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ATB Movement, Case, and *Late Unify*

A thesis submitted in partial satisfaction
of the requirements for the degree
Master of Arts in Linguistics

by

Arthur Chang Mateos

2022

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ABSTRACT OF THE THESIS

ATB Movement, Case, and *Late Unify*

by

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Master of Arts in Linguistics

University of California, Los Angeles, 2022

Professor Ethan John Poole, Chair

This thesis investigates the derivation of multidominant structures via Merge and the idea that a syntactic node can have multiple associated feature sets. The empirical focus is case syncretism in ATB movement. I examine the behavior of unmarked case and case whose assignment depends on elements external to the conjunction site. Drawing on data from German, Icelandic, and Hindi-Urdu, I show that these two kinds of case behave the same way as other kinds of case with respect to case syncretism under ATB movement, which is unexpected under existing analyses of ATB via multidominance. I argue that in order to adopt Citko (2005) and subsequent work's analysis of ATB movement as involving shared structure, a different derivational pathway must be adopted, one which does not involve Parallel Merge. I propose a derivational pathway that I call *Late Unify*, wherein shared structure results when two syntactic objects with elements in common are merged.

The thesis of Arthur Chang Mateos is approved.

Stefan Keine

Anoop K. Mahajan

Ethan John Poole, Committee Chair

University of California, Los Angeles

2022

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Section 1

Two Paths to Multidominant Coordination

Structures

In across-the-board (ATB) movement, movement occurs out of two conjuncts into a single position (Ross 1967). ATB *wh*-movement is shown in (1a), and ATB topicalization is shown in (1b):¹

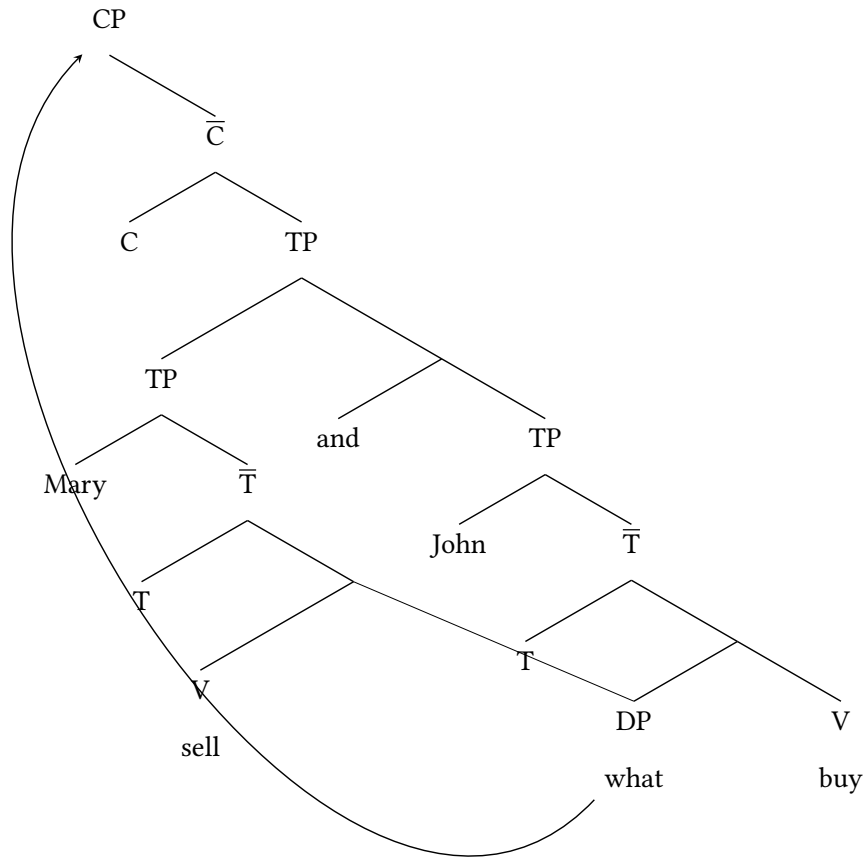
(1) **ATB movement**

- a. **What** did [Mary sell ___] and [John buy ___]?
- b. **That man**, [Mary saw ___] and [John followed ___].

Citko (2005) and subsequent work (Kasai 2007, Gračanin-Yuksek 2007, Citko and Gračanin-Yuksek 2021, a.o.) analyze ATB movement as arising from multidominance, using structures such as (2). Under this view, ATB movement occurs when a single syntactic item that exists simultaneously in both conjuncts – *what*, in (2) – moves to a higher position, where it is pronounced. Note that for clarity of presentation, I use arrows to depict movement in (2) and subsequent diagrams; I follow Citko (2005) and Citko and Gračanin-Yuksek (2021) in assuming that movement via Internal Merge is represented syntactically as multidominance.

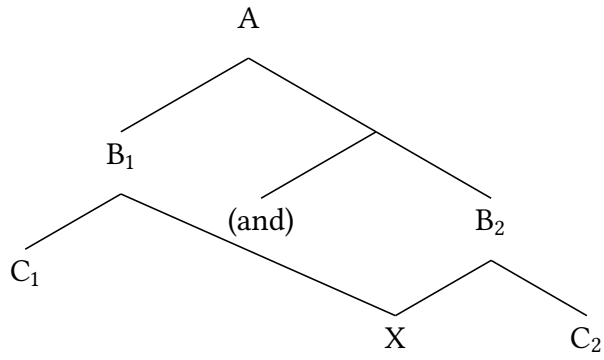
¹In this paper, I limit my attention to ATB movement involving exactly two conjuncts. ATB movement can, of course, have more than two conjuncts, as in *What did [Mary sell ___], [John buy ___], and [Tessa donate ___]?*. I expect the discussion to generalize to n-way conjunction, but this prediction may be investigated by future research.

(2)

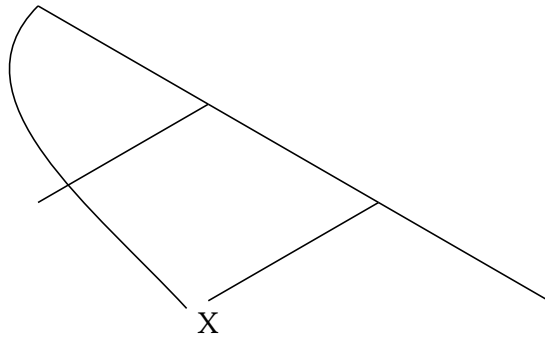


The conjunction structure in (2) can be abstracted to (3). In (3), X is dominated by both B_1 and B_2 , but neither occurrence c-commands the other. The fact that neither occurrence of X c-commands the other distinguishes (3) from multidominant structures produced by movement, which are schematized in (4). I will refer to conjunction structures like (3), where a single element is shared between both conjuncts, as *Multidominant Coordinate Structures* (MCSs). An expository note — throughout the paper, I will often leave out the coordination word *and* when depicting and discussing coordination structures. I remain agnostic about whether coordination is (a)symmetric.

(3)

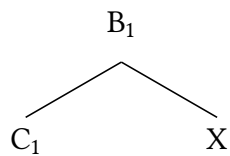


(4)

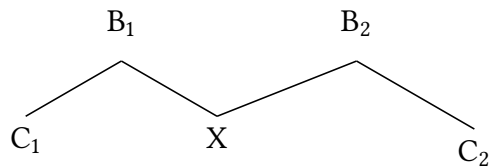


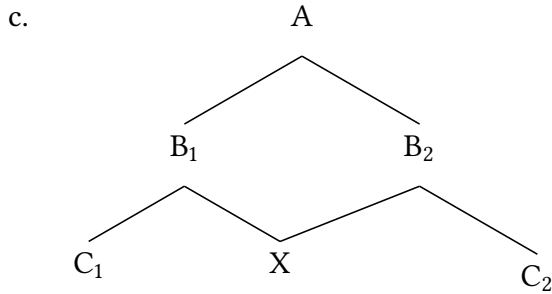
In Citko (2005)'s system, MCSs such as (3) are built via Parallel Merge: X merges externally with C_1 (5a) and then again merges with C_2 (5b). (5b) is the "Parallel Merge" step, as it involves merging an element that is internal to some structure with a root *external* to that structure, forming a doubly rooted structure whose two roots can then be built up in parallel. Merge then targets the two roots to unite them into one (5c).

(5) a.



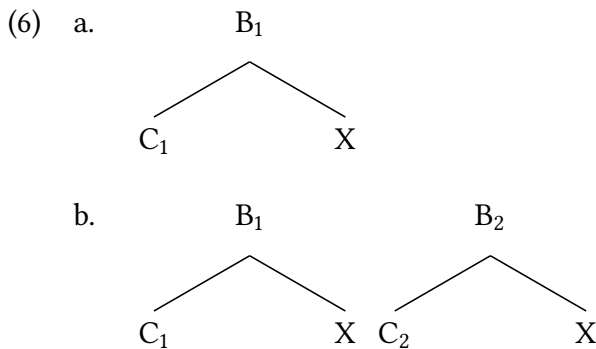
b.



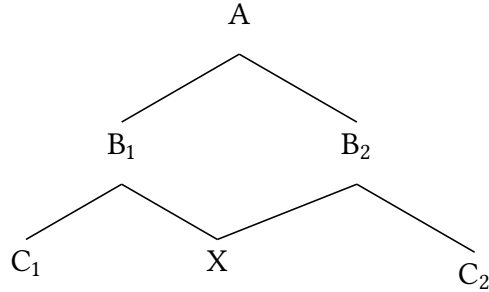


I will argue for a different derivation for MCSs that does not involve Parallel Merge. My proposal, which I call *Late Unify*, builds off of the Collect operation previously explored by Fox and Pesetsky (2007) and O’Brien (2017). The intuition is that rather than X becoming multiply dominated within a doubly-rooted structure as in (5b), X instead starts out as two distinct nodes in different trees. These two trees are built up independently, and X can acquire different features in each of the trees. I propose that these occurrences of X unite into a single occurrence when the trees containing them are merged later in the derivation.

Late Unify is schematized in (6). In (6a), X is merged with C₁. X is also merged with C₂ in (6b). At this point, X exists separately in the two syntactic trees – no features of X are shared between the two occurrences. It is only when these two trees are merged together (6c) that the two X’s are co-identified, producing a multidominant structure. Crucially, (5b) is not an intermediate stage in the derivation of (5c) = (6c).

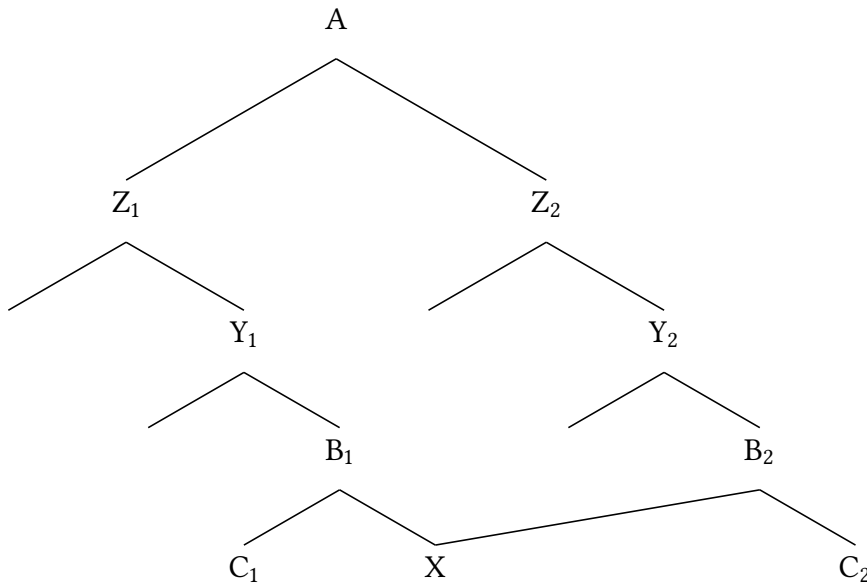


c.



The difference between the Parallel Merge and Late Unify derivations of MCSs becomes more pronounced when more layers of structure are present between the shared element and the coordination site. Suppose, for example, that (3)–(6) had more structural projections between X and A, as in (7):

(7)



In a Parallel Merge derivation of (7), X would be multiply dominated while Y₁, Y₂, Z₁, and Z₂ are built. In a Late Unify derivation, on the other hand, the two occurrences of X would exist independently in their respective conjuncts while the Ys and Zs are built. Under Late Unify, it is only at the final conjunction step – that is, Merge(Z₁, Z₂) = A – that the multidominance structure is created. Thus, even though Parallel Merge and Late Unify produce the same end-structure – (7) – operations that depend on when X comes to be multiply dominated or on how many roots are present within a particular tree at a particular derivational stage will behave differently in the two systems.

In this paper, I use case to differentiate between Parallel Merge derivations and Late Unify derivations of MCSs. ATB movement is known to exhibit “case matching effects”: Positions targeted by ATB movement must match in case (Borsley 1983; Dylą 1984; Franks 1995; Citko 2005; Asarina 2011; Citko and Gračanin-Yukse 2021, a.o.). For example, in the Polish relative clause (8a), both positions targeted by movement are ones where the DP would normally (i.e., if conjunction and movement were set aside) receive accusative case. In (8b), on the other hand, one position would be accusative and the other would be genitive, and the ATB movement is unacceptable; neither the accusative relative pronoun *którą* nor the genitive relative pronoun *której* can be used.

(8) a. dziewczyna **którą** [Janek lubi ____{ACC}] a [Jerzy kocha ____{ACC}]
 girl who.FEM.ACC Janek likes and Jerzy loves
 ‘the girl who Janek likes and Jerzy loves’ (Franks 1995:61)

b. dziewczyna, ***którą**/***której** [Janek lubi ____{ACC}] a
 girl who.FEM.ACC/who.FEM.GEN Janek likes and
 [Jerzy nienawidzi ____{GEN}]
 Jerzy hates
 ‘the girl who Janek likes and Jerzy hates’ (Citko 2011:126)

Cases *can* mismatch, however, if the moved material has identical forms corresponding with the case of each gap – that is, if the form is syncretic. This exceptional behavior is shown in (9). (9), like (8b), involves ATB movement out of coordinated accusative and genitive gaps. However, the accusative and genitive relative pronouns are syncretic in the masculine – *którego* is the form for both cases; and (9) is acceptable, despite the case mismatch.

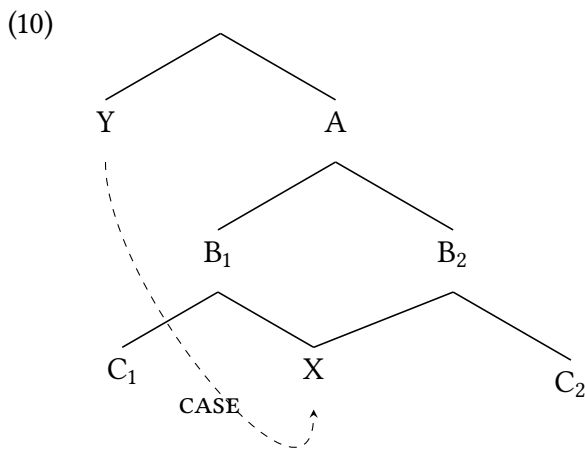
(9) chłopiec, **którego** [Maria lubi ____{ACC}] a [Ewa nienawidzi ____{GEN}]
 boy who.MASC.ACC/GEN Maria likes and Ewa hates
 ‘the boy who Maria likes and Ewa hates’ (Franks 1995:62)

Together, (8b) and (9) point to a striking property of ATB movement. In ATB movement, it seems that a single DP is assigned more than one case: On one hand, (8b) shows that the ATB-

moved element does not have been assigned just accusative or just genitive case – otherwise, the accusative or genitive relative pronoun would be acceptable; and on the other hand, (9) shows that the unacceptability of (8b) is *not* due to other factors that might prohibit the movement; when a syncretic form exists, which is compatible with both assigned cases, the movement succeeds.

The multidominance analysis of ATB movement allows for a neat way of accounting for this dual case-assignment property: Multidominance states that the DP targeted by ATB movement is present in both conjuncts. The idea, then, is that ATB-target DP is assigned case according to its position in each conjunct. The multidominance analysis for ATB movement provides other advantages, too, including deriving the parallelism condition on ATB movement (Williams 1978; Citko and Gračanin-Yuksek 2021), explaining why ATB movement cannot take place covertly (Citko 2005), and giving an explanation for ATB movement that does not require an additional stipulated grammatical mechanism.

Though data like those in (8) and (9) have been known for some time, little attention has been paid to the different kinds of case which may be present in ATB movement. In this paper, I examine the behavior of two types of case in ATB-movement: unmarked case, and case sensitive to elements above the coordination site, which I call *externally assigned case*. Externally assigned case is schematized in (10), where the case on X depends at least somewhat on Y, which is above the conjunction site A:



I argue in this paper that Parallel Merge derivations incorrectly predict that unmarked case and externally assigned case will be exempt from the case-matching requirements seen in (8) and (9). For unmarked case, the issues arises because unmarked case is understood to only occur when no other case has been assigned. For externally assigned case, Parallel Merge analyses encounter issues owing to how they derive dual case assignment to ATB targets. I show that the behavior of both unmarked case and externally assigned case under ATB movement is better explained by Late Unify derivations.

The structure of the paper is as follows: In Section 2, I review the case-syncretism facts of ATB movement and how Citko (2005) and Citko and Gračanin-Yuksek (2021) account for these case-syncretism facts in their MCS system. In Sections 3 and 4, respectively, I discuss configurations involving unmarked case and externally assigned case, and I show that the Parallel Merge MCS account makes incorrect predictions for these two kinds of case. In Section 5, I present the Late Unify approach, and demonstrate how it successfully derives the data from Sections 3 and 4. Section 6 addresses the question of spelling out a DP that has acquired multiple features of the same kind as a result of multidominance. The paper concludes by discussing implications of unmarked case and externally assigned case for non-multidominance accounts of ATB movement and discussing other configurations involving similar case-matching effects aside from ATB movement (Section 7).

Section 2

Case syncretism in ATB movement

2.1 Identity of Form condition

Elements targeted by ATB movement must match in case, with a notable exception: Case mismatches are permitted *only if* the items corresponding with the gaps are syncretic (Borsley 1983; Dyla 1984; Franks 1995; Citko 2005; Asarina 2011; Citko and Gračanin-Yuksek 2021, a.o.). This requirement can be stated as (11), also called the *case-matching requirement*:

(11) **Identity of Form condition on ATB movement:**²

ATB-movement is grammatical only if the items corresponding to all gaps targeted by the movement are identical in form.

The Identity of Form condition on ATB movement is the phenomenon of central empirical interest in this paper. Any analysis of ATB movement — both MCS-based (Citko 2005; Citko and Gračanin-Yuksek 2021) and non-MCS-based accounts (see Section 7.2) — must explain why ATB-moved elements have to be compatible with the cases corresponding to both gaps.

The Identity of Form condition is demonstrated in (12) for Polish. Identity of Form is trivially satisfied when both gaps are of the same case, as in (12a): The verbs *lubi* ‘likes’ and *kocha* ‘loves’ both require accusative objects, so the accusative relative pronoun *którq* can be used in the ATB construction without issue. (12b) demonstrates a case mismatch without syncretism. In the left conjunct, *lubi* requires its object to bear accusative case, whereas in the right conjunct, *nienawidzi* ‘hates’ requires its object to bear genitive case. Accordingly, I will refer to (12b) as an *ACC/GEN coordination*. Since the accusative relative pronoun — *którq* — and the genitive relative pronoun — *której* — are distinct, the choice of either one will result in a mismatch with the other object

²Note that Identity of Form is a necessary, but not sufficient, condition for grammatical ATB-movement. Other conditions, such as parallelism (Williams 1978), must also be met for ATB-movement to be grammatical.

position. Thus, Identity of Form cannot be satisfied, and (12b) is ungrammatical. (12c) is an ACC/GEN coordination that differs minimally from (12b); however, (12c) is grammatical. As shown in (13), whereas the feminine relative pronouns are distinct for accusative and genitive, the masculine series happens to have the same form, *którego*, for both cases. Thus, even though the cases of the two gaps in (12c) are different, Identity of Form is satisfied by the syncretic form *którego*, which is compatible in case with both gaps.

(12) **Polish ATB relative clauses**

- a. dziewczyna **która** [Janek lubi ____{ACC}] a [Jerzy kocha ____{ACC}]
 girl who.FEM.ACC Janek likes and Jerzy loves
 ‘the girl who Janek likes and Jerzy loves’ (Franks 1995:61)
- b. dziewczyna, ***która**/***której** [Janek lubi ____{ACC}] a
 girl who.FEM.ACC/who.FEM.GEN Janek likes and
 [Jerzy nienawidzi ____{GEN}]
 Jerzy hates
 ‘the girl who Janek likes and Jerzy hates’ (Citko 2011:126)
- c. chłopiec, **którego** [Maria lubi ____{ACC}] a
 boy who.MASC.ACC/GEN Maria likes and
 [Ewa nienawidzi ____{GEN}]
 Ewa hates
 ‘the boy who Maria likes and Ewa hates’ (Franks 1995:62)

(13) **Polish relative pronouns, MASC and FEM**

Case	MASC	FEM
NOM	który	która
GEN	którego	której
ACC	którego	którą

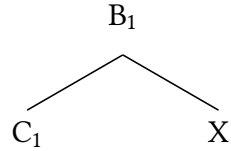
The pattern in (12) – wherein case mismatches are alleviated by syncretism in vocabulary items – has been observed across many languages in a wide range of ATB constructions. Under multidominance, explaining (12) requires that multiple cases be assigned to the ATB target. The fact that DPs targeted by ATB movement show evidence of being assigned more than one case is noteworthy; in most other scenarios, a DP may have only one case (see, e.g., Schütze (1997), Baker (2015) and Deal (2016) for analyses in which the assignment of one case either supersedes or is blocked by a previous case-assignment operation to the same DP). The Activity Condition (Chomsky 2000, 2001b) is a further restriction that normally blocks double case assignment to a single DP. Other constructions that display syncretism-alleviated case matching requirements are discussed in Section 7.3.

2.2 Case syncretism in MCSs built via Parallel Merge

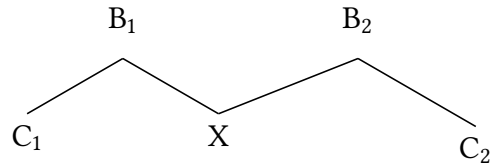
To explain how the Identity of Form condition arises, Citko (2005) and Citko and Gračanin-Yuksek (2021) – henceforth, *C&GY* – appeals to the derivational stages of building an MCS. As an MCS is built up via Parallel Merge, it passes through derivational stages wherein multiple root nodes exist concurrently.

(14), repeated from (5), illustrates the idea of multiply rooted structures. (14a) depicts a singly-rooted structure, with B_1 as the only root node. (14b), is a doubly-rooted structure, produced by Parallel-Merging X with C_2 ; B_1 and B_2 are the two roots. (14c) shows the result of merging B_1 and B_2 to form the node A . (14c) is singly rooted, with A as the root.

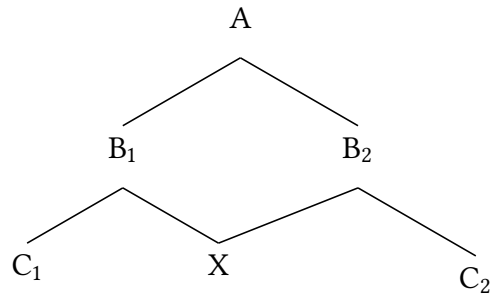
(14) a. **Singly-rooted structure**



b. **Doubly-rooted structure**



c. **Singly-rooted structure**

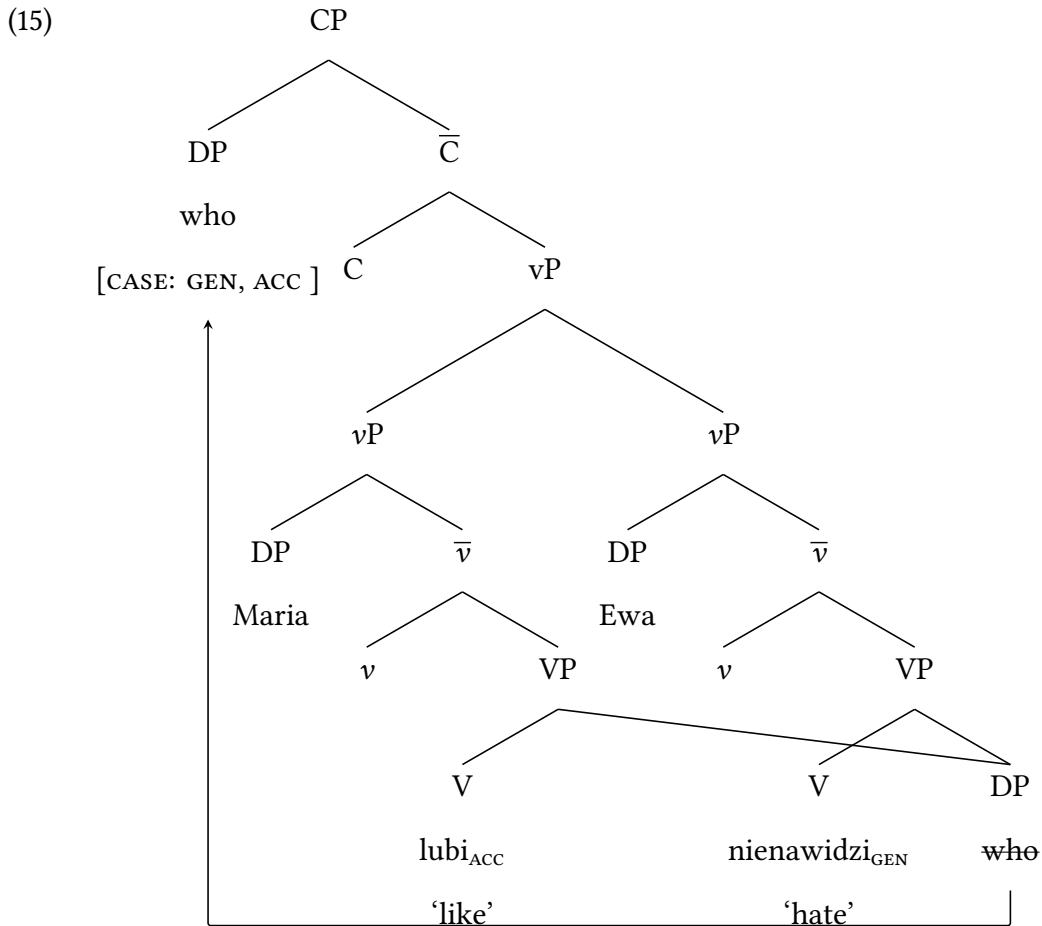


Thus, although (14c) itself is singly rooted, its derivation passes through a stage with a doubly rooted structure.

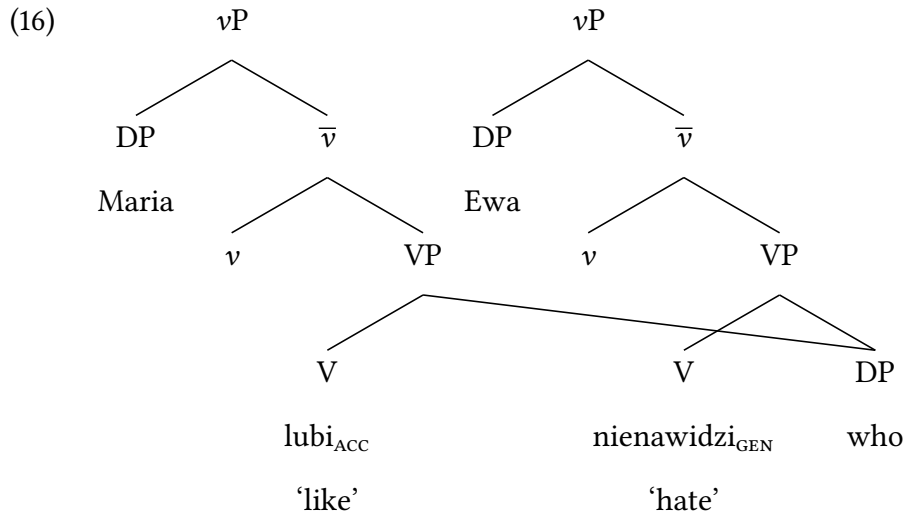
Citko and Gračanin-Yuksek (2021:21–22, 49) state that when multiple roots exist within a structure, then case is assigned multiple times. Accordingly, (14b) satisfies the conditions for multiple case assignment to X. Suppose now that different cases are assigned to X within B₁ and B₂. Assuming a Distributed Morphology framework (Halle and Marantz 1993), X must then be spelled out with an exponent compatible with both these cases. This is the source of the Identity of Form requirement: The forms for X corresponding with the cases assigned within B₁ and B₂ must be syncretic, otherwise X cannot be spelled out.

Assigning case multiple times for multiply rooted structures builds on the intuition behind MCS approaches to ATB-movement: In an MCS, a DP occupies two positions; therefore it receives two cases. My Late Unify approach will appeal to the same intuition.

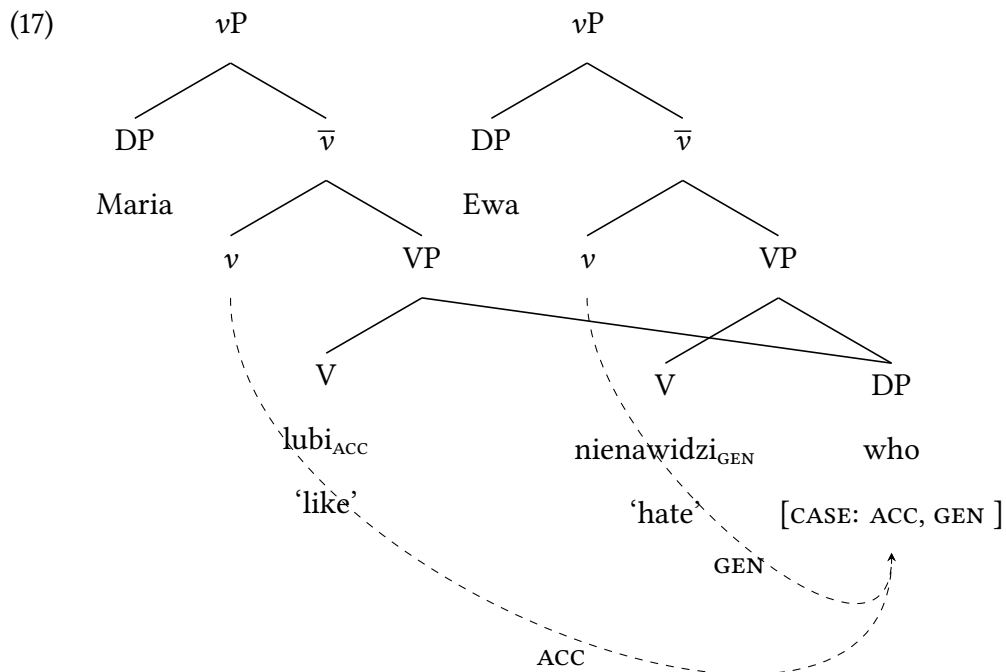
To illustrate concretely Citko (2005) and C&GY's approach to case assignment, the structure for (12) is shown in (15). The DP 'who' (corresponding with the abstract X from the previous discussion) merges as the argument of both *lubi* 'like' and *nienawidzi* 'hate', which require accusative and genitive objects, respectively. 'Who' then moves across-the-board to Spec-CP.



Although the CP relative clause in (15) is singly rooted, the structure is doubly rooted from the step at which Parallel Merge occurs all the way until the step at which the *vP*s are coordinated. (16) shows the structure immediately before coordination:



According to Citko (2005) and C&GY, it is within this doubly-rooted structure that the two cases are assigned to 'who.' Citko (2005:480) assumes a functional-head theory of case assignment, where case features on 'who' are valued by a probe on v (Chomsky 2000, 2001a). Because there are two v heads in (16), *both* value the case feature on 'who', resulting in its being assigned both accusative and genitive case:



To spell out ‘who,’ a form compatible with both accusative and genitive case must be used. Citko and Gračanin-Yuksek (2021:86) assume the feature decomposition in (18) from Franks (1995:42), citing Jakobson (1958), of [\pm marg(inal), \pm quant(ified), \pm dir(ectional)]. Other feature decompositions may be possible too (see Section 6), but we use (18) here for the sake of concreteness.

(18) **Polish case feature decomposition**

NOM	=	[-marg, -quant, -dir]
ACC	=	[-marg, -quant, +dir]
GEN	=	[-marg, +quant, -dir]
INS	=	[+marg, -quant, -dir]
DAT	=	[+marg, -quant, +dir]
LOC	=	[-marg, +quant, -dir]

The feature decomposition and the relative pronoun forms in (13) can be captured in a Distributed Morphology account using the following vocabulary items:

(19) **Vocabulary items for Polish relative pronouns**

<i>która</i>	\leftrightarrow	[+fem, -marg, -quant, +dir]
<i>której</i>	\leftrightarrow	[+fem, -marg, +quant, -dir]
<i>którego</i>	\leftrightarrow	[-fem, -marg]

Per the feature decomposition in (18), a DP that has been assigned both accusative and genitive case, as in (17), has the features [-marg, -quant, +dir] and [-marg, +quant, -dir], in addition to a feature for gender. If the DP in question is feminine, as in (12b), then no choice of vocabulary item is suitable: Each of the vocabulary items in (19) conflicts with at least one of the features on the terminal node.³ If, on the other hand, the DP is masculine, as in (12c), then *którego* can be

³As Hein and Murphy (2020:270-271) raise, using the criteria of feature conflict would require a nonstandard definition of the Subset Principle. Both [+fem, -marg, -quant, +dir] and [+fem, -marg, +quant, -dir] are subsets of the terminal node’s feature (in fact, their union is exactly the set of all features on the terminal node). Citko (2005:488) invokes the notion of a “feature clash,” but does not formally define it.

inserted, since it satisfies the Subset Principle for both feature bundles. Thus, our assumed feature decomposition and vocabulary items explains the difference in acceptability between (12b) and (12c).

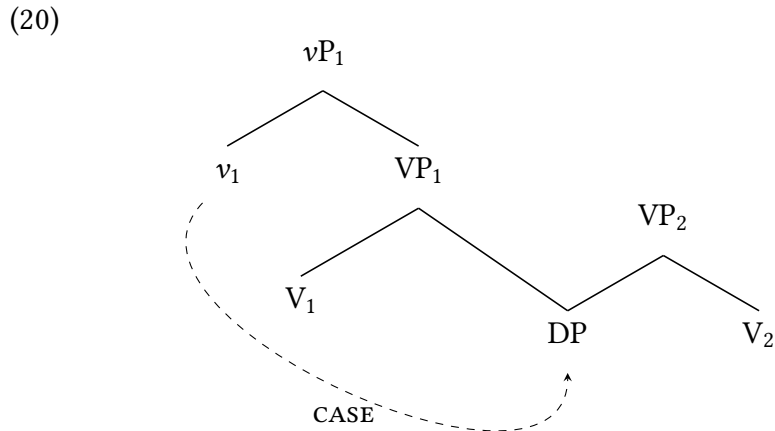
To explain why a single DP can be assigned multiple cases in MCSs, Citko (2005:481) states that case probes on the two v heads probe and value ‘who’ simultaneously. This ensures that there is no need for a case feature to ‘look ahead’ to determine whether it should stay active for subsequent valuation, as might arise if the two cases are valued sequentially (as in, e.g., Nunes (1995)’s sideward movement account).

Only *after* the DP ‘who’ has been valued with multiple case features does the conjunction step reduce the doubly-rooted structure in (17) to a singly-rooted one, rooted by the topmost vP in (15). By this point in the derivation, the case feature on ‘who’ has already been valued twice. Thus, when it comes time to spell out ‘who’, both case features are present. A lexical item must be selected that is sufficiently underspecified such that it is compatible with both genitive and accusative case features. Such a syncretic form exists for the masculine but not the feminine: (12c) is acceptable but (12b) is not. I return to the issue of spelling out multiple case features in Section 6.

To summarize, Citko (2005) and C&GY derive the Identity of Form condition on ATB movement by proposing that case valuation occurs once for each root node that a structure contains. Since MCSs built via Parallel Merge have multiple roots before coordination, these structures result in a DP’s case feature being valued multiple times.

Theoretical issues remain with this proposal. The first is in regards to how the two conjuncts are built up simultaneously. Parallel Merge is – at least as implemented by Citko (2005) and C&GY– unconstrained derivationally as to when it can apply. This freedom introduces a potential issue owing to the non-deterministic ordering of structure building. Suppose we have an ATB movement construction targeting an object, where two vPs are coordinated and the source of object case in both conjuncts is v . There is a derivation where one conjunct is built all the way up to vP before the other is, and case assignment happens from this first v head *before* the other v

head has merged, as depicted in (20):



To explain why multiple case assignment occurs in ATB-movement configurations but not generally, Citko (2005:481) relies on the multiple case assignment happening simultaneously via Agree. Given the derivational stage depicted in (20), however, simultaneous case assignment is not possible in our hypothetical ATB-movement construction; when the derivational stage is reached at which v_2 merges and is able to assign case, DP 's case feature has already been valued. The prediction that Citko (2005)'s system makes, therefore, is that a derivation passing through the stage (20) would circumvent the Identity of Form condition. In order for Citko (2005)'s analysis not to overgenerate in this way, some mechanism needs to ensure that both conjuncts are built up sufficiently high before simultaneous case assignment occurs. Williams (2013)'s idea of a 'functional clock' may offer a solution to this issue, but it is an additional assumption which must be made. Note that the non-determinism objection raised here for (20) applies only to Citko (2005)'s account. C&GY are not explicit about the mechanism responsible for multiple case assignment and whether it must occur simultaneously. The lack of specificity in C&GY must be clarified in order to be further analyzed.

Setting aside the timing problem, a second, more serious issue, faced by Citko (2005) and C&GY's system owes to their assumptions about case assignment. Citko (2005) assumes that the source of case on an ATB-moved object is v in both conjuncts, which we had also assumed in the discussion regarding (20). Citko (2005) and C&GY's analysis offers some flexibility for, say, case

to be assigned by V, but it encounters issues for other kinds of case. In particular, unmarked case and case assigned from above the site of conjunction (what I call *externally assigned case*) present issues for Citko (2005) and C&GY's account. These two kinds of case are the subjects of the two sections to follow.

Section 3

Issue 1: Unmarked case

Unmarked case is a central component of Dependent Case Theory. Dependent Case Theory (Marantz 1991; Baker and Vinokurova 2010; Baker 2015; Preminger 2020) sets out three types of cases – lexical case, dependent case, and unmarked case – that differ in how they are assigned:⁴

- **Lexical case:** Assigned locally, e.g., by preposition or verb that idiosyncratically case-marks its object
- **Dependent case:** Assigned structurally, according to c-command relationships between DPs
- **Unmarked case:** Assigned as a last resort at Spell-out (Baker 2015); or the PF manifestation of an unvalued case feature (i.e., [CASE: □]) (Preminger 2014, 2020)

These three kinds of case follow a hierarchy: A DP may be assigned dependent case only if it has not been already been valued for lexical case; and a DP is assigned unmarked case *only if* it has been assigned no other case in the course of a derivation. The following section examines the behavior of unmarked case under ATB-movement, beginning with the predictions made by Citko (2005) and C&GY's system. Because the focus is on unmarked case vs. other types of cases, I will refer to dependent case and lexical case collectively as *non-unmarked case*.

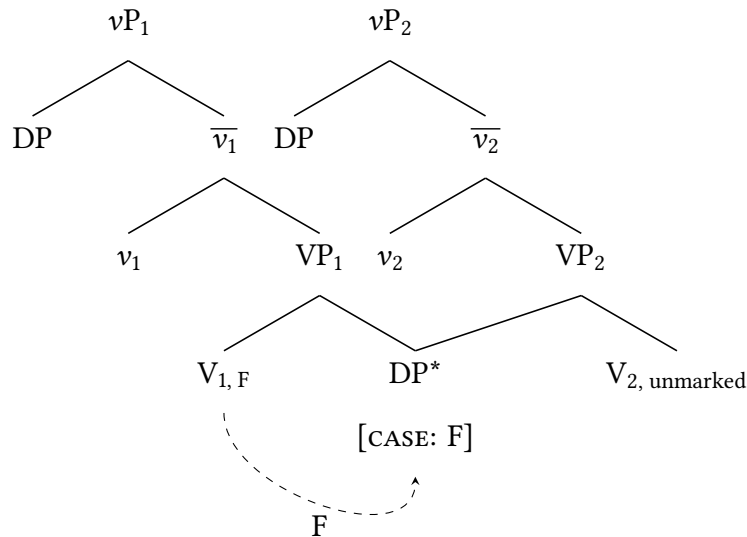
3.1 Prediction

According to C&GY, case-syncretism requirements arise in ATB movement when each conjunct involves a different case being assigned. Consider now the scenario depicted in (21), where ATB

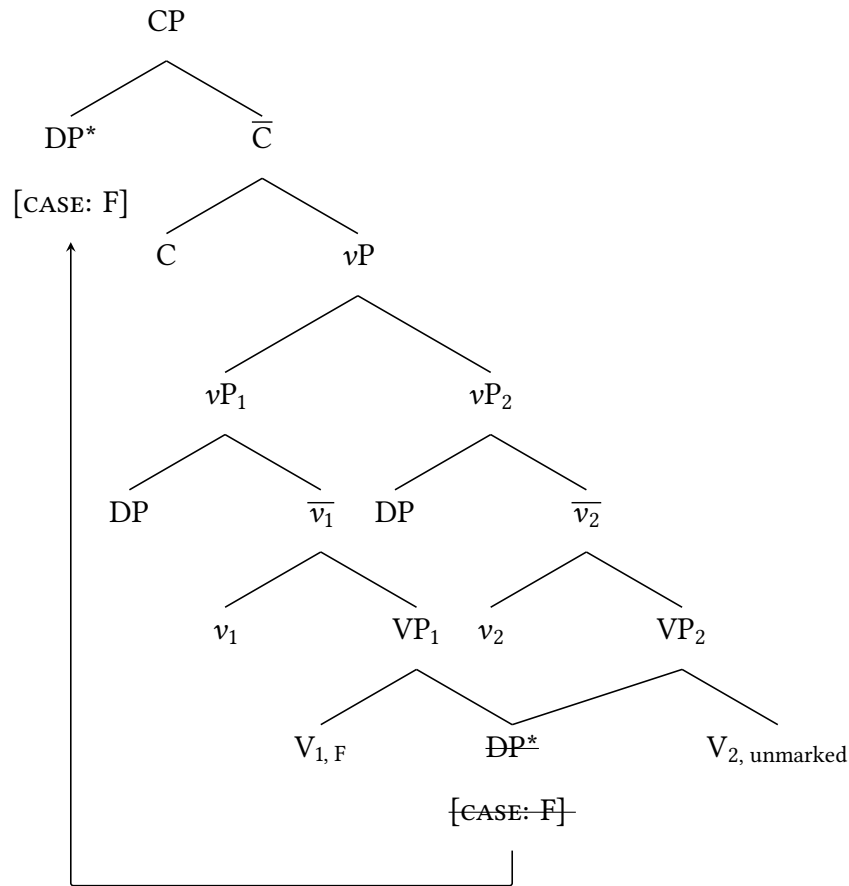
⁴Marantz (1991) proposes a fourth kind of case, *default case* (see also Schütze 2001). Preminger (2020) argues that default case can be understood as a generalized version of unmarked case.

movement targets DP*. DP* occupies a position in the left conjunct corresponding with some non-unmarked case F and a position in the right conjunct corresponding with unmarked case. (21a) shows the structure immediately before conjunction. This is the last derivational stage at which multiple case assignment may occur in Citko (2005) and C&GY's system, because after the two *v*Ps are conjoined, the structure ceases to be doubly rooted. Crucially, only one case value is assigned to DP* in (21a): case F, corresponding with the left conjunct. DP* does not receive any case value within the right conjunct, since unmarked case is only assigned at PF if no other case has been assigned. Thus, when conjunction – and subsequently, movement – occur as shown in (21b), DP* remains valued with only one case feature.

(21) a. **Case assigned before conjunction**



b. **Conjunction, then movement**



When Spellout applies, the case feature on DP* has been valued as F and nothing else. Since F is present, there is no reason for unmarked case assignment to arise on DP*; DP* is expected to be spelled out with only case F. Thus the prediction made by Citko (2005) and C&GY's system is that it should be possible to spell out DP* in (21) a form which is compatible with case F but incompatible with unmarked case.

Generalizing the above discussion, Citko (2005) and C&GY's analysis of ATB movement makes the following prediction regarding unmarked case:

- (22) **Prediction:** Coordinated unmarked and non-unmarked case gaps are exempt from the Identity of Form condition on ATB movement.

In particular, Citko (2005) and C&GY's analysis predicts that if unmarked and non-unmarked case gaps are coordinated such that the corresponding unmarked and non-unmarked case forms

are not syncretic, the ATB movement is acceptable if the non-unmarked case form is used.

In the remainder of this section, I present empirical evidence to the contrary. I review data from three constructions – German topicalization; Hindi-Urdu scrambling; and Icelandic *wh*-questions – where ATB movement targets a DP that moves out of coordinated unmarked and non-unmarked case positions. In each ATB-movement construction, the Identity of Form condition holds: Evidence from syncretism indicates that the moved DP has non-unmarked case *and* unmarked case, contrary to what C&GY’s approach predicts in combination with the notion of unmarked case.

3.2 German topicalization

German has a nominative-accusative case alignment, in which nominative would be considered the unmarked case (Schütze 2001; McFadden 2007). As noted by te Velde (2005:299f) and shown in (23), German ATB topicalization can target coordinated nominative and non-nominative DPs.⁵ In (23a), *Käse* ‘cheese’ moves into topic position out of an accusative gap in the left conjunct and a nominative gap in the right conjunct. In (23b), *die Milch* ‘the milk’ moves across-the-board in the same fashion. Crucially, *Käse* and *die Milch* in (23) are both syncretic between nominative and accusative. The acceptability of this movement holds regardless of conjunct ordering, as shown in (23c)–(23d). (23b)–(23d) are courtesy of Stefan Keine, as are all other German data to follow, unless otherwise noted.

⁵Hartmann et al. (2016) present experimental evidence to the contrary, arguing that German ATB topicalization requires strict case identity, rather than identity of form. Interestingly, in the experimental items used by Hartmann et al. (2016), ATB movement targets animate DPs rather than the inanimate DPs as in (23) and later in this paper. Stefan Keine (p.c.) reports that ATB movement targeting case-mismatched animate DPs is indeed less acceptable than ATB movement targeting case-mismatched inanimate counterparts. The reasons for this asymmetry are open to future investigation.

(23) **ATB topicalization out of NOM and ACC positions (syncretic)**

- a. **Käse** [mag ich nicht ____{ACC}] und [ist ____{NOM} auch nicht
cheese like I.NOM not and is also not
gut für mich]
good for me
'I don't like cheese and it is also not good for me' (te Velde 2005:229f)
- b. **Die** **Milch** [mag ich nicht ____{ACC}] und [ist ____{NOM} auch
the.FEM.ACC/NOM milk like I.NOM not and is also
nicht gut für mich]
not good for me
'I don't like the milk and it is also not good for me'
- c. **Käse** [ist ____{NOM} nicht gut für mich] und [mag ich auch nicht ____{ACC}]
cheese is not good for me and like I also not
'Cheese is not good for me and I also don't like it'
- d. **Die** **Milch** [ist ____{NOM} nicht gut für mich] und
the.FEM.ACC/NOM milk is not good for me and
[mag ich auch nicht ____{ACC}]
like I also not
'The milk is not good for me and I also don't like it'

Whereas the feminine singular definite determiner *die* is syncretic between nominative and accusative as in (23b) and (23d), its masculine counterpart is not: The accusative form is *den*, and the nominative form is *der*. Under non-syncretism with these masculine determiners, ATB movement is unacceptable:

(24) **ATB topicalization of NOM and ACC positions (non-syncretic)**

*Den / *Der Käse [mag ich nicht ____{ACC}] und
the.MASC.ACC the.MASC.NOM cheese like I.NOM not and
[ist ____{NOM} auch nicht gut für mich]
is also not good for me
'I don't like the cheese and it is also not good for me'

The movement is also ungrammatical when conjunct ordering is reversed, as shown in (25). Indeed, this seems to be a general fact of ATB movement; for the remainder of the paper, the reader may assume that the German and Hindi-Urdu data presented hold regardless of conjunct ordering.⁶

(25) *Der / *Den Käse [ist ____{NOM} nicht gut für mich] und
the.MASC.NOM the.MASC.ACC cheese is not good for me and
[mag ich auch nicht ____{ACC}]
like I also not
'The cheese is not good for me and I also don't like it'

The minimal pairs (23b) vs. (24) and (23d) vs. (25) show that the ungrammaticality of ATB-topicalizing 'the cheese' can be attributed to neither the movement step itself nor the mismatch in case, as both of these are tolerated as long as the vocabulary items are syncretic. Rather, ungrammaticality occurs when the ATB-moved element has forms that are non-identical for the cases of the two pre-movement gaps.

Similar facts are observed for ATB topicalization out of coordinated dative and nominative gaps. In (26), the verb *verfallen* 'fallen for' requires a dative object, while a nominative subject is expected in the right conjunct. ATB topicalization can target these positions when the moved material is syncretic, as in (26a).⁷ However, if ATB movement targets material that is *not* syncretic

⁶The Icelandic facts to be discussed in Section 3.4 are somewhat more complicated. Some speakers allow ATB movement out of mismatched case gaps, provided the moved material matches in case with the first gap (Jim Wood p.c., Jóhannes Gísli Jónsson p.c.). This warrants future research.

⁷Though syncretic for accusative and nominative (*die*), the feminine definite determiner has a distinct form (*der*) for dative case. Therefore, no syncretic feminine counterpart such as (23b) for (24) is available for (26b).

between dative and nominative case, then the result is ungrammatical (26b).

(26) **ATB topicalization of DAT and NOM object**

- a. **Käse** [bin ich ____{DAT} verfallen] aber [ist ____{NOM} nicht sonderlich gut
cheese am I fallen.for but is not particularly good
für mich].
for me

‘I’m obsessed with cheese but it’s not particularly good for me’

- b. ***Dem** / ***Der** **Käse** [bin ich ____{DAT} verfallen] aber [ist
the.MASC.DAT the.MASC.NOM cheese am I fallen.for but is
____{NOM} nicht sonderlich gut für mich].
not particularly good for me

‘I’m obsessed with the cheese but it’s not particularly good for me’

Citko (2005) and C&GY’s system, together with the idea that unmarked case appears only when no other case has been assigned, predicts that (24) and (25) should be grammatical with the determiner *den*, and (26b) should be grammatical with the determiner *dem*. These are the determiners that correspond with the non-unmarked cases. These predictions are wrong: The ATB movement is grammatical only if the moved material is compatible with *both* the unmarked and non-unmarked cases.

3.3 Hindi-Urdu object scrambling

Hindi-Urdu (HU) has a tripartite case system: In perfective aspect, transitive subjects bear ergative case, transitive objects bear accusative case,⁸ and intransitive subjects bear nominative case. Nominative is the unmarked case (see Agarwal 2022). Some HU verbs deviate from this pattern

⁸I will refer to the *-ko* morpheme, which has been analyzed as differential object marking (Mahajan 1990; Mohanan 1994; Bhatt and Anagnostopoulou 1996; Mahajan 2017), as “accusative.” For the purposes of this paper, the distinction is not relevant.

(Davison 2004) with regards to which cases their arguments appear with, which allows for testing ATB movement – in particular, scrambling – of coordinated nominative and non-nominative objects.⁹

(27a) shows coordination involving two accusative objects, and (27b) shows ATB scrambling out of these object positions. All unattributed HU data are courtesy of Hashmita Agarwal.

- (27) a. [Anu=ne **Sita=ko** bulaaya] aur [Raj=ne *(**us=ko**) chuuma]
 Anu=ERG Sita=ACC called and Raj=ERG DEM=ACC kissed
 ‘Anu called Sita and Raj kissed her’
- b. **Sita=ko** [Anu=ne ____{ACC} bulaaya] aur [Raj=ne ____{ACC} chuuma]
 Sita=ACC Anu=ERG called and Raj=ERG kissed
 ‘Sita, Anu called and Raj kissed’

An object drop analysis of (27b) is ruled out because (27a) shows that when scrambling does not occur, both conjuncts must contain overt objects.¹⁰

As with Polish and German ATB movement, ATB scrambling in HU can target elements that differ in case, provided that the forms are syncretic. In HU, dative and accusative cases both have the form *-ko* but can be differentiated by optionality and passivisation (Mohanani 1994; Davison 2014; Agarwal 2021, 2022). That is, dative and accusative are syncretic.

Given this syncretism, ATB object scrambling can target coordinated dative and accusative positions. (28) involves coordination of the verbs *dii* ‘gave’ and *dekha* ‘saw’, with a dative indirect object in the first conjunct and accusative direct object in the second. (28a) shows the sentence without scrambling; in (28b), scrambling targets the left conjunct’s indirect object and the right conjunct’s direct object:

⁹HU has both subject and object scrambling. I use object scrambling in this section because it allows greater control over the height of coordination: With subject scrambling, it can be difficult to determine whether the coordination is above or below the subject level, and thus whether the scrambling proceeds across-the-board out of both conjuncts or out of a single position above the coordination site.

¹⁰The object used in the right conjunct is a demonstrative because repeating the proper name is dispreferred.

(28) a. **Coordination with DAT IO and ACC DO**

[Sita=ne **Ram=ko** kitab dii] aur [Rita=ne *(**us=ko**) dekha]

Sita=ERG Ram=DAT book gave and Rita=ERG DEM=ACC saw

‘Sita gave Ram₁ a book and Rita saw him₁’

b. **ATB object scrambling: OK with DAT-ACC syncretism**

Ram=ko [Sita=ne ____{DAT} kitab dii] aur [Rita=ne ____{ACC} dekha]

Ram=DAT/ACC Sita=ERG book gave and Rita=ERG saw

‘Sita gave Ram₁ a book and Rita saw him₁’

Again, comparing the licit object gap in the right conjunct of (28b) with the illicit object gap in the right conjunct of (28a) shows that scrambling has occurred across-the-board out of both conjuncts.

Having established that ATB scrambling can occur out of gaps with mismatched case when the forms are syncretic, we now turn our attention to mismatches involving nominative (unmarked) case, which is not syncretic with any other case in HU. As a baseline, note that ATB scrambling can target nominative objects:

(29) a. [Sita=ko **Anu** pasand hai] aur [Raj=ko *(**vo**) dikhi]

Sita=DAT Anu likes AUX and Raj=DAT her saw

‘Sita likes Anu and Raj saw her’

b. **Anu** [Sita=ko ____{NOM} pasand hai] aur [Raj=ko ____{NOM} dikhi]

Anu Sita=DAT likes AUX and Raj=DAT saw

‘Anu, Sita likes and Raj saw’

When a nominative object is coordinated with an object of a different case, ATB scrambling is not possible, whether the scrambled material is pronounced with unmarked case or with the case of the other gap. The baseline sentences (30a) and (31a) establish that without scrambling that targets the case-mismatched positions, the coordination is acceptable.

- (30) a. **Baseline: Coordination with NOM and ACC objects**
 [Sita=ko **Ram-∅** pasand hai] aur [Rita=ne ***(us=ko)** dekha]
 Sita=DAT Ram-NOM like be and Rita=ERG DEM=ACC saw
 ‘Sita likes Ram₁ and Rita saw him₁.’
- b. **ATB object scrambling: * out of NOM and ACC gaps**
***Ram-∅/*Ram=ko** [Sita=ko _____{NOM} pasand hai] aur
 Ram=NOM/Ram=ACC Sita=DAT like be and
 [Rita=ne _____{ACC} dekha]
 Rita=ERG saw
 ‘Sita likes Ram₁ and Rita saw him₁.’
- (31) a. **Baseline: Coordination with NOM and DAT objects**
 [Sita=ne **Ram=ko** kitab dii] aur [Rita=ko ***(vo)** pasand hai]
 Sita=ERG Ram=DAT book gave and Rita=DAT 3.NOM like be
 ‘Sita gave Ram₁ a book and Rita likes him₁.’
- b. **ATB object scrambling: * with NOM and DAT**
***Ram=ko/*Ram=∅** [Sita=ne _____{DAT} kitab dii] aur [Rita=ko _____{NOM}
 Ram=DAT/Ram-NOM Sita=ERG book gave and Rita=DAT
 pasand hai]
 like be
 ‘Sita gave Ram₁ a book and Rita likes him₁.’

Again, this result is surprising under Citko (2005) and C&GY’s MCS approach to ATB movement, which predicts that the ATB-scrambled material has case requirements according to the case assigned in each conjunct. In the left conjuncts of both (30b) and (31b), no case is assigned, and in the right conjuncts, accusative and dative cases are assigned, respectively. Thus after conjunction and the movement step, the scrambled object would have accusative or dative case, but not nominative. Then, since nominative is an unmarked case and since the scrambled material

already has a case, nominative should not arise. Yet, this is not what is observed: *Sita* cannot be spelled out with accusative case in (30), and cannot be spelled out with dative case in (31). Thus, despite nominative case being unmarked case in HU, the Identity of Form condition still applies when ATB movement targets nominative positions.

3.4 Icelandic *wh*-questions

A similar pattern can be seen in Icelandic *wh*-questions. Icelandic has a nominative-accusative case alignment, with nominative as the unmarked case (Marantz 1991; McFadden 2004). Icelandic *wh*-movement can apply across-the-board, targeting coordinated nominative and accusative gaps, when the moved vocabulary items are syncretic for case:

- (32) a. Hvaða borð myndi Jón vilja ____{ACC} og Ólu bjóðast ____{NOM}?
 what table.ACC/NOM would Jón want and Óla get.offered
 (Sigurðsson and Wood 2021:40)

- b. Hvaða mynd myndi Jón elska ____{ACC} og Ólu leiðast ____{NOM}?
 what movie would Jón love and Óla be.bored.by
 (Sigurðsson and Wood 2021:40)

When a DP with distinct nominative and accusative forms, such as *hestur* ‘horse’ (accusative: *hest*; nominative: *hestur*) is targeted by ATB movement, acceptability degrades (Jim Wood, p.c.). Thus, as in German ATB topicalization and HU ATB scrambling, unmarked case in Icelandic *wh*-movement is unexceptional with respect to the Identity of Form condition.

3.5 Section takeaways

In this section, I have discussed three instances of ATB movement where one of the elements targeted by movement bears unmarked case. Within C&GY’s system in which the Identity of Form condition depends on two different case values being assigned prior to conjunction, we would expect that the ATB target could be spelled out with just the non-unmarked case in these

configurations. Yet this is not what is observed: ATB movement that targets an unmarked case position coordinated with a non-unmarked case position must be spelled out with both cases. This presents a serious issue for C&GY's account.

One might propose that phase-based Spellout prior to the conjunction step could explain the behavior of unmarked case under ATB movement. The issue examined in this section has been that unmarked case is not assigned, and therefore should not be present on a DP that acquires some other case value through another means. However, having Spellout trigger phase-wise would provide a way for a DP to acquire unmarked case sufficiently early for unmarked case to coexist with another case. The idea would be that some phase – perhaps vP – triggers the Spellout of DP^* in the unmarked case conjunct. Because DP^* does not receive any other case value within that conjunct, DP^* would then be spelled out with unmarked case. Provided that this spellout of unmarked case occurs prior to (or simultaneous with) the valuation of DP^* with case F from the left conjunct, this would cause DP^* to receive both unmarked case and case F, yielding the desired Identity of Form condition. This phase-based Spellout approach encounters an issue, however: Because DP^* will be targeted by a subsequent ATB-movement step, it must move to the phase edge. In doing so, it moves out of the Spellout domain, thus escaping valuation with unmarked case.

The data discussed in this section show that unmarked case behaves no differently than any other case with regards to the Identity of Form condition on ATB, contra the prediction in (22). This is surprising given how unmarked case is typically understood to behave: Unmarked case appears only when no other case has been assigned. ATB movement thus presents a counterexample to this pattern: Elements targeted by ATB movement show evidence for having acquired both unmarked and non-unmarked case. At this point, we are left with a choice: Either we must re-evaluate our theory of unmarked case to account for the behavior of unmarked case under ATB movement, or we must consider alternative analyses of ATB that conform with our current understanding of unmarked case. Given the wealth of arguments in favor of unmarked case in the grammatical system, I pursue the latter option, though the former also deserves further study.

Section 4

Issue 2: Externally assigned case

4.1 Prediction

A second issue with C&GY's account occurs when we consider case assignment that depends on elements external to the conjunction site. For C&GY's account of the Identity of Form condition, it is crucial that case in both conjuncts be assigned before the two conjuncts are conjoined. This requirement owes to the restriction in (33), previously discussed in Section 2.2:

(33) **Condition for multiple case valuation (C&GY 2021:21–22):**

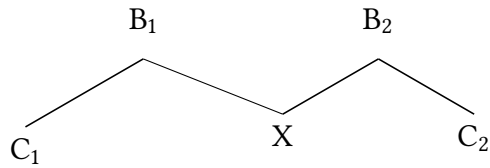
Multiple case valuation occurs only within multiply rooted structures.

After the conjunction step, the structure ceases to be singly rooted. Per (33), therefore, upon conjunction, the structure ceases to permit multiple case valuation.

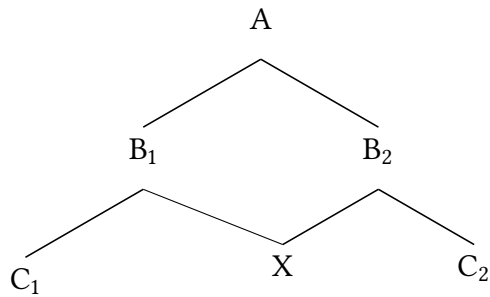
Consider, for example, the structure in (34). (34a) shows an MCS structure prior to conjunction. Two roots – B_1 and B_2 – are present, so case valuation to X may occur twice within (34a), given Citko (2005) and C&GY's assumptions. At the conjunction step (34b), A becomes the sole root, and the structure remains singly rooted for the rest of the derivation.

Now consider the position of Y in (34c). Y is above the coordination site A. If the case on X depends on the presence of Y – e.g., if Y is responsible for dependent case on X – then this case on X is what I will call *externally assigned*. Since Citko (2005) and C&GY's account of the Identity of Form condition relies on *simultaneous* case assignment within doubly rooted structures, the prediction is that externally assigned case should not be observable on X if X has already been assigned case within B_1 or B_2 . Alternatively, if no case is assigned to X within both B_1 and B_2 , then X should not show evidence of being assigned two different externally assigned cases.

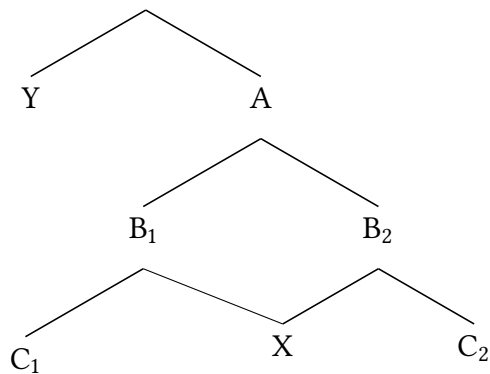
(34) a. **Immediately before conjunction**



b. **Immediately after conjunction**



c. **Derivation continues**



Summarizing the above discussion, Citko (2005) and C&GY's analysis of ATB movement makes the following prediction regarding externally assigned case:

(35) **Prediction:** Case assigned from above the site of conjunction (i.e., externally assigned case) is exempt from the Identity of Form condition on ATB movement.

In the remainder of this section, I present evidence from Icelandic object gap and the HU permissive construction showing that the prediction in (35) is inconsistent with the data.

4.2 Icelandic object gap

In Icelandic object-gap sentences (Rögnavaldsson 1990; Pouplier 2003; Ximenes 2007), two conjuncts share a single subject (descriptively speaking), and the second conjunct lacks an overt object – shown in (36a) – which would be required in the absence of conjunction, as seen in (36b). The object of the first conjunct is interpreted semantically as the object of both conjuncts.

(36) Object gap

- a. Ég elska þig og dýrka _____{ACC}
I love you.ACC and admire
'I love you and admire you' (Rögnavaldsson 1990:360)
- b. *Ég dýrka _____{acc}
I admire
'I admire you' (Rögnavaldsson 1990:370)

Object gap requires the subject to be absent in the second conjunct (37), and the gapped object must match in case with the object of the first conjunct (38). Note that for all the DPs in (38), the DP object in the left conjunct would take a different form if it were in the right conjunct (e.g., the dative counterpart of *stelpan* 'the girl' in (38a) is *stelpunni*).

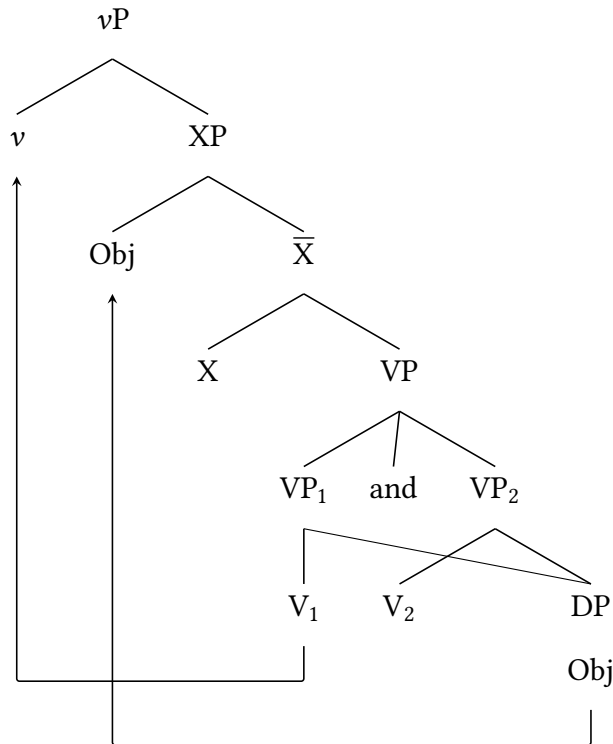
- (37) Ég tók blaðið og (*eg) braut _____{ACC} saman
I took the.paper.ACC and I folded together
'I took the paper and folded it together' (Pouplier 2003:362)
- (38) a. Þeim finnst **stelpan** aðlaðandi og vilja giftast *(**henni**)
they.DAT find the.girl.NOM attractive and want marry.INF her.DAT
'they find the girl attractive and want to marry her'
- b. Þeir sjá **stúlkuna** og finnst *(**hún**) álitleg
they.NOM see the.girl.ACC and find her.NOM attractive
'They see the girl and think she is attractive'

c. Þeim líkar **bíllinn** og kaupa ***(hann)**
 they.DAT like the.car.NOM and buy him.ACC
 ‘They like the car and buy it’

d. Ég keypti **sjónvarp** og skilaði ***(þvi)** til eiganda síns
 I bought the.TV.ACC and returned it.DAT to owner its
 ‘I bought the TV and returned it to its owner’ (Ximenes 2007:3)

Ximenes (2007) analyzes object gap as ATB object movement out of coordinated VPs to a position below *v*, followed by V-to-*v* movement out of the left conjunct. These arguments involve quantifier float, negation, auxiliary, definiteness, and adverb placement data (Ximenes 2007:5-10). Ximenes’s proposed structure for object gap is depicted in (39):

(39) **Object gap: VP coordination, adapted from Ximenes (2007:11)**¹¹



¹¹Ximenes (2007) does not assume multidominance, but states she is agnostic to the mechanism behind ATB movement. I have represented it as a multidominant structure for the sake of consistency with the rest of the paper.

The case-matching requirement of Icelandic object gap on display in (38) is a familiar one for ATB constructions. Moreover, as with other ATB constructions, the case-matching requirement disappears when the object would be assigned two different cases whose forms happen to be syncretic.

(40) is taken from a newspaper headline, so lacks an overt subject. The two verbs in (40), *stal* ‘steal’ and *eyðilagði* ‘destroy’, require dative and accusative objects, respectively. In (40a), the singular *bíl* ‘car’ is syncretic between dative and accusative, and can undergo object gap. The plural counterpart, *bílum* ‘cars’ is not syncretic, and significantly worse with object gap (40b).

(40) **Case mismatch with object gap**

- a. Stal **bíl** [stal ____{DAT}] og [eyðilagði ____{ACC}].
 stole car.ACC/DAT and destroyed
 ‘stole a car and destroyed it’ (Sigurðsson and Maling 2010:71)
- b. ??Stal **bílum** [stal ____{DAT}] og [eyðilagði ____{ACC}].
 stole cars.DAT and destroyed
 ‘stole cars and destroyed them’ (Ximenes 2007:4)

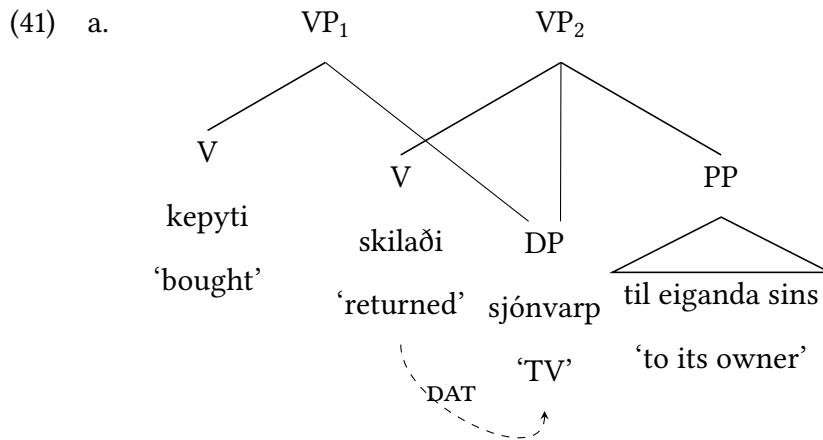
The fact that mismatched cases with object gap are tolerated under syncretism, as seen in (40a), shows that the movement of case-mismatched items is not illicit wholesale, but rather is subject to limitations pertaining to the available forms. That is, object gap also adheres to the Identity of Form condition.

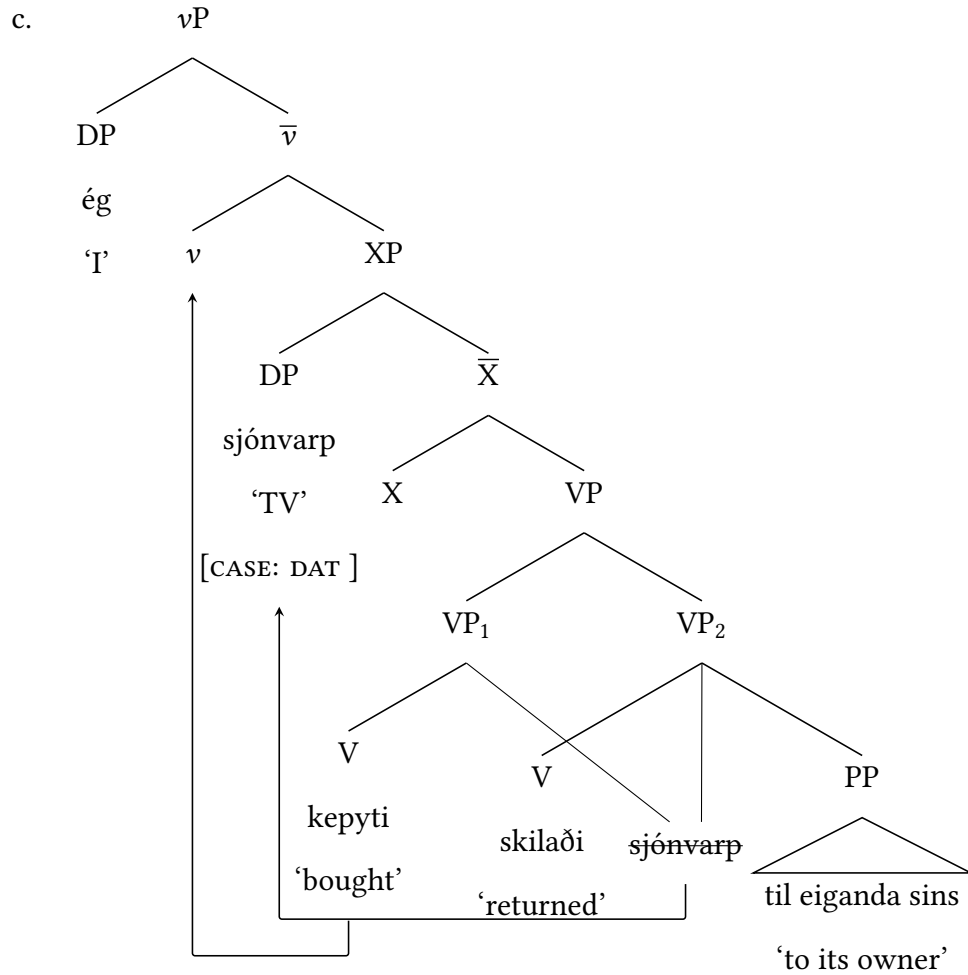
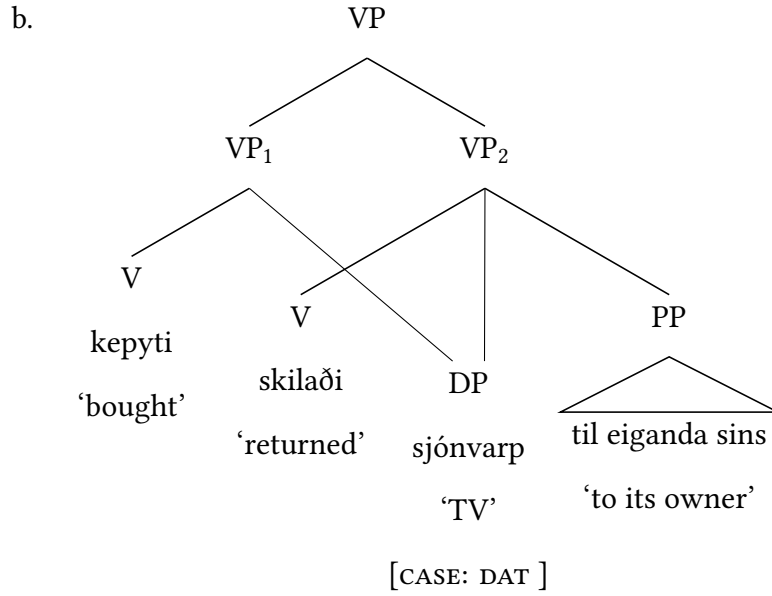
Turning our attention now to the cases involved in (38), (38a) is a NOM/DAT coordination, while (38b) and (38c) are NOM/ACC coordinations. Since nominative is unmarked case in Icelandic, these data provide additional support for the trend documented in Section 3.

(38d) exemplifies a different kind of configuration: In one conjunct, the object is expected to receive dative case, and in the other, it is expected to receive accusative case. Dative case is assigned locally in the right conjunct, as the gapped object is an argument of the verb *skila* ‘return’, which requires both its indirect and direct objects to bear dative case. In the left conjunct, the case

assigned is accusative. Icelandic accusative case is dependent case whose assignment is contingent on the presence of a c-commanding DP higher in the structure (Andrews 1976; Thráinsson 1979; Zaenen et al. 1985; Ármann Sigurðsson 1989; Marantz 1991). That is, accusative case on *sjónvarp* in (38d) is externally assigned.

The structure of (38d) immediately before and after conjunction is shown in (41). Before conjunction occurs, the structure is doubly rooted (41a). This configuration would allow multiple case assignment under C&GY's assumptions, but at this point, only one case can be assigned to the object – dative case, in the right conjunct. Accusative cannot be valued yet, since the c-commanding subject *ég* 'I' has not yet merged into the structure. The VP conjunction structure is shown in (41b). At this point, *sjónvarp* has only been assigned dative case. The structure in (41b) is singly rooted, and the structure is still singly rooted when the subject is merged in (41c).





Since (41c) is singly rooted, it does not allow for multiple case assignment. Since *sjónvarp* 'TV'

has already received dative case, the accusative dependent-case rule does not apply, and therefore *sjónvarp* is assigned only dative case. However, the ATB movement is not grammatical with *sjónvarp* in its dative form (*sjónvarpi*) either (Ximenes 2007:3–4). The fact that an unambiguously dative form is unacceptable in this DAT/ACC object gap sentence except under DAT/ACC syncretism shows that these configurations cannot be analyzed to involve only dative case valuation on the object. Contrary to what Citko (2005) and C&GY's system predicts, externally assigned case must also have been assigned to the object.

Thus, data from the Icelandic object-gap construction shows that the Identity of Form condition must be observed even when one of the cases is externally assigned. DAT/ACC configurations involve one case being assigned below the conjunction level and one case sensitive to elements above the conjunction level. Moreover, (38b) and (38c) – ACC/NOM and NOM/ACC coordinations, respectively – actually involve *no* cases being assigned below the conjunction level: Accusative case is dependent case conditioned by the conjunction-external subject (as discussed for (38d)), and nominative case is unmarked case which is also not assigned within the conjunction site. Still, the Identity of Form condition holds, as evidenced by the ungrammaticality of (38b)–(38c).

As a final note regarding object gap, observe that in (41), the landing site for ATB movement is below where the subject – which is responsible for dependent case assignment – merges. This detail is inconsequential for Citko (2005) and C&GY's analysis and for my Late Unify approach presented in Section 5, but becomes relevant when evaluating non-MCS approaches to ATB movement, as will be seen in Section 7.2.

4.3 Hindi-Urdu permissive

The HU permissive construction with *de-na* 'give/let' (Butt 1995; Davison 2014; Agarwal 2021, 2022) is a second configuration in which ATB can occur where case assignment is sensitive to elements external to the site of coordination. Examples of the permissive construction are given in (42):

- (42) a. Anjum=ne Saddam*(=ko) haar-∅ banaa-ne di-yaa.
 Anjum=ERG Saddam=DAT necklace-NOM make-INF give-M
 ‘Anjum let Saddam make a necklace’ (Butt 1995:35)
- b. Sita=ne fasal(=ko) jalne diyaa
 Sita=ERG crop(=ACC) burn.UNACC let
 ‘Sita let the crops burn’ (Agarwal 2021:9)

I adopt the structure in (43) from Davison (2014) for the permissive. In this structure, *de-na* embeds a non-finite clause containing both the embedded subject and object (if there is one):

- (43) DP₁ [DP₂ (DP₃) V-inf] ‘let’

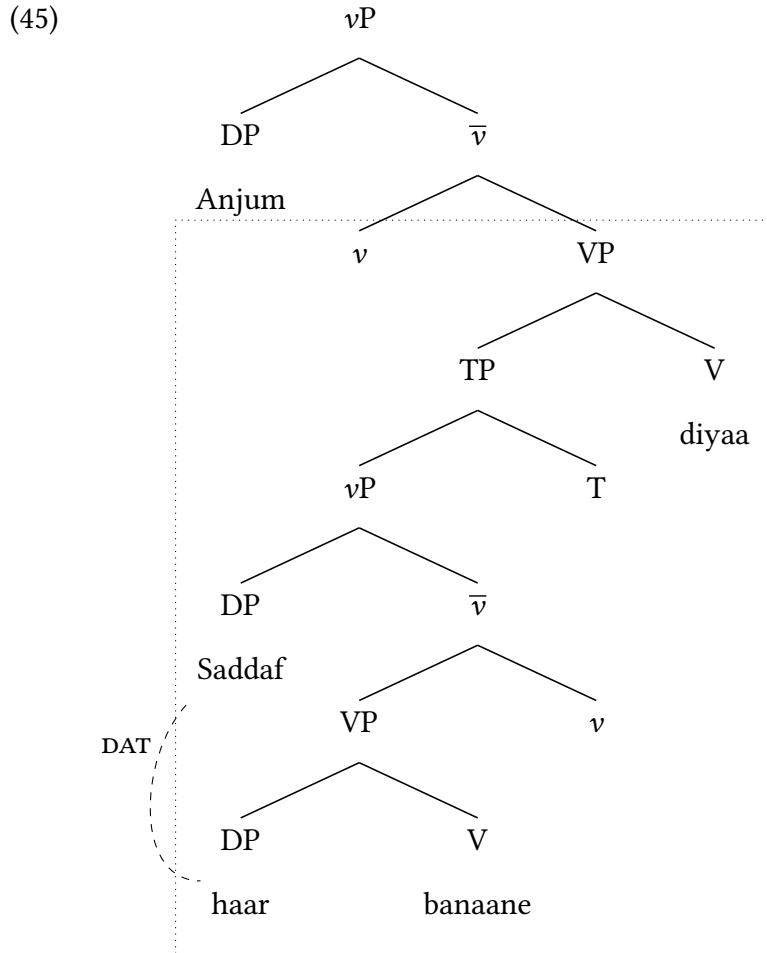
In the permissive, transitive embedded subjects bear obligatory dative case, as seen on *Saddaf* in (42a). Intransitive embedded subjects, on the other hand, bear optional accusative case, as shown in (42b). Agarwal (2021) argues that the dative case on embedded transitive subjects is dependent case within the matrix VP.¹² This analysis owes to the observations that i) transitive subjects do not receive dative case *when they are not embedded* (ruling out the embedded transitive predicate as the source for dative case); and ii) *intransitive* embedded subjects do not receive dative case (ruling out the embedder ‘let’ as the source for dative case). I follow Agarwal (2021) in adopting the dative dependent-case rule for HU given in (44):

- (44) **Dependent-case rule for dative case (Baker 2015:131):**

If DP₁ c-commands DP₂ in VP, assign dative to DP₁.

To illustrate (44) in the permissive, the structure for (42a) is shown in (45), with the domain for dependent dative case indicated via a dotted box. In the argument to follow, it will be crucial that the domain for dependent dative case on the embedded subject – i.e., matrix VP – properly includes the embedded clause.

¹²Agarwal (2022) argues, alternatively, that the domain for the dependent dative case assignment in to embedded transitive subjects is matrix *vP*. The argument that I present regarding externally assigned case is agnostic to this difference; what is important is just that the case domain is larger than the embedded clause.



When an embedded permissive subject undergoes ATB scrambling from transitive and intransitive clauses, the case marker *ko* is obligatory. This is shown in (46). In both (46a) and (46b), the left conjunct has a transitive subject, and the right conjunct has an intransitive subject. Although the movement is string-vacuous with respect to the first conjunct, the structure in (46) cannot be analyzed as coordination below the subject level because due to differences in predicate types as there is no plausible height of coordination placing the subject above the coordination site. HU verbs have different transitive and unaccusative forms: As can be seen in (46b), the verb ‘burn’ has the transitive form *jalaane* and the unaccusative form *jalne*. The verb forms, therefore, indicate that the subject ‘fire’ has merged in a different position within each conjunct of (46b)’s embedded clause — Spec-*vP* in the first conjunct (47a), and Comp-*VP* in the second (47b). We conclude therefore that the sentences in (46) result from coordination above the embedded subject,

followed by ATB scrambling of the subject.

(46) **ATB movement of coordinated embedded subjects**

- a. Sita=ne **aag*(=ko)** [_____{DAT} fasal jalaane] aur [_____{ACC}
Sita=ERG fire(=DAT/ACC) crops burn.TRANS and
failne] diyaa
spread.UNACC let

‘Sita let the fire burn the crops and spread’

- b. Sita=ne **aag*(=ko)** [_____{DAT} fasal jalaane] aur
Sita=ERG fire(=DAT/ACC) crops burn.TRANS and
[_____{ACC} jalne] diyaa
burn.UNACC let

‘Sita let the fire burn the crops and burn’

(47) a. **Transitive form (*jalaane*)**

[_{VP} aag=ko v [_{VP} fasal jalaane]]

b. **Unaccusative form (*jalne*)**

[_{VP} v [_{VP} aag=ko jalne]]

I claim that (46) shows that *aag* ‘fire’ has been assigned both dative and accusative cases. The argument is twofold. First, we know that *aag* has been assigned dative case; if it had not been, the *ko* marking would be not be obligatory. Second, we know that *aag* has been assigned accusative case by comparing (46) with the data in (48). Certain types of nominals, such as non-referential DPs, are incompatible with accusative case marking (Bhatt 2007).¹³ For example, when the non-referential DP ‘earthquake’ is used as an intransitive embedded subject, it cannot bear accusative case (48a); it must instead bear unmarked case. Non-referential DPs can bear dative case, however, as shown in (48b), where ‘earthquake’ is a transitive embedded subject.

¹³This is related to accusative case being differential object marking; see fn. 8.

Crucially, (48c) shows that ATB movement of the embedded subject is unacceptable for conjoined embedded clauses with where ‘earthquake’ is an intransitive embedded subject in one conjunct and a transitive embedded subject in the other. Neither

- (48) a. Bhagwaan=ne [zalzalaa*(=ko) hone] diyaa
 God=ERG earthquake=ACC happen let
 ‘God let the earthquake occur’
- b. Bhagwaan=ne [zalzalee*(=ko) shahar ukhaadne] diyaa
 God=ERG earthquake=DAT city uproot let
 ‘God let the earthquake destroy the city’
- c. *Bhagwaan=ne **zalzalee(=ko)** [_____{NOM} hone] aur
 God=ERG earthquake=DAT/ACC happen and
 [_____{DAT} shahar ukhaadne] diyaa
 city uproot let
 ‘God let the earthquake occur and destroy the city’

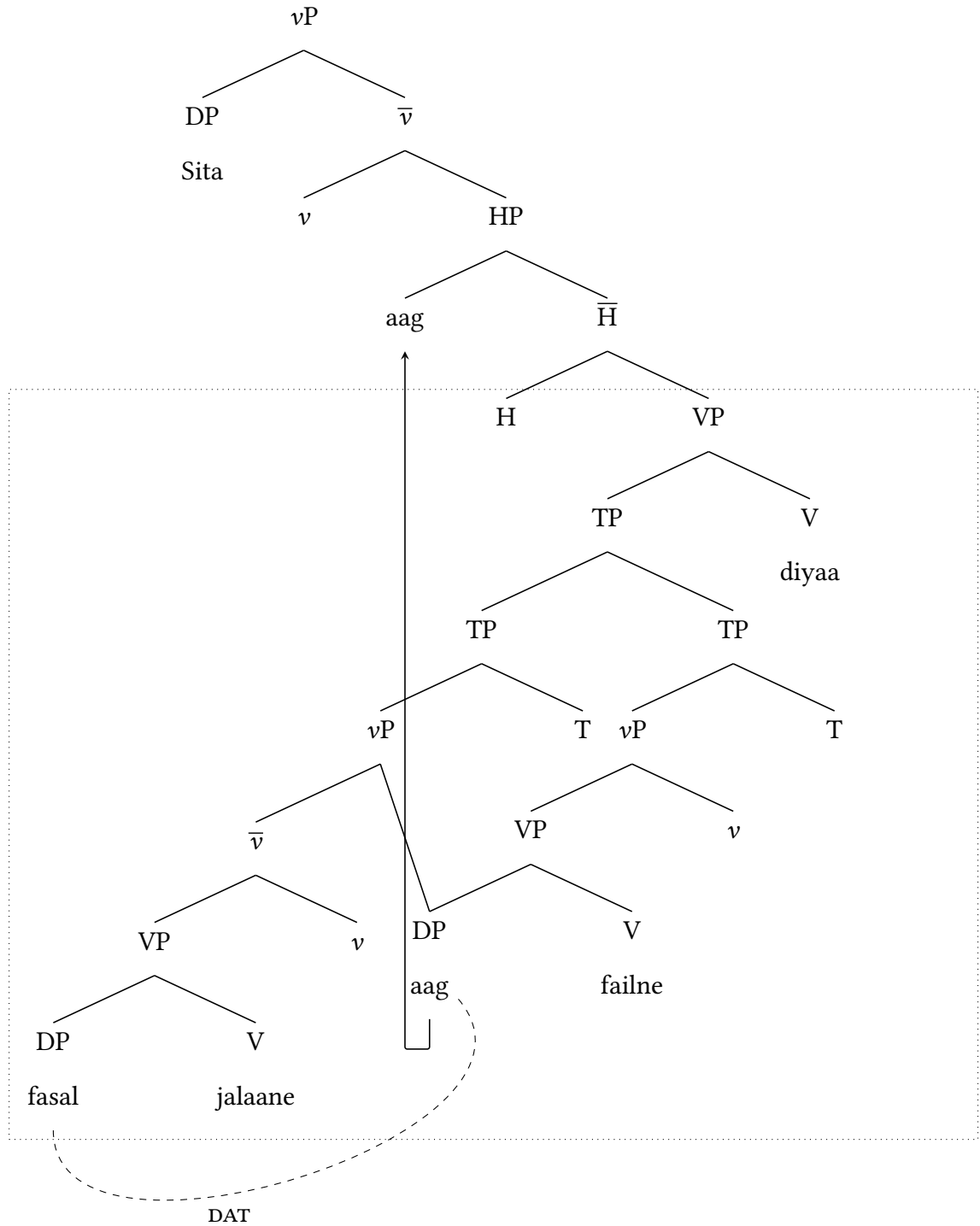
To summarize what we have seen in (46)–(48), the Identity of Form condition holds in the HU permissive construction when ATB movement targets an embedded dative subject coordinated with a subject having accusative or nominative case.

Since Citko (2005) and C&GY’s analysis depends on case being multiply assigned within doubly rooted structures, the observed Identity of Form condition depends on both dative and the second case being assigned prior to the merger of matrix V. But this expectation is inconsistent with our understanding of dative case assignment in HU.

In (49), the domain for dative case assignment – matrix VP – is indicated with a dotted line. According to the dependent-case rule in (44), dative case cannot be assigned to *aag* until the matrix V has merged, since until that derivational stage, the conditions for dependent dative case assignment are not met:¹⁴

¹⁴For concreteness, I have depicted the landing site for *diyaa* as between matrix V and matrix *v*. The actual landing

(49) **DAT: Dependent case within matrix VP (dotted)**



site may actually be higher or lower than this. The distinction is unimportant for the present purposes, as our interest is in the source of case relative to the height of conjunction.

Therefore dative case cannot be assigned until after the conjunction step, i.e., after the stage when the structure ceases to be doubly rooted. Thus, the conditions for a DAT/ACC Identity of Form requirement within Citko (2005) and C&GY's analysis are not met: Their analysis predicts that the embedded subject *aag* will only be assigned one case. Yet, as evidenced by comparing the unacceptability of (46) with the acceptability (48c), this prediction is not borne out.

4.4 Section takeaways and interim summary

In this section, I have presented two instances demonstrating that the Identity of Form condition applies to externally assigned case — i.e., case assigned from above the site of conjunction — just as it applies to any other kind of case. Like with unmarked case in Section 3, the observed empirical behavior of externally assigned case is at odds with what Citko (2005) and C&GY's analysis predicts.

At this point, I have shown two kinds of case configurations for ATB movement that pose problems for Citko (2005) and C&GY's Parallel-Merge based analysis. Their analysis can be broken into two components: i) ATB movement results from movement targeting a multidominated element which is simultaneously present in both conjuncts; and ii) The ATB-movement Identity of Form condition results from case being assigned multiple times due to the presence of multiple root nodes as an MCS is built. In the next section, I propose an alternative derivation for MCSs which preserves i) from Citko (2005) and C&GY's analysis, and which I argue better derives the empirical facts. I call this approach *Late Unify*.

Section 5

Late Unify

5.1 Proposal

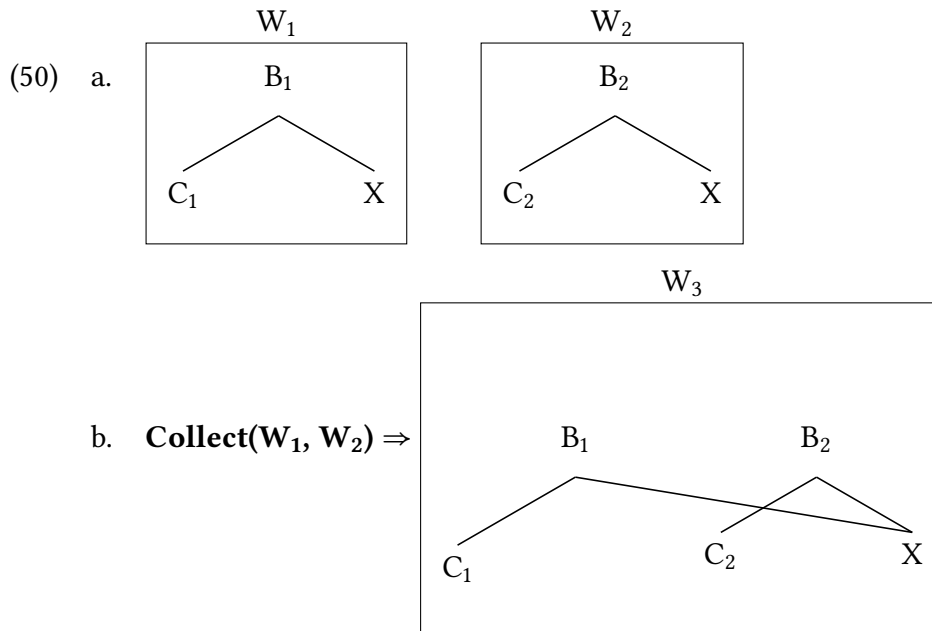
Like Citko (2005) and C&GY’s Parallel Merge approach to building MCSs, the Late Unify approach taps the intuition that elements that are ATB-moved out of MCSs bear one case feature for each position in which they are merged. However, as discussed in Sections 3 and 4, relying on these multiple case values to be assigned simultaneously within doubly-rooted trees encounters issues for unmarked case and externally assigned case.

With Late Unify, I propose that the two conjuncts are built up as separate syntactic trees, each with a separate occurrence of the element that will later be targeted by ATB movement. Within each conjunct, each occurrence of the to-be-ATB-moved element has its own parent node and its own associated feature set. I propose that at the conjunction step¹⁵ — that is, when the trees for the two conjuncts are merged into a single tree — the properties of both occurrences of the ATB target from the two conjuncts are combined. Since these properties include the dominance relations involving the ATB target, the ATB target comes to occupy two positions within a single tree at the conjunction step. When the two occurrences from distinct trees are united within a single tree, the ATB target becomes what I call *shared material*, following Fox and Pesetsky (2007).

The idea that shared material starts out in distinct trees which are later united has been explored previously with the Collect operation in Fox and Pesetsky (2007) and O’Brien (2017) (see also Bachrach and Katzir 2009). O’Brien (2017) models Collect as an operation that combines two separate workspaces into one. When Collect applies, any elements that are common across the two workspaces are co-identified. Dominance relations from the two combining workspaces are

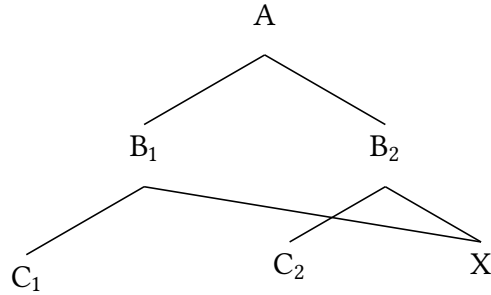
¹⁵I continue to set aside discussion of the conjunction word *and*, as noted in Section 1. Accordingly, when I discuss the “conjunction step,” I mean whichever step is responsible for the two conjuncts being united under a single root.

also preserved into the new one. Thus, an element that previously was present in two workspaces – with a distinct parent node in each – becomes multi-dominated within the product workspace upon application of Collect. Collect, as described in O’Brien (2017), is depicted in (50), where the dominance relations $B_1 > X$ and $B_2 > X$ from workspaces W_1 and W_2 in (50a) are preserved into the new workspace W_3 in (50b).



Fox and Pesetsky (2007) and O’Brien (2017) identify Collect as an operation distinct from Merge; Fox and Pesetsky (2007) suggests that Collect is Merge without the labeling step, an idea also explored by Hornstein and Pietroski (2009). Once Collect has applied to create shared material, Merge can subsequently target two nodes that dominate the shared material, uniting the shared material under a single node. For illustration, (51) shows the outcome of applying Merge to B_1 and B_2 in (50b) to produce a new node A that totally dominates X . If A is a coordination structure, then (51) represents the familiar MCSs that we have been examining in this paper, with X as the shared material.

(51) **Merge(B₁, B₂) applied to (50b)**



My Late Unify proposal takes from Fox and Pesetsky (2007) and O’Brien (2017) the idea that MCSs arise from co-identifying material that exists independently within two different trees. I diverge from Fox and Pesetsky (2007) and O’Brien (2017), however, by eliminating the operation Collect. Rather than using Collect to produce structure sharing in MCSs, I argue that the sharing results from applying Merge to two trees that (happen to) contain the same syntactic element. There is thus no separate operation Collect as depicted in (50). Instead, I propose, when Merge targets two trees with material in common, the product is necessarily a structure that involves shared material. For example, the derivation for (51) skips the intermediary step depicted in (50b); applying Merge(B₁, B₂) to (50a) would yield (51) directly. In my system, workspaces correlate one-to-one with trees, and each tree has a unique root. Thus, to say that a DP occurs in two distinct trees is to say that it is present in two distinct workspaces. It is natural, given our understanding of workspaces, that the two occurrences do not interact until their trees are merged; cross-workspace interaction is not permitted.

Deriving shared material in MCSs as a byproduct of Merge rather than as a result of Collect restricts the timing of subsequent operations that may rely on material being shared.¹⁶ I argue in Section 5.3 that restricting structure-sharing to occur relatively late in the derivation of an MCS — which Late Unify enforces — is important for avoiding overgeneration.

I state in (52) the main theoretical proposal underlying the Late Unify analysis. Following Fox and Pesetsky (2007) and O’Brien (2017), I assume that same syntactic element can exist in different

¹⁶See also the ‘Just-in-time’ constraint on Collect proposed by O’Brien (2017:99).

trees within a single derivation. Within each tree, each occurrence has an associated feature bundle. I propose that when Merge targets two syntactic structures, all dominance relations and feature bundles from each structure are inherited by the product structure. In particular, a particular same element is present in both the syntactic structures being merged, the dominance relations and features associated with that element in each of the two pre-Merge structures are preserved in the structure that is produced. Such a Merge operation can be conceptualized as merging the two structures, thereby superimposing any syntactic objects that they have in common. Thus, the operation Merge is defined as follows:

(52) **Merge with superimposition:**

Let A and B be syntactic elements. Then the product of Merge(A, B) is the minimal C such that:

1. C dominates A and B;
2. All dominance relations from A and B are maintained in C; and
3. All feature bundles from A and B are maintained in C.

To function as intended, the Merge operation in (52) requires that syntactic elements be drawn from an indexed numeration (Chomsky 1995), or that occurrences of the same elements are indexed in some other way. This requirement ensures that when Merge occurs, sufficient information is available to identify which sub-components to superimpose. See also O'Brien (2017).

As an example of how (52) operates, suppose that within A and B, X is assigned different case features values – say, F1 and F2, respectively. Then when Merge(A, B) occurs, the product will contain a single X, which has two associated feature bundles – one with case F1 and the other with case F2.

Notice that in the ATB-movement constructions we have been examining in this paper, X has had identical values for features other than case (e.g., number and gender) within A and B. These common features are present in each of the feature bundles:

(53) a. **X, in A:**

[CASE: F1, GENDER: FEM, NUM: SG, ...]

X, in B:

[CASE: F2, GENDER: FEM, NUM: SG, ...]

b. **X, in Merge(A, B) = C:**

{[CASE: F1, GENDER: FEM, NUM: SG, ...], [CASE: F2, GENDER: FEM, NUM: SG, ...]}

Suppose now that instead of having different case features within A and B, X has the *same* case feature value F3 within A and B prior to the application of Merge(A, B). Within C, X will still inherit the feature bundle from each of its occurrences. Therefore, X will have associated with it two feature bundles that happen to be identical:

(54) **X, in C:**

{[CASE: F3, GENDER: FEM, NUM: SG, ...], [CASE: F3, GENDER: FEM, NUM: SG, ...]}

As such, the sets of feature bundles produced by Merge must be multisets (also called *bags*). Multisets are sets that allow for multiple copies of the same element. The assumption that multiple copies of the same feature bundle can co-exist on a syntactic node is required for ATB movements displaying an Identity of Form sensitivity where neither cases involved is determined below the conjunction step. An example of such a configuration in which multisets are necessary is discussed in Section 5.2 for HU.

Since multiple case features can exist on a single element, there arises the question of how to value the case on such an element. I propose that case is assigned at most once for each *case-assigning configuration*. A case-assigning configuration is defined to be a set of syntactic elements in a structural relation that would lead, absent any intervening factors, to case being assigned. For example, a case-assigning configuration for lexical case consists of a lexical case assigner and a DP in the c-command domain of the lexical case assigner. For dependent accusative case, a case-assigning configuration consists of two DPs in a c-command relationship within a relevant domain, where the higher one has not been valued for case.

(55) **Conservativity of case assignment:**

A case-assigning configuration may value at most one case feature on a given DP.

5.2 Demonstration of Late Unify

Late Unify derives the Identity of Form condition on ATB movement for the kinds of case that have been discussed in this paper. In this section, I demonstrate Late Unify first with the case configurations from Section 2 that are unproblematic for Citko (2005) and C&GY, then with the two other, more problematic, configurations discussed in Sections 3 and 4, unmarked case and externally assigned case.

The Polish ACC/GEN relative clauses from (12) are repeated in (56). Recall from Section 2.2 that this is a configuration where case is assigned in both conjuncts below the site of conjunction, and thus a configuration in which Citko (2005) and C&GY's Parallel Merge approach successfully derives the Identity of Form condition.

(56) **Polish relative clauses with case mismatches**

- a. dziewczyna, *która / *której [Janek lubi ____{ACC}] a
girl who.FEM.ACC who.FEM.GEN Janek likes and
[Jerzy nienawidzi ____{GEN}]
Jerzy hates

‘the girl who Janek likes and Jerzy hates’ (Citko 2011:126)

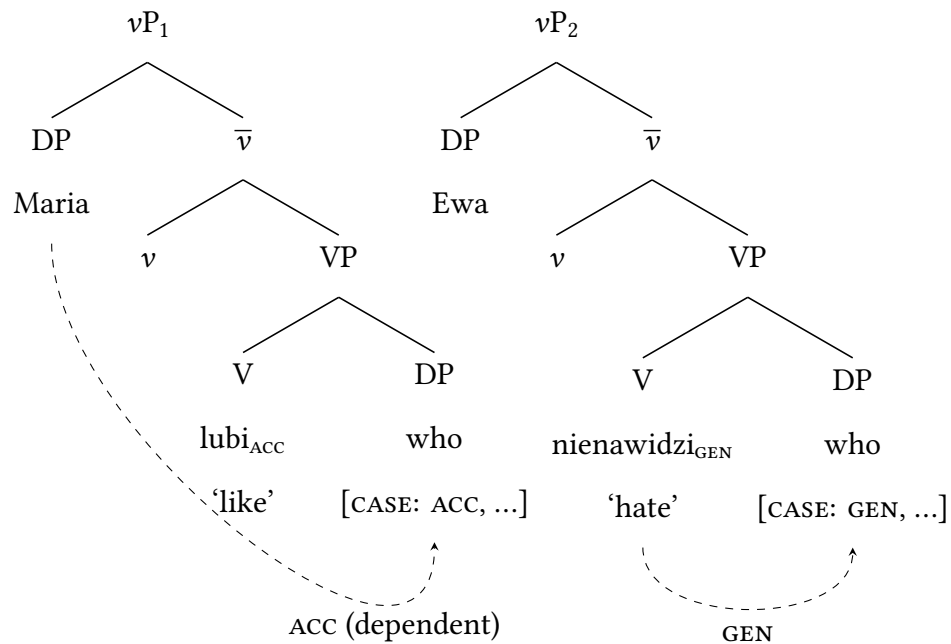
- b. chłopiec, którego [Maria lubi ____{ACC}]
boy who.MASC.ACC/GEN Maria likes
a [Ewa nienawidzi ____{GEN}]
and Ewa hates

‘the boy who Maria likes and Ewa hates’ (Franks 1995:62)

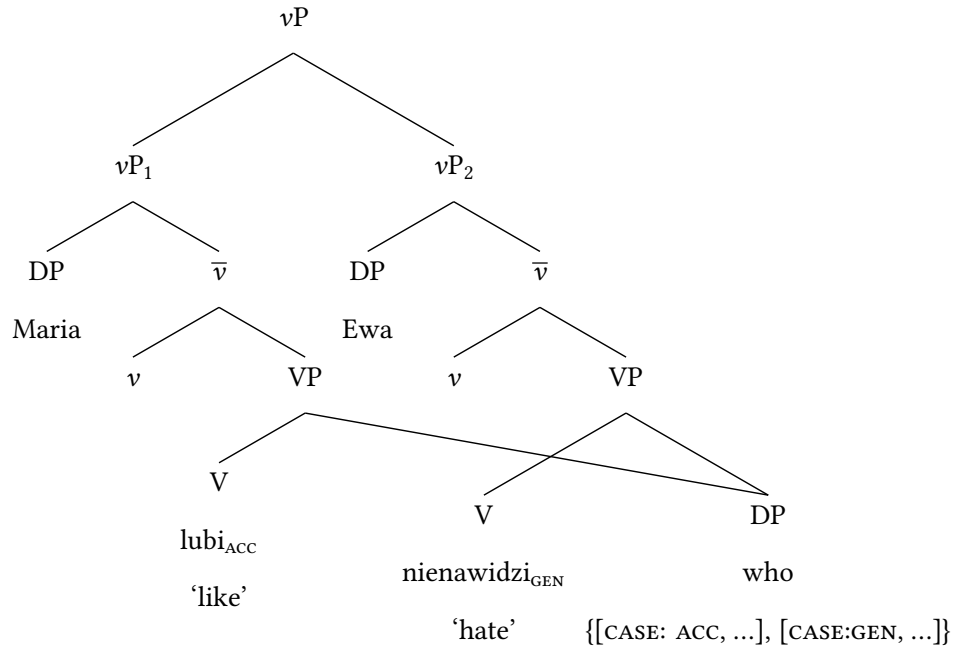
(57a) shows the structure before coordination. Both νP_1 and νP_2 include occurrences of the DP

‘who.’ Case assignment occurs independently in each conjunct: ‘who’ is assigned accusative case in the left conjunct via a dependent-case rule, and is assigned genitive case from the lexical-case verb *nienawidzi* ‘hate’. When conjunction occurs via Merge(vP_1 , vP_2) in (57b), the two occurrences of ‘who’ are united into one, which inherits both a feature bundle with accusative case from vP_1 and a feature bundle with genitive case from vP_2 . The derivation then continues as in Citko (2005) and C&GY’s analysis: The two feature bundles on ‘who’ persist through the subsequent Spec-CP ATB-movement step, and the vocabulary item inserted into Spec-CP must be compatible with both cases. Thus, the ATB movement is unacceptable when the accusative and genitive forms are distinct (56a) but acceptable when the forms are syncretic available (56b). I return to the spellout process in Section 6.

(57) a. **Build conjuncts independently; ‘who’ is present in each**



b. **Merge(vP_1 , vP_2). ‘who’ gets both case features**



Turning now to ATB-movement configurations where unmarked case is coordinated with another case, we see that Late Unify again successfully derives the observed Identity of Form condition. To illustrate, consider the ACC/NOM German ATB topicalization in (58), repeated from (23b) and (24).

- (58) a. **Die** **Milch** [mag ich nicht _____{ACC}] und [ist _____{NOM} auch
the.FEM.ACC/NOM milk like I.NOM not and is also
nicht gut für mich]
not good for me
‘I don’t like the milk and it is also not good for me’
- b. ***Den** / ***Der** **Käse** [mag ich nicht _____{ACC}] und
the.MASC.ACC the.MASC.NOM cheese like I.NOM not and
[ist _____{NOM} auch nicht gut für mich]
is also not good for me
‘I don’t like the cheese and it is also not good for me’

Before conjunction occurs, accusative case is assigned to the object in the left conjunct via a

dependent-case rule. Within the right conjunct, case is not assigned, since this is an unmarked case position. Therefore, immediately before conjunction, ‘the milk/cheese’ has been assigned accusative case in the workspace corresponding with the left conjunct, and ‘the milk/cheese’ has an unvalued case feature in the workspace corresponding with the right conjunct:

(59) **Left conjunct:** [CASE: ACC, ...]

Right conjunct: [CASE: □, ...]

When conjunction occurs via Merge, the two feature bundles that include [CASE: ACC] and [CASE: □] combine to form the multiset {[CASE: ACC, ...], [CASE: □, ...]}. No case-valuation operation occurs after the conjunction step (the dependent-case rule has already applied within the left conjunct, so it does not apply a second time to value the remaining unvalued case feature on ‘the milk/cheese’). Therefore, the unvalued case feature [CASE: □] from the right conjunct survives until Spellout, leading to an ACC/NOM syncretism requirement on the moved material. In (58a), this syncretism requirement is fulfilled by *Die Milch*, but in (58b), the forms – *Den Käse* and *Der Käse* – are not syncretic, yielding unacceptability. Late Unify thus derives the desired result that the Identity of Form condition holds for unmarked case under ATB movement.

Finally, we consider configurations containing externally assigned case. One such example from HU is given in (60a), repeated from (48b), which involves movement out of nominative and dative case gaps. The dependent dative case in the right conjunct requires the presence of matrix VP to be assigned, and thus cannot be assigned prior to conjunction. The unacceptability of (60a) contrasts with the acceptability of (60b) (repeated from (46a)), in which movement proceeds out of accusative and dative case gaps, where the forms are syncretic.

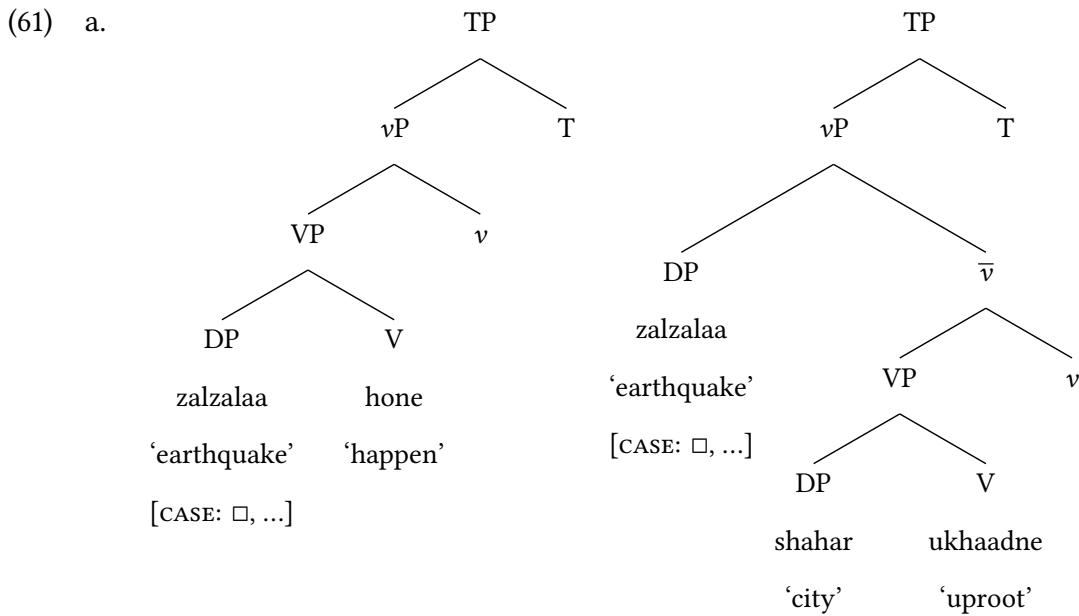
- (60) a. *Bhagwaan=ne **zalzalee(=ko)** [_____{NOM} hone] aur
 God=ERG earthquake=DAT/ACC happen and
 [_____{DAT} shahar ukhaadne] diyaa
 city uproot let
 ‘God let the earthquake occur and destroy the city’

- b. Sita=ne **aag*(=ko)** [_____{DAT} fasal jalaane] aur
 Sita=ERG fire(=DAT/ACC) crops burn.TRANS and
 [_____{ACC} failne] diyaa
 spread.UNACC let

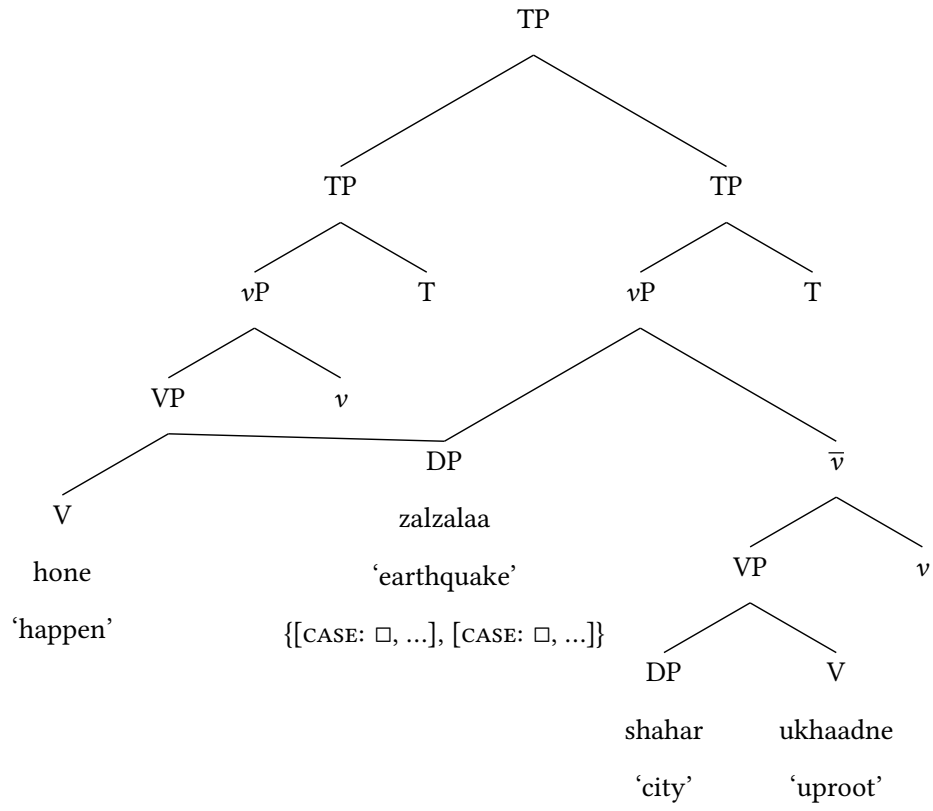
‘Sita let the fire burn the crops and spread’

Within a Parallel-Merge based MCS account, the ungrammaticality of (60a) is unexpected: Neither case is assigned prior to the conjunction step (in fact, unmarked case is never assigned), so the conditions for simultaneous case assignment are not satisfied. Within the Late Unify approach, however, we can account for the unacceptability of (60a).

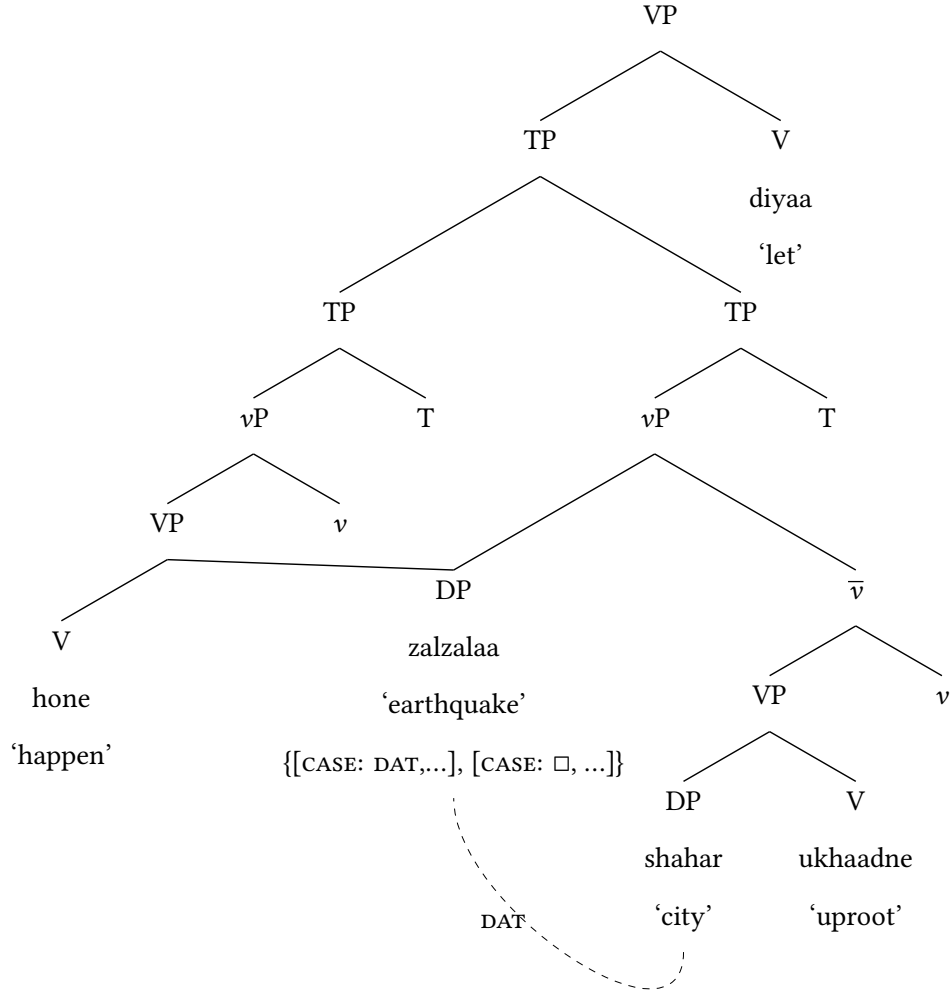
The derivation for (60a) is shown in (61). We begin with the pre-conjunction structure, shown in (61a). ‘Earthquake’ exists in both conjuncts, and in both, its case feature is unvalued. Both unvalued case features are inherited when ‘earthquake’ becomes shared material upon conjunction (61b). One of these unvalued case features is valued with dative case via the dependent-case rule in (44) upon merger of the matrix V (61c). The other stays unvalued, so at Spellout becomes unmarked case. The ungrammaticality of (60a) can be attributed to this DAT/NOM incompatibility.



b.



c.



It is crucial in (61) that only one of the two unvalued case features is valued by the dative dependent-case rule (44). This is ensured by conservativity of case assignment, (55), which prevents (44) from applying twice for the same case-assigning configuration.

Having demonstrated that Late Unify can derive the Identity of Form condition for ATB-movement constructions involving unmarked case and externally assigned case, we have thus shown that Late Unify accounts for the issues raised for Parallel Merge in Sections 3 and 4.

5.3 Anytime Unify

In this section, I discuss a third possible framework for building MCSs, which I will ultimately argue against. I will call this third framework Anytime Unify.

Anytime Unify rejects Citko (2005)'s idea of simultaneous case valuation. Instead, Anytime Unify – like Late Unify – analyzes the Identity of Form condition in ATB-movement as arising because different occurrences of the same syntactic item become united in a single structure after having previously existed in separate structures with distinct feature bundles. Whereas Late Unify takes unification to occur when Merge targets two structures that have an element in common, Anytime Unify instead sets out unification as an independent operation that can occur at any point during a derivation.

Fox and Pesetsky (2007) and O'Brien (2017) propose that Collect can happen at various points during a derivation.¹⁷ Adding the additional assumption (62) to O'Brien (2017)'s Collect operation as described in Section 5.1, we arrive at one implementation of Anytime Unify. Anytime Unify therefore represents a natural extension of Fox and Pesetsky (2007) and O'Brien (2017)'s Collect framework with additional specification (`[collection-extension]`) regarding the behavior of feature bundles. Note the similarity between (62) and Condition 3 of Merge as defined in (52).

(62) The product $\text{Collect}(A, B)$ contains all feature bundles present in A and B

The issue with Anytime Unify is that it overgenerates: It fails to prevent case from being assigned “over-eagerly” across conjuncts to a DP that would otherwise remain unmarked. This prediction conflicts with the empirical generalization that the Identity of Form requirement depends on the cases that would appear independently in the two gaps if there were no conjunction.

To demonstrate this overgeneration, consider the German DAT/NOM topicalization in (63),

¹⁷Fox and Pesetsky (2007) and O'Brien (2017) use the assumption that Collect can occur either early or late to derive ATB-movement island effects noted by Bachrach and Katzir (2009). Although I argue in this paper that early Collect yields undesirable results with respect to case assignment in ATB movement, it should be noted that making this assumption offers other advantages. Whether the same island effects can be derived in the Late Unify system I have proposed remains to be seen, though I suspect that they cannot.

repeated from (26a). Consider first just the left conjunct, whose structure before V2 movement is given in (64). In the left conjunct, the DP object *Käse* ‘cheese’ receives lexical dative case according to the predicate *verfallen* ‘fallen for’. *Käse* is c-commanded by the subject DP *ich* ‘I’ in the left conjunct, but because *Käse* is valued with lexical case, it is not a candidate for dependent accusative case.

(63) **ATB topicalization targeting NOM and DAT gaps**

Käse [bin ich ____{DAT} verfallen] aber [ist ____{NOM} nicht sonderlich
cheese.DAT/NOM am I fallen.for but is not particularly
gut für mich].
good for me

‘I’m obsessed with cheese but it’s not particularly good for me’

(64) [TP [_{VP} ich [_{VP} bin Käse verfallen]]]

Considering now only the right conjunct, *Käse* is the only nominal and thus dependent case is not expected to apply; *Käse* should be unmarked for case.

Late Unify and Anytime Unify make different predictions for (63). Late Unify predicts that *Käse* will receive dative and nominative case according to its respective position within the left and right conjuncts. Anytime Unify, however, predicts that *Käse* may instead be assigned dative and accusative case. I explain these predictions in turn.

With Late Unify, the identification of the occurrences of *Käse* from the two conjuncts occurs at the conjunction step. At this point in the derivation, *Käse* in the left conjunct has been assigned lexical dative case, and *Käse* in the right conjunct is still unvalued for case. Thus, the unified occurrence that results from conjunction inherits two feature bundles – one with dative case and one with unvalued case. Recall that in the left conjunct, *ich* c-commands the object *Käse*, but *Käse* is not valued with dependent accusative case because its case feature has already been valued. Once the conjunction occurs, though, there is once again an unvalued case feature on *Käse*, corresponding with its position in the right conjunct. Thus, conjunction creates a configuration

wherein *ich* – which is unvalued for case – c-commands *Käse*, which also has an unvalued case feature. This configuration is precisely one in which dependent case assignment would apply. However, assuming the Strict Cycle Condition (65) ensures that by the time the problematic configuration has been created, the derivational stage for dependent accusative case valuation has already passed.

(65) **Strict Cycle Condition (Chomsky 1973)**

No rule can apply to a domain dominated by a cyclic node A in such a way as to affect solely a proper subdomain of A dominated by a node B which is also a cyclic node.

Dependent accusative case is therefore *not* assigned despite the unvalued case feature, which as a result remains unvalued until Spellout. The end result is that *Käse* must bear dative and unmarked (nominative) case.

Under Anytime Unify, the ATB-moved material can come to have two case features earlier, *before* the merger of the subject *ich* in the left conjunct. For example, Collect could trigger immediately after *Käse* merges with *verfallen* in the left conjunct and with *gut* in the right conjunct.¹⁸ If Collect occurs sufficiently early, then at the derivational stage when *ich* merges, *Käse* will have two case features – one unvalued, and the other valued lexically for dative case. The c-command relationship between *ich* and *Käse* will therefore fit the criteria for dependent case assignment; so *Käse* will be valued for dependent accusative case. The end result is that *Käse* must bear dative and accusative case.

To summarize, in the configuration (63), Late Unify predicts that the case feature corresponding with unmarked case will remain unvalued through the entirety of the derivation and be spelled out as unmarked case, i.e., there will be a DAT/NOM syncretism requirement. Anytime Unify, on the other hand, predicts that this feature will be valued as dependent case due to elements in the lexical case conjunct, i.e., there will be a DAT/ACC syncretism requirement. Unfortunately, German does not have the syncretism patterns that allow us to test this difference empirically:

¹⁸Since Anytime Unify also allows Collect to apply later, the behavior of Late Unify can also be generated; for example, if Collect applies immediately before the conjunction step. The issue is that Anytime Unify overgenerates.

German nominals targetable by ATB movement are (non-)syncretic for dative and nominative in exactly the same situations that they are for dative and accusative. For example, *Käse* is syncretic between nominative, accusative, and dative without a determiner, but all forms are distinct when a determiner is present. Nonetheless, the assignment of spurious accusative case in (63) would be surprising indeed, given that neither conjunct is independently expected to have accusative case. I take this prediction of spurious case to be undesirable.

To differentiate empirically between Late Unify and Anytime Unify, a language must have an ATB-movement construction targeting two conjuncts, A and B, such that:

1. Movement from A targets an unmarked case gap;
2. Movement from B targets a lexical case gap;
3. The structure of B is such that if the gap in B did *not* have lexical case, a dependent-case rule would trigger and value the gap with dependent case, prior to the conjunction step; and
4. Unmarked/lexical case coordinations can be differentiated morphologically from dependent/lexical case coordinations. That is, there is some paradigm in which the unmarked and lexical case forms are syncretic and the dependent and lexical case are not syncretic (or vice versa).

German satisfies Conditions 1–3 but not Condition 4. HU cannot be used, either, to differentiate between Late Unify and Anytime Unify because, to my knowledge, there is no ATB-movement construction in HU that satisfies Condition 3. When Conditions 1–3 are met, Late Unify approach and Anytime Unify make different predictions regarding the cases that will be assigned. These predictions based on Conditions 1–3 are theoretical; it is Condition 4 which allows for empirically differentiating these two predictions.

Even absent the concrete evidence from Condition 4 in German, I take the Late Unify prediction to be more parsimonious with the Identity of Form condition. The prediction that Anytime Unify

makes — that an unmarked case gap becomes valued for dependent case due to the presence of material in the other conjunct — would be a surprising finding indeed, one which departs from the trend that every previous account of the ATB case facts has sought to explain. Nonetheless, this is an empirical issue that warrants further investigation.

Section 6

Spellout and feature gluttony

Under Late Unify, Merge produces configurations where a syntactic node has multiple associated feature bundles, thereby behaving as a kind of “gluttonous” terminal node in the sense of Coon and Keine (2021). Citko (2005)’s Parallel Merge-based account also involves spelling out nodes with multiple values for a given type of feature. To spell out sets of feature bundles on a single syntactic node, several options are available:

(66) **H1:** Perform vocabulary insertion once for all features on the terminal node: Insert a single VI into the terminal node that is compatible with all present feature values according to the Subset Principle. Vocabulary insertion succeeds if and only if a suitable underspecified VI exists.

H2: Perform vocabulary insertion independently for both feature bundles present. Vocabulary insertion succeeds if and only if identical VIs are selected by both vocabulary insertion processes.¹⁹

H1 is the approach pursued by Citko (2005) and Hein and Murphy (2020), while H2 is similar to proposals by Schütze (2003:301) and Bjorkman (2016) for non-ATB movement constructions and by Kluck (2009) Asarina (2011) for Right-Node Raising — which has been argued to also involve shared material (McCawley 1982, Bachrach and Katzir 2009, Citko and Gračanin-Yuksek 2021, a.o; see also Section 7.3). I claim that H2 better derives the Identity of Form Condition.

H1 and H2 make different predictions regarding the behavior of underspecified vocabulary items. This difference in predictions is most prominent with elsewhere forms. As I will demonstrate in the example that follows, H1 predicts that if a maximally underspecified vocabulary item exists,

¹⁹The term “identical” is intended to encompass analyses that differ on what precisely the identify condition is. “Identical” may be a requirement that the same vocabulary item be selected by each vocabulary insertion operation (thus excluding situations of accidental homophony), as argued by Kluck (2009) and Asarina (2011, 2013) or, alternatively a requirement that the forms selected by each vocabulary insertion operation be phonologically identical, as suggested by Sigurðsson and Wood (2021).

this underspecified vocabulary item will always be acceptable as a last resort in ATB movement constructions. H2 predicts otherwise. More generally, H1 predicts that the Identity of Form condition may be violated if there exists some vocabulary item whose feature specification represents a subset of the features assigned to each of the gaps; H2 predicts no such exception to the Identity of Form condition.

For illustration, consider the case decomposition for Polish assumed by Hein and Murphy (2020:280) in (67), in which each of the six Polish cases is subdivided into values for three subfeatures.

(67)

Case	subj	gov	obl	wh _{inan}	wh _{anim}
NOM	+	-	-	co	kto
ACC	-	+	-	co	kogo
GEN	+	+	+	czego	kogo
DAT	-	-	-	czemu	komu
INS	+	-	+	czym	kim
LOC	-	-	+	czym	kim

Hein and Murphy (2020) present (67) in the context of ATB-movement in *wh*-questions. When the same feature decomposition is applied to ATB relative clauses, however, issues arise. We discussed in Section 2 the syncretism between Polish genitive and accusative cases for masculine relative pronouns. Another syncretism exists on the feminine side, between genitive and dative case. This second syncretism is bolded in (68):

(68) Polish relative pronouns, MASC and FEM

Case	MASC	FEM
NOM	który	która
GEN	którego	której
DAT	któremu	której
ACC	którego	którą

Której is the syncretic form for genitive and dative feminine relative pronouns, and can be used in DAT/GEN relative clauses (see also Dylą 1984:704), consistent with the Identity of Form condition:

- (69) Dziewczyna, **której** [____{DAT} było zimno] i [z powodu tego
girl who.GEN/DAT was cold and from reason this.GEN
____{GEN} nie było na zajęciach]
not was at class

‘the girl who was cold and therefore not in class’ (Franks 1995:64)

According to the feature decomposition in (67), genitive and dative have no subfeatures in common; genitive is [+subj, +gov, +obl] and dative is [-subj, -gov, -obl]. Therefore, in an underspecification account, the VI for *której* must be maximally underspecified in order to be consistent with both genitive and dative features. That is, *której* must be an elsewhere vocabulary item with respect to case:

- (70) *której* ↔ [+FEM]

The fact that *której* is completely unspecified for case means that its associated case features will *always* be a subset of a given feature bundle for feminine. Therefore according to H1, *której* is expected to be licit in any situation requiring a feminine relative pronoun, provided that there is not a more specific competitor that wins out by the Subset Principle. It follows that Polish ATB relative clauses with headed by feminine nouns should never be ungrammatical, at least not for

reasons of case; *której* ought to be available even if no other relative pronoun is.²⁰

Yet we have already noted that this prediction does not hold up. This is seen in the ACC/GEN coordination (71), repeated from (12b). Recall that due to the minimal non-syncretic vs syncretic pair, (71) vs. (12c), we can be sure the former is ruled out for case reasons rather than some other factor.

- (71) *dziewczyzna, **która/której** [Janek lubi _____{ACC}] a
 girl who.FEM.ACC/who.FEM.GEN Janek likes and
 [Jerzy nienawidzi _____{GEN}]
 Jerzy hates
 ‘the girl who Janek likes and Jerzy hates’ (Citko 2011:126)

The two gaps in (71) are genitive and accusative, which, using the decomposition in (67), have respective case decompositions [+subj, +gov, +obl] and [-subj, +gov, -obl]. Since the VI for *której* (given in (70)) is unspecified for case, its case specification is therefore a trivially subset of all case subfeatures on the relative pronoun. No other vocabulary item from (68) satisfies the Subset Principle for the terminal node corresponding to the relative pronoun.²¹ Therefore H1 incorrectly predicts, given the feature decomposition in (67) and the grammaticality of (69), that (71) will be grammatical with *której* as the relative pronoun.

H2 suffers from no such issue. H2 states that a separate vocabulary-item selection process occurs for each feature bundle present on the terminal node.²² Thus, for the genitive feature (i.e.,

²⁰Stefan Keine points out that leaving *której* completely underspecified for case presents a potential issue: Since nominative is the unmarked case, and unmarked case is the absence of a case value, the vocabulary item that corresponds with nominative must also be completely underspecified for case. This produces a conflict with the vocabulary item in (70). I suspect we can circumvent this issue by saying that at Spellout, any unvalued case feature becomes *valued* for unmarked case (here, nominative). Then *której* could retain the specification in (70), while *która*, the nominative form, could be [GENDER: +FEM, CASE: NOM]. Alternatively (and maybe equivalently), we could say that unmarked case is the PF manifestation of [CASE: □] (Preminger 2014, 2020); under this view, the vocabulary item for the nominative *która* would be [GENDER: +FEM, CASE: □]. I think the key factor in both these workarounds comes to distinguishing the empty matrix [] from [CASE: □], a distinction also discussed in Schütze (2001).

²¹See Hein and Murphy (2020:270–272) for further discussion on the Subset Principle applied to sets of subfeatures.

²²In the configurations I have examined, shared material involves differing values for only one kind of feature. That is, although the gaps in (71) differ in case, they are both +FEM, -PL, +ANIM, +WH, etc. If the gaps were to differ on more than one kind of feature, the space of possible form-identity requirements would expand. For example, if one

the feature bundle [+subj, +gov, +obl]), *której* is selected, and for the accusative feature, *którą* is selected. As these are two distinct forms, H2 correctly predicts ungrammaticality in (71).

It should be noted the argument presented above is particular to the case decomposition in (67). Differing feature decompositions may be proposed for a language – see, e.g., (18) for an alternative Polish proposal – and a different decomposition may avoid the particular issue raised here regarding the underspecificity of *której*.²³ However, other choices of feature decomposition will run into the same shape of issue. Given the empirical tendency – stated as the Identity of Form condition – that ATB movement is grammatical only if the forms that would be inserted independently (i.e., in a non-coordination context) into each of the gaps are identical, H2 better derives the generalization.

gap were plural accusative and the other gap were singular genitive, would the plural accusative, plural genitive, singular accusative, and singular genitive all need to be syncretic? Or just plural accusative and plural genitive? I suspect the latter, but further empirical research in this domain can inform refinements on the analysis presented in this paper.

²³In actuality, the feature decomposition assumed by C&GY, part of which is given in (18), encounters the same exact issue as the feature decomposition (67) from this section. Namely, the genitive and dative have no subfeatures in common and therefore can only be spelled out by an elsewhere form. In Section 2.2, I left out mentions of dative case so as not to distract from the discussion of Citko (2005) and C&GY's analysis.

Section 7

Conclusion and discussion

7.1 Summary

In this paper, I have examined multidominance-based analyses of ATB-movement with a particular focus on the different ways cases are known to be assigned, using case syncretism patterns as a means to infer which cases have been assigned. I have shown that existing multidominance-based ATB-movement analyses cannot account for case-mismatched ATB-movement configurations in which one of the cases is unmarked or in which case assignment depends on elements higher than the site of coordination, i.e., externally assigned case.

I have proposed Late Unify as an alternative mechanism for building multidominant coordination structures to the Parallel Merge mechanism proposed by Citko (2005) and C&GY. Late Unify produces structures that involve shared material by co-identifying occurrences of the same element once they become part of the same syntactic tree, and creates these sharing configurations as a byproduct of Merge. I have shown that Late Unify correctly derives the behavior of unmarked case and externally assigned case under ATB movement.

I note here that although the case studies were presented in terms of Dependent Case Theory, the discussion generalizes quite naturally to other theories of case: Unmarked/default case can also exist in functional-head theories of case (Legate 2008), and externally assigned case is contingent only on the location of the case assigner, not the mechanism by which the case is assigned.

Although we have considered only case features in this paper, it would be reasonable to expect that other kinds of features — π -features, animacy, definiteness, etc. — could also come to have multiple values on the same terminal node via Late Unify (see also Bjorkman 2016, 2021). In Section 6, I discussed how Late Unify can be seen as creating “gluttonous” nodes, i.e., nodes that have multiple values for the same kind of feature (Coon and Keine 2021). Possible connections

between feature gluttony and Late Unify warrant further exploration.

In remainder of the paper, I discuss how what we have seen about unmarked and externally assigned case can be applied to non-multidominance analyses of ATB movement, and whether Late Unify may be applied to other non-ATB constructions where case syncretism has been observed to alleviate case mismatches.

7.2 **Alternative accounts of ATB-movement**

In this paper, I have assumed that ATB-movement involves underlying multidominant coordination structures (MCSs), and I have sought to present a derivation of MCSs that is consistent with the different case patterns observed for ATB-movement. In this section, I address the implications of Sections 3 and 4 on non-MCS analyses of ATB-movement.

Numerous theoretical mechanisms have been proposed for ATB movement. These include haplology, single-gap extraction, parallel extraction, and sideward movement. A haplology-based approach (Biskup 2018) states that ATB movement is the result of two independent movement operations followed by deletion under identity applied to one of the moved elements. According to single-gap extraction analyses (e.g., Ha (2008); Salzmann (2012a,b)), the observed movement proceeds out of just one of the conjuncts; in the other conjunct, ellipsis (Salzmann 2012a,b) or null operator movement (Munn 1992; Franks 1995) occurs. Parallel extraction accounts (e.g., Ross 1967; Williams 1978; Blümel 2014; Hein and Murphy 2020) state that ATB movement involves two distinct syntactic elements moving simultaneously into the same position, thereby uniting into one. Sideward movement theories (Hornstein and Nunes 2002; Fernández-Salgueiro 2008) model ATB movement as an initial leftward “interarboreal” movement between conjuncts followed by a subsequent movement into the surface position. Using (72) as an example, these different treatments of ATB-movement are schematized (73):

(72) What did Mary sell and John buy?

(73) a. **Haplology**

What ~~what~~ did [Mary sell ____] and [John buy ____]?

b. **Single-gap extraction and ellipsis**

What did [Mary sell ____] and [John buy what]?

c. **Single-gap extraction and operator movement**

What did [Mary sell ____] and [*Op* John buy ____]?

d. **Parallel extraction**

What did [Mary sell ____] and [John buy ____]?

e. **Sideward movement**

What did [Mary sell ____] and [John buy ____]?

Haplology and single-gap extraction analyses are compatible with the unmarked case data from Section 3 and externally assigned case data from Section 4. These two styles of approaches analyze the pre-movement positions in the two conjuncts as being occupied by distinct syntactic items, and thus, each DP has a distinct case feature that can be valued (or unvalued) according to its pre-movement structural position. The syncretism requirement arises as a consequence of whichever operation reduces these two items into one. For instance, with haplology, the two

items can be reduced to one only if they are identical at PF.

Among parallel extraction analyses, whether an analysis is compatible with the data from Sections 3 and 4 depends on the details of the movement mechanism proposed. If a given analysis derives ATB movement’s Identity of Form condition via a mechanism that occurs too early in the derivation, then that analysis will make incorrect predictions regarding unmarked case and/or externally assigned case. As an illustrative example, we compare here Hein and Murphy (2020) and Blümel (2014)’s parallel extraction accounts with regards to the Icelandic ACC/NOM object sentence in (74), repeated from (38b):

(74) Þeim líkar **billinn** og kaupa ***(hann)**
 they.DAT like the.car.NOM and buy him.ACC

‘They like the car and buy it’ (Ximenes 2007:3)

Recall from Section 4.2 that according to Ximenes (2007)’s analysis of object gap, the landing site of ATB-movement is below *vP*— i.e., below the sentential subject — as shown in (75):

(75) [_{vP} Þeim líkar [**billinn** [líkar ____] og [kaupa ____]]]

Hein and Murphy (2020)’s parallel movement account requires that the case values of the two DP positions targeted by ATB movement already be determined by the time ATB movement occurs. This requirement is satisfied by neither of the DPs in (74): The left conjunct has nominative (unmarked) case, and the right conjunct has accusative case, which is a dependent case that requires the higher subject in order to be assigned. Hein and Murphy (2020) therefore cannot derive the Identity of Form condition that applies in (74). Blümel (2014)’s parallel movement account, on the other hand, attributes the Identity of Form condition to a requirement that holds at Spellout on the lower, pre-movement positions. Blümel (2014) therefore can account for the Identity of Form condition observed for (74).

It is not clear how sideward movement approaches (Nunes 1995, 2001, 2004; Hornstein and Nunes 2002) would derive the case syncretism facts on ATB-movement, which are discussed only briefly in the sideward movement literature (Nunes 1995:415). Moreover, existing proposals of

sideward movement are not specific about their assumptions regarding how case is assigned. Given that there is not much discussion of case assignment in sideward movement systems, it is difficult to assess their compatibility with the issues examined in this paper.

7.3 Other constructions with Identity of Form requirements

Until this point, I have limited my discussion of the Identity of Form condition to ATB-movement constructions. It should be noted, though, that in Late Unify and other MSC approaches, the Identity of Form condition owes not to the movement step itself, but rather to the fact that a DP is shared by different parts of a sentence's structure. Therefore, any structure that involves syntactic material that is shared between two positions, neither of which c-commands the other, is predicted to introduce the possibility for multiple case assignment, even when no movement is involved. In this section I survey other phenomena that involve Identity of Form requirements — Right-Node Raising, verbal coordination, and free relatives — and address possible connections to Late Unify.

Right-Node Raising (RNR, Postal 1974) is subject to similar Identity of Form requirements to ATB-movement (Zaenen and Karttunen 1984; Asarina 2011; Citko and Gračanin-Yuksek 2021). Like ATB-movement, RNR has been analyzed (among other ways) as resulting from multidominant structure-sharing (e.g., McCawley 1982; Gračanin-Yuksek 2007; Bachrach and Katzir 2009; Citko and Gračanin-Yuksek 2021). These multidominance analyses of RNR have attributed the observed Identity of Form requirement to a shared element receiving a different case in each conjunct. A Late Unify approach to RNR similarly derives the Identity of Form condition. As with ATB-movement, Late Unify predicts that unmarked case and case assigned from above the conjunction behave no differently than any other kind of case with respect to the Identity of Form condition, contra other multidominance-based approaches.

A structure-sharing analysis could also be extended to sentences involving what is at least superficially verbal coordination, such as (76).

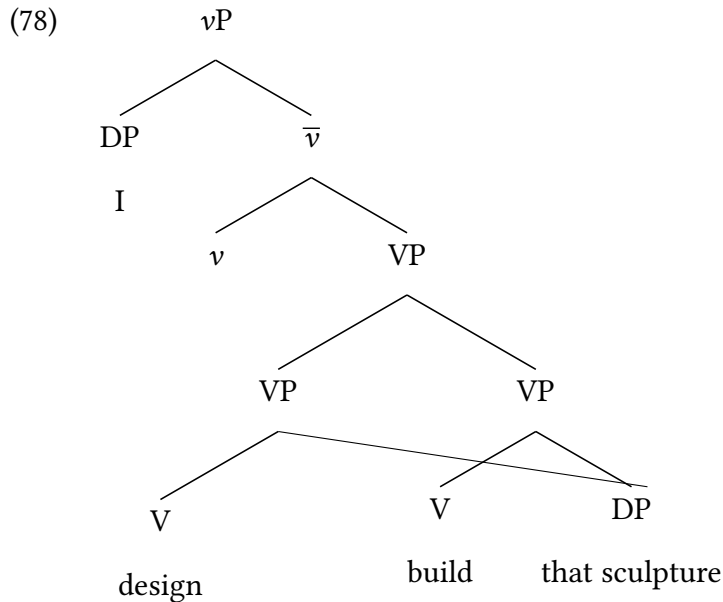
- (76) a. I designed and built that sculpture.
 b. Samson studies and teaches linguistics.

Preliminary data from German indicates that when coordinating verbs whose objects typically bear different cases, the object must be syncretic between the cases that would be required by the two verbs. That is, the same Identity of Form condition present in ATB movement and RNR also occurs in sentences with V-coordination. This is shown in (77), where the verb *helfen* ‘help’, which requires a dative object, and the verb *unterstützen* ‘support’, which requires an accusative object, are coordinated. Under syncretism, the coordination sentence is acceptable, but when the syncretism is eliminated – shown in (77) with the addition of a determiner – then the sentence is unacceptable.

- (77) Maria hat (*die/*den) Studenten unterstützt und geholfen
 Maria has the.ACC/the.DAT students supported and helped
 ‘Maria has supported and helped (the) students’

Analyzing V-coordination as involving coordinated structure above the verbal level would provide a neat explanation for the case facts in (77). This idea is illustrated in (78) for (76a). Within Late Unify or other MCS analyses, the object has one case feature for its position in each of the conjuncts, so it may be valued for two different cases, yielding a requirement for Identity of Form.²⁴

²⁴Hirsch (2018) has independently argued that sentences involving putative coordination of objects – such as *John saw every student and every professor* – also involve shared structure beneath the coordination level.



Free relatives have also been noted to display case-syncretism requirements, most famously in German (Groos and van Riemsdijk 1981). The head of the free relative clause in (79) can be understood to have two case requirements imposed on it – accusative, since the free relative clause is the matrix object, and nominative, since the head is itself the subject of the free relative clause. (79a) – where the *wh*-words are non-syncretic for nominative and accusative – is unacceptable, whereas (79b) – where the nominative and accusative forms are syncretic – is acceptable.

- (79) a. Ich nehme, {*wen / *wer} einen guten Eindruck macht.
 I take who.ACC who.NOM a good impression makes
 ‘I take whoever makes a good impression’ (Groos and van Riemsdijk 1981:177)
- b. Ich habe geessen was noch übrig war.
 I have eaten what.ACC/NOM still left was
 ‘I ate what was left’ (Groos and van Riemsdijk 1981:212)

At first glance, the contrast between (79a) and (79b) seems to suggest that an analysis of case-syncretism requirements in ATB-movement and RNR might be extended to free relatives. However, free relatives in many languages behave differently from the former two constructions with respect to case (Hirschbühler and Rivero 1983; Suñer 1984; Grosu 1994; a.o.). In Icelandic, the relative

pronoun must bear the case that would be assigned within the relative clause, regardless of the case expected from the matrix clause (Vogel 2002; Wood et al. 2017). In other languages, free relatives are subject to case hierarchy effects: In certain situations involving a case mismatch, the form corresponding with the ‘higher’ case can be used even if syncretism does not apply. This is shown in (80) for German. The matrix verb *einladen* ‘invite’ requires an accusative object and the free relative verb *vertrauen* ‘trust’ requires a dative object. Even so, (80) is grammatical with the dative relative pronoun *wem*, which is not syncretic with the accusative form *wen*.

(80) a. *Ich lade ein wen ich vertraue
 I invite PTCL who.ACC I trust
 ‘I invite who I trust’

b. Ich lade ein wem ich vertraue
 I invite PTCL who.DAT I trust
 ‘I invite who I trust’

(Vogel 2002:121)

The acceptability of (80b) contrasts with the unacceptability of ATB-movement out of coordinated accusative and dative gaps when syncretism is not present non-syncretic (Hartmann et al. 2016:81). Thus, although free relatives are subject to *some* case matching requirements, they do not form a natural class with ATB movement. A Late Unify approach is therefore poorly suited for explaining the case requirements on free relative constructions.

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