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# Remarks on the A/A'-distinction: A thematic approach*

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**Kim, Kwang-sup. 2015. Remarks on the A/A'-distinction: A thematic approach.** *Linguistic Research* 32(1), 125-149. In order to capture the A/A'-distinction at LF, Takahashi (2006, 2010) and Takahashi and Hulsey (2009) propose that the complement of D can optionally undergo late merge: that is, D can merge with its complement after it undergoes A-movement. Lebeaux (2009) puts forth an analogous idea: the complement of D is generated as a pro, and the pro is replaced by an overt NP after A-movement takes place. Both approaches are based on the assumption that thematic roles must be assigned as early as possible－the assumption that thematic role assignment is subject to the principle of earliness. These approaches, however, run into several problems, including the A/A'-distinction at PF－the phenomenon that DP-traces, unlike *wh*-traces, are not visible at PF. In this article, I propose that the A/A'-distinction at LF and PF originates from the fact that the subject can be base-generated either in a thematic position or in a Case-position, which in turn results from the fact that (i) arguments are associated with their thematic role via a λ-conversion (Heim and Kratzer 1998), and (ii) the λ-operator can be percolated via function composition (Di Sciullo and Williams 1987). This article shows that the thematic approach provides a principled account not only for the A/A'-distinction at LF and PF but also for many other phenomena, including the complement/adjunct asymmetry, Barss's generalization, and the predicate/non-predicate asymmetry. **(Hankuk University of Foreign Studies)**

**Keywords** A/A'-distinction, reconstruction effects, anti-reconstruction effects, λ-conversion, function composition, complement/adjunct asymmetry, Barss's generalization, predicate/non-predicate asymmetry

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## 1. Introduction

Natural languages are characterized by the fact that the position in which an object is phonetically realized can be different from the position where the object is actually interpreted (Chomsky 1995). Sentences (1a-b) are typical examples illustrating the PF/LF asymmetry. In (1a-b) *John* and *he* cannot be co-referential, although *he* does not c-command *John*.

(1) a. *Which claim that $John_i$ is insane did $he_i$ consider to be non-sense?
b. *Which brother of $John_i$ does $he_i$ like?

This phenomenon can be nicely captured if movement consists of copy and merge and the lower copy can be interpreted at LF, as Chomsky (1995) argues: that is, if (1a-b) are represented as (2a-b) respectively, it is quite natural that *he* and *John* cannot be co-referential in (1a-b).

(2) a. *[which claim that $John_i$ is insane] did $he_i$ consider [~~which~~ claim that $John_i$ is insane] to be non-sense?
b. *[which brother of $John_i$] does $he_i$ like [~~which~~ brother of $John_i$]?

Interestingly, however, A-movement poses a threat to the copy theory of movement; there is no Binding C violation effect when A-movement takes place (Riemsdijk and Williams 1981, Freidin 1986, and Fox 1999).

(3) a. The claim that $John_i$ is insane seems to $him_i$ to be non-sense.
b. Every brother of $John_i$ seems to $him_i$ to like Mary.

In order to explain the A/A'-distinction under the copy theory of movement, Takahashi (2006, 2010) and Takahashi and Hulsey (2009) propose a wholesale late merge approach, according to which the determiner *the* can merge with its complement after it lands in A-position.

(4) a. [the seems to $him_i$ [~~the~~ to be [~~the~~ non-sense]]]: merger of *claim that Johni is insane*

b. [the claim that John$_i$ is insane seems [~~the~~ to him$_i$ to be [~~the~~ non-sense]]]

The wholesale late merge approach can explain the A/A'-distinction illustrated in (1) and (3). This article, however, points out several empirical problems with this approach, and then explores the possibility that the subject can be base-generated either in a thematic position or in a Case-position. It is usually assumed that thematic role assignment is a syntactic operation, which is subject to the earliness principle. In this article, however, I take the view that arguments are associated with their thematic role via a semantic operation—a λ-conversion (Heim and Kratzer 1998), and the λ-operator can be percolated via function composition (Di Sciullo and Williams 1987). A consequence of this claim is that the subject can be generated either in a thematic position or in a Case position: that is, there are two sources for (3a).

(5) a. [the claim that John$_i$ is insane] seems to him$_i$ to be non-sense.
b. [the claim that John$_i$ is insane] seems to him$_i$ [the claim that John$_i$ is insane] to be non-sense.

Since the subject can be base-generated in the SPEC of the matrix T, as in (5a), there is no Binding C violation effect in (3a). This article shows that this line of approach provides a principled account not only for the A/A'-distinction at LF and PF but also for many other phenomena, including the complement/adjunct asymmetry, Barss's generalization, and the predicate/non-predicate asymmetry.

## 2. A Wholesale Late Merge Approach to the A/A' -Distinction at LF

Sauerland (1998) and Fox (2000) describe the A/A'-distinction as follows: A-movement optionally leaves a trace whereas A'-movement obligatorily leaves a trace. This seems to be a correct descriptive generalization, but the immediate question is whether the descriptive generalization follows from a more fundamental principle. With a view to providing an answer to this question, Takahashi (2006,

2010) and Takahashi and Hulsey (2009) capitalize on Lebeaux's (1988, 1991, 1995) late merge approach, claiming that the complement of a determiner can be inserted later. As illustrated in (6a-d), *every* moves first and then, is merged with its complement counter-cyclically.

(6) a. [every like Mary]: merger of *to*, and movement of *every*
b. [every to [every like Mary]]: merger of *to him*, *seem* and T, and movement of *every*
c. [every T seem to him [every to [every like Mary]]]: late merge of *brother of John*
d. [[$_{DP}$ every [$_{NP}$ brother of John]] T seem to him [every to [every like Mary]]]

If the so-called wholesale late merger is permitted, there is no chance for *him* to c-command *John* and hence they can be co-referential.

In the wholesale late merge approach the A/A'-distinction derives from the condition that NP must be Case-marked. Suppose that *which* undergoes A'-movement and then is merged by its NP complement, as in (7a-b). If so, it is incorrectly expected that *John* and *he* can be co-referential.

(7) a. which does he$_i$ like ~~which~~: wholesale late merge of *brother of John*
b. which brother of John$_i$ does he$_i$ like ~~which~~

In order to fix this problem, Takahashi (2006, 2010) and Takahashi and Hulsey (2009) propose that the complement of D—NP—must be assigned Case. They argue that NP can be assigned Case if it undergoes a countercyclic merger with an A-moved D. In (6d) *brother of John* can be assigned Case since it merges with the copy in SPEC-T—the copy in a Case position. By contrast, NP cannot be assigned Case if it undergoes a countercyclic merger with an A'-moved D. For example, in (7b) it cannot be assigned Case since it merges with the copy in a non-Case position. In order to be assigned Case, NP must merge with the *wh*-determiner *which* before the *wh*-determiner moves out of a Case position. Therefore, A'-movement displays reconstruction effects. To sum up, in the wholesale late merge approach the contrast between A-movement and A'-movement follows from the claim that NP

must be assigned Case.

There are several problems with the wholesale late merge approach. First of all, the Case-based approach is problematic. The determiner can take a PP complement as well as an NP complement. PP, unlike NP, is not assigned Case. As a consequence, it can undergo the wholesale late merge even in a non-Case position, as illustrated in (9a-c), and it is therefore predicted that *John* and *he* can be co-referential in (8b), contrary to fact.

(8) a. *The best song of John$_i$, he$_i$ doesn't like.
b. *Some of John$_i$'s best songs, he$_i$ doesn't like.

(9) a. He doesn't like some: A'-movement of *some*
b. [some [he doesn't like ~~some~~]]: wholesale late merge of *of John's best songs*
c. [some of John's best songs [he doesn't like ~~some~~]]

Second, the Case-based approach is not tenable if D as well as N is assigned Case. The determiner *some* must be assigned Case in (10), which supports the claim that D is assigned Case. If so, N cannot be assigned Case directly from T/v, since D is closer to T/v than N, and the only option is that N is assigned Case indirectly from D. If this line of approach is correct, in (11) the late-inserted NP can be assigned Case from *some*, leaving the A/A'-distinction unaccounted for.

(10) He doesn't like some (of John's best songs).

(11) a. some$_{[+accusative]}$ he doesn't like some$_{[+accusative]}$: wholesale late merge
b. [some$_{[+accusative]}$ [songs of John]] he doesn't like some$_{[+accusative]}$: Case assignment
c. [some$_{[+accusative]}$ [songs$_{[+accusative]}$ of John]] he doesn't like some$_{[+accusative])}$

The third problem arises from the fact that in (12b) the *every* in the SPEC-T cannot c-command the *every* in the thematic position.

(12) a. [every T [$_{VP}$ seems to him [every to [every like Mary]]]]: wholesale late merger
b. [$_{TP}$ [$_{DP}$ every [$_{NP}$ brother of John]] T [$_{VP}$ seems to him [every to [every like Mary]]]]

It is unclear how the lower copy of *every* can be deleted at PF. If we assume that the notion 'chain' is not available on account of the principle of inclusiveness, the lower copy cannot be deleted since it cannot find a c-commanding higher copy—a c-commanding antecedent. Finally, the wholesale late merge approach cannot explain the A/A'-distinction at PF—the fact that A-movement traces may not be visible at PF as well as at LF. Lightfoot (1976) observes that DP-traces do not block *to*-contraction, although *wh*-traces do. In (13) *going to* can be contracted into *gonna*, for instance.

(13) a. The boy is going to leave. b. The boy's gonna leave.

This comes as a surprise in the wholesale late merge approach. According to the approach, *the* is base-generated inside VP and moves to the SPEC-*to*. It is therefore strange that the intervening copy cannot block *to*-contraction.

(14) [the boy is going [~~the~~ to [~~the~~ leave]]]

Jaeggli (1980) stipulates that only Case-marked traces block *to*-contraction. However, Caseless traces can block contraction: in (15b) the trace left by head movement blocks contraction.[1]

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1 Lebeaux's (2009) proposal is analogous to Takahashi and Hulsey's in that overt NPs may not appear in the thematic positions. He proposes that there are two structures called the Case frame structure and the theta subtree: the Case frame corresponds to the schematic structure, and the theta subtree corresponds to the lexical elements that must be fused/projected into the open slots of the Case frame.

(i) Theta Subtree Case frame
↘ ↙
Full tree

The Case frame consists only of closed-class elements, including determiners and pro, whereas the theta subtree consists of open-class elements, as illustrated in (iia-b), and the full tree is generated if the pro's in the Case Frame are replaced by the overt lexical items in the theta subtree.

(ii) a. Theta Subtree: man see woman b. Case Frame: the pro see a pro
(iii) Full tree: the man see a woman: via fusion of (iia) and (iiib)
Lebeaux argues that fusion or lexical overlay takes place after A-movement, but prior to A'-movement, which accounts for the A/A'-asymmetry. In short, Lebeaux's approach is similar to

(15) a. We should've called the police.
b. *Should we've called the police?

To sum up, it is hard to explain the A/A'-distinction at LF and PF if we assume that a thematic position must be occupied by a lexical item.

Let us suppose that the subject can be base-generated in the SPEC of the matrix T. If so, the A/A'-distinction at PF and LF straightforwardly follows. For instance, in (16a) *going* and *to* can be contracted since no constituent intervenes between them, and in (16b) *Mary* and *her* can be co-referential since *her* cannot c-command *Mary*.

(16) a. the boy [is going to leave]
b. The claim that $Mary_i$ is insane seems to $her_i$ to be non-sense.

The immediate question is why and how the subject can be base-generated in the SPEC-T. This is the main concern of the following section.

## 3. A Thematic Approach to the A/A' -Distinction

There are two major approaches to thematic roles in minimalism: the thematic role assignment approach (Hale and Keyser 1993, 2002, Chomsky 1995), and the thematic feature checking approach (Bošković 1994, Lasnik 1995, Bošković and Takahashi 1998, Hornstein 1999, 2001). According to the thematic role assignment approach, a thematic role is assigned to an argument under a certain structural configuration, and the thematic feature checking approach advocates that a thematic role, just like a Case feature, is a feature that undergoes a checking operation.

(17) a. $V_{theme}$ DP: thematic role assignment
b. V $DP_{theme}$
(18) a. $V_{theme}$ $DP_{[\alpha\ role]}$: thematic role checking or valuation
b. $V_{theme}$ $DP_{[theme\ role]}$

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Takahashi and Hulsey's, and not surprisingly, the two approaches run into similar problems.

Interestingly, neither approach is congruous with the minimalist assumption that syntactic operations are motivated by morphological features. In minimalism, syntactic operations like feature checking or assignment are triggered by morphological features, which are usually realized as overt morphemes. However, there are no morphological reflexes for thematic roles: there is no morpheme for agent or theme. This hints at the possibility that an argument itself does not have a theta feature and a thematic role is not a syntactic feature that requires a syntactic operation. This section explores the possibility that thematic role assignment takes place via a semantic operation.

## 3.1 A Semantic approach to Theta Role Assignment

I propose that a thematic role is not a feature that triggers a syntactic operation like feature checking or assignment. More specifically, I assume that Heim and Kratzer's (1988) semantic approach is on the right track. They propose that if we capitalize on the semantics of predicates, an argument can be associated with its thematic role without syntactic operations such as checking or assignment. For instance, if the verb *arrive* has the denotation in (19), its sister comes to play the role of theme or 'arriver' via a λ-conversion.

(19) [|arrive|] = $\lambda x \in D_e$. x arrives
(20) [| John arrives |] = [[|John|] [|arrive|]] = [[|arrive|] (John) = [$\lambda x \in D_e$. x arrives] (John) = 1 iff John arrives.

In (20) there is no transfer of a thematic role, and instead, *John* is associated with the thematic role 'arriver' through a λ-conversion, which means that an argument must be a sister of its predicate.[2]

Let us compare Case assignment with theta role association. Once *who* is assigned nominative Case from T in (21), all the upper copies can keep the nominative Case feature.

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[2] This is quite minimalistic in the following sense. There is no morphological reflexes for thematic roles, which suggests that thematic role assignment does not involve syntactic operations. Notice that in the approach advocated here there is no syntactic operation involved in the course of assigning a thematic role.

(21) [$_{CP}$ who$_{[+nominative]}$ do you [$_{vP}$ ~~who$_{[+nominative]}$~~ think [$_{CP}$ ~~who$_{[+nominative]}$~~ [$_{TP}$ ~~who$_{[+nominative]}$~~ T ~~who$_{[+nominative]}$~~ like Mary]]]]

As a result, the Case feature can be maintained although the copy in the Case position is deleted. By contrast, a thematic role is not transferred to an argument, as evident by the fact that there is no morphological marker for a thematic role. Only the copy in the thematic position can get access to the thematic role via a λ -conversion and the other copies cannot carry any information about the thematic role. For instance, in (22) *which brother of John* itself has no feature for a thematic role, and only the lowest copy can be associated with the thematic role 'likee'. If so, it follows that the lowest copy must be interpreted at LF; otherwise, it is not possible to recover the information that *brother of John* is an argument of the predicate *λx[like(x)]*. Therefore, the lower copy is required to be interpreted at LF by the principle of recoverability.[3]

(22) Which brother of John does [$_{TP}$ he [he $_{\lambda y}$[v(y) [$_{\lambda x}$[like(x)] ~~which~~ brother of John]]]]?

On the other hand, the principle of recoverability also requires the copy in the SPEC of C to be interpreted as well, for it gives the information about the scope of *which*. If the highest copy is deleted at LF, the scope effect is not recoverable. Furthermore, the *wh*-operator must have scope over the whole clause. As a result, both the copy in the launching site and the copy in the landing site must be interpreted in compliance with the principle of recoverability, as illustrated in (23).[4]

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[3] In the copy theory what is meant by 'deletion' is complete deletion. There is nothing left in the lower copy position after deletion.

(i) a. Which book did you buy ~~which book~~?
b. which book did you buy t?

This is different from the trace theory. In the trace theory movement leaves behind a trace, and the trace is interpreted as a variable. Under the copy theory advocated here, however, nothing is left after deletion, and so there is no constituent that bears a thematic relation with the predicate. As a consequence, the restriction must be interpreted in the theta-position.

[4] In short, when *wh*-movement takes place, split spell-out takes place. There are two different approaches to the split spell-out. Chomsky (1995) proposes that only the *wh*-operator stays in the operator position, that is, in the SPEC-C, and its restriction is interpreted in the theta-position.

In the representation *he* c-commands *John*, and they therefore cannot make a co-referential relation.

(23) which brother of John does he v $\lambda x$[like(x)] ~~which~~ brother of John

The upshot of the claim is that an argument is related with its thematic role not via a syntactic operation but via a semantic operation: a thematic role bearer—a predicate—is a functor, and its sister comes to be associated with its thematic role via a λ-conversion. A consequence of this claim is that the copy that is a sister with a predicate must not be deleted, which gives rise to reconstruction effects.

## 3.2 Anti-Reconstruction Effects in A-movement and Optional DP-Movement

In the preceding subsection I have claimed that there must be a copy in the thematic position at LF, since a thematic role cannot be syntactically transferred to its argument. If this claim is correct, however, it is puzzling that in (3b), that is, in (24), *John* and *him* can be co-referential.

(24) Every brother of John seems to him to like Mary.

This puzzle is resolved if we consider that a thematic role is not a syntactic feature and so it is not subject to the principle of earliness. Sentences like (25a) cannot be generated if a predicate—a thematic role bearer—must merge with an argument as soon as it is introduced into the syntax.

(25) a. Mary sings and dances. b. [Mary [sings [and [dances]]]]

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(i) Which ~~book~~ did you read ~~which~~ book?

On the other hand, Fox (2000) proposes that both the *wh*-operator and the *wh*-restriction are interpreted in the landing site and the operator is deleted in the launching site.

(ii) which book did you read ~~which~~ book?

In this paper I tentatively assume that the second approach is correct.

In (25a) *sings* and *dances* are conjoined first, and then *Mary* merges with the complex predicate *sings and dances*.[5] This suggests that a thematic role bearer may not merge with an argument at the earliest possibility: a thematic role or a thematic variable is not a syntactic feature that requires a syntactic operation. Sentence (25a) is well-formed because the thematic variable of *sings* and *dances* can be bound later when *Mary* merges with the complex predicate *sings and dances*: in (25b) *Mary* is a sister of the complex predicate, which is interpreted as 'λx[x sings and x dances]', being associated with the thematic variable of the complex predicate.

If there is no need to merge a predicate with its argument as early as possible, there is no need for *John* to merge with *sick* in (26) as long as it can be associated with the thematic role of *sick*.

(26) John seems sick.

Let us examine whether the SPEC-T position can be associated with the thematic role of *sick*. According to Williams (1981, 1987, 1994) and Di Sciullo and Williams (1987), a complex predicate can be generated via the mechanism of 'function composition'. In (27a) the predicate *seem* is a functor taking *sick* as its argument, and the functor does not have its own external thematic role: that is, *seem* is of <<e,t> <e,t>> type. In this case, the functor can take the external thematic role of its complement as its external thematic role via function composition.

(27) a. [| [$_{VP}$ seem [$_{AP}$ sick]] |] = [| seem |] (λx ∈$D_e$. sick(x)): function composition
b. λx ∈$D_e$. [seem ° sick(x)]

There is no LF in Williams (1981, 1987, 1994) and Di Sciullo and Williams

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5 If we make use of the predicate-internal subject hypothesis, there is another possible derivation for (25a), as illustrated in (i).

(i) [Mary [$_{vP}$ t sings] & [$_{vP}$ t dances]]

The structure (i) gives the reading in which the singing event and the dancing event are separate events. On the other hand, (25b) gives the reading that *sings* and *dances* constitute a single event. Since (25a) gives both the single event reading and the separate event reading, both derivations are required.

(1987). So the function composition is a syntactic operation in their analysis. But I propose that it is a last resort LF operation to resolve the type mismatch problem. The predicate *sick* requires an <e> type, but *seem* is not of <e> type. In this context, the function composition takes place: that is, the λ-operator is percolated in an attempt to find an <e> type argument. There is a condition on function composition to the effect that the functor must have no external argument. If it has an external argument, the λ-operator cannot be percolated. The raising verb *seem* does not have an external argument, and so function composition is permitted in (28a). Precisely, function composition takes place iff (i) the sister of a one-place predicate is not of <e> type but of <<e,t> <e,t>> type. As shown in (28b), the function composition—the λ-operator percolation—enables *John* to be associated with the thematic variable although it is base-generated in the SPEC-T.

(28) a. [John [$_{VP}$ seem $_{\lambda x}$[sick(x)]]]: function composition (=λ-operator percolation)
b. [John $_{\lambda x}$[seem [ sick(x)]]]

If a thematic role does not trigger a syntactic operation and function composition is available, then there is no driving force to require an argument to merge with its predicate as early as possible; the only driving force for external merge is 'reduce the numeration'. In this approach there are several different ways of deriving the same PF string. Given the numeration in (29), the predicate *sick* can merge with *John*, or it can merge with *be*. If it merges with the DP *John*, (30b) is generated after a series of trivial mergers and DP-raising.

(29) numeration: {John, sick, be, to, seem}
(30) a. [T seem to be [$_{\lambda x}$[sick(x)] John]]: DP-raising
b. [John T seem to be [$_{\lambda x}$[sick(x)] John]]

If, on the other hand, it does not merge with *John*, the string (31a) is generated.[6] In (31a) *sick* requires an <e> type argument, but *be* cannot satisfy it. The type mismatch can be resolved via function composition. In fact, *to*, *seem*, and T cannot

6 Williams (1987) proposes that NP-traces are base-generated in thematic positions, while assuming that thematic role assignment is subject to the earliness principle.

satisfy the semantic requirement either, and in addition, they do not have their own external arguments: they are of <<e,t> <e,t>> type. So function composition can take place as a last resort to resolve the type mismatch problem. The function composition enables the λ-operator to be percolated up to T', making it a complex predicate.

(31) a. [John [T [ seems [ to [ be $\lambda x$[sick(x)]]]]]]: λ-operator percolation
b. [John $\lambda x$[T ~~$\lambda x$~~[seems ~~$\lambda x$~~[to ~~$\lambda x$~~[be ~~$\lambda x$~~[sick(x)]]]]]]

As a consequence, *John* can be associated with the thematic variable in (31b), since *John* is a sister of the complex predicate. In short, DP-raising may not be involved in generating the string *John seems to be sick*. It is now straightforward why *John* can be co-referential with *him* in (24)—in (32).

(32) Every brother of John [seems to him to like Mary]

If *every brother of John* can be base-generated in the SPEC of T, *him* cannot c-command *John* and so co-indexing these two constituents is compatible with the Binding Condition C.[7]

A-movement shows not only anti-reconstruction effects but also reconstruction effects. This is not surprising either since an argument can be base-generated in a thematic position as well as in a Case position. In (33a-b) *everyone* can be a binder for *his* and *himself*, respectively. It is because the subject can be base-generated in a thematic position, as illustrated in (34a-b).

(33) a. His$_i$ mother seems to everyone$_i$ to be beautiful.
b. Pictures of himself$_i$ seem to everyone$_i$ to be nice.
(34) a. His$_i$ mother seems to everyone$_i$ to be [beautiful his$_i$ mother]

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7 Even when *every brother of John* is base-generated as the sister of *like Mary*, it can be interpreted in the matrix SPEC-T if the lower copy is deleted.

(i) Every brother of John [seems to him to ~~every brother of John~~ like Mary]

In this case the copy in the matrix SPEC-T is associated with the theta-role when *seems to him to like Mary* comes to be a complex predicate via function composition.

b. Pictures of himself$_i$ seem to everyone$_i$ to be nice [pictures of himself$_i$]

In (35) there is a Binding C violation effect, which means that *him* can c-command *John*, which in turn means that in (34a-b) *everyone* c-commands the lower copy of *his* and *himself*, respectively.[8] Therefore, there is a connectivity effect in (34a-b).

(35) *It seems to him$_i$ that John$_i$ is a genius.

The fundamental difference between A-movement and A'-movement lies in the fact that the copy in A-position can be associated with a thematic role, but the copy in A'-position cannot. A-movement does not involve crossing over other argument(s). If there were an intervening argument, DP-movement would be blocked by the Minimal Link Condition. As a consequence, the argument in A-position can be associated with a thematic role via function composition. In (36) the λ-operator can be percolated up to T', since there is no intervening argument. As a result, *Mary* comes to be a sister of the percolated λ-operator, and consequently, can be associated with the theme role. *To him* appears to be a barrier to λ-operator percolation, but it cannot be, since it is not of <e> type.

(36) Mary $\lambda x$[$_{T'}$ seems $\lambda x$[to him to be $\lambda x$[sick(x)]]]

By contrast, A'-movement usually involves crossing over other arguments, and the intervening argument blocks the λ-operator percolation by functioning as an

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8 Let us consider following examples, which pose an interesting puzzle: *his* is bound by *everyone*, but *John* can be co-referential with *him*.

(i) a. His$_j$ picture of John$_i$ seems to everyone$_j$ to appear to him$_i$ to be funny.
b. His$_j$ picture of John$_i$ seem to him$_i$ to appear to everyone$_j$ to be funny.

This puzzle is resolved if we assume with Kim (2011) that the pronominal binding relation is created in the course of derivation, whereas the Binding Condition C applies at LF. According to this view, *his* can take *everyone* as its antecedent if *his picture of John* is generated as the sister of *funny*, and *John* and *him* can be co-referential if *his picture of John* is interpreted in the matrix SPEC-T.

argument of the percolated λ-operator. Furthermore, Williams (1987, 1994) proposes that C, as well as other arguments, is a barrier to theta role percolation: C does not permit function composition.

(37) XP ⋯ [$_{CP}$ that $_{\lambda x}$[ ⋯x⋯ ]]
|_____|
*

We can derive Williams' proposal from the condition that function composition is not permitted if a functor has an external argument. Function composition is an operation which enables a functor to take the external argument of its complement to be its own external argument, but if the functor has its own external argument, function composition cannot take place. One potential external argument of C is the world argument W: that is, if we assume that C is of <t, <s, t>> type, it does not allow function composition. As illustrated in (38), C requires a <s, t> type external argument as well as a <t> type internal argument, which blocks function composition. That is, only the <X, X> type permits function composition, and so C, being of <t <s,t>>, does not permit function composition.

(38) [$C_{<t,<s, t>>}$ $_{\lambda x}$[$_{TP}$ ⋯x...]]

To recapitulate, since an intervening argument and C do not permit λ-operator percolation, a thematic role cannot be percolated to A'-position via function composition. On the other hand, the thematic role can be percolated to A-position. This contrast gives rise to the A/A' reconstruction asymmetry.

## 4. Consequences of the Thematic Approach

Thus far, I have made two claims: (i) a thematic role is not transferred to an argument via a syntactic operation, but rather, it is associated with its sister via a semantic operation—a λ-conversion, which brings about the reconstruction effects of A'-movement, and (ii) a λ-operator, which is a link for a thematic role, can be percolated via function composition, which gives rise to the optional DP-raising and

consequently to optional reconstruction effects of A-movement. There are many interesting consequences of these two claims. This section shows that these two claims shed light on the complement/adjunct asymmetry, Barss's generalization, and the predicate/non-predicate asymmetry.

## 4.1 The Complement/Adjunct Asymmetry

We have generalized that A'-movement displays obligatory reconstruction effects, but the generalization is confined to the case in which the *wh*-restriction contains a complement. Even A'-movement does not show reconstruction effects when the restriction contains an adjunct (Riemsdijk and Williams 1981, Freidin 1986, Lebeaux 1988).

(39) a. *Which picture of $John_i$ did $he_i$ buy?
b. Which picture that $John_i$ liked did $he_i$ buy?

A well-known analysis for this asymmetry is Lebeaux's (1988) late-insertion approach, according to which adjuncts, unlike complements, can undergo countercyclic merger. The thematic approach advocated here, however, enables us to explain the complement/adjunct asymmetry without recourse to countercyclic merger. Let us recall that there must be a copy not only in the landing site and but also in the launching site; without the copy in the landing site, the information about the scope effect of movement is not recoverable, and without the copy in the launching site, the thematic information is not recoverable.

(40) which NP ⋯ ~~which~~ NP
Landing site Launching Site

The *wh*-restriction in the launching site is redundant, and the redundant constituent is required to be as minimal as possible in accordance with the principle of economy. The smallest restriction of *which pictures of John* is *picture*, but (41a) cannot be represented as (41b), for the variable x in the lower copy of *picture(x)* cannot be bound in the representation.

(41) a. Which picture of John$_i$ did he$_i$ buy?
b. Which [$_{NP}$ [$\lambda$x picture$_{(x)}$] of John] did he buy [$_{NP}$ [$\lambda$x picture$_{(x)}$]]

If a thematic role could be transferred to its argument, the lower copy would not contain a variable. Since it cannot be given away to its argument, however, every copy of *picture* contains a thematic variable. This means that in (41a) the minimal well-formed restriction is *picture of John*: that is, (41a) must be represented as (42). This representation is ill-formed on account of the Binding Condition C.

(42) Which [$_{NP}$ picture$_{(x)}$ of John] did he buy [$_{NP}$ picture$_{(x)}$ of John][9]

Let us now turn to (39b)—(43a). Once again, the restriction of *which* must be interpreted not only in the thematic position but also in the operator position, and the principle of economy requires the lower copy to be as minimal as possible, since it is redundant. In (43a) the smallest restriction is *picture* and it has no internal theta role—no variable, which means it is possible to delete the adjunct clause attached to the copy in the thematic position, as illustrated in (43b).

(43) a. Which picture that John$_i$ liked did he$_i$ buy?
b. Which [[$_{NP}$ picture] [that John$_i$ liked]] did he$_i$ buy [[$_{NP}$ picture] ~~[that John$_i$ liked]]~~

Therefore, (43a) is grammatical.[10]

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9 I assume that QR is analogous to *wh*-movement in that the restriction of the lower copy must be interpreted in the theta-position. For instance, when *everyone* undergoes QR in (i), its LF looks like (ii).

(i) John read every book
(ii) [every book [John read ~~every~~ book]]

10 It is noteworthy that the Binding C violation effect in (ia) disappears when the *wh*-restriction is attached by a relative clause: (ib) is grammatical although (ia) is not. With an eye to explaining this contrast, Takahashi and Hulsey (2009) assume that in (ib) the complement of *which* is not an NP but a CP: the *wh*-phrase is analyzed as (ii).

(i) a. *[Which corner of John$_i$'s room] was he$_i$ sitting in?
b. [Which corner of John$_i$'s room that Mary repainted] was he$_i$ sitting in?
(ii) [$_{DP}$ Which [$_{CP}$ corner of John$_i$'s room that Mary repainted]] was he$_i$ sitting in?
According to them, CP is not assigned Case and so can undergo wholesale late merge, with the

## 4.2 Barss' generalization

It is well-known that sentence (44a) is ambiguous with regard to the scope interaction between *someone* and *likely*, but the ambiguity disappears when AP-preposing takes place: only the 'someone>likely' reading is available from (44b).

(44) a. Someone from New York is likely to win the lottery. (someone> likely, likely>someone)
b. How likely to win the lottery is someone from New York? (someone>likely, *likely>someone) (Lasnik and Saito (1992))

In (44b) *someone* cannot c-command its original launching site at the overt syntax, which leads Barss (1986) to generalize that total scope reconstruction to a certain position X is not possible when an A-moved QP fails to c-command X in the overt form.[11]

I propose that the contrast in (44) arises from the fact that the option of DP raising is not available in (44b), unlike in (44a). Let us suppose that *someone* is generated inside vP. If so, (45c) is generated after subject-raising and *wh*-movement.

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result that *John* is not c-commanded by *he* in the course of the derivation. We can reinterpret their proposal as follows: CP, unlike NP, is not a complement of *which* but an adjunct.

(iii) [$_{DP}$ which [$_{CP}$ corner of John$_i$'s room that Mary repainted]] was he$_i$ sitting in [$_{DP}$ which ~~[$_{CP}$ corner of John$_i$'s room that Mary repainted]~~]?

If so, *which* does not contain a variable and the principle of economy requires the CP in the launching site to be deleted. As a consequence, *John* can be co-indexed with *he*. Following Fox (1999, 2002), I assume that a variable is inserted into the lower copy and the determiner is replaced by *the* in accordance with Trace Conversion.

(iv) Trace Conversion
Variable Insertion: (Det) Pred → (Det) [Pred λy(y=x)]
Determiner Replacement: (Det) [Pred λy(y=x)] → the [Pred λy(y=x)]

[11] Assuming that Barss's generalization is correct, Sauerland and Elbourne (2002) propose that the generalization follows if raising to the SPEC-T can take place either at the narrow syntax or at PF.

(i) a. [T$_{[EPP\ for\ syntax]}$ …Subject…]: subject raising at the narrow syntax
b. [T$_{[EPP\ for\ PF]}$ …Subject…]: subject raising at PF

(45) a. [T be [$_{VP}$ (be) [$_{AP}$ how likely someone from NY to (someone from NY) win the lottery]]]: raising of *someone from NY*

b. [$_{TP}$ someone from NY [T be] [$_{VP}$ (be) [$_{AP}$ how likely (someone from NY) to (someone from NY) win the lottery]]]: merger of C, T-to-C movement, and *wh*-movement

c. *[$_{CP}$ [$_{AP}$ how likely (someone from NY) to (someone from NY) win the lottery] [[T be] C] [$_{TP}$ someone from NY (T be) [$_{VP}$ (be) ([$_{AP}$ how likely (someone from NY) to (someone from NY) win the lottery])]]]

The problem with (45c) is that the copy of *someone from NY* inside the raised AP cannot be c-commanded by the copy in the SPEC-matrix T. Let us say that chains cannot be created on account of the inclusiveness condition. If so, there is no way to find out whether or not a certain expression is an outcome of a copy operation unless there is a local c-command relation among the copies of the same chain. In the course of the derivation, however, the *someone from NY* inside the raised AP comes to occur outside the c-domain of the pronouncible copy in the SPEC-matrix T: that is, it cannot find a c-commanding antecedent. This leads to a contradiction at PF: the copy of *someone from NY* in the fronted AP must be deleted, since it is Caseless, but it cannot, since it cannot find its antecedent. Therefore, the representation (45c) is ill-formed.[12]

(46) [CP [AP how likely (someone) to (someone) win the lottery] [[T be] C] [TP someone …

*c-command. Hence *deletion.

I have argued that there is an option of base-generating *someone from NY* in the SPEC-matrix T. If *someone from NY* occupies the SPEC-T via an external merger,

12 We can reach the same conclusion if we follow Nunes' (2004) theory of linearization. Nunes (2004) proposes that copy deletion is required to satisfy Kayne's (1994) Linear Correspondence Axiom (LCA). If there is an asymmetric c-command relation among the copies of the same chain, the LCA requires that the non-distinct copy precede and be preceded by itself. Nunes argues that this conflict is resolved if only the highest copy is pronounced. If this line of approach is correct, there is no need for copy deletion when there is no asymmetric c-command relation among the copies of the same chain, and as a consequence, in (45c) the *someone from NY* inside the raised AP cannot be deleted.

the fronted *wh*-phrase cannot contain the copy *someone from NY*, and so a well-formed string is generated: that is, (47c) is well-formed. In the representation *someone from NY* is not c-commanded by *likely*. It is therefore not surprising that the 'likely>someone' reading cannot be available from (44b).[13]

(47) a. [$_{TP}$ [T be] [$_{VP}$ (be) [$_{AP}$ how likely to win the lottery]]]: merger of *someone from NY*
b. [$_{TP}$ someone from NY [T be] [$_{VP}$ (be) [$_{AP}$ how likely to win the lottery]]]: merger of C T-to-C Movement and *wh*-movement
c. [$_{CP}$ [$_{AP}$ how likely to win the lottery] [[T be] C] [$_{TP}$ someone from NY (T be) [$_{VP}$ (be) ([$_{AP}$ how likely to win the lottery])]]]

## 4.3 The Predicate/Non-Predicate Asymmetry

We have seen from 3.1 that adjuncts show anti-reconstruction effects. Interestingly, if an adjunct is part of dislocated VP/AP, it shows total reconstruction effects (Fox (1999), Freidin (1986), Lebeaux (1988), and van Riemsdijk and Williams (1981)). In (48a) *each other* can be bound by *Bill and Mary*, and in (48b) *he* and *an old painter* cannot be co-referential. This suggests that the predicative phrase displays obligatory reconstruction effects.

(48) a. [Visit each other's friends]$_i$, you think they said Bill and Mary will $t_i$.
b. [Pleased with [an old painter]]$_i$, I think he was $t_i$.

Huang (1993) argues that the predicate-internal traces bring about the reconstruction effects: in (49a-b) the trace inside the fronted VP can function as an antecedent for *each other*, and triggers Binding C violation effects.

(49) a. [$t_j$ visit [each other] $_j$'s friends]$_i$, you think they said [Bill and Mary]$_j$ will $t_i$.
b. [$t_j$ pleased with an old painter]$_i$, I think he$_j$ was $t_i$.

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[13] Lasnik and Saito (1992) propose that *likely* can be a control predicate as well as a raising predicate, and (44b) must be analyzed as a control construction.

However, this proposal cannot cover (50a-c). In (50a) the trace in the fronted VP is co-indexed with *Mary*, and it has nothing to do with the fact that *he* and *John* cannot be co-referential.

(50) a. *[$t_k$ criticize a student that John$_j$ taught]$_i$, he$_j$ said Mary$_k$ did $t_i$.
b. *[$t_k$ proud of a student that John$_j$ taught]$_i$, he$_j$ said Mary$_k$ is $t_i$.
c. *[how $t_k$ proud of a student [that John$_j$ taught]]$_i$ did he$_j$ say Mary$_k$ is $t_i$? (Takano 1995:332)

Takano (1995), like Huang (1993), capitalizes on traces but in a different way: he proposes that a trace is a bound variable and must be c-commanded by its antecedent at LF. In (49-50) the fronted VP contains a trace—an unbound variable that cannot be c-commanded by the matrix subject. He argues that the string with an unbound variable is ill-formed at LF. If the fronted VP is reconstructed, however, the unbound variable comes to be bound. Therefore, the fronted VP must undergo reconstruction.

(51) a. [$t_k$ criticize a student that John$_j$ taught]$_i$, he$_j$ says Mary$_k$ did $t_i$: reconstruction
b. he$_j$ says Mary$_k$ did [$t_k$ criticize a student that John$_j$ taught]

This proposal is problematic in the light of the claim made in 3.2—the claim that an ill-formed PF is generated if the fronted predicative phrase contains a lower copy or a trace: in the copy theory of movement (51a) is represented as (52a), which is ill-formed because *Mary* in the fronted vP cannot be deleted at PF. So the correct PF representation must not contain a vP-internal subject, as illustrated in (52b).

(52) a. [Mary criticize a student that John$_j$ taught]$_i$, he$_j$ says Mary$_k$ did [Mary criticize a student that John$_j$ taught]$_i$
b. [criticize a student that John$_j$ taught]$_i$, he$_j$ says Mary$_k$ did [criticize a student that John$_j$ taught]$_i$

As Takano claims, LF must not contain an unbound variable. What is problematic about Takano's proposal is that traces are not variables. Traces are

copies in the copy theory, and copies are not variables. On the other hand, thematic roles are variables, and they must be bound. According to the proposal advocated here, at LF sentences (50a-c) are represented as (53a-c), respectively. The fronted predicative phrases as well as the predicative phrases in situ have a variable, for thematic roles cannot be given away to their arguments and consequently, all copies of predicative phrases contain a variable. The variable in the fronted predicative phrases cannot be bound, although those of the predicative phrases in situ can be bound via function composition—λ-operator percolation and λ-conversion.

(53) a. ~~[λx criticize a student that John$_1$ taught(x)]~~, he$_1$ said Mary [λx did [λx criticize a student that John$_1$ taught(x)]]
b. ~~[λx proud of a student that John$_1$ taught(x)]~~, he$_1$ said Mary [λx is [λx proud of a student that John$_1$ taught(x)]]
c. ~~[λx how proud of a student [that John$_1$ taught(x)]]~~ did he$_1$ say Mary [λx is [λx how proud of a student [that John$_1$ taught(x)]]]?

Accordingly, a well-formed LF can be generated only if the fronted copies are deleted, which results in total reconstruction effects.[14]

## 5. Conclusion

This article has attempted to explain the A/A'-distinction from the perspective that Case positions can be theta positions. In minimalism, syntactic operations are triggered by morphological features, but there are no morphological reflexes for thematic roles, which cast doubt on the possibility that a thematic role is a syntactic

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[14] Heycock (1995) points out that the adjunct that is adjoined to a definite expression show no reconstruction effects.

(i) a. *How afraid of some question Gore has not prepared for do you think he is now t?
b. How pleased with the pictures Pollock painted long ago do you think he is now t?

In order to resolve this problem, Sportiche (2006) proposes that definite expressions undergo topicalization. Another possibility is that definite expressions are interpreted in the landing site.

(ii) how ~~pleased with~~ [the pictures Pollock painted long ago] [do you think he is now [~~how~~ pleased with the pictures ~~Pollock painted long ago~~]]

feature. I have advocated the view that (i) arguments are associated with their thematic role via a λ-conversion, and (ii) a λ-operator can be percolated via function composition, with the result that (i) there must be a copy in a thematic position, and (ii) a Case position can be a thematic position. I have shown that this semantic approach provides a principled account for the A/A'-asymmetries at LF and PF, the complement/adjunct asymmetry, Barss's generalization, and the predicate/non-predicate asymmetry.

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