

# A Merge-Based Account of Hierarchical Asymmetry in English Coordinate Structures\*

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Coordinate structures are traditionally treated as symmetric constructions in which conjuncts are parallel in category, hierarchical status, and function. This assumption, however, is empirically inadequate: English coordination exhibits systematic hierarchical non-parallelism among conjuncts with respect to structural position, sharing relations, and interpretive burden—asymmetries irreducible to surface categorial mismatch. Despite substantial generative work on coordination, no existing account has determined which asymmetry type demands which structure-building operation, or whether such distinctions can be established on language-internal grounds alone. This article addresses that gap through four empirical domains in English: unlike-category coordination, irreversible ordering, Across-the-Board (ATB) extraction and the Coordinate Structure Constraint (CSC), and the syntax-semantics subordination mismatch. These domains are shown to instantiate three structurally distinct asymmetry types, evaluated against ordinary Merge, pair-Merge, and Parallel Merge, with the movement/base-generation distinction and lexicalized dependency as boundary conditions. No single Merge operation proves sufficient: Ordinary Merge provides a baseline for unlike-category structures but fails to derive ordering restrictions or shared-structure dependencies; pair-Merge better handles adjunction-like augmentation asymmetries; and Parallel Merge offers the most principled account of ATB phenomena through multidominance. The article concludes that the three asymmetry types are irreducible to a single structural source, and that this irreducibility constitutes the primary diagnostic for differentiating among Merge paths within a single language.

*Keywords:* coordinate structures, hierarchical asymmetry, Merge, pair-Merge, Parallel Merge, syntax-semantics interface

## Introduction

Coordinate structures have long been regarded as one of the most paradigmatically symmetric constructions in syntactic theory. In both traditional and generative grammar, coordination is typically understood as a connective relation between two or more constituents that are equal in status, similar in category, and parallel in function. However, this classical picture of symmetric coordination does not exhaust the facts of natural language.

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Since Ross (1967) proposed the Coordinate Structure Constraint (CSC), coordination has no longer been merely an intuitive grammatical phenomenon of joining like constituents, but has become a structural domain governed by strict syntactic conditions.

Among the asymmetric phenomena, this article is concerned not with the most surface-level categorial differences, but with deeper hierarchical asymmetry. Munn (1993) explicitly argued that coordinate structures are asymmetrical, hierarchical structures, and that the conjunction head projects a phrase which is adjoined to the first conjunct. Resonating with this, Zhang (2009, p. 12) showed through the contrast between “*Sally’s mother and yours have turned vegetarian*” and “\**Yours and Sally’s mother have turned vegetarian*” that the first and second conjuncts in a coordinate structure do not genuinely occupy equivalent structural positions. Non-parallelism in coordination should therefore not be understood merely as a difference in linear ordering or an isolated exception, but should be redefined as a question about the internal structural organization of coordination.

This question is important because it directly engages the explanatory scope of Merge theory. Citko (2005, p. 479), using Across-the-Board (ATB) structures such as “*What did John recommend and Mary read?*” as the central example, argued that the sharing relation in coordination cannot be treated merely as a special exception to the CSC, but should be understood as a multidominant structure generated by Parallel Merge. Bošković (2019) further showed through extraction contrasts that the asymmetries in coordination are not simply residues of island effects, but are closely related to phase, labeling, and the requirements of Coordination-of-Likes.

It is worth noting that focusing the analysis exclusively on English has both principled and methodological motivations. English provides an unusually rich and well-documented range of coordination data spanning unlike-category pairings, irreversible ordering, ATB constructions, and the syntax-semantics mismatch, precisely the phenomena that most acutely stress the explanatory limits of any Merge-based account. Rather than diluting the analysis across typologically diverse languages at the cost of empirical depth, the present study pursues the stronger theoretical strategy of showing that the three asymmetry types documented in Section 2 are irreducible to a single structural source even within a single language, thereby forcing a principled differentiation among ordinary Merge, pair-Merge, and Parallel Merge on internal grounds alone. The theoretical conclusions reached thus stand or fall on the basis of the English data themselves, without relying on cross-linguistic generalization as an auxiliary support.

Based on the foregoing, this article sets out to answer the following questions: In which testable syntactic domains does hierarchical asymmetry in English coordinate structures specifically manifest? Which type of Merge, ordinary Merge, pair-Merge, or Parallel Merge, best accounts for each identified asymmetry type? And what do the explanatory limits of each Merge path reveal about the theoretical architecture of coordination more broadly?

## **Empirical Facts of Hierarchical Asymmetry in English Coordinate Structures**

### **Categorial Non-parallelism and Ordering Asymmetry**

The first asymmetric fact to be identified in research on English coordination is the non-parallelism of conjuncts at the surface categorial level. The classic examples discussed by Sag, Gazdar, Wasow, and Weisler (1985, pp. 117-118) directly show that conjuncts are not always strictly like-category pairings:

Example (1)

- a. Pat is either stupid or a liar. [AP/NP]
- b. Pat is a Republican and proud of it. [NP/AP]

c. Pat is healthy and of sound mind. [AP/PP]

The theoretical significance of these examples lies not merely in showing that categories can differ, but in pushing the question further: If conjuncts are not consistent in surface category, how can the coordinate structure nonetheless be well-formed? In other words, categorial non-parallelism is not a simple refutation of the principle of parallelism, but rather shows that parallelism in coordination cannot be reduced to categorial identity and must appeal to deeper structural conditions.

This point becomes clearer in the facts of irreversible ordering. The ordering contrasts discussed by Zhang (2009, pp. 12-13) are shown in Example (2):

Example (2)

- a. Sally's mother and yours have turned vegetarian.
- b. \*Yours and Sally's mother have turned vegetarian.
- c. Every man and his dog left.
- d. \*His dog and every man left.

The contrasts in Example (2) cannot be explained by ordinary linear ordering preferences, but rather resemble manifestations of structural non-equivalence between the first and second conjuncts. From this perspective, categorial non-parallelism is not the endpoint of coordination research, but more like the entry point into the problem of hierarchical asymmetry.

### **Shared Structure and Extraction Asymmetry in Coordination**

If categorial non-parallelism and ordering asymmetry primarily reveal imbalance at the representational level of coordinate structures, then Across-the-Board structures and the CSC further push this imbalance to the derivational level. The representative examples from Citko (2005, p. 479) are shown in Example (3):

Example (3)

- a. What did John recommend and Mary read?
- b. I wonder what Gretel recommended and Hansel read.

For structures of this type, the single-path hierarchical dependency permitted by ordinary Merge is clearly insufficient to provide an explanation, because what genuinely needs to be addressed is how the sharing relation is established and how the shared element simultaneously receives an interpretive position in both conjunct branches.

Corresponding to the grammaticality of shared structures, the extraction contrasts discussed by Bošković (2019) show that asymmetry in coordination is not only manifested as some extractions are possible, but also as why some extractions are structurally unbalanced, as in Example (4):

Example (4)

- a. \*Who did you see [enemies of *t*] and John?
- b. Who did you see [friends of *t*] and [enemies of *t*]?

Example (4a) illustrates a CSC violation caused by unilateral extraction; Example (4b) illustrates the grammaticality of bilateral extraction. Bošković's key claim is that successive-cyclic movement to the edge of a conjunct causes the extracted conjunct to be skewed in the labeling system, thereby disrupting the structural balance between the two conjuncts; in the case of bilateral extraction, both conjuncts undergo the same operation and balance is restored. Accordingly, extraction asymmetry in coordination should be understood as the direct externalization in the derivation of the hierarchical relations internal to coordination.

### **Mismatch Between Syntactic Coordination and Semantic Subordination**

Not all asymmetries in English coordination belong primarily to narrow syntax. The following structures discussed by Culicover and Jackendoff (1997, pp. 195-198) paradigmatically reveal that syntactic coordination and semantic subordination can coexist within the same structure:

Example (5)

- a. You drink one more can of beer and I'm leaving.
- b. Big Louie sees you with the loot and he puts out a contract on you.

Syntactically, structures of this type consist of two clauses connected by *and*, and thus fully conform to the surface form of coordination; but at the level of conceptual structure, the first clause clearly serves as a condition or antecedent event and the second clause serves as a result or subsequent event. They are syntactically coordinate in form while semantically closer to a subordinate relation. Altshuler and Truswell (2022, p. 135) further show that this mismatch is closely related to asymmetric extraction, discourse coherence, and event relations; the grammaticality of "*What did you go to the store and buy?*" also depends on support from discourse coherence relations.

### **Comparison of Merge Explanatory Paths**

#### **The Explanatory Force and Limits of Ordinary Merge**

Any study of hierarchical asymmetry in English coordinate structures must first address how much explanatory force ordinary Merge still retains. As long as syntactic skewing has not produced stable structural consequences with respect to ordering restrictions, sharing burden, and label balance, it is not advisable to abandon this model simply because the explanatory load differs in weight. In particular, in unlike category coordination, structures like those in Example (1), though on the surface crossing categories, do not automatically require a special structure-building mechanism. Ordinary Merge can still serve here as the minimal analytical starting point.

However, the limits of ordinary Merge are equally clear. The problems of irreversible ordering, shared paths, and label balance all indicate that ordinary Merge can explain the existence of coordination, but cannot explain why conjuncts fail to occupy structurally equivalent positions. In other words, once asymmetry produces systematic consequences in ordering restrictions, shared structure, or extraction contrasts, the explanatory force of ordinary Merge declines. Within English alone, the irreversibility facts in Example (2) and the ATB contrasts in Examples (3)-(4) converge on the same verdict: A flat, symmetric structure-building operation is underdetermined with respect to the gradient of derivational asymmetries observed. The English data thus motivate a principled transition to more differentiated Merge paths on purely language-internal grounds.

#### **Pair-Merge and Additive-Enhancement-Type Asymmetry**

If the limitations of ordinary Merge are primarily exposed at the point that two conjuncts do not always enter the structure in the same way, then the discussion of pair-Merge provides an important theoretical outlet for this problem. The question Rubin raises is not merely whether adjuncts are special, but more fundamentally: how does Narrow Syntax know that pair-Merge is required here, rather than the default set-Merge (Rubin, 2003, pp. 661-667)? Chomsky (2021) evidences that a complement merged into the structure by set-Merge is subject to normal c-command relations and can trigger a Condition C violation, while an adjunct merged by pair-Merge occupies an independent structural plane, does not participate in normal c-command relations, and therefore does

not trigger such an effect. This contrast shows that the difference between adjunct structure and complement structure is not only reflected in the derivational result, but also in the nature of the operation each undergoes when entering the structure: The former takes the set-Merge path; the latter takes the pair-Merge path. Rubin's central contribution lies precisely in asking: Before the derivation is complete and before the two constituents have merged, on what basis does NS determine that pair-Merge rather than set-Merge should be invoked?

From the perspective of argument structure, the boundary between ordinary Merge and pair-Merge can be further delimited with the help of a Merge-Based Theory of Argument Structure (Collins, 2024, pp. 7-10). Collins explicitly proposes that only External Merge can establish argument structure, with the Argument Criterion as a formal constraint: Each argument-introducing head introduces only one argument, and each argument can only be introduced by one argument-introducing head. More importantly, Collins explicitly argues against analyzing the passive by-phrase as a vP adjunct formed by pair-Merge, because such an analysis would incorrectly predict that the by-phrase c-commands material to its left, which standard c-command diagnostics do not support. This means that pair-Merge cannot be casually invoked to absorb all seemingly non-parallel phenomena; only those phenomena that clearly manifest additive enhancement without touching the core configuration of argument structure are suitable candidates for pair-Merge analysis.

For the treatment of hierarchical asymmetry in English coordination in this article, some coordination asymmetries are not primarily manifested as shared structure, but rather as one member being closer to an additive, modificational, or expository constituent, as in the semantic subordination mismatch in Example (5). Such asymmetries, when analyzed with pair-Merge, can be further explained as follows: Some seemingly coordinate constituents may not in fact participate in structure-building in the same way as the other member. In other words, hierarchical asymmetry does not necessarily imply shared structure; it may also imply a difference in the mode of merger.

### **Parallel Merge and Shared-Structure-Type Asymmetry**

The fundamental argument of Citko (2005, pp. 475-476, 479) is that if Grammar already permits External Merge and Internal Merge, then a third type of Merge combining properties of both, Parallel Merge, is theoretically natural and predictable; this Merge generates symmetric, multidominant structures, and Across-the-Board questions are the most direct evidence for such structures.

For this article, the most important empirical support for Parallel Merge is undoubtedly the ATB structures in Example (3). If conjuncts were truly combined in a completely independent fashion by ordinary Merge, the question of how one element can simultaneously belong to both conjuncts would become intractable; within the Parallel Merge framework, however, this problem naturally dissolves, because multidominance itself allows the same element to be jointly dominated by multiple higher objects. In other words, in shared-structure-type asymmetry, Parallel Merge is not an optional supplement but the most explanatorily powerful candidate mechanism.

More recent work by Citko (2026, pp. 1-8) further shows that multidominance theory and Late Merge are not irreconcilable. The starting point is so-called Principle C anti-reconstruction effects: Traditional Late Merge analyses typically rely on the distinction that adjuncts can be merged late while arguments cannot, but this premise lacks support not only in Polish but has also been questioned in English. Citko accordingly argues explicitly that a multidominance theory of movement can handle such effects without appealing to the argument/adjunct distinction. This point is particularly important for this article, because it shows that the shared

structure and asymmetric extraction in coordination do not necessarily lead to a single Copy Theory conclusion; on the contrary, they constitute an important entry point for comparing Parallel Merge with more general multidominance analyses.

### **Boundary Conditions for Merge Paths**

Although this article places its explanatory emphasis on the three paths of ordinary Merge, pair-Merge, and Parallel Merge, it is still necessary to introduce more general boundary conditions in order to avoid overly dogmatic theoretical judgments.

The first boundary condition comes from Adger and Ramchand (2005, pp. 161-163, 167). The two authors explicitly point out that, within a framework accepting pro and agree, surface A-bar dependencies may arise either from movement or from base generation; the truly important diagnostic is not locality but identity effects. This means that some so-called movement asymmetries in English coordination may be reinterpreted as dependency relations generated by base-generation, without appealing to Internal Merge.

The second boundary condition comes from the more radical proposal represented by Steedman (2026, pp. 113-116). Steedman attempts to reduce traditionally movement-like discontinuities uniformly to the result of lexicalized dependency and strictly adjacent merger, and explicitly brings coordination within the scope of this analysis. For this article, the significance of this path lies not in immediately replacing ordinary Merge, pair-Merge, or Parallel Merge, but in reminding us that hierarchical asymmetry in English coordination is not only a matter of comparison between different Merge paths, but may also be a question of whether Internal Merge needs to be reduced to a more general mechanism.

These boundary conditions together suggest that although hierarchical asymmetry in English coordination can mainly be compared across the ordinary, pair, and parallel paths, its explanatory boundaries still require higher-level theoretical control.

### **Summary**

The discussion in this section shows that hierarchical asymmetry in English coordinate structures does not support a unified explanation by a single Merge model. Ordinary Merge remains a necessary baseline model; pair-Merge is best suited to explain additive-enhancement-type asymmetry; Parallel Merge provides the most natural theoretical resource for shared-structure-type asymmetry, especially ATB; while the movement/base-generation distinction and the possibility of lexicalized dependency together constitute the boundary conditions of this section. In other words, the reason hierarchical asymmetry in English coordination cannot be casually subsumed under any single established mechanism is precisely that it forces us to make more fine-grained distinctions among mechanisms within Merge theory.

## **Discussion and Conclusion**

### **Theoretical Implications**

The empirical analysis and Merge comparison in this article together show that asymmetry in English coordinate structures can no longer be understood as a collection of scattered exceptions, but should be regarded as a structural dimension with stable manifestations internal to coordination. Whether it is the categorial non-parallelism revealed by unlike category coordination, the irreversible ordering and ATB/CSC contrasts, or the mismatch between syntactic coordination and semantic subordination, all of these facts point toward the same deeper judgment. Conjuncts in English coordination do not always enter the structure in a fully flat, fully

symmetric manner. The intuitive picture of coordination as like constituents placed in linear sequence is, at the syntactic level, insufficient to encompass the real facts of language.

The convergence of three distinct asymmetry types within English itself further strengthens the theoretical conclusions. The unlike-category and ordering data, the ATB and CSC data, and the syntax-semantics mismatch data do not reduce to a single structural source; they require differentiated Merge operations. This internal diversity is the most demanding test an explanatory framework can face, because it must account not only for the presence of asymmetry but for its irreducibly heterogeneous character. The present analysis shows that English coordination, precisely because it exhibits all three asymmetry types in a well-documented and theoretically elaborated empirical tradition, constitutes an exceptionally stringent testing ground for Merge theory. Any account that can successfully differentiate these three types in terms of ordinary Merge, pair-Merge, and Parallel Merge respectively, and do so through independently motivated structural contrasts, will have met that test on internal evidential grounds alone. This represents an important methodological point. The adequacy of a Merge-based theory of coordination should not depend on cross-linguistic support as its primary evidential base, but should be demonstrable from the depth and internal structure of the phenomena attested within a single well-studied language.

This conclusion first means that hierarchical asymmetry should be regarded as part of the ontology of coordinate structures, not as an external deviation from them. Second, the analysis in this article further shows that hierarchical asymmetry is a more suitable unit of research than categorial non-parallelism or semantic subordination, because it can simultaneously cover multiple different surface phenomena without crudely compressing them into a single source. Third, the results of this article require us to reconsider the status of Merge in coordination research. The question today is no longer can coordination be explained by Merge, but rather which type of non-parallelism in English coordination requires which type of Merge.

From a more general methodological perspective, the discussion in this article also resonates with the higher-level judgment about grammar form and simplicity. Chomsky (2021, pp. 6-13) explicitly states that the primary goal of linguistic theory is explanation, and that the more a theory can characterize real language facts with fewer and more general mechanisms, the stronger its explanatory power. Combining this with the analysis in this article, the significance of hierarchical asymmetry in English coordinate structures lies not only in revealing structural skewing internal to coordination, but also in testing whether explanations of such skewing should remain as far as possible within the simplest structure-building system, or must appeal to additional independent mechanisms. It is precisely in this respect that hierarchical asymmetry in English coordinate structures becomes an empirically consequential window with genuine theoretical weight.

### **Conclusion**

This article has conducted research centered on hierarchical asymmetry in English coordinate structures, identifying three empirically distinct asymmetry types and carrying out a comparative analysis of the three main paths of ordinary Merge, pair-Merge, and Parallel Merge within Merge theory.

The first basic conclusion of this article is that the asymmetry in English coordination should primarily be understood as hierarchical asymmetry, not as scattered categorial exceptions or semantic skewing; the irreducibility of the three identified asymmetry types to a single structural source establishes this on purely language-internal grounds. The second conclusion is that hierarchical asymmetry in English coordinate structures does not support a unified explanation by a single Merge model. Ordinary Merge retains its baseline status; pair-

Merge has greater explanatory force for additive-enhancement-type asymmetry; Parallel Merge occupies a central position with respect to shared-structure-type asymmetry; the Move/Merge dual path and lexicalized dependency further suggest that some seemingly movement-like asymmetries do not all require the same derivational explanation. The third conclusion is that the mismatch between syntactic coordination and semantic subordination does not weaken the importance of hierarchical asymmetry as a structural problem, but rather highlights its research value.

This article therefore ultimately argues hierarchical asymmetry in English coordinate structures is not an accidental anomaly of coordination, but a stable dimension of its internal organization; this dimension can no longer be simply subsumed under the single premise that conjuncts should be parallel as a residual problem, but should be brought within Merge theory and given a comparative explanation through different paths such as ordinary Merge, pair-Merge, and Parallel Merge. As long as this holds, research on coordination will no longer be merely an appendage of symmetry theory, but will become an important starting point for rethinking Merge, shared structure, adjunction relations, and the syntax-interface division of labor.

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