing the empirical facts found in syntax and information structure. In addition, some implications are proffered as to special types of LI and related constructions. Section 5 provides concluding remarks.

2. The Essential Properties of Locative Inversion

This section outlines the essential properties of LI from both informational and syntactic perspectives. Section 2.1 overviews the informational properties, and section 2.2 shifts attention to the syntactic properties by citing some representative syntactic analyses in the literature.

2.1. The Informational Properties of Locative Inversion

As is well known, the structure of LI follows the information principle, according

to which the clause characteristically opens with given or background information and ends with new information. Presenting several examples such as (2), Biber et al. (1999: 911–912) describes the typical environment of LI as in (3a–c):²

- (2) A massive mirror, framed in intricately-chased silver, hung above a carved pine chest, [...]. *Next to it stood a silver urn bursting with branches of red berries.* (Biber et al. (1999: 912))
- (3) a. The locative PP provokes the background or setting for a situation. It often links the clause explicitly to the preceding context through a definite DP.
 b. The verb is intransitive or copular which often expresses existence or emergence on the scene.
 c. The subject DP introduces new information, often as an indefinite noun phrase, which may be further developed in the following context.

Overall, the locative PP is taken as old information. In (2), for example, the locative PP is overtly anaphoric to the preceding context by use of the pronoun *it*, which is coreferential with the subject in the preceding sentence. That is, the locative PP is a type of topic element in that it carries given information. On the other hand, the verb in this construction is the intransitive typically expressing existence or emergence. It has been argued that the verb in LI primarily belongs to the unaccusative class and that the verb must be light in meaning and informational status (Coopmans (1989), Hoekstra and Mulder (1990), Levin and Rappaport Hovav (1995)). Finally, the subject DP is introduced at the end of the sentence as new information. More specifically, the subject DP is presented on the scene that the locative PP creates, that is, it serves as the presentational focus (Bolinger (1971, 1977), Fukuchi (1985)). Presented with informational highlight, the subject DP is addressed as the pivotal element in the following context.

2.2. The Syntactic Properties of Locative Inversion

The traditional syntactic analysis of LI is that shown in (4a), in which the locative PP undergoes A-movement to SPEC-T (Hoekstra and Mulder (1990), Bresnan (1994), Collins (1997), Culicover and Levine (2001), Dogget (2004)).

- (4) a. [C [_α PP T V DP t_{PP}]]
 b. [PP C [t_{PP} T V DP t_{PP}]]

The traditional analysis in (4a) is further developed by den Dikken and Næss (1993), Nishihara (1999) and Tanigawa (2009), who strive to reflect the informational property of the locative PP in syntax (see also Stowell (1981)). Leaving aside detailed differences, these researchers propose (4b), in which the locative PP, bearing a topic feature [Top], undergoes A'-movement to a topic position in the C-domain via SPEC-T (cf. Coopmans (1989), Postal (2004), Mikami (2010), Kitada (2011)). According to (4b), the locative PP is syntactically guaranteed as

² See also Birner (1994) for in-depth discussions of discursual properties of LI.

the topic of the sentence by occupying the topic position in the left periphery.

The claim that the locative PP is located in the A'-position is supported by (5a, b), which show that LI rejects the application of Subject-Aux Inversion (hereafter, SAI) and the occurrence in the ECM environment.

- (5) a. * Do under the bed lie two cats?
 b. * I believe under the bed to be a cat.
- (6) a. * Did the picture, John buy?
 b. * I believe the picture, John to buy.

As is clear from the similarity between (5) and (6), these properties of LI are on a par with those of Topicalization illustrated in (6), in which the topicalized elements are displaced to the C-domain in the left periphery. The syntactic parallelism implies that LI involves a derivation in which the locative PP is located in the A'-position.

Meanwhile, it has been argued that the subject DP in LI remains within the VP-domain. This view is favored by the fact that the subject DP must appear between the verb and the VP-adverb.

- (7) a. Into the room strode Robin boldly.
 b. * Into the room strode boldly Robin. (Kathol and Levine (1993: 211))

Provided that the VP-adverb is right-adjoined to VP or vP, the difference in grammaticality between (7a) and (7b) strongly suggests that the subject DP remains accommodated within VP or vP without obeying a rightward movement beyond the verbal projection (e.g. heavy NP shift).

In this connection, another intriguing property of LI worth considering is which element exhibits ϕ -agreement with T. As illustrated below, it is the subject DP that undergoes ϕ -agreement with T.

- (8) a. In that garden stands/*stand a statue of Napoleon.
 b. In that garden stand/*stands two statues of Napoleon.
 (Kathol and Levine (1993: 215))

Although a large number of researchers acknowledge that the locative PP occupies SPEC-T to create the sisterhood relation with TP, there is no apparent sign showing the presence of agreement between the locative PP and T. For this reason, LI has been taken as one of the marked constructions where ϕ -agreement is executed under the distant relation.

3. The Refinement of the POP Framework

This section elaborates on the POP framework, probing deeply into issues that are less discussed in Chomsky (2013, 2015a). This section begins with raising two problems with the POP framework based on the essential properties of LI that were observed in section 2. It then constructs the refined POP framework to overcome the shortcomings that LI sheds light on.

3.1. Problems of the POP Framework

In his series of papers entitled Problems of Projection (POP), Chomsky (2013, 2015a) advocates a syntactic framework that places significant focus on merger and labeling. What this paper calls the POP framework adopts a labeling algorithm, LA, where syntactic objects are labeled for interpretation at the interfaces. With a postulation that, along with other operations, LA operates at the phase level, syntactic objects must be labeled for interpretation, and labeling failure causes a derivational crash.

Chomsky (2013, 2015a) assumes that LA is a special case of Minimal Search (hereafter, MS) that seeks heads H within its search domain, observing the Phase Impenetrability Condition (Chomsky (2000, 2001)). In a syntactic object {H, XP}, in which a head H and a non-head XP are merged, LA selects H as the label. This is because H is the closest head to the syntactic object. The most challenging case of LA is {XP, YP}, a syntactic object in which two non-heads XP and YP are merged. {XP, YP} requires the most prominent features of XP and YP to undergo agreement, whereby the non-head dominating XP and YP obtains a set of features such as <valued F, unvalued F>. As a typical example of {XP, YP}, take {DP, TP}, in which the subject DP is merged with TP as a result of A-movement. (9) illustrates how {DP, TP} is labeled under the POP framework.³

(9) [_β C_[uφ] [_α John_[φ] T_[uφ] [_{vP} t_{DP} saw Mary]]]

While T has inherited unvalued φ-features [uφ] from C, the subject DP bears valued φ-features [φ].⁴ The matching of the two φ-sets yields agreement whereby [uφ] is deleted and valued. LA is assumed to operate at the phase level along with other operations. Accordingly, the agreement of <φ, uφ> assigns the label of <φ, φ> to {DP, TP} at the phase level β (= CP).

{DP, TP} is one of the straightforward cases of {XP, YP} that are easily handled. As deeply discussed below, however, the original POP framework encounters problems with {PP, TP} as constructed in LI. The traditional analysis of LI is reproduced below in (10).

(10) a. On the bed lie two cats.
b. [_β PP [_α T V DP t_{PP}]]

In (10), what undergoes A-movement to SPEC-T is PP rather than DP. Being in the sisterhood relation with TP, nevertheless, the locative PP in SPEC-T apparently lacks agreement with T. Rather, T exhibits φ-agreement with the VP-internal subject DP, as indicated by the plural number inflection of the predicate (see also (8)).

This property of agreement poses two problems for the original POP frame-

³ Special characters such as [uφ] are used in this paper to indicate that the feature has been inherited.

⁴ DPs must bear an unvalued case-feature in addition to [φ], but this paper leaves aside the presence of this feature for simplicity of explanation.

work. The first problem concerns what relation suffices to execute agreement. In the previous framework that is often referred to as the Agree framework, Chomsky (2000, 2001) pervasively claims that agreement is implemented under the long-distance relation observing the Phase Impenetrability Condition, providing intensive arguments for the VP-internal subject/nominative in English and Icelandic. Based on the arguments, he maintains long-distance agreement in which T undergoes ϕ -agreement with the VP-internal DP under the c-command relation. In contrast, Chomsky (2013, 2015a) makes no explicit remarks on long-distance agreement or how to analyze VP-internal subjects/nominatives. The discussion is centered only on canonical examples such as (9) in which ϕ -agreement holds between DP and T(P) under the spec-head or sisterhood relation. It remains unclear whether agreement in the POP framework permits the long-distance relation in addition to the sisterhood relation.

Chomsky (2013) suggests that agreement as well as LA should be reduced to MS. Chomsky (2013: 43) assumes “LA is just minimal search, presumably appropriating a third factor principle, as in Agree and other operations.” Chomsky (2013: 45) states “LA seeks features, not only LI – or perhaps seeks only features, in which case it would be similar to probe-goal relations generally, specifically Agree.” In addition, Chomsky (2015b: 81) asserts that Agree is formulated as a search procedure.⁵ Provided that agreement as well as LA seeks features within its search domain via MS, it must be the case that long-distance agreement is maintained as long as it observes the Phase Impenetrability Condition.

The second problem arises as to how to label {PP, TP}, an instance of {Non-DP, TP}. As discussed above, T in (10a, b) lacks ϕ -agreement with PP in SPEC-T. Provided that Chomsky (2013, 2015a) is right in that grammatical sentences are free from unlabeled syntactic objects and that {XP, YP} requires agreement for labeling, {PP, TP} must involve some agreement to obtain a label. A question remains as to what kind of agreement {PP, TP} is subject to and how it is labeled.

3.2. The Refined POP Framework

This section elaborates on the POP framework to solve the two problems highlighted in section 3.1: i) what relation is the key to implementing agreement and, ii) how to label {PP, TP}, an instance of {Non-DP, TP}. First, this paper adopts the assumptions in (11a–d) concerning {XP, TP}.

⁵ Chomsky (2015b) makes the following remark that agreement should be attributed to search in the current framework:

- (i) The Probe is just... There isn't any identifiable Probe. There's just a search procedure, which is trying to find... It takes a look at a syntactic object and it's asking the question, “What are you?” Now you could formulate Agree that way. You could say there is no Probe, it's just that you're searching for some unvalued feature, and then if you find it, you look for something that will be valued by its relations to it. That's the Probe-Goal relation. But they're reduced both just to search. (Chomsky (2015b: 81))

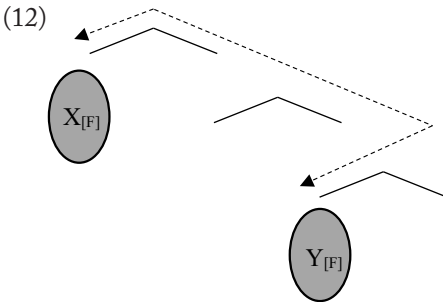
- (11) a. Free Merge: Merge applies freely.
 b. Posterior to Merge and feature inheritance, agreement and MS apply at each phase level.
 c. The weak T is strengthened if XP is merged with a set of T, i.e., if SPEC-T is occupied by Merge. In $[_\gamma \text{XP} [_\beta \text{T} [_\alpha \dots \text{V} \dots]]]$, β counts as a set of T if XP is merged with β to strengthen the weak T.⁶
 d. Agreement is implemented by the top-down search for matching features via MS.

The assumption in (11a) is directly adopted from Chomsky (2013, 2015a), who claims that both External Merge and Internal Merge apply freely, obviating a feature trigger defended in the previous frameworks.

The assumption in (11b) follows Chomsky (2015a) in claiming that the operations are executed in a fixed order. Merge and feature inheritance take place, and then agreement and MS follow.

The assumption in (11c) builds on Mizuguchi's (2019) analysis, according to which what makes T strong is the merger of XP with a set of T. If XP does not occupy SPEC-T, the β -marked set will not be labeled due to the weakness of T as a label. This assumption clarifies that neither agreement nor labeling is required to strengthen T; agreement and labeling are just side effects brought about by the merger of XP with the set of T.

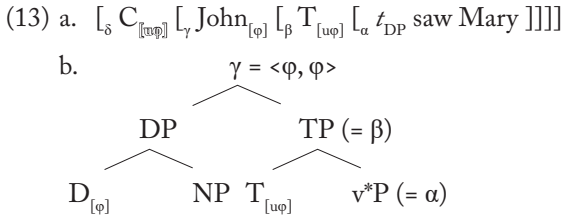
The assumption in (11d) stems from Kinjo's (2018) proposal that agreement should be implemented via MS. In exactly the same spirit as this paper, Kinjo (2018) attempts to refine the POP framework by scrutinizing the Agree framework of Chomsky (2000, 2001). As has already been shown in section 3.1, Chomsky (2013, 2015b) suggests that agreement as well as LA should be reduced to MS. Inspired by such speculation by Chomsky, Kinjo (2018) proposes the following top-down search operation where via MS, agreement matches two syntactic objects with identical agreement features:



⁶ Although this paper consistently uses notations such as XP and YP for expository purposes, XP refers to a set of X. Technically speaking, XP is something like $\{X, \dots\}$.

In (12), the top-down search via MS finds X with [F] first. Then it seeks the matching feature [F] downward and finds Y next. Consequently, X and Y undergo agreement for the matching feature [F]. In this mechanism of agreement, probes and goals defended in the Agree framework are nothing but elements with the identical feature that are detected through the top-down search. This paper assumes that the MS-based agreement searches for matching features in the accessible domain by observing the Phase Impenetrability Condition.⁷

According to these assumptions, the canonical sentence “John saw Mary” is derived as follows:



In (13), the subject DP undergoes Internal Merge (hereafter, IM) to SPEC-T based on Free Merge. The relevant IM strengthens T to make β count as a set of T, i.e. {T, ...}, subsequently at the phase level δ.⁸ Accordingly, MS identifies T as the label of TP (= β) while it also identifies D as the label of DP. Once C is merged with γ, T inherits [uφ] from C. Then the top-down search via MS is conducted from γ, whereby D with [φ] and T with [uφ] are determined as matching features. Consequently, [φ] and [uφ] undergo agreement and <φ, φ> is assigned to {_γ DP, TP}.

Regarding what kind of element is subject to agreement, Kato et al. (2014) and Kinjo (2018) claim that agreement does not require a strict head-head relation. For example, they remark that in {DP, CP}, DP in SPEC-C, a phrasal element, can trigger agreement with C based on the matching of Q-features or φ-features. According to the analysis proposed in (13), the relevant agreement in

⁷ Epstein, Kitahara and Seely (2019) claim that MS operates for agreement and labeling, as well. However, they confine the implementation of agreement only to the XP-YP configurations where the two phrases are in the sister relation.

⁸ This paper assumes, in line with Chomsky (2013, 2015a), that T in English is the weak head. If the IM at issue were lacking, T would remain the weak head. Consequently, β would not be labeled, leading the derivation to crash. This paper attributes this explanation as the reason the tensed clause in English disallows null subjects.

An anonymous reviewer wonders why T in English is not strengthened by the merger of v*P with T in which v*P counts as the complement of T. This paper follows Chomsky (2013, 2015a) and Mizuguchi (2019) to assume the traditional EPP effect in English, according to which an overt syntactic object XP must be merged with TP, whereby XP counts as an element in SPEC-T to create {XP, TP}. It assumes that the merger of v*P with T is not sufficient to meet the end. This issue, which requires further discussion, exceeds the limits of this paper.

{DP, CP} is implemented because the top-down search via MS finds D with [Q]/[φ] and C with [uQ]/[u φ]. This agreement is driven via the head-head relation between D and C rather than the phrase-phrase relation between DP and CP. The same is true of $\{\gamma$ DP, TP} in (13). Apparently, φ -agreement holds between DP and TP, but this agreement is attributed to the head-head relation between D and T mediated by MS.⁹

Though DP and TP are in a sisterhood relation, this relation is not mandatory to agreement but is instead merely an instance of structural relations sufficient to agreement. To put it differently, the merger of XP with TP is required to strengthen T and label β as T, while agreement is not. Agreement as well as labeling is just a side effect caused by the merger of XP and TP because, as an XP-YP structure, {XP, TP} created by this merger requires agreement to obtain a label.

On top of that, this paper makes two assumptions regarding how to analyze A'-movement in the *wh*-question such as "Who did John see?" and Topicalization such as "Her, John saw." First, this paper assumes, in line with Chomsky (2013) and Tanigawa (2018), that there is only one occurrence of C in the matrix left periphery in English and that C is endowed with a valued force feature [F], while *wh*-phrases and topicalized phrases bear an unvalued force feature [uF]. F, decomposing into Q(uestion) and Top(ic), is realized as either Q or Top. For an illustration, consider (14a, b):

- (14) a. $\alpha = \langle Q, Q \rangle$ b. $\alpha = \langle \text{Top}, \text{Top} \rangle$
- \swarrow \searrow \swarrow \searrow
wh-DP_[uQ] CP_[Q] topic-DP_[uTop] CP_[Top]

(14a) illustrates the left periphery of the *wh*-question, in which $\{\alpha$ DP, CP} involves agreement of [uQ]-[Q]. (14b) shows the left periphery of Topicalization, in which $\{\alpha$ DP, CP} involves agreement of [uTop]-[Top]. Consequently, the non-head α respectively receives $\langle Q, Q \rangle$ and $\langle \text{Top}, \text{Top} \rangle$ as its label.

This paper further reinforces this assumption on A'-movement with feature inheritance. Following Chomsky (2015a) and Tanigawa (2017, 2018, 2019a, b), this paper assumes that [Q] and [Top] are inherited from C by T when the element in SPEC-T bears either [uQ] or [uTop]. Consider (15) and (16):

- (15) a. Who saw Mary?
 b. [β C_{[φ][Q]] [α who_{[φ][uQ]] T_{[u φ][Q]] [ν P t_{who} saw Mary]]}}}
- (16) a. He saw Mary.
 b. [β C_{[φ][Top]] [α he_{[φ][uTop]] T_{[u φ][Top]] [ν P t_{DP} saw Mary]]}}}

In these deviations, [Q] and [Top] are inherited from C by T once C is merged with α . Via the matching relation between D and T, these features as well as [φ] undergo agreement with the matching unvalued features that the *wh*-phrase and

⁹ As clarified in note 6, XP and YP are merely sets of X and Y, which means that the head-head relation is crucial to agreement. The author is indebted to an anonymous reviewer for bringing this issue to his attention.

the topic subject bear. Consequently, $\{_{\alpha} \text{DP, TP}\}$ is assigned the dual labels, $\langle Q, Q \rangle$ and $\langle \varphi, \varphi \rangle$ in (15b) and $\langle \text{Top, Top} \rangle$ and $\langle \varphi, \varphi \rangle$ in (16b).

Regarding these derivations, it is crucial to spell out that the *wh*-phrase and the topic subject cannot move locally from SPEC-T to SPEC-C according to the weakness of T. Provided that T is strengthened by the merger of XP in SPEC-T, as assumed in (11c), the local movement at issue empties SPEC-T, which eventually defines T as the weak head at the phase level β . In order to keep T strong, DP has to remain in SPEC-T until the phase level β executes all of the operations, and the only possible way to make this true is the one in which C discharges [Q] and [Top] to T while DP stays in SPEC-T.¹⁰

The refined POP framework is in an actual operation in the following section to propose an analysis in which {PP, TP} in LI is properly labeled and the VP-internal subject successfully undergoes φ -agreement with T.

4. How to Apply Successful Labeling and Agreement to {Non-DP, TP} and the VP-Internal Subject DP

This section analyzes LI in terms of the refined POP framework. It demonstrates that the refined framework leads a successful derivation to LI while well-capturing the empirical facts found in syntax and information structure.

4.1. A Syntactic Analysis of Locative Inversion: A POP-based Analysis

Section 4.1 proposes a novel analysis for LI in terms of the refined POP framework. It argues that the refined POP framework deals successfully with the two problems faced in the original framework.

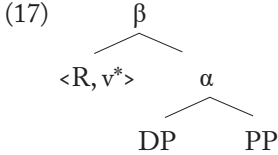
Before presenting an analysis, this section makes two essential assumptions regarding LI. The first assumption concerns the VP structure. As was discussed in section 2.1, LI typically accepts an unaccusative-class predicate. Based on this property, this paper assumes distinctive structure building for the unaccusative as proposed by Epstein, Kitahara and Seely (2016). That is to say, it assumes that in LI, R is externally pair-merged with v^* to constitute $\langle R, v^* \rangle$, whereby [u φ] of v^* is invisible and phasehood of v^* is cancelled. It also assumes, in line with Hoekstra

¹⁰ An anonymous reviewer asks how long-distance movement of subjects such as (ia) can be accommodated. This paper follows Chomsky (2015a: 10–11) to assume the derivation in (ib, c).

- (i) a. Who do you think saw Mary?
 b. $\{_{\beta} \in_{\text{[u}\varphi\text{]}} [_{\alpha} \text{who}_{\text{[}\varphi\text{]}} T_{\text{[u}\varphi\text{]}} \text{ saw Mary }] \}$
 c. $[_{\gamma} \text{who C you think } [_{\alpha} \text{ } \textit{t}_{\text{who}} T_{\text{[u}\varphi\text{]}} \text{ saw Mary }]]$

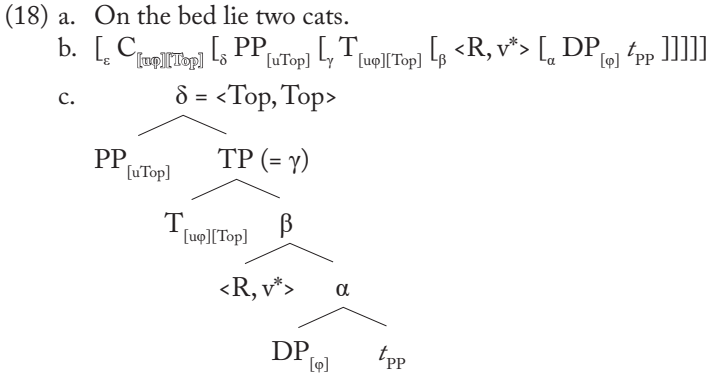
In null-*that* clauses, the embedded C and its non-head β (= CP) are deleted as soon as C discharges [u φ] to T, as in (ib). Due to the deletion of C, the phasehood of C is inherited by and activated on T. The *wh*-phrase *who* can participate in operations in the matrix clause because it is located in the edge of the inherited phase T. Since the inherited phase T and its edge are still visible at the stage of γ , $\langle \varphi, \varphi \rangle$, the label of $\{_{\alpha} \text{DP, TP}\}$, is maintained even after the *wh*-phrase is displaced to SPEC-C in the matrix clause.

and Mulder (1990), that $\langle R, v^* \rangle$ merges with the syntactic object constituted by the merger of DP and PP (the non-head corresponds to a small clause in the traditional analysis).¹¹ These assumptions boil down to the structure in (17).



In addition, this paper makes an assumption as to the locative PP, although it was already mentioned in section 2.2. This paper assumes, following den Dikken and Næss (1993), Nishihara (1999) and Tanigawa (2009), that in LI, the locative PP bears an unvalued topic feature [uTop] in such a way that the topicalized element in Topicalization carries this feature. As has been discussed in section 2.2, the assignment of [uTop] is favored by the topic property of the locative PP observed in both syntax and information structure.

In terms of these assumptions woven into the refined POP framework, this paper proposes the following derivation for LI:



In (18), DP and PP are merged to constitute the syntactic object α , which is merged with $\langle R, v^* \rangle$. Since this structure contains no phase, the locative PP directly undergoes IM from the internal position within α to SPEC-T. The IM of the locative PP helps label α . Thanks to this IM, the subject DP becomes the only element dominated by α , and D is selected as the label of α . At the same time, this IM strengthens T and makes γ count as a set of T at the phase level ε . Once C is merged with δ , [Top] is inherited from C by T concomitantly with [u ϕ]. Subsequently, this derivation meets two matching relations. First, the top-down search via MS finds D with [ϕ] and T with [u ϕ]. Next, the relevant search finds T

¹¹ An anonymous reviewer wonders how arguments are assigned θ -roles in the complement of $\langle R, v^* \rangle$, i.e. within a small clause. Unfortunately, this paper cannot provide a satisfactory answer to this question, but as Bowers (1993) claims, the small clause could be PredP where Pred is the θ -assigner. This paper leaves this issue open.

with [Top] and P with [uTop]. Consequently, the two matching relations elucidate both ϕ -agreement and topic-feature agreement. Regarding the label of $\{\delta \text{ PP, TP}\}$, $\langle \text{Top, Top} \rangle$ is determined as the unique label because agreement applies to the two topic features, which are the most prominent features of PP and TP identified by LA.

Notice that the locative PP must bear [uTop] for the derivation to converge. Without [uTop], agreement would not occur in $\{\delta \text{ PP, TP}\}$. Since labeling of $\{\text{XP, YP}\}$ premises agreement, $\{\delta \text{ PP, TP}\}$ without [uTop] would not obtain a proper label, and owing to this labeling failure, the derivation would not converge.¹² In addition, the presence of the topic feature is crucial to the ungrammatical examples in (5), reproduced below in (19), in which LI is incompatible with SAI and the ECM complement.

- (19) a. *Do under the bed lie two cats?
 b. *I believe under the bed to be a cat.

In terms of the presence of [Top], the present analysis provides successful explanations to these examples. First, SAI is not applied in (19a) because it is assumed in section 3.2 that the matrix left periphery has the unique C, which is assigned either [Q] or [Top] complementarily. Provided that only C with [Q] triggers SAI, the inversion at issue is never applied to LI, in which C bears and discharges [Top] rather than [Q]. On the other hand, as shown in (19b), LI is incompatible with the ECM complement due to the lack of C. It has generally been assumed that the C-domain is not projected in the ECM complement. Given this assumption, the absence of C with [Top] circumvents $\{\text{PP, TP}\}$ obtaining a label.¹³

¹² As pointed out by an anonymous reviewer, the locative PP can undergo long-distance movement, as in (ia).

- (i) a. On the bed, John said lay two cats.
 b. $\{_{\beta} \in \{_{\alpha} \text{ on the bed}_{[u\text{Top}]} \text{ T}_{[u\phi][\text{Top}]} \text{ saw Mary}] \ddagger$
 c. $[_{\gamma} \text{ on the bed}_{[u\text{Top}]} \text{ C John said } [_{\alpha} \text{ }_{\text{PP}} \text{ T}_{[u\phi][\text{Top}]} \text{ lay two cats}]]$

This paper assumes that the relevant example should deserve the derivation of “Who do you think saw Mary?” discussed in note 10. As shown in (ib), the embedded C and its non-head β are deleted once [u ϕ] and [Top] are inherited by T. Accordingly, the phasehood of C is inherited by and activated on T. The locative PP, which is located in the edge of the inherited phase T, can participate in operations in the matrix clause. $\langle \text{Top, Top} \rangle$, the label of $\{\alpha \text{ PP, TP}\}$, is not de-labeled even after the locative PP is displaced to the matrix C-domain, if γ is a single phase including $[_{\alpha} \text{ }_{\text{PP}} \text{ T} \dots]$.

¹³ The locative PP keeps occupying SPEC-T to maintain the reinforcement of T. Although it does not undergo IM to SPEC-C, it obtains the A'-status in SPEC-T as the result of the inheritance of [Top] by T and the assignment of $\langle \text{Top, Top} \rangle$ to $\{\text{PP, TP}\}$. To put it differently, SPEC-T is regarded as the derived A'-position via the relevant feature inheritance and agreement. For this reason, the locative PP behaves on a par with the topicalized element in Topicalization, in which $\langle \text{Top, Top} \rangle$ is given to $\{\text{XP, CP}\}$ and the A'-status is found in SPEC-C (see (6)).

Let us next highlight the implementation of ϕ -agreement in (18). In the present analysis, the top-down search via MS ensures that ϕ -agreement takes place under the long-distance relation, as in Chomsky's (2000, 2001) Agree framework. The application of long-distance agreement provides a straightforward explanation to the paradigm in (8), reproduced here in (20).

- (20) a. In that garden stands/*stand a statue of Napoleon.
 b. In that garden stand/*stands two statues of Napoleon.

Without defending any long-distance agreement, the agreement pattern in (20) would remain in the dark.

This section is ended by demonstrating how the proposed analysis deals with related examples. LI accepts not only locative PPs but also directional PPs as the preverbal element. Typical examples with directional PPs includes "into the room walked John," in which the unergative manner-of-motion verb selects the directional PP. This paper assumes, following Zubizarreta and Oh (2007), that when selecting the directional PP, manner-of-motion verbs such as *walk* and *run*, which potentially belong to the unergative class, are subject to the structure building for the unaccusative (see also Levin and Rappaport Hovav (1995)). Specifically, this paper applies the structure building proposed for the unaccusative class to the relevant manner-of-motion class: v^* is made invisible by being externally merged with R, and $\langle R, v^* \rangle$ is merged with the non-head dominating DP and PP. Zubizarreta and Oh (2007) propose that the unaccusative class and the manner-of-motion class with the directional PP lack the functional projection v as well as the external argument and that the verb and the two arguments are accommodated within the V-projection. Regardless of the details, the syntactic derivation proposed in (18) is in line with their analysis in that v is made invisible both in the unmarked unaccusative class and in the manner-of-motion class at issue.¹⁴

¹⁴ Culicover and Levine (2001) present LI examples such as (ia, b), which include unergative verbs that are not categorized in the manner-of-motion class.

- (i) a. In the room slept fitfully the students in the class who had heard about the social psych experiment that we were about to perpetrate.
 b. Remember Robin? Well, in the room slept fitfully . . . ROBIN!
 (Culicover and Levine (2001: 293))

Referring to these examples as heavy inversion, Culicover and Levine argue that they are acceptable if the postverbal DP is relatively heavy in weight or if it is phonetically stressed. Related to this observation is the position of the postverbal DP and the VP adverb. As is clear from (ia, b), the postverbal DP must follow the VP adverb in this type of LI (cf. (7)). Based on these facts, they propose a distinctive derivation for heavy inversion in which, while the locative PP is topicalized to the left periphery, the subject DP moves up to SPEC-T and then gets postposed and right-adjoined to the projection of T as a result of heavy NP shift. As for unmarked examples of LI, on the other hand, they maintain the traditional analysis in which the subject DP remains within VP and the locative PP occupies SPEC-T.

For a comprehensive analysis of LI, it is necessary to clarify the derivation of what

The derivation in (18) assumes that the non-head α , which is created by the merger of DP and PP, is merged with $\langle R, v^* \rangle$. This structure yields another possibility of derivation, as illustrated in (21).

$$(21) [_{\zeta} PP_{[uTop]} [_{\epsilon} C_{[[u\phi][Top]} [_{\delta} DP_{[\phi]} [_{\gamma} T_{[u\phi]} [_{\beta} \langle R, v^* \rangle [_{\alpha} t_{DP} t_{PP}]]]]]]]]$$

In (21), DP undergoes IM to SPEC-T, while PP undergoes IM to SPEC-C.¹⁵ In this case, what follows the two IMs is inheritance of only $[u\phi]$ by T, whereby $[Top]$ remains in C. As the result of agreement, $\{\delta DP, TP\}$ receives $\langle \phi, \phi \rangle$ while $\{\zeta PP, CP\}$ receives $\langle Top, Top \rangle$. This derivation results in an example of Topicalization, “On the bed, two cats lie.”

4.2. The Interface of Syntax and Information Structure

On the basis of the syntactic analysis in (18), section 4.2 discusses how syntax interacts with information structure in LI.

This paper claims that the proposed syntactic derivation involving topic features is associated with the unanimous information structure of LI where the locative PP counts as old information. What is emphasized here is that LI is subject to the peculiar information structure not accidentally but inevitably: the syntactic derivation affects the information structure. The locative PP in LI is urged to carry $[uTop]$ for syntactic convergence, and at the same time, $[uTop]$ grants the locative PP the status of given information once it is valued by $[Top]$ in T. Therefore, the assignment of $[uTop]$ contributes to the construction in two ways.

Regarding the focus status of the subject DP, this paper follows Kiss (1998) in claiming that the VP-internal subject is interpreted as the presentational focus merely by receiving a pitch accent. Kiss (1998) states that, unlike the identification focus, which is accompanied with exhaustive or contrastive reading, the presentational focus (information focus) is not associated with A'-movement to any

Culicover and Levine (2001) call heavy inversion. Nonetheless, the discussion of heavy inversion requires much more space for writing, and the author leaves this issue for future research.

¹⁵ An anonymous reviewer asks what happens if the locative PP with $[uTop]$ stays in situ. As suggested by the reviewer, in-situ topics should be excluded, provided that an unvalued feature must be located higher than its valued counterpart, as argued by Bošković (2007). To reinterpret it in light of agreement by MS, an unvalued feature must be detected first, and its valued counterpart must be found next or at once. In fact, this order of feature detection is implied by Chomsky (2015b: 81) (see (i) in note 5). If it is assumed that topics bear $[uTop]$ and C bears its valued counterpart $[Top]$, topics must be displaced to such a position that MS can detect $[uTop]$ prior to $[Top]$ or detect $[uTop]$ and $[Top]$ simultaneously. In (21), in which the relevant PP undergoes IM to SPEC-C to create $\{\zeta PP, CP\}$, MS from ζ finds $[uTop]$ and $[Top]$ at once because P and C are equally close for ζ . In contrast, the derivation where the locative PP stays in situ could be ruled out because it goes against the right order of feature detection.

Obviously, it requires much more detailed discussion to validate the idea that feature detection must follow the fixed order. This paper leaves this issue for future research.

particular syntactic position; rather, it is a function of constituents marked by pitch accents. This paper takes the position that the subject DP in LI remains within the VP-domain and is interpreted as the presentational focus in the discursal use via a pitch accent.

Here, the fact that the subject DP is the only possible candidate of the presentational focus in LI should be emphasized. As discussed above, the locative PP is designated as the topic of the sentence by the assignment and valuation of [uTop]. In addition, by occupying SPEC-T, the locative PP is linearly the left-most element, which has the nearest access to the old context. Meanwhile, the verb in LI is typically restricted to the unaccusative class that expresses existence and emergence. This deprives the verb of the role as the focus. Eventually, only the subject DP is eligible for the target of focus interpretation. In other words, the subject DP in LI is deemed as the focus of the sentence, its unambiguous interpretation being predestinated by the topic status of the locative PP and the use of the unaccusative predicate.

4.3. Implications

This section demonstrates implications of the proposed analysis. The first implication is made regarding less standard examples of LI. The proposed analysis predicts that the preverbal PP can continue occupying SPEC-T if it shares a certain matching feature with T. It should be true that the matching feature is one other than a topic feature. This prediction is correctly borne out by the acceptability of the following examples:

- (22) a. She pointed to an impressive but imitation oak desk *at which sat a prissy, tiny, bespectacled individual.*
 b. In the centre of the green was a pond, beside it was a wooden seat *on which sat two men talking.* (Biber et al. (1999: 918–919))
- (23) a. Out of which barn ran a horse? (Hoekstra and Mulder (1990: 32))
 b. In which city live all your relatives? (Culicover and Levine (2001: 304))

These examples are accommodated by the proposed analysis with an assumption that C in this case discharges [Q] rather than [Top] to T. In these examples, [Q] inherited by T undergoes agreement with [uQ] of the interrogative PP, which assigns <Q, Q> to {PP, TP}.^{16,17}

¹⁶ If one sticks to Bianchi's (1999) analysis of the relative clause, [Q] can be replaced with [relative] so that {PP, TP} receives a label like <Rel, Rel>.

¹⁷ As has been discussed in this paper as well as elsewhere, the unmarked interpretation of LI is that the locative PP serves as a topic. If these examples involve <Q, Q> rather than <Top, Top>, they should give rise to a different interpretation from canonical LI examples such as "On the bed lie two cats," in which the locative PP functions as a topic in the assertive matrix clause. Regarding the interrogative examples in (23), the natural interpretation would be the one where the locative PP functions as a focus rather than a topic.

To the author's knowledge, the judgement of the interrogative examples varies: these examples are not accepted by all native speakers (see Nishihara (1999: 391, fn.8)). In light

The second implication is made regarding an inversion construction similar to LI. The construction worth discussing here is Preposing around *Be* (hereafter, PAB) in (24), for which there are good reasons to extend the analysis proposed for LI.

- (24) a. More important has been the establishment of legal services.
 b. Taking tickets at the door was a person I had previously roomed with.
 c. Examined today and found in good health was our nation's first executive.
 d. In each hallway is a large poster of Lincoln. (Emonds (1970: 28–31))

As has been attested elsewhere, PAB is syntactically parallel to LI in that the preverbal element is the non-subject and the subject DP appears after the main verb. PAB is another example where {Non-DP, TP} is constituted. The parallelism is also observed in terms of information structure. As Bolinger (1971, 1977) and Fukuchi (1985) argue, the discourse function of PAB is that the preverbal element, typically the progressive predicate and the participial predicate, is presupposed from the preceding context and that, after the *be*-verb, the postverbal DP is presented on the scene that the preverbal element sets about. Hence, the correspondence between the two constructions suggest that PAB is analyzed on par with LI. That is to say, the preverbal element is located in SPEC-T and undergoes topic-agreement with TP, while the postverbal subject remains within the VP-domain and values [$u\phi$] of T under the long-distance relation.¹⁸

Furthermore, the analysis proposed here brings several implications to the *there*-construction and the dative subject construction in (25), which are similar to LI in that the predicate selects a non-agentive subject and the VP-internal DP exhibits agreement with T (Kuno (1973), Andrews (1982), Thráinsson (1994), Ura (1996), Jónsson (2003)).¹⁹

- (25) a. There are two men in the room.
 b. Henni leiddust strákarinnir.
 her-3SG.DAT bored-3PL the boys-3PL.NOM

of syntax, it could be that the labeling of $\langle Q, Q \rangle$ in LI is not always favored. The focus interpretation of the locative PP as well as the labeling of $\langle Q, Q \rangle$ may be rejected for some reasons. This paper leaves why this is the case to future research.

¹⁸ This paper assumes with Hoekstra and Mulder (1990) that PAB as well as LI begins with a small clause. Specifically, this paper adopts the following structure where α corresponds to a small clause:

- (i) [$_{\beta} \langle R, v^* \rangle$ [$_{\alpha}$ DP XP]]

In (i), DP is directly merged with the phrasal element XP comprising of an adjective, a progressive predicate or a participial predicate (cf. (17)). To derive PAB, XP is dislocated from this VP-internal position to SPEC-T. The *be*-verb is first realized in $\langle R, v^* \rangle$ and should head-raise to T later.

¹⁹ Abbreviations in this paper are as follows: DAT = dative; NOM = nominative; SG = singular; PL = plural; 3 = third person; PRES = present.

- 'She found the boys boring.' (Sigurðsson (1996: 1))
- c. John-ni musuko-ga ir-u (zizitu).
 John-DAT son-NOM be/have-PRES (fact)
 '(The fact that) John has a son.'

For discussion of these constructions, it is useful to take a brief look at Richards (2004, 2008). In his analysis, the expletive *there* bears a defective φ -set [Person]; the dative phrase is a complex element in which DP is merged with a null expletive bearing a defective φ -set [3rd Person].

In conjunction with Richards' (2004, 2008) analysis, this paper applies the analysis of LI to the examples in (25) in such a way that [u φ] undergoes agreement with the two elements. Consider (26):

- (26) a. [$_{\delta}$ C [$_{[u\varphi]}$] [$_{\gamma}$ there $_{[Person]}$] [$_{\beta}$ T [$_{[u\varphi]}$] [$_{\alpha}$ <R, v*> DP $_{[\varphi]}$]]]]]
- b. [$_{\delta}$ C [$_{[u\varphi]}$] [$_{\gamma}$ Expl. $_{[3Person]}$ +DP [$_{\beta}$ T [$_{[u\varphi]}$] [$_{\alpha}$ <R, v*> t_{DP} DP $_{[\varphi]}$]]]]]
- c.
- $$\begin{array}{c} \gamma = \langle \text{Person, Person} \rangle \\ \swarrow \quad \searrow \\ \text{XP}_{[Person]} \quad \text{TP} (= \beta) \\ \swarrow \quad \searrow \\ \text{T}_{[u\varphi]} \quad \alpha \text{ (containing DP}_{[\varphi]}) \end{array}$$

In (26), the expletive and the dative subject, whose category is assumed as XP, are located in SPEC-T owing to either External or Internal Merge. This merger makes β count as TP at the phase level of δ . This derivation meets two matching relations. First, the top-down search via MS finds X with [Person] and T with [u φ]. This relation elucidates partial agreement of [u φ] in person, and the label of <Person, Person> is assigned to $\{\gamma, \text{XP}, \text{TP}\}$. This partial agreement does not suffice to make [u φ] completely valued, because its number and gender remain unspecified. [u φ] has to undergo further agreement for valuation. The top-down search via MS continues to seek another matching element, and eventually, it finds [φ] of the VP-internal DP.²⁰ The matching relation between [u φ] and [φ] induces φ -agreement, by which [u φ] is completely valued.²¹

5. Concluding Remarks

This paper has scrutinized the POP framework by providing retrospective arguments for LI and has attempted to answer the following questions: i) what relation is needed to trigger agreement in sentences with a VP-internal subject and ii)

²⁰ This analysis does not mean that T bears two sets of [u φ]. It bears only one set of [u φ]. Since the first agreement between XP and TP is merely partial, [u φ] still remains active after the first agreement. The top-down search via MS keeps detecting another matching element for the partially valued [u φ] to find [φ] of DP.

²¹ Coincidentally, Honda (2020) and Kanno (2020) propose similar analyses for the *there*-construction. In contrast, Miyagawa, Wu and Koizumi (2018) pursue a different approach in which expletives and datives in SPEC-T have no agreement with T.

how {Non-DP, TP} is labeled. As for i), this paper has argued that long-distance agreement, as in the Agree framework, is maintained in the POP framework. Specifically, this paper has applied Kinjo's (2018) agreement by MS to LI and the related examples. As for ii), this paper has proposed that {PP, TP} in LI is subject to topic-feature agreement. Simultaneously, this paper has also approached the informational status of LI from the proposed syntactic analysis and claimed that the syntactic derivation with topic-feature agreement and a VP-internal subject has a somewhat consequential influence on the informational status.

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【要 旨】

{Non-DP, TP}構造と動詞句内主語における適切なラベル付けと Agreement の適用 ——精緻化したPOPの枠組みを用いた場所句倒置の再考——

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本稿は、特異な文法構造と情報構造を持つ場所句倒置を遡及的に考察しながら、Chomsky (2013, 2015a) の提唱する POP の枠組みを精緻化する。動詞句内主語が T とどのように一致するのか、{PP, TP} がどのような一致を行うのか、の 2 点に的を絞り、i) Chomsky (2000, 2001) の枠組み同様、長距離での一致が当該の枠組みでも維持される、ii) {PP, TP} では、話題素性の継承と一致の結果、ラベル〈Top, Top〉が得られる、と提案する。加えて、場所句が話題、文末主語が焦点となる特異な情報構造に、統語派生がどの程度、影響を与えるかという、統語論と情報構造の相互関係に関しても議論を行う。{PP, TP} での話題の一致及びラベル付けが、統語派生を収束させ、場所句の解釈にも影響を与えるという意味で、その効果が統語論と情報構造の両面で反映されると論じる。