Chapter 2
A Note on Huave Morpheme Ordering: Local Dislocation or Generalized U20?

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Introduction

In the past few decades, different frameworks have emerged which claim that a single computational engine drives both syntactic and morphological composition, either to a large extent, as in Distributed Morphology (DM), or entirely, as in frameworks based on Antisymmetry (Kayne 1994).

Where morpheme order is concerned, Distributed Morphology (DM) attributes a major, but not exclusive, role to the syntax (see among others, Halle and Marantz (1993); Embick and Noyer (2007); Bobaljik (2012; 2015) and Harley (2012)). Mismatches may arise between the output of the syntax and the actual morpheme order, in which case postsyntactic readjustment rules (Lowering and Local Dislocation) apply to generate the observed linear orders.

In Minimalist frameworks based on Antisymmetry, the linear order in syntax and morphology is read off the syntactic output directly; hence, there is or can be no need for lowering or local dislocation postsyntactically (see among others, Kayne (1994; 2005; 2010); Julien (2002), my own work Koopman and Szabolcsi (2000); Koopman (2005; 2014; 2015), and work in Nanosyntax Starke (2010); Caha (2009); Muriungi (2009)).

The question whether postsyntactic ordering mechanisms that rearrange morpheme orders can be dispensed with or not depends on the syntactic framework one adopts.

How do we decide between these two (broad) syntactic frameworks? Joshi (1985) proposes that the class of possible human languages is properly included in the class of Mildly Context-sensitive grammars. As Stabler and his colleagues have shown, frameworks with right adjunction and without, with head movement or without, with antisymmetry or without, etc., all fall within the class of Mildly

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G. Sengupta et al. (eds.), *Perspectives on the Architecture and Acquisition of Syntax*, DOI 10.1007/978-981-10-4295-9_2

Context-sensitive grammars Stabler (2011), and Sportiche et al. (2013, Chap. 12). An intuitive notion of syntactic complexity or whether head movement is better than phrasal movement will not decide which framework to adopt.

What matters is how well the frameworks account for the empirical data, not just for individual languages but for human languages in general, whether they generate predictions that can be verified, and how appropriate they are for the interfaces with phonology and semantics. This is what the discussion will focus on.

To make the question of whether we need postsyntactic reordering or not tractable, and test it on Huave morpheme orders that have been argued to illustrate the need for the postsyntactic reordering of **Local Dislocation**, a powerful postsyntactic reordering process that applies to linear (not hierarchical) orders discussed in Embick and Noyer (2001), as well as in their handbook article (Embick and Noyer 2007), this chapter will start laying out the two frameworks, DM and (my version of) the minimalist antisymmetry approach to morphology will be detailed in Section "Two Frameworks".

It develops an expected typology of morpheme orders, based on Cinque's inspiring paper that models the possible and impossible syntactic word order patterns known as Greenberg's 1963 Universal 20 (U20) (Greenberg 1963; Cinque 2005), discussed in Section "Syntax: Universal 20".

Universal 20 word order patterns turn out to generalize to many other syntactic hierarchies as well (see, for example, Cinque (2009)) (Section "Syntax: U20 Patterns Generalize"). This provides important information about the framework needed to account for typology of word order patterns.

This generalized U20 syntactic word order typology leads to a concrete hypothesis about a crosslinguistic typology of morpheme orders (Section "Morphology: Morphology Tracks U20 Patterns"). If there is one syntactic engine for syntax and morphology, the same ordering patterns *and* restrictions should be found in morphology as well. If postsyntactic reordering is not unavailable in UG, orders that require postsyntactic reordering in DM must be accounted for by the generalized U20 framework, with possible morpheme orders falling within the U20 typology.

The frameworks are put to the test in Section "Huave Morpheme Ordering: Local Dislocation or U20?" on a puzzling morpheme order paradigm from Huave, which is taken to illustrate the need for **Local Dislocation** (see Embick and Noyer (2001), and their handbook article (Embick and Noyer, 2007).

The local dislocation analysis is discussed in Section "A Puzzle: Huave Morpheme Order". It falls short because the underlying syntactic structure, on which local dislocation is supposed to operate given the DM framework, cannot be adopted. In Section "A Sketch of a Syntactic Analysis", the U20 approach to the Huave data is worked out and evaluated. The data patterns fall within the expected U20 typology. Some ungrammatical morpheme orders fall outside the typology, and their ungrammaticality is thereby fully expected, as such orders simply cannot be derived. Other ungrammatical patterns can be related to general syntactic problems, as expected under a single computational engine. Lastly, the syntactic account extends to capture variation in morpheme orders between different Huave dialects, and in fact predicts the possible space of variation.

Overall, there is no motivation to adopt Local dislocation for Huave, not even within DM. A syntactic account can in fact be constructed, based on a direct interface between the syntax and phonology, and the similarity of the typology of word order patterns in syntax *and* morphology.

Two Frameworks

Here, I briefly spell out the assumptions that underly the two frameworks.

Distributed Morphology DM

DM in practice is in essence a (narrow) syntax → "morphology" → phonology model. I present here the assumptions that many seem to share. Narrow syntax and morphology use different atoms, and rules. Only semantically meaningful atoms are hypothesized to project in "narrow syntax," which feeds into compositional semantics. Semantically vacuous,[1] but phonologically meaningful atoms (case, agreement, linkers, theme vowels, etc.) are hypothesized to be merged in the (postsyntactic) morphological component, which interfaces with spell-out/phonology.

The syntax in practice is a standard Minimalist one (without antisymmetry), with head (not phrasal) movement responsible for creating the skeleton of word structure. The syntax can generate only the possible morpheme orders that derive by head movement: Any "unusual" linear orders (unusual w.r.t. the syntactic expectations) must be dealt with by additional operations in the postsyntactic morphology module, which thus has its own structural atoms, structure building and reducing mechanisms, and readjustment rules/realization rules. These further adjust and modify the syntactic structures for linearization and prepare for vocabulary insertion and the interface with phonology.

A Single Computational Engine: Antisymmetry, Minimalism, and Phrasal Movement

Antisymmetry is a syntax → phonology model, with the syntax of natural languages showing a fundamental left right asymmetry (cf. starting from Kayne (1994)) There is a single syntactic component: There is no distinction between "narrow" syntax (semantically interpretable), and postsyntactic syntax. Syntactic

[1]Deciding if some element is semantically vacuous or not is more challenging than often assumed.

structures are strongly decompositional, with small atoms (most probably single features) and their associated lexical properties driving the derivation. Neither complex feature bundles, nor fully inflected lexical items are selected from the lexicon as input to merge, with feature checking from the inside out mirroring the syntactic hierarchy (Chomsky 1992). Traditional verb placement or noun placement results from Internal merge (feature-driven (remnant) phrasal movement, not head movement). Under a single computational engine, this holds for morpheme ordering as well. Since there is no syntax/structure building postsyntactically, there should be no postsyntactic adjustment rules for morpheme orders either.

So as to be able to talk about morphology, I assume that affixes (prefixes, suffixes) have the following lexical specifications.[2] With DM, I assume late spell-out: This is by no means a shared assumption.[3]

(1) a. Prefixes are heads (or perhaps specifiers of silent heads) merging with a complement.
b. Suffixes are heads. In addition to merging with a complement, they carry an *EPP* feature may be further specified for category (Koopman 2005) or not. This triggers Internal merge to satisfy the *EPP*, and yields the surface head final property of English morphology, for example. Head finality is a derived surface property, not a special property of the morphological component.
c. Interface properties with the phonology may be further specified on *EPP* features (and by hypothesis, these are the only place where these may be so specified.)[4]

Finally, lexical properties must be locally satisfied, i.e., checked under sisterhood. This means that prefixes are syntactically head complement structures which simply happen to align in a head complement configuration. There is no need to be a X^0 constituent.

Deciding Between Frameworks

The two frameworks assume quite different syntactic derivations. We decide between frameworks in how well the frameworks account for the empirical data, not just for individual languages but for human languages in general, whether they

[2]The following are close to traditional assumptions about lexical entries. This is probably the major difference with nanosyntax.

[3]Chris Collins and Richard Kayne (p.c).

[4]See Koopman (2014) for "size" restrictions imposed by ph. These properties range from "no bigger than a light foot," to no bigger than "root", or "no bigger than phrases of size x derived through pied-piping", to specifications how deeply embedded in the syntactic structure phonological material is allowed to occur. They can be directly read off from the output of the syntactic derivation (cf. the complexity filters in Koopman and Szabolcsi (2000), and "grafts" on structure building EPP features in Koopman (2014)).

generate predictions that can be verified, and how appropriate they are for the interface with the phonology and semantics.

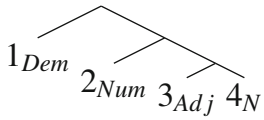
In Koopman (2015), building on earlier work,[5] I present a novel argument in favor of a single computational engine for syntax and morphology. This argument builds on the research that has emerged around Cinque's (2005) modeling of U20,[6] and is quite simple. If there is one syntactic engine which covers both syntax and morphology, we should find the exact same ordering patterns and restrictions in syntax and morphology. This approach provides us with a typology of possible and impossible morpheme orders, and initial exploration about what is found and what is not is quite promising.

Syntax: Universal 20

Cinque (2005) lists and models the attested and unattested word order patterns of Dem, Num, A, and N, known as Universal 20 (U20) patterns (Greenberg 1963). The orders reveal a fundamental asymmetry of human languages: Prenominally, the order appears to be invariant, but postnominally, many more orders are attested.

As Cinque (2005) shows, only 14 out of the 4!=24 logically possible word order patterns are attested,[7] as summarized in Table 2.1.[8] The numbers 1, 2, 3, 4 in the tables represent an independently established syntactic/scopal hierarchy where 1 c-commands 2, 2 c-commands 3, etc.). The patterns in the gray shaded cells do not occur. Cinque asks why we find these particular orders, and why certain orders are not found. Cinque's provides an answer to these questions: Only orders that can be generated by UG can surface. Orders that are not found cannot arise, and are thus excluded in principle. His proposed account reduces to antisymmetry, a characteristic of human languages, and properties of Merge (External Merge: a fixed universal hierarchy), and Internal Merge (properties of movement). Well-motivated independent parameters related to Merge capture the variation in orders.[9]

(2) a. Antisymmetry (Kayne 1994).
b. An independently motivated universal syntactic/semantic hierarchy:



[5]In particular, Koopman and Szabolcsi (2000), Koopman (2005), and Koopman (2014).

[6]Universal 20 also plays a central role in Nanosyntax.

[7]The generalizations hold up in Cinque's own now quite extensive database of 1535 languages as of April 30, 2015. Of the potential counterexamples, Cinque (pers. com.), only one could perhaps be qualified as a genuine counterexample.

[8]Frequency of patterns is omitted from Table 2.1.

[9]Abels and Neeleman (2009) propose an analysis without the LCA/ antisymmetry, which permits right and left adjunction, but restricts movement to leftward movement.

Table 2.1 Universal 20 patterns (*1* Dem, *2* Num, *3* Adj, and *4* N)

Attested: ✓		Un-attested: 0	
1234	✓	1324	0
1243	✓	1342	✓
1423	✓	1432	✓
4123	✓	4132	✓ or *0*?
2134	0	2314	0
2143	0	2341	✓
2413	0	2431	✓
4213	0	4231	✓
3124	0	3214	0
3142	0	3241	0
3412	✓	3421	✓
4312	✓	4321	✓

c. Different surface orders (in neutral orders) are derived from this hierarchy by (leftward) Movement (Internal Merge) of (i) a *phrase* that (ii) must contain the lexical noun.

Variation (language internal or crosslinguistic) is due to two different types of parameters:

1. **height of movement** parameters[10] capture how high the subtree with the noun moves up in the hierarchy (if at all). This captures well-established empirical generalizations about variation, starting with Pollock (1989) study of the distribution of verbal forms in English and French.
2. **pied-piping** parameters determine whether the nominal constituent pied-pipes Adjectives, or Numerals, etc. on its journey up into the hierarchy.

Because of (2-c), there is no crosslinguistic order variability prenominally: 123 can only be reordered by pied-piping with the Np,[11,12] 1243, 1423, and 4123 orders correspond to derivations with the (phrasal) nominal constituent halting at different heights, stranding adjectives, numerals, and demonstratives. Remaining orders correspond to height of movement and pied-piping possibilities, yielding greater order variability in linear orders postnominally. Finally, unattested orders, i.e., gaps, fall out in a principled fashion: *2134, *3124, etc. cannot arise in neutral contexts, because it would require a numeral or an adjective to move without the nominal constituent: This is illegal.

[10]I am not concerned here with the question of how this is achieved technically.

[11]Here and below, I use small caps p to remind the reader of the phrasal nature of the moved constituent.

[12]It remains to be seen to what extent prenominal order can also be the effect of Internal merge (movement). See Koopman and Szabolcsi (2000: 24–25) for arguments that a 1 2 3 4 order in verbal complexes in Hungarian must be the result of internal merge, i.e., movement.

The statement in (2-c) is the modern incarnation of head movement, with broader and better empirical coverage. The 1243, 1423, and 4123 orders are traditionally dealt with by head movement, which is part of the standard toolbox in syntax. Why then depart from this assumption? Why phrasal movement, not head movement? The problem is not that these particular orders cannot be so derived in individual languages, but rather that a head movement analysis (as Cinque et al. (1994) himself proposed in his earlier work on the Romance noun phrase) cannot capture the crosslinguistic generalizations from a fixed syntactic/semantic hierarchy (cf. Cinque 2010). This is also an important argument in Koopman and Szabolcsi (2000), where we show that a head movement analysis for verbal complexes in Hungarian does not allow for a unified account underlying the different orders of the same verbal complexes in different environments, whereas a phrasal movement account does. The support for phrasal movement analysis thus comes (in part) from the unification it allows, with comparative syntax playing a central role.[13]

Syntax: U20 Patterns Generalize

Since 2005, U20 patterns have been shown to be much more general. Cinque (2009) details similar left right asymmetries (order before the noun or the verb is invariant, postnominal or postverbal order is more variable) and gaps for many different syntactic domains.[14]

This line of research, while still in its infancy, is exciting. It leads to the question what sequences form U20 hierarchies and why. It also leads to the question if the typology of morpheme orders tracks U20 patterns as well. Indeed, if there is a single computational system for syntax and morphology, and if that computational system yields syntactic U20 patterns, we expect the typology of morpheme orders to do so as well (Koopman 2015).

[13]The failure of nominal complements to pied-pipe with the N is often taken to be problematic for phrasal movement, and support head movement. This presupposes that nouns do take complements, or/and that complements can remain in their thematic positions. Neither assumption has empirical support (Kayne (1994); Kayne (2000, Chaps. 14, 15), Kayne (2005, Chap. 7), and Hoekstra (1999) among others). This means that a N is both a N and an NP, compatible with either a head movement or a phrasal movement analysis.

[14]See Cinque (2009) for examples and references of relative orders of attributive adjectives, relative orders of different types of adverbs, the order of tense, mood, aspect and V, Directional Locative P NP, clitic complexes preverbally or postverbally, verbal complexes in Germanic (cf. Koopman and Szabolcsi (2000) on verb clusters in Hungarian, Dutch, and German; Barbiers (2005), Wurmbrand (2006), and Abels (2011), who is the first to demonstrate that the hierarchy/order relations four-membered Germanic verb clusters track the U20 patterns in the noun phrase.

Table 2.2 Morphological patterns and gaps for any hierarchy of 123: English

123	✓	[re [de [activate]]]	
132	✓	[un [lock able]]	*not able to be locked*
312	✓	[madonna [wanna [be]]]	
321	✓	[[[[nation] al] iz] e]	
231	✓	[[un [lock]] able]	*able to be unlocked*
213		* ?0	

Morphology: Morphology Tracks U20 Patterns

What do we expect to find if morpheme orders track syntactic U20 patterns? We should observe left right asymmetries, and all and only possible U20 patterns. U20 patterns that cannot be generated should never occur. For an independently motivated fixed (scope) hierarchy of three elements, two affixes, and a lexical category, we expect to find at most five patterns within a single language, with one gap *213. At most, because which patterns occur depends on the morpheme inventory in the language, and their specific lexical properties. In a language like English, which has prefixes and suffixes, all five expected patterns appear to be attested, as shown in Table 2.2.

123 (stacked prefixes), 132, 321 (mirror orders), and perhaps 231, with right-branching structures before the head,[15] are expected under any syntactic theory of morphology. 312 orders, however, *are* expected in the U20 approach, but not by syntactic theories based on head movement, which will assume postsyntactic movement for such orders. 312 will be briefly discussed in the next section. Evaluating gaps is difficult. However, 213 orders in English seem to be excluded: *de-re-activate* in so far as possible only corresponds to *de* scoping over *reactivate* (123), not to a reading where *de* is interpreted in the scope of *re* (*231). *Unrelockable* can only correspond to a reading where *un* takes scope over *re*, not a reading where *un* has undergone raising, and is interpreted in the scope of *re* (see Koopman (2015) for further discussion).

For a fixed hierarchy of four elements, we should find the 14 patterns presented in Table 2.1.

312 Orders

312 orders are also known as Scope violations or Mirror order violations. These orders are expected to arise under generalized U20 through phrasal movements

[15]These orders are ruled out by the Final over Final constraint of Biberauer et al. (2014). Since such orders are clearly attested, a different account is needed for the dislike languages often have for right-branching structures before a head.

(i.e., spec to spec movements). They occur in Korean and Japanese (Koopman 2005), Quechua (Muysken 1981; Myler 2013), Bantu (Hyman 2003; Muriungi 2009; Buell 2005; Ryan 2010), and Wolof (Torrence 2003; Buell 2005), among many languages, and, as we will see below, also in Huave.

Chichewa

Here, we discuss some examples from Chichewa, so as to familiarize the reader with the framework, and show how to proceed building up the syntactic analysis.[16]

A linear *V Caus Inst* order in Chichewa is structurally ambiguous Hyman (2003), reflecting two different Merge (=scope) hierarchies, as indicated in the examples. (3) is derived by the (remnant) Vp pied-piping Caus, yielding a regular 321 mirror order: Caus

(3) $1_{Ins} > 2_{Caus} > 3_{V}$ 321

íl- íts- il- a
cry Caus- Ins- FV
'..use an instrument to make x cry'

The example in (4), however, is derived by the subtree containing Vp stranding the Ins. This is a 312 order, where the head complement merge order surfaces after verb.

(4) $1_{Caus} > 2_{Ins} > 3_{V}$ 312

takas- its- il- a
stir- Caus- Ins- FV
'.. cause [to stir with]'

Apart from cases where a linear order corresponds to two different hierarchies, there are also cases where two different linear orders map onto a single merge hierarchy, recalling the variable orders of verbal complexes in Hungarian and Dutch (Koopman and Szabolcsi 2000). This depends, however, on the order in which the suffixes are merged. This can be illustrated with different combinations of Rec, Caus, and V.

The reciprocal suffix *−an* (Caus) can merge either with Caus or with V, yielding two different syntactic hierarchies with different semantic interpretations.

[16] I make no attempt here to contrast this approach to the account in Hyman (2003).

(5) a. $1_{Caus} > 2_{Rec} > 3_V$ (..cause reciprocal Ving)
b. $1_{Rec} > 2_{Caus} > 3_V$ (.. reciprocal causing to V)

The hierarchy in (5-a) yields two different linear orders with the same meaning:

(6) Two linear orders (312 and 321) from the fixed hierarchy $1_{Caus} > 2_{Rec} > 3_V$:

a. a- ku- máng- íts- an- a — 312
3Pl- PROG-tie- Caus- Rec- FV

b. a- ku- máng- án- its- a — 321
3Pl- PROG-tie- Rec- Caus- FV
'..cause to tie each other'

The hierarchy in (5-b) yields only one possible order (from Ryan (2010, 7a, 7b) who cites Larry Hyman and Sam Mchombo p.c.).

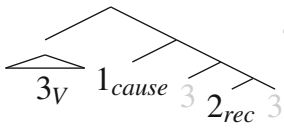
(7) One linear order (321) from the fixed hierarchy $1_{Rec} > 2_{Caus} > 3_V$:

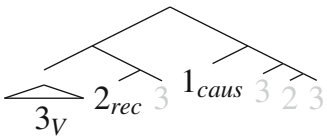
a. a- ku- máng- íts- an- a — 321
3Pl- PROG-tie- Caus- Rec- FV

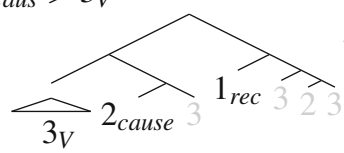
b. *a- ku- máng- àn- its- a — 312
3Pl- PROG-tie- Rec- Caus- FV
'..cause each other to tie'

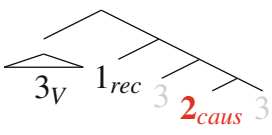
How do these patterns follow given the respective underlying hierarchies? The linear morpheme orders must Reflect the syntactic derivations below, forced by the U20 approach. Movement is driven by the EPP feature that suffixes have as part of their lexical specification.

(8) $1_{Caus} > 2_{Rec} > 3_V$ (Cause reciprocal Ving)

(6-a) 

and (6-b) 

(9) $1_{Rec} > 2_{Caus} > 3_V$
(7-a) 

not * (7-b) 

As we can observe by inspecting the derivations, the verbal constituent may pied-pipe Rec or strand it: The variability is thus in some way related to the optionality of pied-piping. The Caus suffix, however, must pied-pipe with V. Since 312 is excluded in this case, we can conclude that this is related to a prohibition on stranding Caus somehow.

What is the difference between Rec and Caus? Both are suffixes with an *EPP* feature as their lexical specification. Well-formed cases with Caus, however, always have a left sister with phonological content at the output of the syntactic derivation, i.e., at the interface with spell-out, but the reciprocal does not. If this is required for the Spec of the Caus, pied-piping of the causative must be forced in (9), yielding a single output, and ruling out stranding Caus. This suggests the following generalization needs to be accounted for: Caus requires a spec with PH content at the interface with phonology/spell-out, but Rec does not. As I propose in Koopman (2014) for different cases, this can be modeled by a further specification of the *EPP* property of a lexical entry, which Caus has (must have lexical content in spec at spell-out), but Rec does not, suggesting that the *EPP* property of Rec can be satisfied at some point in the derivation, allowing Vp to strand Rec.

Huave Morpheme Ordering: Local Dislocation or U20?

The preceding section simply gave an idea of the tasks that are involved in motivating an analysis, and pursuing the predictions of the U20 approach to morphology. A linear order of morphemes (once these are identified) must map onto a syntactic hierarchy, which should be independently motivated. The syntactic derivations that underly the linear orders must be hypothesized, and the formulation of the lexical properties that drive the syntactic derivation must be deduced, and ditto for height of movement and pied-piping parameters. The analysis must of course be internally consistent. Once an analysis is motivated, we can verify whether the linear orders indeed fall within the expected U20 patterns, or not, pursue further predictions, etc. We now turn this into practice in the next section for Huave.

A Puzzle: Huave Morpheme Order

Here, we turn to the puzzling case of morpheme ordering in Huave (San Mateo del Mar), a language isolate of Oaxaca State, Mexico, discussed by Embick and Noyer (2001; 2007). The morpheme order in Huave represents a type of mismatch between syntax and morphology, and is argued to involve *Local dislocation*, a local movement process defined in terms of adjacency, operating postsyntactically after vocabulary insertion. This local readjustment process is further claimed to care only about linear order, not about hierarchical structure. Is local dislocation motivated?

Can the U20 approach to morphology outlined above account for these orders in Huave, and can we dispense with local dislocation?

The morpheme order puzzle is illustrated below (from Embick and Noyer (2007): 320, 51–53). The example sentences vary in two ways: First, whether the subject is first person singular or plural (person and plural are discontinuous), and second, whether the tense is "present" (atemporal) or "past/completive." The verb in these examples is transitive, starting with a vowel, probably an exponent of a Voice prefix. Some affixes in Huave are always suffixal (Refl and Pl), some are "mobile," surfacing sometimes preverbally, sometimes postverbally. The puzzle concerns the alignment of affixes in the postverbal domain. Note that this is the domain where we expect to find variation under U20 because Vp moving past the affixes can interact with pied-piping.[17]

(10) Present, 1st person, sg/pl. Embick and Noyer (2007), ex. 51)

a. S- a- kohch- ay
1- Th- cut- Refl
' I cut myself'

b. S- a- kohch- ay- on
1- Th- cut- Refl- Pl
'we (excl.) cut ourselves'

(11) Past, 1st person, sg.

a. T- e- kohch- ay- os
PAST- Th- cut- Refl- 1
' I cut (past) myself'

b. *T- e- kohch- as- ay
PAST- Th- cut- Refl- 1
' I cut (past) myself'

(12) Past 1st person, pl.

a. T- e- kohch- as- ay- on
PAST- Th- cut- 1- Refl- Pl
'We cut ourselves'

b. *T- e- kohch- ay- os- on
PAST- Th- cut- Refl- 1- Pl
'We cut (past) ourselves'

The order is Refl-1 in (11-a), but excluded in the context of a plural (12-b). The linear sequence 1-Refl is excluded in (11-b), but obligatory in the context of the plural (12-a). This pattern is not derivable by syntactic head movement.

[17]We (incl.) lacks *−s− a- kohch- ay- on* "we (incl.) cut ourselves." The default plural-n cooccurs with 1/2 person, the third person plural form is a fused form. The fact that both person and number are expressed on the plural suffix is probably important (see section (22)).

Embick and Noyer (2007) set out to capture the following generalization: A reflexive affix *-ay* appears directly before the final affix of a verb, if there is any. This is achieved by a role of local dislocation which is triggered by a morphological well-formedness condition that applies to complex verbs in Huave, and that specifically refers to the Refl affix.

(13) Refl must precede postroot-X, X a non-Root node.

Refl, it is assumed, is right peripheral to the verb inflectional complex. When no Xs occur, postroot (13) is satisfied, and (10-a) results, with Refl in final position. But when the root is followed by at least one inflectional affix, a Local Dislocation operation which left-adjoins Refl to the final affix applies to satisfy (13). This rules out (11-b) and (12-b). This yields a second position effect with respect to the edge of the verb, but only if other affixes are present.

The assumption that Refl is peripheral to the verb's inflectional complex is required to make local dislocation work. This basic position of Refl must result from the syntax, given DM; hence, it must be supported by what is known about the syntax of reflexives in general, given that the syntax of Huave reflexives has not been studied. This implies that the syntactic structure underlying (12-a) must be something like [[[V 1s] Pl] Refl], assuming head movement, with Refl c-commanding 1st of the transitive verb. This is a highly implausible syntactic structure from a typological point of view: Refl affixes are generally closer to the transitive verb than the 1st person subject. This is clearly true internal to Huave as well, as the "mobile" first person affix *−s−* must be above the Refl in transitive verbs, as shown in (10-a) and Section "Establishing a Syntactic Hierarchy and How High Vp Moves" below.[18]

Since the syntax on which this analysis has to be based makes no sense, the local dislocation analysis on which it must be based, together with the ad hoc well-formedness condition (13), must be rejected as well. It simply must be shown that a speaker can arrive at the underlying syntactic structures by undoing local dislocation. This is what the DM framework requires. The syntax of Huave affixes plays no role in this analysis at all. This means that the generalization that a reflexive affix *-ay* appears directly before the final affix of a verb, if there is any, does not translate into a linguistic analysis.

Thus, an alternative analysis for these morpheme orders pattern is necessary in any case, which takes the syntax into account. In the next sections, we test the U20 framework on these data. As I will conclude, there is no need, nor place, for local dislocation in this account.

[18]In Kim (2008) layered affix fields for Huave of San Fransisco, Refl is also closer to the verb root and then the "mobile" first person suffix *−s−*.

A Sketch of a Syntactic Analysis

Here I will develop a syntactic analysis based on Antisymmetry and phrasal movement as in the U20 approach, taking the limited data presented in the paradigm above, and see how far we can get.

Establishing a Syntactic Hierarchy and how high Vp moves

The very first step consists in determining a reasonable syntactic hierarchy, and determining height of movement of the Vp within this hierarchy. This hierarchy will give us a baseline for the derivation of the orders and properties that must be derived and interactions with pied-piping parameters. Recall that variability in suffix order, as is the case of the Huave paradigm, is expected under antisymmetry, as a consequence of variable pied-piping options. Preverbal orders are expected to show no variability, which seems to be true for Huave. This plays no role in the discussion.

Establishing a syntactic hierarchy of merge is difficult. The four items in (14), I assume, must be ordered in a unique fixed hierarchy. 1st person and Pl(ural) are discontinuous, and not bundled in a single node. Present and past interact with this hierarchy, as shown below.

(14) 1st, Pl, Refl, [Th-V]

It seems reasonable that 1st is merged above Pl, because of the person hierarchy. In languages in which person and plural are independent morphemes (Georgian, Semitic, Maasai), the exponent of person ends up consistently to the left of plural. Refl merges with the V(p), and 1st Person subject is c-commanding Refl, as we saw in Section "A Puzzle: Huave Morpheme Order". This yield the following hierarchies: Refl

(15) a. Refl> V
b. 1st>Refl
c. 1st >Pl

It is unclear, however, what the relative order of merge of Refl and Pl is. I will therefore explore both logically possible hypotheses: Either the order is *Refl* > *Pl*, or it is *Pl* > *Refl*, and let the data speak to determine the issue. Looking ahead, it turns out that both hierarchies seem correct for different varieties of Huave, with different morpheme orders.

We now have two hypotheses about the possible shape of the hierarchy that underlies the linear order. These are merges in head complement orders (but with internal Merge interspersed), in agreement with antisymmetry. A constituent containing the remnant Vp (here, Th V) will move leftward, raising the question how high they raise (and why).

(16) Hypothesis 1: $Refl > Pl$:

1st Refl Pl [Th V]
1 2 3 4

(17) Hypothesis 2: $Pl > Refl$:

1st Pl Refl [Th V]
1 2 3 4

Two further elements occur in the examples: "Present" (unmarked for tense or aspect) and "Past/completive" $-t-$. These lead to a different order w.r.t. the mobile affix -s- (-t- itself is a mobile affix, preceding transitive verbs and verbs with a voice prefix), but following intransitive verbs (big VPs), or verbs with a Voice suffix.

The linear orders reveal that the constituent containing the Vp moves to different heights. If $-s-$ always spells out the 1st person node, a reasonable assumption, we observe that $-s-$ precedes the transitive verb (in fact voice initial verbs) in the present, but follows it in the past.

(18) a. "Present/Unmarked":
1_{1st} V...
'A phrase containing the transitive verb moves above Pl/Refl, but stops below 1st person *s* in "present" tense'

b. "Past": $[t - Th\ V..]1_{1st}$ ..
'A phrase containing the transitive verb raises above 1st in "past/completive" (possibly to the C region)'

As expected under U20 derivations, the verb may or may not pied-pipe other postverbal elements. Such orders, however, are expected to comply with the U20 patterns that can be derived from a given syntactic hierarchy.

1*st* person $-s-$ is referred to in the literature as a *mobile* affix, sometimes ending up preverbal, sometimes postverbal. In the syntactic analysis sketched here, it is not the 1st affix that is mobile. It is in fact always in the same merge position, with the Vp moving to different heights, depending on the type of tense/aspect. Its placement w.r.t. the verb is not driven by a morphological property of the affix itself, in formal terms, the affix does not have an epp_V, but by properties of heads above it (in the past), or below it (in the present). This is sufficient for the discussion here.[19] Such mobile patterns are well known from the syntax. Object clitics in Romance for example follow the imperative (when the V raises to the left periphery), but precede the tensed verb (when the V stops in Agr/T). English subjects follow the finite

[19]Kim (2010) argues the placement of mobile affixes is driven by phonology. Affixes (mobile and nonmobile alike) occur at a fixed distance from the root relative to other affixes. Mobile affixes prefix to vowel initial stems, but suffix to consonant initial stems, to avoid vowel epenthesis. This is incompatible with the U20 view of morpheme order presented here, and remains to be addressed.

auxiliary when T moves to C, but precede T in declaratives, etc. The intuition that lexical items are somehow in invariant syntactic positions, with the functional elements moving around, lowering, etc., does not translate into a syntactic reality in natural languages.

Derivations: Testing Hypothesis 1: Refl > Pl

The fixed syntactic hierarchy in (19) forces specific syntactic derivations for the (limited) data presented above (annotated below). These allow us to verify that possible orders indeed fall within the licit U20 patterns, and to check if the analysis is internally consistent.

(19) 1st Refl Pl [Th V]
1 2 3 4

(20) a. S- a- kohc- ay.
1- Th- cut- Refl
'I cut myself'

$1_1 3_V 2_{Refl}$

→*Vp moves past Refl*

b. S- a- kohc- ay- on.
1- Th- cut- Refl- Pl
'We cut ourselves'

$1_{1st} 4_V 2_{Refl} 3_{Pl}$

→*Vp moves past Refl, strands Pl*

(21) a. T- e- kohc- ay- os.
PST- Th- cut- Refl- 1
'I cut (past) myself'

PST $3_V 2_{Refl} 1_{1st}$

→*Vp pied-pipes Refl*

b. *T- e- kohc- as- ay
PST- Th- cut- 1- Refl
'I cut (past) myself'

*PST $3_V 1_{1st} 2_{Refl}$

→*Vp must pied-pipe Refl. Refl cannot strand*

(22) a. T- e- kohc- as- ay- on.
PST- Th- cut- 1- Refl- Pl
'We cut ourselves'

(PST) $4_V 1_{1st} 2_{Refl} 3_{Pl}$

→ *REF and Pl must strand*

b. *T- e- kohc- ay- os- on
PST- Th- cut- Refl- 1- Pl

*(PST) $4_V 2_{Refl} 1_{1st} 3_{Pl}$

→* a U20 violation!

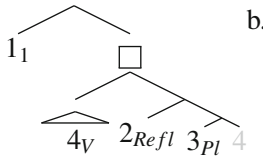
Possible and impossible U20 patterns:
The attested morpheme orders 132, 321, 1423, and 4123 are possible U20 patterns, as expected by the theory. The ungrammaticality of 4213 order in (22-b) is expected: V and the Refl do not form a constituent to the exclusion of Plural. This order therefore cannot be derived. Nothing further needs to be said. Why (21-b) is ruled out, however, must be explained, as this order is fine, in fact obligatory in the context of the Plural.

Questions about stranding and pied-piping
Why cannot Refl strand (21-b), unless the plural is stranded as well (22-a)? (21-b) competes with (21-a), an order where pied-piping yields convergence.

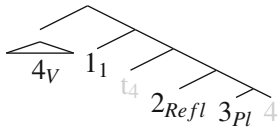
Similar alternations are found in Hungarian and German (Koopman and Szabolcsi, 2000). We proposed there that pied-piping can be the unmarked option. Unmarked options, however, can be overridden by the needs of other structural elements, say requiring a small piece of structure for example (as is the case for V-second). This forces splitting the structure leading to stranding of elements which can otherwise pied-pipe. Applied to Huave, this implies that you must pied-pipe when possible, unless there is (or are) some other factor(s) that force stranding for convergence. This factor must be absent in (21-b) yielding pied-piping as the sole output. Why is this so? Reflexive can pied-pipe (21-a). Why cannot it do so in the context of a stranded plural?

It will be helpful to examine what the output of the derivation would look like. Take as point of departure the structure in (23a), where (22-a) has merged with 1st. In the Past environment, the Vp must move past 1st. There are exactly two ways in which this can happen. Spec extraction or pied-piping of the node labeled. Extraction of Vp extracts, strands the Refl, yielding the grammatical 4123 in (23b). Vp pied-piping Refl results in the ungrammatical (23c):

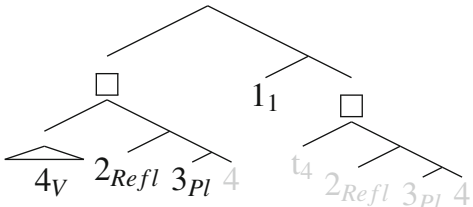
(23) a.



b.



c. *



If the output of pied-piping in (23c) can be excluded on independent grounds, Refl may strand, because the unmarked option of pied-piping will not lead to convergence. Note that this derivation results in the heavily right-branching

syntactic structure in (23c). Such right-branching structures in Spec position routinely (though not always) lead to ungrammaticality in the syntax of the world's languages. This problem thus relates to a well-known syntactic problem, as expected under a syntactic account. For an account that excludes this case as a problem related to depth of embedding of phonological material, see Koopman (2014): In the past environment, the Vp ends with the V being the most deeply embedded spelled-out material.

In sum, under the fixed hierarchy in Hypothesis 1, a U20 account derives the possible and impossible morpheme orders in Huave. Ungrammatical morpheme orders either cannot be generated by the grammar, or are excluded by interactions of pied-piping and stranding, partially driven by the exclusion of heavy right-branching syntactic structure in Spec positions.

An empirical prediction about variation

The U20 theory makes a strong prediction about the type of variation we expect to find between different dialects or individual speakers of Huave. Indeed, since (22-b) cannot be built from this particular hierarchy, we should not find *any* dialects or speakers who accept it, or produce it. It turns out that this order is found in the San Fransisco del Mar variety of Huave (Kim 2008).[20] This means that these orders cannot be derived from hierarchy 1. However, if the theory is correct, and if this order turns out to be possible for some speakers or dialects, it *must* be the case that this order derives from a different hierarchy.

The fact that I formulated two hypotheses about the hierarchy with no clear way of deciding between the relative order of Refl and Pl now becomes highly relevant. Perhaps both hypotheses are right, but differences in hierarchy will result in a different set of judgments under the syntactic account. The following sections show this is basically correct: The theory predicts the space of variation in morpheme orders, for hierarchies which are not universally fixed.

Local dislocation or U20

I have shown with this sketch that there is no need for local dislocation in Huave to capture these morpheme orders: A syntactic U20 approach can capture the possible and impossible morpheme orders from a fixed syntactic hierarchy, with height of movement and pied-piping parameters at play. General questions that arise can be related to well-known syntactic questions; predictions that are made can be verified and further explored.

[20]Ralf Noyer and Yuni Kim (p.c).

Derivations: Testing Hypothesis 2: Pl > Refl

We next test the fit of Hypothesis 2 on the exact same data. The two hypotheses only differ for the relative order of merge of Ref and Pl. They will yield the same outputs, except when Refl and Pl cooccur.

The data will be summarized in Table 2.3. As before, we proceed from the fixed syntactic hierarchy in (24) (Hypothesis 2). As we will see, this hypothesis cannot model these data patterns.

(24) 1st Pl Refl [Th V]
1 2 3 4

(25) a. T- e- kohc- ay- os
PST- Th- cut- Refl- 1
'I cut (past) myself' $\boxed{\text{PST } 3_V 2_{Refl} 1_{1st}}$
→*Vp can pied-pipe Refl*

b. *T- e- kohc- as- ay
PST- Th- cut- 1- Refl
'I cut (past) myself' $\boxed{*\text{PST } 3_V 1_{1st} 2_{Refl}}$
→*Vp must pied-pipe Refl; Refl may not strand*

(26) a. T- e- kohc- as- ay- on
PST- Th- cut- 1- Refl- Pl
'We cut ourselves' (PST) $\boxed{4_V 1_{1st} 3_{Refl} 2_{Pl}}$
→*Vp pied pipes Refl and subextracts, strands Refl and Pl*

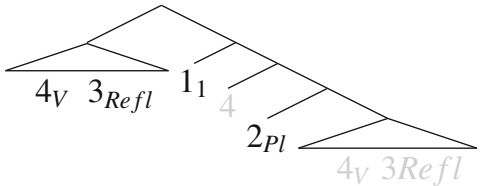
b. *T- e- kohc- ay- os- on
PST- Th- cut- Refl- 1 *(PST) $\boxed{4_V 3_{Refl} 1_{1st} 2_{Pl}}$
→*what excludes this?*

Table 2.3 A comparison of the predicted outputs under Hypothesis 1 and 2 (with pied-piping unmarked)

Ex.	*Hyp 1*:1 > *Ref* > *Pl* > *V*	*Hyp 2*: 1 > *Pl* > *Refl* > *V*
(20-a)	$1_1\ 3_V\ 2_{Refl}$	same
(20-b)	$1_{1st}\ 4_V\ 2_{Refl}\ 3_{Pl}$	$1_{1st} 4_V 3_{Refl} 2_{Pl}$
(21-a)	PAST $3_V 2_{Refl} 1_{1st}$	same
(21-b)	* PAST $3_V 1_{1st} 2_{Refl}$	same
(22-a)	(PAST) $4_V\ 1_{1st}\ 2_{Refl}\ 3_{Pl}$	(PAST) $4_V\ 1_{1st}\ 4_V 3_{Refl}\ 2_{Pl}$
(26-b)	*(PAST) $4_V 2_{Refl} 1_{1st} 3_{Pl}$	(PST) $4_V 3_{Refl} 1_{1st} 2_{Pl}$

Attested orders (1432, 4132) are licit U20 patterns. But so is 4312 (26-b). This order cannot be excluded either on Huave internal considerations. Here is why. In the same Past environment, Refl must pied-pipe with V, and cannot strand, as shown in (25-a) and (25-b). Since Refl also pied-pipes with V in (26-b), the problem cannot be related to V pied-piping Refl, or the output. Moreover, the *Past V 1st pl* pattern (past 312) is independently attested, showing that plural strands below 1st. Under hierarchy 2 then, there simply is no account why this string would be excluded. Since all properties converge, this string is expected to be grammatical, as illustrated in (27). This turns out to be a good thing, as we see in the next section.

(27)



Hypothesis 2 should thus clearly and unambiguously be rejected as a possible hierarchy underlying these specific patterns. This leaves us with the quite successful Hypothesis 1.

What Patterns Are Expected for Hypothesis 2?

So far, we simply examined if hypothesis 2 could account successfully for the particular word order patterns that we described, and rejected it for the data patterns under consideration. Here, we examine the expected output orders under Hypothesis 2, keeping everything else the same, and compare this with the expected outcomes under hypothesis 1. The results are summarized in Table 2.3. This table yields predictions about what variation we can find in Huave dialects.

As for the first three rows, the linear strings *1st V Refl, 1st V refl Pl, and Pst V Refl 1st* are fine under either hypothesis. The order *past V 1st Refl* of (21-b) is excluded in the same way for both hierarchies: Pied-piping is unmarked. Since stranding Refl is not independently forced, stranding Refl is excluded. Stranding is forced for *Past V 1st Pl* (22-a) in the same fashion: Pied-piping would result in *Past V Refl Pl 1*. In both cases, this violates right branch depth of embedding. In short, we expect no variation in Huave for these orders depending on the two hierarchies.

But the two hierarchies do lead to different predictions for rows 5 and 6. The order *pst V Refl 1s Pl* of (26-b) is ruled out under hypothesis 1, but perfect under hypothesis 2. The order *V 1st Refl Pl* (26-a) is perfect under hypothesis 1, but its expected grammaticality depends on whether subextraction from a complex specifier, a potential island violation, is allowed or not. We do not get much help from

the syntax, as this question has never been completely resolved.[21] As argued in Koopman and Szabolcsi (2000), subextraction from a complex specifier must be excluded in the derivation for verbal complexes in Hungarian. Cinque (2005), p.c. noted that this order is "possibly spurious" for nominal U20 patterns, but believes now that it should be allowed (it occurs frequently enough in his extended U20 database). Subextraction must be ruled out for several cases of morpheme orders in Wolof, as shown in Koopman (2015). But Abels (2011), however, shows this order is documented within Germanic.

If subextraction from a complex specifier is excluded, 4132 should be excluded in principle as well as an island violation. In short, the predictions for grammaticality under hypothesis 2 depend on whether subextraction is allowed or not.

Expected Patterns of Variation Within Huave

Table 2.4 now summarizes the only predicted variation in morpheme orders for Huave dialects or speakers for the set of data we have considered, depending on whether subextraction is allowed or not.

What is known about variations of such strings in different varieties of Huave? There are four dialects of Huave: San Mateo (which is the dialect with the data reported so far), Santa Mar´ıa (a dialect Rolf Noyer worked on extensively), San Dionisio, and San Francisco del Mar (Kim 2008; 2010). The data reported here, modeled by hypothesis 1, are solidly established for San Mateo and Santa Mar´ıa (Ralph Noyer, p.c). But in San Fransisco del Mar, (22-b) is fine (Yuni Kim, p.c and Kim (2010)), in accordance with the hierarchy in hypothesis 2:

(28) t- a- xut- ey- as- an (or: t-a-xut-e-s-an)
PAST- Th- hide- Refl- 1- Pl
'we (excl.) hid ourselves'

The theory furthermore predicts that (22-a) should be accepted if subextraction is possible, but should be excluded in the San Francisco dialect if subextraction from a complex specifier is ruled out. Yuni Kim (p.c) volunteered that she had not verified the negative data, but thought she never heard it. The verifications of the full empirical predictions for Hypothesis 2a versus 2b will thus have to wait further work.

Ralf Noyer (p.c) also points out that (Stairs and Hollenbach 1969) mention in a footnote that the alternative order in (22-a) which he gives as ungrammatical is possible, as noticed by Gregory Stump. Noyer's consultants, however, do *not*

[21] See Koopman (2015) for a suggestion under what circumstances subextraction in the syntax could be expected to be possible: What is at issue is whether this configuration is always an island, or sometimes.

Table 2.4 Predicted patterns of variation in Huave morpheme orders

	Hyp 1 $1 > Ref > Pl > V$	Hyp 2a $1 > Pl > Refl > V$	Hyp 2b no subextr. $1 > Pl > Refl > V$
(22-a)Pst-V-1st-Refl-V	✓	✓	
(22-b)Pst-V-Refl-1st		✓	✓

accept this alternative order: The facts represented by Hypothesis 1 are clear. The published literature does not mention this order as a possible order either. Given the argument presented here, however, we can make sense of these apparently problematic data. This alternative order could very well have come from a speaker with an internal grammar that reflects the hierarchy under Hypothesis 2. We may never know. But, given the theory that I have sketched here, this is the type of variation that is expected, and thus no cause for concern. On the contrary, the theory can be used and should be used to pursue possible variation.

An important point is that the linear order in (28) is *not* derivable from the hierarchy in Hypothesis 1. The theory therefore leaves no choice: If such orders are attested, they must reflect a *different* hierarchy. As this hierarchy cannot contradict universal hierarchies, the variation in Merge must be located in an area where such variation is allowed. In fact, it is encouraging that where we found indeterminacy in the order of merge, this indeterminacy actually may provide insights in how closely related varieties may differ exactly. In other words, the theory makes specific predictions about patterns of variation in different varieties of Huave speakers.

Conclusion

We conclude that there is no motivation to adopt Local dislocation for Huave, even within DM, and every reason to extend the syntactic account to the morphology of Huave more generally, and put the theory to test on other potentially problematic cases. As I showed, a syntactic account can in fact be constructed, based on a direct interface of syntax and phonology, which accounts for the typology of word order patterns in syntax *and* morphology, as expected under a single computational engine for syntax and morphology. There is every reason to extend the syntactic account to Huave morphology more generally in the future, and put the theory to test on other potentially problematic cases that have been argued to motivate postsyntactic reordering.

To evaluate different frameworks, as stated at the beginning of this chapter, it matters how well the frameworks account for the empirical data, not just for individual languages but for human languages in general, whether they generate predictions that can be verified, and how appropriate they are for the interfaces with phonology and semantics.

The account developed here fares well with respect to these criteria. It can capture the various aspects that underly the empirical data. Further analytical problems that arise can be related to well-known syntactic puzzles or phenomena. The framework generates predictions that can be verified, and it is appropriate for the interface with phonology—the linear order is read off the syntactic derivation—as well as semantics in so far as the hierarchical structures underlying the linear orders encode scope. The interface is important. Any DM type account of morpheme ordering must be able to show how morpheme order relates to the syntax in a particular language, and show that this is a reasonable syntax.

In many ways, this chapter here suggests that Baker's Mirror Principle has to be true under the syntactic account:

(29) **Mirror Principle** Baker (1985, p. 4)
'Morphological derivations must directly reflect syntactic derivations (and vice versa)'

It simply took a different understanding of syntax than was possible at the time, building on general progress of the field, with an ever increasing focus on comparative syntax.

While there are well-known surface violations of the Mirror order principle, i.e., orders that cannot be derived by head movement, we expect these violations to fall within the possible syntactic patterns under the syntactic U20 approach in the framework presented here. This is an important question for the future research agenda.

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