Opaque reflexes of movement: ordering final vs. intermediate movement steps*

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1. Introduction

In this paper I investigate transparent and opaque interactions (feeding and counter-feeding) of the Minimalist operations Merge and Agree in order to gain insights into their nature and mode of application. On the basis of the configuration where a single head triggers both operations, I argue for a more fine-grained typology of Merge. I present evidence from patterns of reflexes of movement for a distinction between final and intermediate movement steps because they can apply at different points relative to Agree triggered by the same head, giving rise to opaque interactions. Furthermore, the cross-linguistic variation provides evidence that the order of operations on a head is extrinsic.

The configuration under investigation is one in which a head H triggers the two operations Merge and Agree (such as v which, by standard assumptions, triggers Merge of the external argument and Agree with the internal argument). I assume that all operations are feature-driven: The feature [•F•] on H triggers Merge of H with an element of category [F], and the unvalued probe [∗F:□∗] triggers Agree with an element that bears a corresponding valued feature [F:V] (the notation follows Heck and Müller 2007). Hence, the configuration of interest can be abstractly depicted as in (1):

(1) H { [•F•], [∗F:□∗] }

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It has repeatedly been oberved that Merge and Agree in the configuration in (1) interact transparently (cf. Bruening 2005, van Koppen 2005, Halpert 2012, Kalin and van Urk 2012 for bleeding cases, Anand and Nevins 2005, Müller 2009, Asarina 2011, Assmann et al. 2012 for feeding cases). Hence, the operations that H triggers apply sequentially (simultaneous application can only produce opaque interactions but not transparent ones, see e.g. Kenstowicz and Kisseberth 1979). This can be achieved by ordering the operation-inducing features on H. In the literature, it is assumed that the order of operations is language-specific, i.e. there is a parameter that is set either to Merge $\succ$ Agree or to Agree $\succ$ Merge (where '$\succ$' means *applies before*).

The central new observation of this paper is that there is empirical evidence that suggests that Merge can apply both before and after Agree *within a single language*. That is, we find evidence for the order in (2) where Merge is interleaved with Agree:

(2) Merge $\succ$ Agree $\succ$ Merge

Assuming that Merge is a uniform operation and that there is a parameter that determines the order of Merge and Agree, the order in (2) is paradoxical because it is symmetric: The parameter can order Merge before or after Agree, but not both at the same time. To solve this paradox, I propose that we need to distinguish different types of Merge; the Merge operation that applies before Agree is of a different type than the Merge operation that applies after Agree:

(3) Merge$_1$ $\succ$ Agree $\succ$ Merge$_2$

If the parameter orders *types* of Merge (and not just Merge) relative to Agree, it is possible to interleave Merge and Agree as in (3). Hence, I argue for a more fine-grained typology of Merge operations.

2. Reflexes of successive-cyclic movement

The split of Merge types I want to argue for in this paper is between final (terminal, criterial) and intermediate movement steps in a movement chain. The empirical evidence comes from cross-linguistic patterns of reflexes of long Ā-movement.

2.1 Reflexes of movement as the result of feeding

In many languages, Ā-movement has a reflex: Movement of an XP affects the form of an element E on the path of movement. In the following example from Kinande, we see a morphological reflex of wh-movement on the complementizer; its form co-varies with the noun class of the wh-phrase.

(4) Kinande (Niger-Congo, Schneider-Zioga 1995, 71):[1]

a. [$_{CP}$ abahi$_k$ bo Yosefu alangira __$_k$]
Q.II C.II Yosefu saw
'Who did Yosefu see?'

b. [$_{CP}$ iyondi$_k$ yo Yosefu alangira __$_k$]
Q.I C.I Yosefu saw
'Who did Yosefu see?'

Reflexes of movement on a head H are standardly analysed as the result of an agreement relation between H and an XP moved to SpecHP, cf. (5) (see e.g. Torrego 1984, Rizzi 1990, Kinyalolo 1991, Schneider-Zioga 1995, Collins 1993, Chung 1998).

(5) [$_{HP}$ XP$_k$ [$_{H'}$ H [$_{ZP}$ ... t$_k$ ...]]]
agreement

(6) H { [•F•] ≻ [∗F:□∗] }

(5) represents a feeding configuration: Movement of XP feeds agreement between XP and H because H searches for an agreement controller in its specifier. It is only through movement that XP reaches this position SpecHP. To get feeding, it is thus crucial that movement applies *before* H triggers agreement. In Minimalism, agreement is modeled by the operation Agree. A head with an unvalued probe feature [∗F:□∗] searches for a value on a goal. To enforce Spec-head Agree, Agree must be upwards such that the goal c-commands the probe (Baker 2008, Koopman 2006, Zeijlstra 2012, Assmann et al. 2012).[2] Thus, in languages with a reflex of movement, the head which exhibits the reflex first triggers Merge (movement) and then upward Agree, cf. (6).

2.2 Patterns of reflexes of long Ā-movement

Let me now turn to reflexes of movement under long-distance Ā-movement. The question is *where* the reflex occurs in case movement crosses at least one clause boundary. I identified four different patterns, abstractly shown in (7) for a reflex R on the C-head triggered by long wh-movement across two clause boundaries. Crucially, R can also be triggered by other types of Ā-movement and it can show up on any other head; what is important is the abstract distribution of R. In what follows, I will call the clause in which the Ā-moved XP surfaces the final clause and all lower clauses crossed by movement non-final clauses.

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[1] The following glosses are used in this paper: AGR = agreement, CL = class, C = complementizer, DEF.PROX = definite proximate article, DEM = demonstrative, L = linker, NOM = nominative, OBJ = object, OBL = oblique, PL = plural, PST= past, Q = question word, SG = singular, WH = wh-agreement.

[2] I assume, following Baker (2008), that the direction of Agree is variable. It can apply upwards or downwards. Here I focus on instances of upward Agree only, but the argument for a split between final and intermediate movement steps can also be made on the basis of data that involve downward Agree, leading to (counter-)bleeding interactions. See Georgi (2014, ch.3) for data and derivations.

(7) *Patterns of reflexes of movement*:

a. PI: reflexes in the final and non-final clauses
$[_{CP1}$ XP$_{wh}$ $[_{C'}$ **C-R** ... $[_{CP2}$ **C-R** ... $[_{CP3}$ **C-R** ... t$_{XP}$]]]]

b. PII: reflexes solely in the final clause
$[_{CP1}$ XP$_{wh}$ $[_{C'}$ **C-R** ... $[_{CP2}$ C ... $[_{CP3}$ C ... t$_{XP}$]]]]

c. PIII: reflexes solely in non-final clauses
$[_{CP1}$ XP$_{wh}$ $[_{C'}$ C ... $[_{CP2}$ **C-R** ... $[_{CP3}$ **C-R** ... t$_{XP}$]]]]

d. PIV: no reflex in any clause
$[_{CP1}$ XP$_{wh}$ $[_{C'}$ C ... $[_{CP2}$ C ... $[_{CP3}$ C ... t$_{XP}$]]]]

Pattern I (cf. (7-a)) is well-known from the literature: If movement causes a reflex on a head of category H, then we see this effect in every clause along the path of movement. In languages with pattern II (cf. (7-b)), however, the reflex only occurs in the final clause, more precisely on the head that projects the final landing site for XP. Pattern III (cf. (7-c)) is the opposite of pattern II: The reflex only occurs in non-final clauses, but not in the final clause. Finally, in languages with pattern IV (cf. (7-d)) there is no reflex in any clause.

Let me provide an example for each pattern. Irish (Celtic) exhibits a pattern I reflex: The default form *go* of the complementizer changes into a form glossed as *aL* in every clause crossed by movement.

(8) *Complementizer selection in Irish (McCloskey 2002: 3)*:

a. $[_{CP}$ Dúirt mé $[_{CP}$ **gu**-r shíl mé $[_{CP}$ **go** meadh sé ann]]]
said I *go*-PST thought I *go* would.be he there
'I said that I thought that he would be there.' *no extraction*

b. $[_{NP}$ an tainm $[_{CP}$ OP$_k$ **a** hinndeadh dúinn $[_{CP}$ **a** bhí ___$_k$ ar an áit]]]
the name *aL* was.told to.us *aL* was on the place
'the name that we were told was on the place' *long relativization*

In Chamorro (Austronesian) we find a pattern II reflex. The choice of the complementizer depends on various factors: In clauses without Ā-movement, it is determined by properties of the clause (e.g. finiteness); in case Ā-movement has applied, the choice depends on properties of the extracted element (e.g. the category of the moved XP). In the latter case, there is thus Agree between C and the moved XP (see Chung 1998, 223ff. for details). In case of long extraction as in (9), the category of the extracted XP only determines the form of the C-head in the final clause (the XP is of category N, hence C surfaces as Ø). In the non-final clause, the form of C is determined by properties of the clause itself (finite, embedded declarative clause, C surfaces as *na*).

(9) *Complementizer choice in sentences with wh-movement (Chung 1998, 230)*:

[$_{CP}$ [Manu na lepblu]$_k$ **Ø** malagu'ñiha [$_{CP}$ **na** u-taitai ___$_k$]]
which L book C WH.OBL.want-AGR C WH.OBJ.AGR-read
'Which book do they want to read?' (lit: 'Which book do they want that they read?')

In Wolof (Niger-Congo) the complementizer bears a prefix that agrees in class with the XP in SpecCP, as in Kinande (cf. (4)). With long wh-movement, we find pattern III (in *an*-chains): The class prefix of the wh-word is identical to the class prefix on the C-head crossed by movement, but only in non-final clauses. In the final clause, we find the default class marker *l-* (glossed as EXPL), irrespective of the class of the wh-word, cf. (10-a).

(10) *Complementizer agreement in Wolof an-chains (Torrence 2012, 1173f.)*:

a. [$_{CP}$ K-an$_k$ **l**-a-ñu wax [$_{CP}$ **k**-u jigéén j-i foog [$_{CP}$ **k**-u
CL-Q EXPL-a-3PL say CL-u woman CL-DEF.PROX think CL-u
ma dóór ___$_k$]]]
1SG hit
'Who did they say that the woman thinks that I hit?'

b. [$_{CP}$ K-an$_k$ **l**-a-ñu wax [$_{CP}$ **l**-a jigéén j-i foog [$_{CP}$
CL-Q EXPL-a-3PL say EXPL-a woman CL-DEF.PROX think
l-a ma dóór ___$_k$]]]
EXPL-a 1SG hit
'Who did they say that the woman thinks that I hit?'

As shown in (10-b), it is also possible to have pattern IV in *an*-chains: Class agreement can optionally be missing in all clauses along the path of movement. In this case, we find default agreement on C throughout.

There are other languages which exhibit these patterns. Pattern I is found, for example, with *meN*-deletion in Indonesian (Saddy 1991) and inversion in Spanish (Torrego 1984); pattern II occurs e.g. with *no*-marking in Duala (Epée 1976) and pronoun choice in Ewe (optionality between patterns I and II, Collins 1993); pattern III shows up with *ke*-stranding in Dinka (van Urk and Richards 2013), preverbal focus marking in Kitharaka (Muriungi 2005), and obligatory extraposition in German (Müller 1999). For all of these languages there is independent evidence (i) that the Ā-dependency indeed involves movement (island-sensitivity, reconstruction effects, cross-over effects) and (ii) that the reflex is tied to *overt* movement (no reflex if the XP stays in-situ). For reasons of space I cannot provide the relevant examples here, see the references and Georgi (2014) for an overview. Pattern I figures prominently in the theoretical-comparative literature; pattern II is, however, much less discussed. In more recent works, its existence is at most mentioned in passing or it is classified as not being a "real" reflex of movement (Boeckx 2008, Lahne

2008). Pattern III is completely absent from this literature. The aim of this paper is to present the first uniform account of all patterns.

2.3 Opacity of patterns II and III

The existence of pattern I has been taken as evidence for the hypothesis that movement applies successive-cyclically: If the reflex is the result of a local Agree relation between a head H and an XP in SpecHP and we find this reflex in clauses where the XP does not surface, then the XP must have passed through SpecHP in non-final clauses on the way to its final landing site, as indicated in (11):

(11) $[_{CP1}$ XP_{wh} $[_{C'}$ **C-R** ... $[_{CP2}$ t_{XP} $[_{C'}$ **C-R** ... $[_{CP3}$ t_{XP} $[_{C'}$ **C-R** ... t_{XP}]]]]]]

But what about patterns II and III? What I would like to defend is the claim that in all the languages listed above, movement applies in the same successive-cyclic manner as in (11), even in languages with patterns II, III and IV. Thus, patterns II and III (and also IV) are opaque: Movement to SpecHP can feed Agree because there is a reflex of this movement in some clauses (in the final clause for PII or in non-final clauses for PIII); but sometimes this movement does not lead to reflex (no reflex in SpecHP if it is an intermediate landing site in PII languages, or if it the final landing site in PIII languages). Hence, we have instances of *counter-feeding*.

First I want to address an obvious objection to this claim with respect to pattern II: Since we do not see a reflex in non-final clauses, one could argue that there are no intermediate landing sites. This could be either (i) because the Ā-dependency does not involve movement, rather the XP is base-generated in its surface position, or (ii) because the XP is moved in one fell swoop without stop-overs. Hypothesis (i) cannot generally hold for pattern II languages (although there is evidence for it from Irish *aN*-chains, see McCloskey 1979 et. seq.) because in all the pattern II languages listed in the previous subsection, the Ā-dependency exhibits movement properties such as island-sensitivity and cross-over effects. In Chamorro, for example, wh-movement is sensitive to the Complex NP constraint:

(12) *Complex NP island in Chamorro (Chung 1998, 211-212)*:

*[Hayi siha na famagu'un $]_k$ un-rispeta $[_{NP}$ ädyu i palao'an $[_{CP}$ ni
who PL L children AGR-respect DEM the woman C
f*um*a'na'gui $\_\__k$]]
WH.NOM.teach
'Which children do you respect the woman who taught?'

Hypothesis (ii) according to which movement applies in one fell swoop also cannot be maintained for all pattern II languages. Evidence comes from languages with multiple reflexes of movement. In these languages, a single instance of Ā-movement can have two different types of reflexes. If a pattern I and a pattern II reflex co-occur, movement would have to apply successive-cyclically (to derive pattern I) and in one fell swoop (to derive pattern II) at the same time, which is impossible. The presence of pattern I clearly shows that movement applies successive-cyclically in these languages, too. Hence, the pattern II reflex cannot be due to the absence of intermediate movement steps. Let me illustrate multiple reflexes with Chamorro: We have already seen that Chamorro has a pattern II reflex on the complementizer. In addition, the same Ā-dependencies trigger wh-agreement, a special agreement form on the verb. Crucially, wh-agreement exhibits pattern I, it occurs in every clause crossed by movement. We can see in (9) that wh-agreement (glossed as 'wh') and complementizer agreement co-occur.

To conclude, the absence of reflexes in non-final clauses in pattern II languages cannot generally be due to the absence of intermediate movement steps. Movement seems to be successive-cyclic in at least some of these languages, too, just as in pattern I languages. Hence, the absence of a reflex of movement does not necessarily imply the absence of movement. The same argument can be made on the basis of pattern III languages. In these, movement is obviously successive-cyclic – we do see reflexes in non-final clauses and in all the languages with pattern III mentioned above the Ā-dependency that triggers the reflex shows typical properties of movement (island-sensitivity, cross over effects, reconstruction effects). Nevertheless, there is no reflex caused by the final movement step. Hence, patterns II and III are opaque: Only some movement steps to SpecHP feed Agree, others have the opposite effect, i.e. they counter-feed Agree. Obviously, the decisive factor is whether the movement step is an intermediate or a final step, because in pattern II and pattern III languages only one type of them feeds Agree. We know that counter-feeding is derived by the opposite order of operations than feeding. Hence, if Merge $\succ$ Agree leads to feeding (under upward Agree), Agree $\succ$ Merge results in counter-feeding. Hence, we have evidence for the paradoxical order Merge $\succ$ Agree $\succ$ Merge on the head H in pattern II and III languages. This paradox can be resolved if final and intermediate movement steps have designated triggers and can thus be ordered differently relative to Agree.[3]

[3] There are a few approaches to the variation between patterns I and II that assume that movement in pattern II languages is successive-cyclic, i.e. that pattern II is opaque (Haïk 1990, Biloa 1993, Collins 1993). These approaches are representational in nature. They try to resolve the opacity with enriched representations, viz. with the postulation of (different types of) traces and constraints on traces. However, these analyses cannot be upheld in Minimalism given that there are no traces anymore and consequently no constraints that can refer to them. In addition, none of these approaches can account for multiple reflexes of movement. For a detailed discussion see Georgi (2014, ch.2.4).

3. An ordering analysis

3.1 Assumptions

I assume that all operations are feature-driven (Merge is driven by [•F•] and Agree by [∗F:□∗]). These features must be discharged otherwise the principle Full Interpretation (Chomsky 1995) will be violated. [•F•]-features are discharged if the head that bears this feature merges with an element that has a corresponding feature [F]. Unvalued probe features [∗F:□∗] are discharged if they are assigned a value under Agree. Agree can apply if the goal with a matching valued feature [F:V] asymmetrically c-commands the probe (cf. Chomsky 2000, 2001). I follow Řezač (2004), Preminger (2011) in assuming that there is another way to discharge probe features: In case the probe does not find a goal, it is discharged by default (default valuation or default deletion).

Movement is subject to the PIC in (13). I assume that every phrase is a phase. This enforces successive-cyclic movement of an XP through the edge (the specifier) of every phrase on the way to its final landing site.

(13) *Phase Impenetrability Condition (PIC, Chomsky 2000, 108)*:
In phase α with the head H, the domain of H is not accessible to operations outside α; only H and its edge are accessible to such operations.

Crucially, intermediate movement steps enforced by the PIC have a designated trigger; following Chomsky (2000, 2001), we can call this feature an edge feature [•EF•]. [•F•] will be the trigger for final movement steps in what follows.

Only a single operation can apply at any stage of the derivation. Hence, if a head H triggers more than one operation, the operation-inducing features must be ordered. This ordering takes place in the numeration. The order is determined by language-specific ordering principles as in (14) that order types of Merge triggers and Agree triggers.

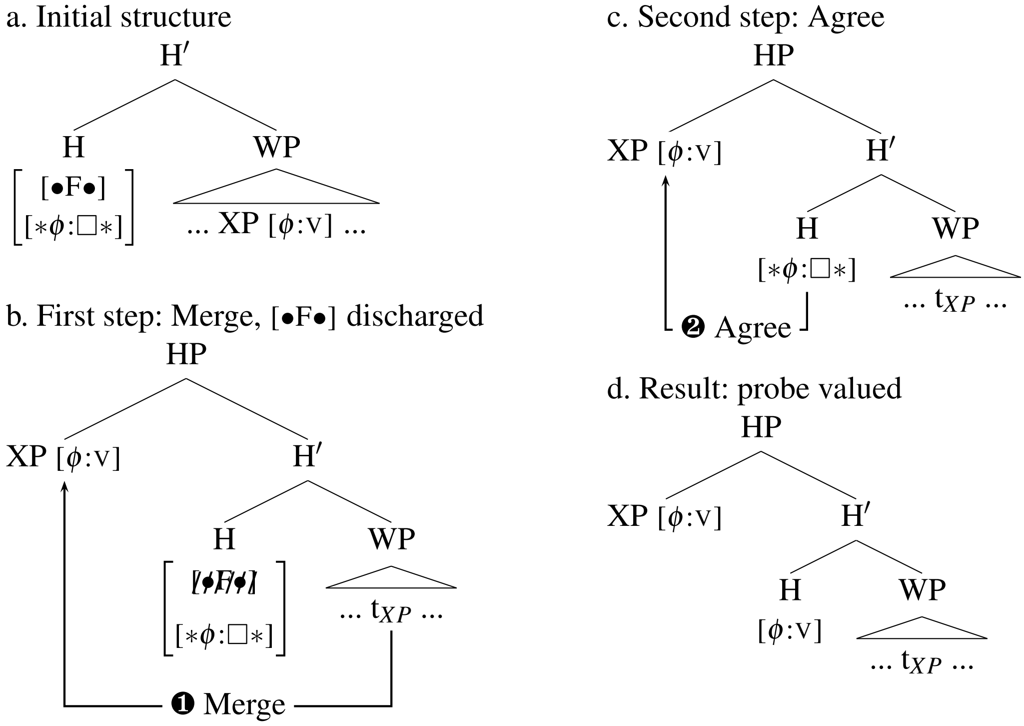
(14) *Abstract ordering statement*: [•F•] $\succ$ [∗F:□∗] $\succ$ [•EF•]

The features are ordered on a stack of which only the topmost feature is accessible. A lower feature becomes accessible once the topmost feature has been discharged and thus deleted. As a result, every operation-inducing feature can only attempt to trigger an operation at a certain point of the derivation, i.e. when it is on top of the stack, but neither before nor after that point (even if its context would be met at an earlier or at a later stage of the derivation). Cross-linguistic variation is the result of reordering of operation-inducing features. The logically possible orders of the three types of features (final vs. intermediate Merge and Agree) will result in the four patterns of reflexes of movement.

3.2 Derivations and variation

Assume a head H triggers internal Merge of an XP and Agree; XP is a potential goal for the probe on H (it bears matching features). As a consequence of the present set of assumptions, movement steps that apply *before* Agree *feed* Agree; movement steps that apply *after* Agree *counter-feed* Agree. Let me illustrate this. (15) provides a feeding derivation. H first triggers Merge. As a result, XP moves to SpecHP; [•F•] is thus discharged. In a subsequent step, H triggers Agree, here ϕ-Agree, and finds the goal XP in SpecHP. The probe is valued and discharged. Hence, we will see a reflex of movement on H.[4]

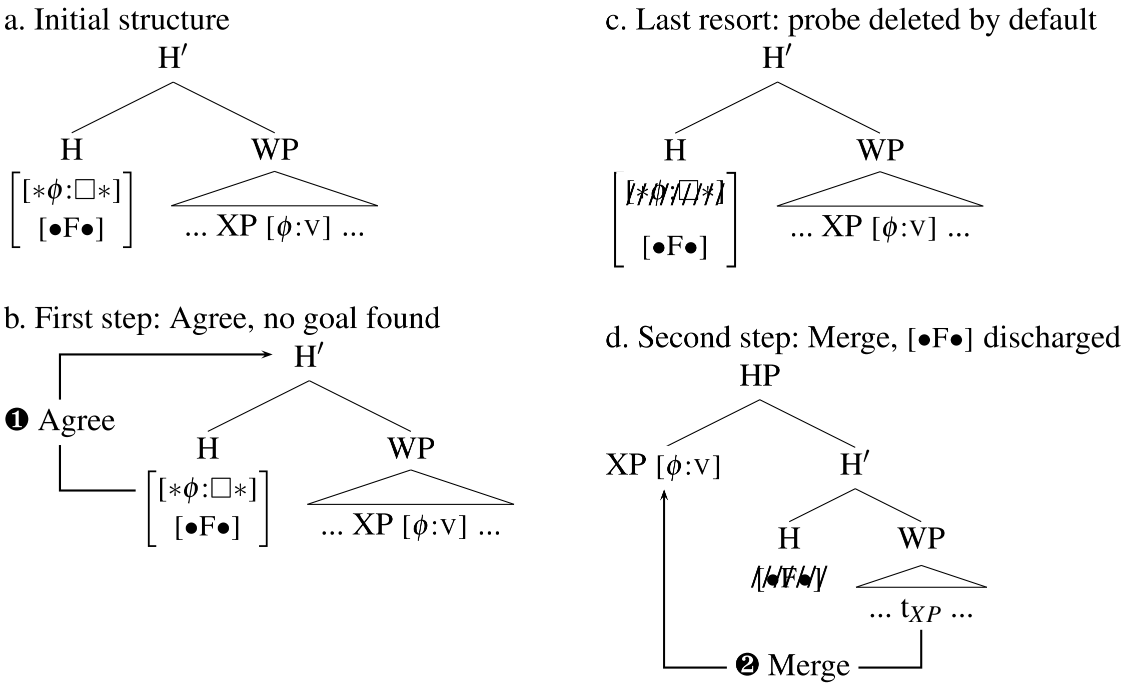
(15) *Internal Merge feeds Agree*:



(16) illustrates counter-feeding. If H triggers Agree first, Agree fails because there is no XP in SpecHP at this point that could be a goal for the probe on H. Hence, the probe is discharged by default (if it were not discharged, the derivation could not continue because the Merge triggering feature would never become the topmost feature on the stack). In a subsequent step, H triggers Merge and XP moves to SpecHP. Since Agree does not lead to valuation, we will not see a reflex of movement on H.

[4] If the value on H is realized morphophonologically, we get a phonological or a morphological reflex of movement on H. On how to derive syntactic reflexes see Georgi (2014).

(16) *Internal Merge counter-feeds Agree*:



On the surface, (16-d) is opaque because XP is in the right structural position to be a goal for H and we would thus expect that the probe can be valued. However, Merge comes too late to feed Agree. The probe feature is already deleted (it had to be; otherwise Merge could not apply in the first place). The system is strictly derivational: It is not possible to postpone an operation and see whether it could apply at a later stage of the derivation.

Given that there are two types of Merge-triggering features ([•F•] and [•EF•]) and probe features in this system, there are six possible orders. Four of them lead to different patterns. These orders are illustrated in (17) (features separated by commas are not ordered to each other; their order does not matter for the succes of Agree).[5] If final and intermediate movement steps are triggered before Merge (cf. (17-a)), they both feed Agree, resulting in pattern I. If both of them apply afer Agree (cf. (17-d)), both counter-feed Agree and hence, there is no reflex of movement, deriving pattern IV. If Agree applies in between the two types of Merge we see a reflex of movement only in some positions along the path of movement. In (17-b) only final movement steps feed Agree, intermediate steps apply too late. This derives pattern II. And in (17-c), the reverse holds: Only intermediate movement steps feed Agree, which gives rise to pattern III. The possible orders of the three features thus derives the attested patterns of reflexes of movement.

[5] This is the case when the two types of movement apply at the same point relative to Agree. The order among them is irrelevant, the only thing that matters for the reflex is the order of Merge relative to Agree.

(17) *Orderings of the two types of Merge triggers relative to a probe feature*

order of features	interactions		pattern
	final steps	intermediate steps	
a. [●F●], [●EF●] ≻ [∗F:□∗]	feed Agree		P I
b. [●F●] ≻ [∗F:□∗] ≻ [●EF●]	feed Agree	counter-feed Agree	P II
c. [●EF●] ≻ [∗F:□∗] ≻ [●F●]	counter-feed Agree	feed Agree	P III
d. [∗F:□∗] ≻ [●F●], [●EF●]	counter-feed Agree		P IV

3.3 Multiple reflexes

The present analysis enables us to account for multiple reflexes in a simple way. Recall that in languages with multiple reflexes a single instance of Ā-movement can have several reflexes which follow different patterns. In Chamorro, for example, wh-movement leaves a pattern I reflex on the verb (wh-agreement) and a pattern II reflex on the complementizer (complementizer agreement), cf. (9). As long as the reflexes are the result of two different Agree relations, the different probe features can be interleaved with the Merge triggers:

(18) *A pattern I and a pattern II reflex co-occur*: [●F●] ≻ [∗F:□∗] ≻ [●EF●] ≻ [∗L:□∗]

[F]-Agree will only be fed by a final movement step because only those steps apply before [F]-Agree; intermediate movement steps apply too late. Hence, [F]-Agree will result in a pattern II reflex. Agree in feature [L], however, applies after both final and intermediate movement steps. Hence, both movement types will feed [L]-Agree and the result is a pattern I reflex. Indeed, two different features are involved in the two reflexes in Chamorro: wh-agreement involves case Agree and C-agreement involves category Agree with the moved XP. The ordering in Chamorro would thus be as follows:

(19) *Ordering in Chamorro*: [●F●] ≻ [∗CAT:□∗] ≻ [●EF●] ≻ [∗CASE:□∗]

3.4 An argument for extrinsic ordering

A central research question in frameworks that work with sequential application of rules has always been whether the order of the rules is extrinsic or intrinsic. It is extrinsic if it must be stipulated in a language-specific fashion. It is intrinsic if it follows from independent (probably universal) principles of grammar.[6] There are two major views: Chomsky

[6]Principles that have been proposed in the literature include specificity, complexity, obligatoriness, and the Cycle. For references see Georgi (2014).

(1965) states that extrinsic ordering is required in addition to intrinsic ordering; Pullum (1979) claims that all orders are determined by universal principles and are thus intrinsic.

The variation found with reflexes of movement provides an argument for the need of extrinsic ordering, in line with Chomsky's view. The reasoning goes as follows: If there are two operations A and B, the principles predict either the order $A \succ B$ or $B \succ A$. However, some orders of the features [•F•], [•EF•], [∗F:□∗] in (17) are the opposite of one another. For example, [•F•] must be ordered before [∗F:□∗] to derive patterns I and II, but the order must be the reverse to generate patterns III and IV. But no principle can predict $A \succ B$ and $B \succ A$ at the same time. Consequently, the ordering of the operation-inducing features on a single head must be extrinsic. I do not claim that there is no intrinsic ordering; many orders of operations that are triggered by distinct heads may still follow from principles of the grammar. But extrinsic ordering is required in some cases.

4. Conclusions

In this paper I have investigated interactions of the operations Merge and Agree that arise when they are triggered by a single head. I have argued that we need to distinguish different types of Merge because they can apply at different points relative to Agree, giving rise to opacity effects. In particular, I have argued on the basis of patterns of reflexes of successive-cyclic movement that there is a split between Merge-inducing features that trigger a final and those that trigger intermediate movement steps. The ordering approach I have developed presents the first uniform account of all four attested patterns. Furthermore, the cross-linguistic variation found with reflexes provides evidence for the need of extrinsic ordering of operation-inducing features on a head. This approach provides strong evidence for a strictly derivational model of grammar where only a single operation can apply at any stage of the derivation.

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