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Exploring the EM-only hypothesis*

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Lee, Kyoungmi. 2025. Exploring the EM-only hypothesis. *Linguistic Research* 42(1): 141-167. This study critically examines Kitahara and Seely's (2024) proposal for deriving the Duality of Semantics—the distinction between propositional and clausal domains—through a strengthened version of Minimal Yield (MY) and a expanded definition of Accessibility. Their framework, refining Chomsky's (2023a) box system, eliminates the explicit distinction between External Merge (EM) and Internal Merge (IM), arguing that IM occurs only once to delineate the two thought domains. While this approach reduces reliance on stipulative distinctions, it raises some conceptual challenges, including the fixed composition of the workspace (WS), the necessity of IM, and look-ahead problems inherent in finite WS configurations. To address these issues, we propose an EM-only system that eliminates IM entirely, thereby simplifying derivation while adhering to minimalist principle. In this system, both arguments and non-arguments are introduced via EM, remaining accessible to phase heads for interface interpretation. By employing dynamic lexical selection during derivation, this approach avoids look-ahead problems and aligns with the Markovian property of syntactic computation, which excludes reliance on prior stages of derivation. The EM-only system, independent of IM, offers a simpler, more parsimonious framework for syntactic theory while maintaining the capacity to account for diverse syntactic phenomena. **(Kyungpook National University)**

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1. Introduction

Language, as a thought-generating system, encompasses two distinct domains of

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thought: the propositional domain and the clausal domain. This is referred to as the Duality of Semantics. According to Chomsky (2020, 2023a), the propositional domain pertains to argument structure, involving theta roles and the interpretation of complements of functional elements. In contrast, the clausal domain is associated with displacement, reflecting discourse- and information-related properties, such as scope, topic, and focus.[1] Chomsky (2021, 2024) further observes that A-positions, associated with theta and argument positions, provide the core semantics, while A'-positions correspond to discourse- and information-related properties. This A/A'-distinction forms the basis of the Duality of Semantics.

Crucially, External Merge (EM) is associated with theta structures, while Internal Merge (IM) is often linked to clausal properties involved in displacement. However, IM is not exclusively tied to A'-positions, as it also applies to A-positions involved in subject or object raising[2]. Instead of maintaining a strict A-/A'-distinction, Chomsky (2023a) asserts that Merge, the primary structure-building operation, is divided into EM and IM. These operations, satisfying Principle T, are essential for generating propositional and clausal semantics. Specifically, Chomsky (2023b) posits that EM generates the semantic properties of the propositional domain, while IM yields the semantic properties of the clausal domain.

(1) Principle T (Chomsky 2023a: 5)
All relations and structure-building operations are thought-related, with semantic properties interpreted at CI (conceptual-intentional interface).

The Duality of Semantics and its connection to Merge raise theoretical questions. Kitahara and Seely (2024) challenge the necessity of explicitly dividing Merge into EM and IM. They argue that the effects of the Duality of Semantics can be derived

1 While Chomsky (2020) introduces this distinction as a general property of language, Chomsky (2023a) explicitly links it to two categories of thought: the propositional domain, defined by basic theta structure, and the clausal domain, encompassing force- and information-related elements.

2 An anonymous reviewer suggests that IM may apply exclusively to A'-positions, based on a strict definition of argument positions. According to Chomsky (1981: 47), an A-position is defined as a potential theta position of an argument or a variable in D-structure. Furthermore, SPEC-INFL is also considered a potential theta position, as it can be occupied by an expletive (Chomsky 1995: 55). From this perspective, phase-internal Merges, such as SPEC-INFL and object-raising, are regarded as instances of A-movement to A-positions rather than A'-positions (Chomsky 2023a: 14). Therefore, IM is not restricted to A'-positions but can also apply to A-positions.

without stipulating this distinction, relying instead on a stronger version of Minimal Yield (MY) and their broader notion of Accessibility. Their proposal, however, raises another question about the role of IM (i.e., delineating two thought domains), which in turn prompts a broader consideration of whether IM can be entirely dispensed with.

A closer examination of empirical evidence raises doubts on the assumption that IM plays a primary role in transitioning from the propositional to the clausal domain. Some properties of the clausal domain—such as interrogative, topic, focus, and scope—are not exclusively derived from IM but can also result from EM. For example, studies argue that the adjunct *why* is externally merged in the clausal domain (see Rizzi 2001, Ko 2005, Stepanov and Tsai 2008). Additionally, Chomsky contends that SPEC-INFL is filled via IM although it belongs to the propositional domain due to its secondary semantic role. These observations challenge the claim that IM is essential for delineating the two domains of thought.

Merge, the simplest structure-building operation, is indispensable, and its two subcases—EM and IM—appear equally fundamental. If, as Chomsky and Kitahara and Seely argue, IM plays a role in delineating two domains of thought, the interpretive system must retain information about whether syntactic objects were introduced via EM or IM. This raises the question of whether such information is truly necessary for interpreting propositional and clausal semantics at the conceptual-intentional (CI) interface. The answer is negative. Semantic interpretation is determined by the structural relations between syntactic objects produced by operations, not by the specific manner in which those objects are introduced.[3]

Chomsky (2023a: 6) identifies three fundamental structural relations: *sisterhood, term-of,* and *c-command*. Of these, *sisterhood* pertains to the domain of EM, while *term-of* is associated with the domain of IM. The third relation, *c-command,* is typically associated with IM. The structure that represents *c-command* is called the *c-command* (cc-) 'configuration', which does not inherently depend on IM. If so, IM may not be necessary as an independent operation for establishing these relations.

This reconsideration of structural relations extends to control constructions, where copy relations arise from cc-configuration, independently of IM. If *c-command* does not depend on IM, then copy relations should also not require IM. Regardless of

3 Collins and Groat (2018) observe that only lexical items and structures formed through Merge with lexical items are interpreted at the interfaces.

whether the *controller* (antecedent) is introduced via IM (Hornstein 1999) or EM (Chomsky 2021, 2023a, b; Kitahara and Seely 2024), it forms a copy relation with the *controllee* (PRO, the empty pronominal). This fact follows from the Markovian nature of syntactic derivation, wherein each stage operates independently of its derivational history. Consequently, if copy relations and structural dependencies can be established without IM, then IM is not required as an independent syntactic operation.

Maintaining the distinction between EM and IM introduces unnecessary complexity without contributing to explanatory adequacy. Chomsky (2020, 2021, 2023a, b, 2024) asserts that IM is simpler than EM based on search. However, IM cannot operate independently of EM.[4] Since IM exclusively targets elements already introduced by EM, it does not function as an independent operation but instead presupposes EM. This makes EM the true foundational operation for structure building.

Since IM contributes no independent operation beyond what EM provides, we propose dispensing with IM altogether and redefining Merge solely as EM. This simplifies the theory of grammar by eliminating redundancy without loss of empirical coverage. Our proposal does not assume that IM is inherently problematic, but rather that EM alone can fully capture the effects attributed to IM. If a single operation can generate the same empirical outcomes as two, then maintaining both introduces unnecessary redundancy. Eliminating this redundancy enhances computational efficiency while preserving explanatory power.

Previous studies have raised similar arguments. For example, Koster (2007), Stroik (2009), and Im (2024) challenge the necessity of IM, while Mizuguchi (2023, 2024) contends that phase-internal movement (i.e., subject raising) is an instance of EM. Shim (2024) introduces the concept of Dynamic Access, which allows interface interpretation at the point of Merge, eliminating the need for IM entirely. Though we do not delve into these arguments, consult these approaches for alternative perspectives on eliminating IM.

This study critically evaluates Kitahara and Seely's proposal and explores the implication of an EM-only system for syntactic computation. Section 2 examines their

4 Move consists of Merge and Agree, making it more complex than its subcomponents, Merge and Agree (Chomsky 2000). In later minimalism, Merge is divided into EM and IM, with Move traditionally associated with IM.

Accessibility framework and MY, identifying conceptual and empirical issues. Section 3 proposes and develops the EM-only system, considering its explanatory advantages in light of the Markovian property of derivation. Section 4 concludes this study.

2. Minimal Yield (MY) and accessibility

Kitahara and Seely (2024) raise questions regarding Chomsky's (2023a) system (henceforth, the MC system), specifically why the first phase edge (i.e., the specifier of v*-phase, SPEC-v*) holds a special status that allows higher phase heads to consult its information instead of accessing elements through Minimal Search (MS). As an alternative, Kitahara and Seely propose a system (henceforth, the KS system) that removes this privileged status of the phase edge. Instead, their system relies on MS while maintaining subject and object shifts to SPEC-INFL and SPEC-V, respectively. These first internal merged (IMed) elements, though not placed at the phase edge, are accessible to higher phase heads.

In their 2024 ICSS presentation, Kitahara and Seely suggest that IM is conventionally required for agreement or Case through feature-checking. Moreover, IM is crucial in dividing domains into propositional and clausal categories. By unifying derivations in both the v*-phase and the C-phase, and proposing a restricted form of Minimal Yield (MY), they derive the effects of the Duality of Semantics.

This section examines how MY operates within the KS system and addresses some conceptual and empirical issues it raises.

2.1. Restricted Minimal Yield (Kitahara and Seely 2024)

In Chomsky (2021, 2023a), the concept of MY is introduced as a mechanism to restrict computational resources. This concept aligns with the notion of resource restriction discussed in Chomsky (2019, 2020, 2024), which limits the elements available for syntactic operations. This reduction of computational complexity supports the pursuit of genuine explanation. In simplified terms, if a workspace (WS) contains two objects, P and Q (i.e., WS=[P, Q]), the accessible objects for further operations are P and Q. After P and Q merged, the resulting WS' contains one new object, the set {P, Q} (WS'=[{P, Q}]). Thus, the number of accessible objects increases by only one,

from two in WS (P and Q) to three in WS' (P, Q, and {P, Q}). Chomsky defines all members of WS and their terms as accessible.

Kitahara and Seely (2024), however, propose a more restrictive version of MY, whereby accessibility decreases during derivation rather than increases. This difference stems from their narrow definition of accessible elements. While Chomsky treats all syntactic objects in WS and their terms as accessible, Kitahara and Seely limit accessibility to WS-members and their theta-marked terms.

Importantly, Chomsky distinguishes between accessibility and eligibility for Merge, whereas Kitahara and Seely do not. Under Chomsky's framework, eligibility for Merge is restricted to elements involved in theta structures. Specifically, EM produces theta structures, and IM applies to these theta structures. Kitahara and Seely adopt a similar approach by restricting accessibility to theta-marked terms but expand it to include WS-members (i.e., sets constructed within WS). They argue that Chomsky's eligibility condition for Merge is too restrictive (ICSS talk). Functional categories, for example, must enter the derivation even though their introduction is unrelated to theta structures. Therefore, Kitahara and Seely propose that both theta-related elements and WS-members are accessible to Merge, broadening the condition for Merge to align with free Merge. Their definition of accessibility is presented below:

(2) Accessibility (Kitahara and Seely 2024)
    a. WS-members are accessible to Merge
    b. theta-marked terms (in WS-members) are accessible to Merge
    c. a strong form of Minimal Yield: Merge never increases accessibility, and decreases accessibility when possible.
    [The term 'terms' refers to members of a member.]

To illustrate Accessibility (2), consider a WS containing two non-theta-marked members, *a* and *b* (WS=[a, b]). When these elements are merged, they form the set {a, b} in WS'. As a result of this operation, accessibility decreases from two to one. In WS, both *a* and *b* are accessible. After Merge, only the set {a, b} (a WS-member) remains accessible in WS'. Neither of the non-theta-marked terms *a* nor *b* is accessible in WS'.

If one of the WS members *a* is theta-marked and the other *b* is not, accessibility remains unchanged after Merge in WS'=[{a, b}]: the WS'-member {a, b} and the

theta-marked term *a*. However, if both *a* and *b* are theta-marked—a theoretically impossible scenario—Merge would increase accessibility from two to three in WS': the set {a, b}, and the two theta-marked terms *a* and *b*. Such an increase violates MY.

Kitahara and Seely deduce the Duality of Semantics without explicitly dividing Merge into EM and IM. They argue that under the Strong Minimalist Thesis (SMT), it is unreasonable for Merge, as a single structure-building operation, to bifurcate into two subtypes (EM and IM). Instead, they propose dispensing with the distinction. Furthermore, because both the instances of Merge (as suggested by the Duality of Semantics) relate to arguments through theta-relatedness, it becomes challenging to account for the introduction of non-arguments (e.g., functional categories) into derivations. To address this, Kitahara and Seely reject restricting Merge solely to theta-related elements. Instead, they assume that Merge, as the simplest structure-building operation in I-language, must be capable of selecting all members of the WS to construct a structure. In other words, both WS-members and theta-marked elements are accessible to Merge.

To evaluate their assumptions about Accessibility, it is necessary to examine their conception of the WS in greater detail. Kitahara and Seely define WS as a set of syntactic objects available for computation.[5] They also adopt Chomsky's (2021) FormCopy (FC), which determines copy relations upon phase completion. Consider the following derivation, where WS_1 contains two members: a non-theta-marked element P and a theta-marked element Q. (Here, n represents the number of accessible elements in the WS, and '!' indicates a violation of the system's constraints on accessibility.)

(3) (i) $WS_1=[P, Q]$ n=2
(ii) Merge(P, Q, WS_1) = [{P, Q}] = WS_2 n=2
(iii) Merge(Q, {P, Q}, WS_2) = [{Q_2, {P, Q_1}}] = WS_3
(a) Q_2 is not theta-marked n=2
(b) Q_2 is theta-marked !n=3

At step (ii), the Merge of the two members of WS_1 does not increase accessibility:

5 This definition raises potential look-ahead issues, as the manner in which WS is defined directly impacts accessibility. We will return to this issue in the next subsection.

there are two accessible elements in WS_2—the WS_2-member {P, Q} and theta-marked term Q—thereby adhering to MY. Now consider step (iii), where an identical inscription[6] of Q is merged with the WS_2-member {P, Q}. The resulting WS_3 contains the member $\{Q_2, \{P, Q_1\}\}$ (indices provided for clarity). Two scenarios arise depending on whether Q_2 is theta-marked.

If Q_2 is not theta-marked, accessibility remains unchanged, with two accessible elements-the theta-marked term Q_1 and the WS_3-member $\{Q_2, \{P, Q_1\}\}$. This outcome complies with MY. If Q_2 is theta-marked, accessibility increases from two to three—the theta-marked terms Q_1 and Q_2, and the WS_3-member $\{Q_2, \{P, Q_1\}\}$. This increase constitutes a violation of MY. From this analysis, the theta criterion can be deduced: ban on movement from a theta position to another theta position.

Kitahara and Seely extend their Accessibility framework to obligatory control constructions to illustrate how MY prohibits IM from theta positions (i.e., The Duality of Semantics). Consider the example below:

(4) Bill tries to leave.
  (i) WS_1=[{v, {tried, {to, {$Bill_1$, leave}}}}]
  (ii) WS_2=[{$Bill_2$, {v, {tried, {to, {$Bill_1$, leave}}}}}]

If $Bill_1$ undergoes IM to $Bill_2$ in (i), two accessible elements exist: the theta-marked term $Bill_1$ and the WS-member {v, {tried, {to, {$Bill_1$, leave}}}}. After applying IM of *Bill* in (ii), the number of accessible elements increases to three: the set {$Bill_2$, {v, {tried, {to, {$Bill_1$, leave}}}}}, and two theta-marked terms $Bill_1$ and $Bill_2$, *tryer* and *leaver* roles, respectively. This increase violates the constraints of MY, implying that movement from a theta position to another theta position is prohibited under MY.

In contrast, if $Bill_2$ is introduced via EM, MY is not violated. Consider the following:

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6 Chomsky (2023b) defines 'structurally identical' as follows:
'X and Y are structurally identical if they are identical in formal and semantic features and non-distinct in phonological and morphological features.'
Structurally identical elements can represent either repetition or copy relations. Copy relations are established between two identical elements if they are in the same phase (see Chomsky 2021, 2023a).

(5) Bill tries to leave.
(i) WS_1=[$Bill_2$, {v, {tried, {to, {$Bill_1$, leave}}}}]
(ii) WS_2=[{$Bill_2$, {v, {tried, {to, {$Bill_1$, leave}}}}}]

Here, WS_1 contains three accessible elements: two members *Bill*$_2$ and {v, {tried, {to, {$Bill_1$, leave}}}}), and theta-marked term *Bill*$_1$. After the two WS_1-members undergo EM in WS_2, the accessible elements remain the same: {$Bill_2$, {v, {tried, {to, {$Bill_1$, leave}}}}}, and the two theta-marked terms, *Bill*$_1$ and *Bill*$_2$. Since accessibility does not increase, MY is obeyed.

Thus, the desirable effect of Duality of Semantics can be achieved by following the definition of Accessibility in (2), without requiring explicit reference to EM and IM. Accessibility accounts for both EM to theta positions and IM to non-theta positions.

Kitahara and Seely further argue that their Accessibility can also derive the Phase Impenetrability Condition (PIC) effect. The PIC restricts movement across phase boundaries. To illustrate this, let us expand the derivation in (3) by introducing a phase head that merges with the WS_3-member {Q_2, {P, Q_1}}, as shown in step (iv) below:

(6) (i) WS_1=[ph, P, Q] n=3
(ii) Merge(P, Q, WS_1)=[ph, {P, Q}]=WS_2 n=3
(iii) Merge(Q, {P, Q}, WS_2)=[ph, {Q_2, {P, Q_1}}]=WS_3 n=3
(iv) Merge(ph, {Q_2, {P, Q_1}})=[{ph, {Q_2, {P, Q_1}}}]=WS_4 n=1

The Merge of a phase head with the WS_3-member {Q_2, {P, Q_1}} reduces accessibility in WS_4, consistent with Accessibility. Upon merging the phase head, the structurally identical inscription Q_2 forms a copy relation with Q_1. As a result, MS finds the non-theta-marked Q_2, rather than the theta-marked Q_1. At the phase level, no accessible theta-marked terms remain; only the WS_4-member {ph, {Q_2, {P, Q_1}}} is accessible. This accounts for the PIC effect, which prohibits movement across phases. Consider (7).

(7) John saw Bill
  (i) {saw $Bill_1$}
  (ii) {$Bill_2$ {saw $Bill_1$}}
  (iii) {v* {$Bill_2$ {saw $Bill_1$}}}

In (ii), *Bill*$_2$ and *Bill*$_1$ are repetitions until the derivation reaches the phase level. At the phase level (iii), *Bill*$_2$ becomes inaccessible because it is not theta-marked. Similarly, *Bill*$_1$, though theta-marked, is also inaccessible because *Bill*$_2$ and *Bill*$_1$ form a copy relation within the phase, and thus MS finds *Bill*$_2$ rather than *Bill*$_1$. Since *Bill*$_2$ is not theta-marked, there are no accessible terms in the set (iii). This illustrates the effect of PIC: after a phase is completed, movement across the phase boundary is prohibited.

In summary, Kitahtara and Seely propose that the effect of the Duality of Semantics —namely, the separating EM and IM—can be deduced from their notion of Accessibility. By employing a more permissible accessibility and a restricted version of MY, they claim that the effects of both the Duality of Semantics and the PIC can be derived without explicit reference to IM or EM. In their framework, IM occurs only once, merging an element from a theta position to a non-theta position—that is, from the propositional domain to the clausal domain. This single instance of IM separates the two domains. Once the derivation reaches the clausal domain, access is restricted to elements within that domain, excluding access to the propositional domain.

2.2 Challenges in Kitahara and Seely's proposal

Kitahara and Seely attempt to deduce the effects of the Duality of Semantics—namely, EM for theta structures and IM for non-theta structures—by employing a more permissive notion of accessibility and a restricted version of MY compared to Chomsky's framework. Their Accessibility is repeated below.

(8) Accessibility
  a. WS-members are accessible to Merge
  b. theta-marked terms are accessible to Merge

c. Merge never increases accessibility but decreases (restricted MY)

A key distinction between Kitahara and Seely's and Chomsky's Accessibility lies in the inclusion of WS-members as accessible elements. In Chomsky's framework, accessibility of Merge is limited to theta-marked terms. By contrast, Kitahara and Seely broaden accessibility to include WS members. This broader assumption requires a closer examination of how the WS is defined, as its composition directly affects accessibility. Kitahara and Seely conceptualize WS as a finite set of syntactic objects (SOs) available for computation and as the locus of syntactic computation[7].

(9) Workspace (WS) is a set of syntactic objects (SOs), those available for computation.

The WS, as defined by Kitahara and Seely, includes both atomic elements from the Lexicon (lexical items) and syntactic objects already constructed by Merge. The finite nature of the WS introduces potential look-ahead issues, as its composition directly determines accessibility. This non-trivial issue will be addressed later, following a discussion of accessibility.

Consider a WS with two members, P and Q, and the application of Merge, which maps WS to WS'. The resulting configurations of WS', which can be theoretically considered, are as follows:

(10) (i) WS=[P, Q] ← Merge(P, Q)
(ii) a. WS'=[{P, Q}, P, Q]
b. WS'=[{P, Q}, Q]
c. WS'=[{P, Q}]

According to Chomsky's (2020, 2021) MY, the derived WS' in (a) and (b) violates the Determinacy[8], leading to indeterminacy. For example, in (a), it is unclear which

7 Chomsky's definition of the WS is not accurately described as a finite set, especially in light of recent works (Chomsky 2020, 2021; Chomsky et al. 2023). These highlight the dynamic and evolving nature of the WS, describing it as a place where syntactic operations occur and where lexical items and derived objects are incorporated as needed.

8 Determinacy is one of the six desiderata outlined by Chomsky (2019) that computational operations in language should meet: Descriptive Adequacy, Recursion, Strong Minimalist Thesis, Stability, Restrict

instance of P should be selected, as there are two identical instances of P. To avoid this ambiguity, Chomsky's MY stipulates that the current state of WS (WS') must exclude items generated in the earlier operation.[9] This ensures that the valid configuration is (c), where WS' contains only the newly derived syntactic object (SO) {P, Q}. Under Chomsky's MY, Merge introduces no more than one new accessible item. Thus, the accessible SOs in the WS in (i) are P and Q, and in WS' in (c) they are P, Q and {P, Q}.

However, Kitahara and Seely's MY is more restricted: accessible SOs are limited to WS-members and theta-marked terms, without increasing the number of accessible items. Imagine a WS with two non-theta-marked SOs, P and Q, and the application of Merge to them, which is possible in cases of adjunction.

(11) Accessibility

(i)	WS=[P, Q] ← Merge(P, Q)	n=2 (P, Q)
(ii)	a. WS'=[{P, Q}, P, Q]	!n=3 ({P, Q}, P, Q)
	b. WS'=[{P, Q}, Q]	n=2 ({P, Q}, Q)
	c. WS'=[{P, Q}]	n=1 ({P, Q})

Although Kitahara and Seely's MY prohibits WS' in (a), it allows WS' in (b) and (c). However, a closer examination of WS' in (b) reveals a critical issue. In WS' in (b), the accessible items include {P, Q} and Q as WS'-members. Despite adhering to MY, WS' in (b) violates Determinacy condition, which prohibits the carryover of items that have already entered a Merge operation into the subsequent workspace. Once P and Q undergo Merge, they can no longer exist as members of the WS'. Consequently, WS' in (b) should not be acceptable.

Let us proceed to address the non-trivial look-ahead issue. Since the WS consists of a finite set of SOs that are preselected from Lexicon, Kitahara and Seely's argument that the effect of the Duality of Semantics can be derived through Accessibility is significantly weakened. To illustrate this, reconsider the obligatory control construction

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Computational Resources, and Determinacy. Epstein et al. (2022) expand this list by adding Strict Binarity, increasing the total to seven desiderata.

9 Syntactic derivations are strictly Markovian, meaning that the language system does not function like proof theory, where the history of derivation is preserved in the current state. In contrast, syntactic derivations do not retain their history in the current sate due to the constraints imposed by MY (Chomsky 2021: 21). For further discussion, see Section 3.

discussed previously.

(12) Bill tries to leave.
{$Bill_2$, {v, {tried, {to, {$Bill_1$, leave}}}}}

Kitahara and Seely argue that Accessibility accounts for why *Bill*$_2$ must be introduced via EM rather than IM, aligning with the Duality of Semantics. If *Bill*$_2$ enters derivation via IM, Accessibility increases because *Bill*$_2$, being theta-marked, becomes an accessible term alongside *Bill*$_1$. In contrast, if *Bill*$_2$ is introduced via EM, Accessibility remains unchanged.

However, the distinction between these scenarios does not depend on the operation itself (EM or IM) but rather on the initial composition of the WS. Consider the following options:

(13) a. WS_1=[{v, {tried, {to, {$Bill_1$, leave}}}}] n=2
IM of $Bill_2$
WS_2=[{$Bill_2$, {v, {tried, {to, {$Bill_1$, leave}}}}}] !n=3
b. WS_1=[$Bill_2$, {v, {tried, {to, {$Bill_1$, leave}}}}] n=3
EM of $Bill_2$
WS_2=[{$Bill_2$, {v, {tried, {to, {$Bill_1$, leave}}}}}] n=3

Kitahara and Seely's Accessibility explanation of the obligatory control structure is plausible only if we assume differing initial WS compositions for the two scenarios. In the IM case, there is only one inscription of *Bill* in WS as shown in (a), whereas in the EM case, there are two inscriptions of *Bill* in WS as shown in (b). This implies that the WS compositions differ from the outset. Ultimately, convergence depends on the initial WS compositions before the derivation begins—a hallmark of the look-ahead problem.

Nonetheless, a critical aspect of Kitahara and Seely's account warrants closer scrutiny. In both scenarios in (13), the WS_2 configuration is identical, containing two structurally identical inscriptions, *Bill*$_1$ and *Bill*$_2$. Due to the Markovian property of syntactic derivation (see footnote 9), it is indeterminate whether these inscriptions were introduced via EM or IM. Kitahara and Seely resolve this indeterminacy through Accessibility, noting that the two inscriptions are not considered copies until the phase

is completed. At the phase level, the structurally identical $Bill_1$ and $Bill_2$ form a copy relation, rendering the lower copy $Bill_1$ invisible.

This mechanism implies that, regardless of whether an inscription is introduced via EM or IM, it ultimately forms a copy relation with its identical inscription upon phase completion. Kitahara and Seely derive the effects typically attributed to EM and IM (i.e., the Duality of Semantics) through Accessibility, without explicitly referencing the two operations. This observation raises the intriguing possibility of an EM-only system, which entirely dispenses with IM from syntactic computation, inviting further exploration into a simplified derivational approach.

In the next section, we challenge the assumption that WS is preloaded with atomic elements before syntactic operations begin. Instead, we adopt Collins (1997), who argues that WS selects lexical items (LI) freely from the Lexicon as needed during the derivation, rather than operating with a fixed set. This perspective aligns with the concept of free Merge, allowing LIs to enter the derivation without prior restriction. Consequently, WS functions not as a predetermined set of syntactic objects but as a dynamic computational workspace, where elements are introduced in real time to construct derivations efficiently.

3. The EM-only system

3.1 Workspace and Minimal Yield

Kitahara and Seely view WS as a fixed set of syntactic objects available for computation. This set comprises lexical items drawn from the Lexicon and syntactic objects already constructed via Merge. Similarly, Fong et al. (2019) view WS as a finite set. Both groups recognize WS as having a dual role: both a dynamic place for syntactic computation and a repository of preselected lexical items from the Lexicon (the latter role is akin to Numeration[10]).

This conception imposes constraints on free Merge. If syntactic computation relies on a predefined and limited set of lexical items, it risks deviating from the principle

10 In Chomsky (1995: 227), Numeration is defined as a set of pairs, each consisting of a lexical item and an index. During the derivation, when a lexical item is selected, its associated index decreases by one.

of optimal design sought for the Computation of Human Language (CHL), as argued by Stroik (2009). Collins's (1997) Lexical Insertion offers an alternative view: lexical elements are copied directly from the Lexicon and immediately merged into the structure. In this system, Copy targets an element from the Lexicon, followed by Merge, as illustrated in (14).

(14) i. {T, {V, DP}}
ii. Copy DP (from Lexicon)
iii. Merge(DP, {T, {V, DP}}) = {DP, {T, {V, DP}}}

Im (2009) adopts a similar perspective, arguing that a lexical array is unnecessary since syntactic computation occurs directly within the Lexicon by selecting lexical items. Building on these views, we argue that lexical items are not preselected into WS creating a finite set for computation. Instead, WS should be understood primarily as a place for syntactic computation.

(15) Workspace
A place where syntactic operations take place.

For simplicity, and as Chomsky (2020) notes, WS should be kept as small as possible, restricting computation to the minimum necessary (i.e., minimizing the number of WS-members). To ensure this, the resources available to Merge must remain limited—a condition known as MY, or what Chomsky (2019, 2020) refers to as resource restriction, which serves as a desideratum for Merge.

Chomsky's (2020, 2021: 19) MY defines the accessible items in WS as WS-members and their terms. To obey MY, Merge should construct the smallest possible new items accessible to further operations, ensuring that the number of accessible items increases by one with each operation.[11] In contrast, Kitahara and Seely propose a stricter version of MY, as discussed in the previous section. Unlike Chomsky's MY, their MY focuses on items eligible for Merge, disallowing any increase in the number of items eligible for Merge during computation.

Merge is a simple binary set formation. If this is non-negotiable, the number of

11 Fong et al. (2019) interpret MY as defining the size of workspace, contending that the size of the WS cannot decrease.

items subject to Merge must be restricted to two (or one in cases of self Merge of nouns[12]). Furthermore, following Kitahara and Seely's framework, we extend eligibility for Merge beyond arguments to include non-arguments, such as functional categories, allowing Merge to target any two WS-members. Without preselected LIs from the Lexicon, Merge dynamically selects items one at a time, forming sets within WS.[13] In this system, any LI drawn from the Lexicon into WS, along with any sets already present within WS, can participate in Merge. Importantly, Merge operates exclusively on WS-members and does not apply to their terms.

3.2 The EM-only system

The grammar of the computational system of human language (C_{HL}) is Markovian, first introduced in Chomsky (1957) (see Baltin 2005 for challenges to this notion). Chomsky (et seq.) asserts that computation is strictly Markovian: it retains no memory of previous stage, meaning that earlier derivational steps are not preserved in the current stage.

Under this Markovian property, it becomes impossible to determine how structurally identical inscriptions enter the derivation when FormCopy (FC) operates through MS. FC selects an element X and searches for a structurally identical inscription Y at the phase level to establish a copy relation, denoted <X, Y>. This copy relation is established only at the phase level. Crucially, given the Markovian property, FC can apply to configurations that do not necessarily arise from internal Merge (IM). Chomsky (2021) refers to such configurations as Markovian gaps (M-gasp). Consider the obligatory control sentence again:

(16) Bill tries to leave.
{$Bill_2$, {v, {tried, {to, {$Bill_1$, leave}}}}}

At the phase level, the two identical inscriptions, *$Bill_1$* and *$Bill_2$*, form a copy relation <$Bill_2$, $Bill_1$> via FC. However, FC does not register how these inscriptions entered

12 A single element is asserted to undergo Merge independently to initiate a derivation. For discussions on root self/unary-Merge, see Adger (2013) and Lee and Kim (2024), for noun self-Merge, see Orüs et al. (2017) and Lee (2023).

13 Collins (1997) notes that Select is not a separate operation but rather an integral part of Merge.

the derivation. The conventional ban on movement from a theta position to another would suggest that both inscriptions entered via EM rather than IM. Nevertheless, FC itself is unaffected by whether the inscriptions entered through EM or IM. This follows directly from the Markovian nature of derivation, according to which how the derivation is developed is irrelevant to the syntactic configuration at the phase level.

This observation raises a fundamental question: why posit two types of Merge, EM and IM, when the Markovian property of derivation implies that how elements enter the derivation is irrelevant to FC? From a minimalist perspective, pursuing a genuine explanation requires questioning whether the distinction between EM and IM is truly necessary. If a single operation—Merge—could account for all syntactic configurations, it would significantly simplify the grammar.

To evaluate the necessity of IM, let us briefly examine the restricted applications of IM in the so-called box system proposed by Chomsky (2023a; henceforth, the MC system) and Kitahara and Seely (2024; henceforth, the KS system). Both frameworks place limitations on IM with distinct implications.

In MC system, IM, conforming to Principle T as defined in (1), is restricted to members of a theta structure. An element that has undergone IM from its theta structure to the phase edge cannot undergo IM again but is instead accessed by higher phase heads for interpretation, as if metaphorically 'boxed' at the phase edge.

(17) MC system
  a. what did John see
     $\{C_{[Q]}, \{John_2, \{INFL, \{John_1, \{what_2, \{v^*, \{V, what_1\}\}\}\}\}\}\}$
  b. who read the book
     $\{C_{[Q]}, \{who_2, \{INFL, \{who_1, \{v^*, \{V, the\ book\}\}\}\}\}\}$

In (17a), the internal argument (IA) undergoes IM to the lower phase edge (SPEC-v*) but does not proceed to SPEC-C. Instead, it is boxed at SPEC-v* and accessed by the phase head C for interpretation at the interfaces. In (17b), the external argument (EA) undergoes IM to SPEC-INFL but does not to SPEC-C. Unlike the IA at SPEC-v*, the EA at SPEC-INFL is not boxed nor accessed by C because SPEC-INFL is not a phase edge. Instead, the EA at SPEC-v* is accessed by C for instructions as it resides at the v*-phase edge[14].

Kitahara and Seely challenge several aspects of the MC system: First, what makes SPEC-v* so special that both the EA and IA at this position are accessible to higher phase heads, even though they are distinct in nature? For instance, the EA is theta-marked, whereas the IA is not; moreover, the EA belongs to the C-phase, while the IA belongs to the v*-phase. Another issue concerns assigning theta roles strictly based on structural positions. For example, in (18b), how can the system distinguish among potential theta-role options for XP?

(18) a. {C, {EA, {INFL, {EA, {IA, {v*, {V, IA}}}}}}}
b. {XP, {v* ...}}

Additionally, an empirical question arises: which copy of *who* can C access when both *who*$_1$ and *who*$_2$ are not at a phase edge?

(19) {$C_{[Q]}$, {who_2, {INFL, {was arrested who_1}}}}

To address these challenges, Kitahara and Seely propose a unified system for the v*P and CP domains that eliminates reliance on the phase edge concept. In their framework, both the IA and EA are first externally merged into theta structures, corresponding to the propositional domain. Subsequently, they undergo IM from the theta structure into non-theta structures, forming the clausal domain. Once in the clausal domain, these elements become accessible to later phase heads for the interpretation of clausal properties, such as interrogative, focus, and topic.

(20) KS system
a. what did John see
{$C_{[Q]}$, {$John_2$, {INFL, {$John_1$, {v*, {$what_2$, {V, $what_1$}}}}}}}
b. who read the book
{$C_{[Q]}$, {who_2, {INFL, {who_1, {v*, {V, the book}}}}}}
c. who was arrested
{$C_{[Q]}$, {who_2, {INFL, {was arrested who_1}}}}

14 According to Chomsky (2023b), phase heads access the SPEC position of the lowest phase for interpretation or computation.

The KS system provides a clearer separation between the propositional and clausal domains via IM than the MC system. This distinction is schematically illustrated as follows:

(21) a. MC system

	C-phase	v*-phase
Propositional	{EA, {INFL, {EA	{V, IA
Clausal	{C,	{IA, {v*,

b. KS system

	C-phase	v*-phase
Propositional	{INFL, {EA	{V, IA
Clausal	{C, {EA,	{v*, {IA,

Simply put, in both the MC and KS systems, IM distinguishes the interpretation at the interfaces between the propositional and clausal domains, except when targeting SPEC-INFL in the MC system. However, the KS system departs from the MC system in that it is independent of the phase edge. Instead, accessibility to later phase heads is determined by an element's presence in the clausal domain.

These IM-restricting systems, however, raise a significant conceptual question: if IM moves elements from the propositional to the clausal domain, making them accessible to phase heads in the clausal domain, why can those phase heads not directly access elements in the propositional domain? In other words, if clausal phase heads can interpret elements moved via IM, what fundamentally prevents them from directly accessing elements in the propositional domain without requiring IM? This tension suggests that the justification for one-time-only IM requires further conceptual support.

Additionally, given the Markovian property of derivation discussed in the context of obligatory control constructions, there appears to be no compelling need to maintain two distinct types of Merge (EM and IM). For these reasons, we propose an EM-only system, which provides a more parsimonious explanation within a minimalist framework and aligns with the pursuit of genuine explanation.

(22) EM-only system

	C-phase	v*-phase
Propositional	{INFL, {EA	{V, IA
Clausal	{C,	{v*,

In the EM-only system, arguments are introduced into the derivation (ultimately at theta positions) via EM to build the argument structure of predicates. These arguments do not undergo movement throughout the derivation; in other words, there is no IM in this system. Instead, the EMed arguments at their theta positions remain accessible to later phase heads, which consult them for interpretations at both the Conceptual-Intentional (CI) and the Sensory-Motor (SM) interfaces.

Notably, EM is not restricted to filling theta positions; it can also target non-theta positions such as SPEC-INFL[15] or clausal-initial positions. Consider the sentences in (23), which illustrate *there*-constructions and *tough*-movement, respectively.

(23) a. There are people in the room.
b. Many books are easy for John to read.

According to Chomsky (1995), the Extended Projection Principle (EPP) and Agree for φ-feature checking are distinct processes. In *there*-constructions as in (23a), the expletive *there* can be analyzed as externally merging into SPEC-INFL to satisfy EPP. Similarly, in *tough*-construction (23b), Chomsky (2021) suggests that the matrix subject *many books* is introduced into SPEC-INFL via EM, thereby avoiding improper movement that would arise if *many books* underwent successive-cyclic movement.

Further instances of EM into non-theta position include hanging topics and high adverbials, as illustrated in (24) and (25), respectively.

(24) a. John, Mary doesn't like that little bastard. (Cinque 1997: 100)
b. Luigi, Maria è andata via senza parlar-gli.
Luigi Maria is gone away without talk.INF-IO.CL
'Luigi, Maria left without talking to him.' (Stark 2022: 10)

(25) a. Clearly, they saw the sign. (≠ They saw the sign clearly.)

15 Chomsky (2023a) considers SPEC-INFL a position for assigning secondary semantic roles.

b. Strangely, Jessica was explaining it.
(≠ Jessica was explaining it strangely.)
(Blümel and Goto 2024)

Hanging topics, as shown in (24), appear in utterance-initial positions. Despite the presence of resumptive elements in these sentences, hanging topics are not syntactically connected to them (Cinque 1997). High adverbials, as in (25), are merged in positions higher than their canonical clause-internal counterparts. Blümel and Goto (2024) and Lee (2024) propose that adjuncts are introduced into syntactic structures via EM directly into non-theta positions, rather than undergoing IM.

To summarize, in the EM-only system, elements introduced via EM either into theta positions or non-theta positions remain visible to later phase heads for interpretation. The following illustrates an example of the EM-only system.

(26) Bill tried to leave
$\{Bill_3, \{INFL, \{Bill_2, \{v, \{tried, \{to, \{Bill_1, leave\}\}\}\}\}\}\}$
EM EM EM

Here, all inscriptions of *Bill* are introduced via EM: $Bill_1$ and $Bill_2$ into theta positions, and $Bill_3$ into non-theta position SPEC-INFL. Since INFL is not a phase head, it cannot access theta-marked elements directly. Therefore, $Bill_3$ enters SPEC-INFL via EM.[16]

Next, consider conventional wh-movement in the EM-only system.

16 An anonymous reviewer raises concerns about the justification for the EM of SPEC-INFL. In fact, the requirement for SPEC-INFL is not inherently tied to how it is filled-whether by IM or EM. Filling of SPEC-INFL is conventionally attributed to the EPP (Extended Projection Principle), which functions as a cover term under the 'free Merge'. The EPP is often associated with labeling, as discussed in Chomsky (2013, 2015), Epstein et al. (2014), Gallego (2017), and Mizuguchi (2023).
The reviewer also questions the Case assignment of *Bill* and *who* in the surface subject position in (26) and (27), respectively. Case assignment for these elements is determined during externalization, reflecting [phi]-agreement (see Woolford 2003 and Lee 2021). This process occurs in a c-command configuration (Chomsky 2019), where agreement relations are established to ensure proper interface interpretation.

(27) a. Who was arrested
{$C_{[Q]}$, {who_2, {INFL, {v, {V who_1}}}}}
EM EM
b. who saw what
{$C_{[Q]}$, {who_2, {INFL, {who_1, {v*, {V, what}}}}}}
EM EM EM

In wh-interrogative constructions, the phase head C must value its Q-feature by searching for EMed elements. MS finds the higher copy between two structurally identical inscriptions in a c-command configuration.[17] In (27a), C finds *who*$_2$, and in (27b), it finds both *who*$_2$ and *what*, valuing their Q-features. At this moment, instructions for the externalization of the wh-phrases are determined.[18] Thus, sentence

17 An interesting question arises from an anonymous reviewer regarding the copy relations of pronouns. If pronouns-particularly first-/second-person pronouns-enter the derivation from the Lexicon via EM, what factors of pronouns should be considered when determining whether these pronouns qualify as 'identical' elements? (See footnote 6 for the definition of 'structurally identical.') Examine the following examples:

(i) a. John expected him to adopt him.
... {expect, {him_3, {to, {him_2, {adopt him_1}}}}}
b. *John expected me/you to adopt me/you.
... {expect, {me_3/you_3, {to, {me_2/you_2, {adopt me_1/you_1}}}}}

Pronouns in (i) are referential. In (a), the third-person pronoun him refers to different referents, while in (b), the first-/second-person pronouns *me/you* refer to the same referent. According to our EM-only system, those pronouns are introduced into derivation from the Lexicon via EM. Specifically, *him*$_1$, *him*$_2$ and *him*$_3$ are theta-marked as *adoptee, adopter, and expectee,* respcectively. Copy relations are formed between *him*$_2$ and *him*$_3$, and the higher copy *him*$_3$ is externalized at the SM. However, copy relations are not formed between *him*$_1$ and *him*$_2$ because they belong to different phases (i.e., *him*$_1$ is merged into v*-phase, but *him*$_2$ is merged outside of it). This pattern is also observed in (b). However, first-/second-person pronouns differ from third-person pronouns in a crucial way: the former have fully specified person features, encoded as speaker/addressee, whereas the latter have defective person features (Kratzer 2009). Consequently, first-/second-person pronouns that belong to different phases in (b) cannot be considered repetitions. In contrast, third-person pronouns in (a) qualify as repetitions.

18 Wh-phrases introduced via EM are consulted by phase-heads to determine interface interpretation and externalization. The examples in (i) illustrate optionality of preposition pied-piping in wh-questions, while the examples in (ii) show quantifier floating in wh-movement. All of these options are determined when externalization is initiated.

(i) a. Who did you talk to t?
b. To whom did you talk t?
(ii) a. What all did he say he wanted t?

(27b) is interpreted as a multiple wh-question.

At the CI interface, all copies in a copy relation are interpreted. However, at the SM interface, externalization depends on the language parameter: in English-type languages, the highest copy is externalized, while in Korean-type languages, the lower copy is externalized.

4. Conclusion

This study critically evaluated Kitahara and Seely's (2024) proposal to derive the Duality of Semantics through a stronger version of MY and a broader notion of Accessibility. While their approach eliminates the explicit distinction between EM and IM, it raises conceptual challenges, particularly regarding the fixed composition of WS and the necessity of IM for distinguishing propositional and clausal domains. The look-ahead problem inherent in their finite WS composition and the restriction of IM to a single instance indicate a need for further conceptual refinement.

To address these issues, we proposed an EM-only system that eliminates IM altogether. This system allows all elements, both arguments and non-arguments, to enter derivation via EM. Theta-marked elements remain accessible to phase heads for interface interpretation without movement. By dynamically selecting lexical items from the Lexicon, the EM-only system avoids look-ahead problems and adheres to minimalist principles of simplicity and optimal design.

Additionally, the EM-only system aligns with the Markovian property of derivation, which assumes that syntactic operations do not retain memory of earlier stages. This eliminates the need for distinguishing between EM and IM, as copy relations are determined at the phase level regardless of derivational history. By adopting this

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b. What did he say he wanted all?
c. What did he say all he wanted t? (McCloskey 2000)

Preposition stranding or pied-piping depends on [Q]-percolation from the wh-phrase to the preposition (Kim 2018). When [Q]-percolation does not occur, the preposition strands; however, if it does, the preposition is externalized along with the wh-phrase in SPEC-C.
In (ii), externalization of the wh-phrase can occur either with the quantifier all or without it in the matrix. Specifically, the quantifier all may be externalized in the theta position of the entire DP [what all], in the intermediate SPEC-C, or in the matrix SPEC-C. (See McCloskey for details of the DP structure.)

perspective, the EM-only system accommodates a wide range of syntactic phenomena, including conventional wh-movement, *there*-constructions, *tough*-movement, and high adjunctions, through EM into both theta and non-theta positions. By demonstrating that EM can account for configurations traditionally attributed to IM, this study challenges the necessity of maintaining two distinct types of Merge. Further research will explore the cross-linguistic applicability of the EM-only system and its broader implications.

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