Displacement as a response to non-local allomorphy: Evidence from Tiwa

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The strong tendency for the trigger and target of allomorphy to appear local to one another is often modeled via locality constraints on allomorph selection at the point of exponence in realizational theories of morphology. We present a case study of Tiwa (Tibeto-Burman; India) verbal morphology in which non-adjacency of allomorphy trigger and target is tolerated at the point of exponence. However, post-exponence displacement later occurs to bring about surface adjacency between the trigger and target of allomorphy through either inversion or doubling of the allomorphy trigger. This process of displacement late in the post-syntax provides evidence that the locality bias in allomorphy cannot be modeled solely via constraints on exponent selection. Instead, a bias toward surface locality operates at various stages in the grammar. We offer an analysis of the Tiwa displacement patterns couched in Optimality Theoretic Distributed Morphology in which constraint interaction allows for either morph inversion or doubling to emerge as a response to non-locality of the allomorphy trigger and target. We explore other possible responses to non-locality in allomorphy and discuss how locality-driven displacement can interact with other linearization principles as a possible pathway to multiple exponence.

1 Introduction

Studies of allomorphy have revealed a strong bias toward locality between the target of allomorphy (i.e. the morpheme showing contextually variable realization) and the element in the context that triggers the use of a particular allomorph. One prevalent view in the literature is that the relevant conception of locality in allomorphy is adjacency (assessed either structurally or linearly) between trigger and target (Adger et al., 2003; Embick, 2003, 2010; Arregi and Nevins, 2012; Bobaljik, 2012, a.o.). However, a growing body of work suggests that adjacency is too stringent of a locality condition and that looser constraints on locality should instead be adopted (Merchant, 2015; Moskal, 2015a,b; Moskal and Smith, 2016; Kastner and Moskal, 2018; Božič, 2019; Smith et al., 2019; Choi and Harley, 2019, a.o.).

Regardless of whether adjacency or some alternative locality domain is adopted, realizational approaches to morphology (e.g. Distributed Morphology; Halle and Marantz, 1993) typically make similar assumptions about how this locality bias in allomorphy arises. It is generally taken to be the case that locality contraints are the results of how the process of selecting exponents (e.g. Vocabulary Insertion) operates. That is, it is assumed that when exponents are being selected for insertion, only a sufficiently local part of a node's context can affect which exponent is chosen. Thus, if the allomorphy trigger is not sufficiently local to the allomorphy target at exponence, it will not be able to condition contextual allomorphy of the target.

The bias toward locality in allomorphy is clearly well-motivated from a functional perspective. The farther away the trigger is from the target, the more context a learner must consider to determine what is conditioning the relevant allomorphy. Thus strict adjacency between trigger and target should be the optimal configuration, all else being equal, with greater degrees of non-locality being increasingly less preferred. If the process of exponence is subject to some locality condition, this is a way of modeling in the synchronic grammar the strong pressure for adjacency between trigger and target as well as the constrained nature of less-local allomorphy (Božič, 2019).

Locating locality constraints at the point of Vocabulary Insertion may be sufficient to model most of the locality biases that we find in allomorphy. However, we argue that the functional pressure for adjacency between trigger and target can be encoded in other grammatical processes beyond simply exponence. Specifically, we suggest that post-exponence displacement can occur to bring about linear adjacency between allomorphy trigger and target, even in cases where strict adjacency is unnecessary at the point of exponent selection. Thus, we see evidence for a bias toward surface locality operating at various stages in the post-syntax.

Our case study of post-exponence displacement comes from Tiwa (Tibeto-Burman; India). In Tiwa, first person singular agreement has two allomorphs: *-âng* and *-ng*. The former appears only in the context of the past tense marker *-m*, while the latter is an elsewhere form. In the Tiwa verb, tense morphology immediately precedes agreement based on the default linearization of the syntactic structure. However, focus enclitics can sometimes structurally intervene between tense and agreement and consequently be linearized by default between tense and agreement. When this occurs, tense doubles or inverts with the focus marker(s) in the post-syntax to result in surface adjacency between tense and agreement, as schematized in (1).

(1) a. Order as the result of default linearization
/V-ASP-**T**-FOC-AGR/

b. Surface order with inversion
[V-ASP-FOC-**T**-AGR]

c. Surface order with doubling
[V-ASP-**T**-FOC-**T**-AGR]

Crucially, the displacement of tense around focus happens only in the context of the special agreement allomorph *-âng*, and not elsewhere. We argue that this pattern is indicative of a late displacement process that occurs after the exponent *-âng* is inserted, in order to bring about adjacency between the allmorphy trigger (*-m* PST) and target (*-âng* 1SG). Thus while non-adjacency is tolerated at the point of exponence, it is later "repaired" via post-exponence displacement.

The Tiwa pattern therefore represents a response to non-locality in allomorphy that has not received attention in the literature. It is well known that non-adjacency between trigger and target can block contextually allomorphy altogether (e.g. in Latin; Embick, 2010). It is also the case that allomorphy can apply non-locally in the absence of adjacency if some looser locality condition is met (e.g. in Korean; Choi and Harley, 2019). The Tiwa pattern instantiates a third response to non-adjacency: post-exponence displacement can

create adjacency between a trigger and target that were non-adjacent at the point of allomorph selection. This third strategy demonstrates that the locality pressures in allomorphy extend beyond the point of exponence and cannot be captured solely via constraints on Vocabulary Insertion. Instead, the effects of the functional pressure for locality can be seen in multiple stages of the post-syntax rather than being localized in one grammatical mechanism.

We model the post-exponence displacement in Tiwa via constraint interaction in a hybrid framework combining the non-lexicalist and realizational tenets of Distributed Morphology (Halle and Marantz, 1993) with the constraint-based and output-oriented architecture of Optimality Theory (Prince and Smolensky, 1993), what Rolle (2020) dubs OT-DM. Through modeling this pattern via constraint interaction, we highlight the way in which the Tiwa data appear to illustrate a "resolution of a basic tension between two competing pressures" in morphology, in the sense of Hyman (2003, p. 246). On the one hand, there is pressure for exponents to surface in a linear order that conforms to default linearization principles. On the other hand, there is pressure for the trigger and target of allomorphy to be adjacent. Both of these constraints are operative in Tiwa, and in the case of tense doubling seen in (1c), each copy serves to satisfy one of these constraints: the first copy of tense surfaces in the expected default position and the second surfaces adjacent to the agreement allomorph. We argue that such competing pressures in the Tiwa synchronic grammar instantiate one pathway to multiple exponence (Harris, 2017). The Tiwa data therefore inform our understanding of the factors that can result in multiple exponence cross-linguistically.

The remainder of the paper is organized as follows. In Section 2 we provide relevant background information on Tiwa verbal morphology and allomorphy and introduce two patterns which are to be captured by our analysis, namely exponent inversion and exponent doubling. In Section 3 we argue against an analysis of the Tiwa patterns that relies purely on phonological conditioning, arguing that morphosyntactic conditioning is able to provide a more satisfactory account of not only agreement allomorphy but also exponent displacement. In Section 4 we situate the Tiwa pattern within the broader typology of locality restrictions in allomorphy. Section 5 provides our analysis of post-exponence displacement via constraints interaction in an OT-DM framework. In Section 6 we consider another logically possible pattern of locality-motivated post-exponcence displacement – displacement of the allomorphy target. We predict that this pattern should ultimately be attested given its similarity to other patterns of post-syntactic displacement that we discuss. Finally, in Section 7 we discuss the ramifications the Tiwa doubling pattern has for our understanding of the origins of multiple exponence, before concluding in Section 8.

2 Tiwa allomorphy and post-syntactic displacement

Tiwa (ISO 639-3: lax) is a Tibeto-Burman language spoken by approximately 33,900 people primarily in Assam, northeast India (Eberhard et al., 2023). Unless otherwise noted, the data presented in this paper come from fieldwork with four primary consultants conducted by Virginia Dawson across five field trips to Umswai, Assam in 2015–2022. Additional supplementary data were also collected from one of those consultants via WhatsApp in 2019 and 2020.

In this section we describe the verbal morphology of Tiwa and an instance of allomorphy that will be at the center of our discussion. We then turn to a description of the main pattern of interest to us: inversion and doubling of verbal morphology. We refer the reader to Dawson 2020 for a more complete summary of Tiwa morphology and syntax and references to previous work.

2.1 Tiwa verbal morphology and allomorphy

The finite verb in Tiwa can host several suffixes, which occur in a fixed order. The slot closest to the root can be occupied by either aspect or negation (but not both), and tense follows this aspect/negation slot. Subject agreement is optional and follows tense; it is only overt for first person singular subjects. We do not take a stance on whether this marker expresses true agreement or a type of clitic doubling. We use the term 'agreement' for convenience, and its syntactic status does not directly affect our analysis.

A morphological template is provided in (2), with possible morpheme combinations given in (3) and an example in (4).[1]

(2) Verbal morphology template

[root	-	ASP/NEG	-	TENSE	-	AGR	]
		-do IPFV		-m PST		-ng/-âng 1SG	
		-ga PFV					
		-o/-w NEUT					
		-ya NEG					

(3) Possible combinations of verbal morphology

root	ASP/NEG	TENSE	AGR	gloss
V	-do		(-ng)	IPFV
V	-do	-m	(-âng)	IPFV PST
V	-ga		(-ng)	PFV
V	-ga	-m	(-âng)	PFV PST
V	-o		(-ng)	NEUT
V	-o	-m	(-âng)	NEUT PST
V	-ya		(-ng)	NEG
V	-ya	-m	(-âng)	NEG PST

(4) khôna-ya-m**(-âng)**
hear-NEG-PST-1SG
'I did not hear.'

The linear order of morphemes in the verbal word transparently reflects hierarchical syntactic position (i.e. Agr > T > Asp > Root), and we assume the Mirror Principle (Baker, 1985)

[1]The following abbreviations are used in glossing of Tiwa examples throughout: 1 'first person', 3 'third person', ACC 'accusative', ADD 'scalar additive', AGR 'agreement', CL 'classifier', FOC 'focus', IPFV 'imperfective', NEG 'negation', NEUT 'neutral aspect', PFV 'perfective', PST 'past', SG 'singular'. Tone is represented orthographically following the system adopted in Jose 2014. Glosses for data from other languages use abbreviations from the original source.

to generate default linearization. We will see several places where this default mechanism interacts with other mechanisms governing order.

Agreement morphology can co-occur with an overt pronoun and is transparently related to the 1SG pronoun. In (5) and (6) below, the first instance of *âng* is a pronoun in the expected subject position. The second is an agreement marker, appearing after tense and aspect inflection.

(5) **âng** hât-jíng lí-do-m-**âng**
I market-to go-IPFV-PST-1SG
'I went to market.'

(6) **âng** pe kashóng-gô kan lái-do**-ng**
I the dress-ACC wear-IPFV-1SG
'I'm putting on the dress.'

These examples additionally demonstrate that 1SG agreement has two allomorphs: *-ng* [-ŋ] and *-âng* [-âŋ], the latter with a full vowel and a falling tone like its pronoun counterpart. The two allomorphs, which will be the focus for the rest of this paper, are further illustrated in (7) below with the same verb root.

(7) a. lí-ya**-ng**
go-NEG-1SG
'I will not go.'
b. lí-ya-m**-âng**
go-NEG-PST-1SG
'I did not go.'

The *-âng* allomorph of 1SG only surfaces after the tense marker *-m* PST, while *-ng* appears elsewhere. Taking this distribution as a central feature, we analyze 1SG allomorphy as being morphosyntactically conditioned. The basic morphological realizational rules we adopt are presented in (8).

(8) a. [1SG] ↔ -âng / [PST] __
b. -ng (elsewhere)

Another possibility is that this alternation is phonologically conditioned. We address multiple possible phonological accounts in Section 3 where we show that they are unable to provide a principled explanation for the displacement data that we now turn to.

2.2 Inversion and doubling in Tiwa

Our realizational rule in (8) involves special conditioning of [1SG] in the context of [PST]. Further evidence for the close relationship between subject agreement and tense comes from displacement patterns involving the tense marker, which have not previously been described. Displacement of tense is found in the presence of three clitics: the general informational focus marker *-lô*, the contrastive focus marker *-sê*, and the focus marker *-bó*, which contributes a subtle focus/discourse meaning that is not at present well understood.

Syntactically, the clitics *-lô* and *-sê* pattern as adjuncts, adjoining to focused constituents of various categories.[2] This is illustrated in (9) with a focus-marked adverb and in (10) with a focused DP.

(9) John kripe**-lô** ngá pre-ga.
John slowly-FOC fish buy-PFV
'John slowly bought the fish.'

(10) Ang-do alû khâri-go**-lô** chá-ga.
1SG-TOP potato curry-ACC-FOC eat-PFV
'I ate potato curry.'

These examples illustrate that these clitics do not adjoin in a consistent position in the structure, nor do they adjoin to a particular category of host. Instead, the attachment site of these clitics is determined by which constituent is focused. Within the verb complex, these clitics also do not have a fixed attachment site, but rather can attach at multiple points in the structure.

The three focus clitics *-lô*, *-sê*, and *-bó* act as a class with respect to their morphological positioning and behavior in the verbal domain. The most common position is for them to be syntactically merged outside agreement, and consequently surface as the last exponent in the verbal word. In (11), all of these examples can be translated as 'I did not go' (with different pragmatic shades of meaning, which we set aside here).

(11) 'I did not go.'
a. /root-NEG-PST-AGR-**FOC**/
/lí-ya-m-âng-**lô**/ [líyámâng**lô**]
b. /root-NEG-PST-AGR-**FOC**/
/lí-ya-m-âng-**sê**/ [líyámâng**sê**]
c. /root-NEG-PST-AGR-**FOC**/
/lí-ya-m-âng-**bó**/ [líyámâng**bó**]

It is also possible, however, for these clitics to adjoin instead to a smaller structure and be merged INSIDE agreement. When one of these clitics merges inside agreement, it splits tense and agreement so that they are no longer adjacent based on their merge positions alone.[3] Despite the lack of strict adjacency, the presence of *-m* PST still conditions the insertion of the *-âng* allomorph of 1SG. Interestingly, in these contexts that involve non-adjacency of tense and agreement based on default linearization, adjacency is achieved through one of two displacement operations: inversion or doubling of the tense exponent

[2]The distribution of the marker *-bó* is more difficult to pin down, in part because there are (potentially) several distinct morphemes of that form (see Jose, 2014, p. 26). Since its distribution is not well understood, we set aside a description and analysis of its syntactic behavior here.

[3]Note that the clitics only merge in this low position between tense and agreement when there is overt morphological material in the tense slot, namely, the past tense suffix *-m*. We assume that in the absence of an overt tense morpheme, there is no tense feature in T. This is consistent with the semantic interpretations (past, present, or future, depending on context) that verbs can receive in the absence of overt past tense marking. Crucially, then, the clitics can only merge low when there is an overt tense feature in T for semantic reasons: the absence of a tense feature cannot be focused.

-m PST, the trigger of agreement allomorphy. Below, we contrast *-lô* FOC merged in a high position, (12a), versus merged in a low position, (12b)-(12c). All three examples are acceptable. The same inversion and doubling patterns also hold when the clitics *-sê* and *-bó* are used.

(12) 'I did not go.'

a. High FOC, No Displacement of *-m*
/root-NEG-**PST**-AGR-FOC/
/lí-ya-**m**-âng-lô/ [líyá**m**ânglô]

b. Low FOC, Inversion of *-m*
/root-NEG-**PST**-FOC-AGR/
/lí-ya-**m**-lô-âng/ → lí-ya-lô-**m**-âng [líyálô**m**âng]

c. Low FOC, Doubling of *-m*
/root-NEG-**PST**-FOC-AGR/
/lí-ya-**m**-lô-âng/ → lí-yá-**m**-lô-**m**-âng [líya**m**lô**m**âng]

In (12b), *-m* PST inverts with focus to appear adjacent to *-âng* 1SG on the surface, and in (12c), *-m* doubles appearing on both sides of focus, also yielding surface adjacency between *-m* PST and *-âng* 1SG.[4] Thus in both cases, inversion and doubling ensure that *-âng* 1SG (the target of allomorphy) is adjacent to *-m* PST (the trigger of allomorphy).

The clitics that can intervene between tense and agreement can co-occur with one another. It is possible for multiple of these clitics to occur outside of agreement, but more interestingly it is also possible for one or more of them to appear inside of agreement. When this happens, we see the same type of inversion or doubling of *-m* PST that is seen with a single focus clitic. This is shown in (13) for doubling and (14) for inversion.

(13) 'I did not go.'

a. Both Clitics High, No Displacement of *-m*
/root-NEG-**PST**-AGR-FOC-FOC/
/lí-ya-**m**-âng-lô-sê/ [líyá**m**ânglôsê]

b. One Clitic Low, Doubling of *-m*
/root-NEG-**PST**-FOC-AGR-FOC/
/lí-ya-**m**-lô-âng-sê/ → lí-ya-**m**-lô-**m**-âng-sê [líyá**m**lô**m**ângsê]

c. Two Clitics Low, Doubling of *-m*
/root-NEG-**PST**-FOC-FOC-AGR/
/lí-ya-**m**-lô-sê-âng/ → lí-ya-**m**-lô-sê-**m**-âng [líyá**m**lôsê**m**âng]

(14) 'I did come.'

a. One Clitic Low, Inversion of *-m* with *-lô*
/root-IPFV-**PST**-FOC-AGR-FOC/
/phî-do-**m**-lô-âng-bó/ → phî-do-lô-**m**-âng-bó [phídòlô**m**ângbó]

[4]Typologically, the doubled X-Y-X pattern resembles periodic or alternating multiple exponence (Harris, 2017), and what Caballero and Inkelas (2013) call superfluous exponence. We return to the place of Tiwa doubling within a wider typology of multiple exponence in Section 7.

b. Two Clitics Low, Inversion of *-m* with *-lô* and *-bó*
/root-IPFV-**PST**-FOC-FOC-AGR/
/phî-do-**m**-lô-bó-âng/ → phî-do-lô-bó-**m**-âng [phídòlôbó**m**âng]

In (13b) and (14a), only the focus marker *-lô* is merged low between tense and agreement; the second clitic (*-sê* in (13) and *-bó* in (14)) is merged high, outside of agreement. The existence of structures where focus clitics appear on both sides of *-âng* lends support to the idea that there is a lower and higher adjunction site for these clitics, with the lower site disrupting adjacency between *-m* and *-âng* and triggering displacement. In these examples, *-m* PST doubles or inverts with the lower focus clitic *-lô* to result in adjacency between *-m* and *-âng*.

In (13c) and (14b) we see a slightly different pattern. Here, both clitics are merged low, resulting in two clitics that intervene between tense and agreement. Despite the additional intervening material, *-m* still undergoes displacement, either doubling to appear on both sides of the sequence of focus clitics or inverting with both clitics. The existence of such examples where *-m* undergoes displacement across more than one intervening element provides additional support for the idea that the need for adjacency between *-m* and *-âng* drives displacement.

Importantly, these patterns of inversion and doubling are obligatory in these contexts that involve disrupted adjacency between tense and agreement. When a focus clitic intervenes between *-m* and agreement, it is not possible to use the elsewhere allomorph *-ng* of 1SG instead of *-âng*, despite the fact that agreement is not linearized adjacent to tense by default in such a context. An alternative with *-ng* where tense and agreement remain linearly separated is impossible, as seen in (15).

(15) /root-NEG-PST-FOC-AGR/
*/lí-ya-m-lô-ng/ *[líyámlông]

Equally, it is ONLY when *-m* PST and 1SG agreement are both present that inversion or doubling occurs. In (16) below, the subject is third person singular, which never co-occurs with an overt agreement exponent. Here, *-m* PST must appear before the focus clitic *-lô*.

(16) '(S)he did not go.'
a. /root-NEG-**PST**-FOC/
/lí-ya-**m**-lô/ [líyá**m**lô]
b. /root-NEG-**PST**-FOC/
/lí-ya-**m**-lô/ ↛ *lí-ya-lô-**m** *[líyálô**m**]
c. /root-NEG-**PST**-FOC/
/lí-ya-**m**-lô/ ↛ *lí-ya-**m**-lô-**m** *[líyá**m**lô**m**]

The ungrammaticality of the order FOC-PST in the absence of *-âng* 1SG indicates that FOC does not simply have a lower possible merge site below tense (i.e. */root-NEG-**FOC**-PST/). Rather the order FOC-PST is derived by inversion or doubling of *-m* only in the context of the allomorph *-âng* 1SG.

The data in (16) also suggest that the displacement of *-m* PST is not narrow syntactic movement. If the tense head T underwent movement in the syntax past a focus head, we

would expect such syntactic movement to be possible with or without *-âng*. If the realization of agreement as the allomorph *-âng* was a necessary condition for narrow syntactic movement of T, this would constitute a look-ahead problem and violate a modular separation of syntax from post-syntax (i.e. morphology).

The unavailability of inversion and doubling without *-âng* 1SG suggests that these instances of displacement are not syntactic, but rather post-syntactic. Post-syntactic insertion of the allomorph *-âng* 1SG feeds displacement, with inversion and doubling of *-m* PST strictly dependent upon the presence of *-âng* 1SG.[5]

3 Against a phonological account of Tiwa allomorphy

The morphosyntactic approach to the distribution of *-âng* vs. *-ng* that we proposed in Section 2.1 assumes that the past tense morpheme *-m* provides the relevant context for the insertion of *-âng* (i.e. the realizational rules in (8)). However, this is not the only analytical possibility. Before moving to a discussion of our proposed morphological account of the Tiwa displacement data, we first consider and dismiss alternative approaches to the Tiwa patterns of allomorphy that are grounded in phonology.

In his comprehensive dictionary of Tiwa, Jose (2014) analyzes the distribution of the forms of 1SG as being phonologically conditioned rather than morphosyntactically conditioned. For Jose, *-âng* appears after consonants, while *-ng* appears after vowels (Jose, 2014, pp. 14, 361).[6] As this source is a dictionary, no arguments are given for this analysis. The environments that the two forms appear in are simply listed in the lexical entry for each marker, and the examples given in the entry for *-âng* all involve it following the past tense *-m*.[7]

We do not adopt a phonological analysis of the distribution of the first singular markers for several reasons. Let us first consider the possibility that *-âng* and *-ng* are distinct allomorphs of 1SG agreement but that allomorphy is phonologically conditioned rather than morphosyntactically conditioned. This is the type of analysis that the information in Jose 2014 might suggest. One reason we do not pursue such an account is that the only context where we see *-âng* is after past tense *-m*. No other tense or aspect suffixes unambiguously end in a consonant, and 1SG agreement cannot directly appear after the verb root (which can end in a consonant), seen from (3) in Section 2.1.

[5]Moreover, recall that agreement morphology is optional in Tiwa. The presence of a first person singular subject pronoun without overt agreement is not sufficient to trigger displacement of *-m* PST, as shown in (i).

(i) 'I did not go.'

a. Ang lí-ya-**m**-lô.
1SG go-NEG-PST-FOC

b. * Ang lí-ya-lô-**m**.
1SG go-NEG-FOC-PST

This entails that it is not simply the presence of first person singular features in the syntax that triggers displacement.

[6]All page numbers from Jose 2014 refer to the Tiwa-English portion of the dictionary.

[7]The forms *-gam* and *-dom* that Jose (2014, p. 14) notes can occur before *-âng* can be morphologically decomposed into *-ga* PFV + *-m* PST and *-do* IPFV + *-m* PST (Dawson, 2020).

Another reason is that a phonological conditioning account leaves unexplained the patterns of morpheme inversion and doubling that occur only in the presence of the *-ângng* allomorph. Under a phonological account of allomorph selection, when focus intervenes between tense and agreement, the *-ng* allomorph of first singular should be inserted due to the fact that the focus clitics are vowel-final. However, this is impossible, as was discussed in Section 2.2. Instead, *-ângng* is inserted, despite the lack of adjacency between *-ângng* and *-m*, and *-m* subsequently inverts with focus or doubles to result in adjacency with *-ângng*. If allomorph selection were purely phonologically conditioned, the only way for *-ângng* to be inserted would be for *-m* to undergo displacement prior to allomorph selection for 1SG. However, because displacement of *-m* never occurs in the absence of the *-ângng* allomorph, constraining the displacement would involve a look-ahead problem.

The second potential alternative analysis is one where *-ângng* and *-ng* are surface variants of a single underlying form, rather than unpredictable (suppletive) allomorphs. Under this alternative, there is no allomorph selection, and the surface difference would be derived in the phonological component alone. It is easy to dismiss one version of such an analysis – namely underlying *-ng* /-ŋ/ – as there is no process of [a]-epenthesis in Tiwa. It is clear that this [a] (along with its falling tone) derives from the full pronominal form. We therefore concentrate on another version: underlying *-ângng* /-âŋ/ with deletion of the vowel after another vowel.

A deletion account of 1SG allomorphy would assume that [â] is deleted from *-ângng* 1SG to repair an illicit *VV sequence. Such an account, however, struggles on several counts. First, it fails to account for data involving vowel/consonant alternations. There are few vowel-initial verbal suffixes to which we can compare the behavior of 1SG,[8] but one which does exist is neutral aspect (introduced in (2)), which has present, future, and habitual interpretations depending on context (Dawson, 2020). Neutral aspect alternates between *-o* after consonants and *-w* after vowels, e.g. *mán-**o*** 'will get' vs. *lí-**w*** 'will go'.[9] The most parsimonious analysis of neutral aspect is a single underlying representation /o/, which becomes [w] after a vowel to avoid hiatus.[10]

Which allomorph of 1SG appears in the context of neutral aspect? If the underlying form of agreement were *-ângng*, we would expect it to surface as such whenever phonological conditions allowed that. For instance, in (17) we would expect the realization of NEUT as *-w* as this would break up the VVV sequence, eliminating the need for [â] deletion. Given this, *-ângng* should surface. Instead, however, [â] is not found and the *-ng* allomorph surfaces.

[8]The only potential /a/-initial suffix aside from *-ângng* 1SG in Jose's dictionary is the discourse marker *-arô*, which is transparently derived from *arô* 'and'. When it appears after a vowel, no deletion takes place, as shown in (ii).

(ii) pe-**arô** khóp-sha-bô pasê-ya-m
3SG-ARO word.CL-one-ADD speak-NEG-PST
'S/he, instead, did not say a word!' (Jose, 2014, p. 18)

It is unclear whether this exponent should actually be classified as a suffix, or simply an unstressed discourse marker.

[9]We note that Jose (2014, p. 24) provides at least one example where the [o] variant of the neutral aspect purportedly appears after a vowel (*thi-o-ng* 'I will die'), but our consultants reject this and similar examples.

[10]The locative case marker also alternates between surface forms *-o* and *-w*, showing the same distribution: *hat-**o*** 'in the market' vs. *nó-**w*** 'in the house'.

The appearance of the *-ng* allomorph also means that NEUT has no overt realization due to a ban on complex codas.

(17) /root-NEUT-AGR/
/lí-o-ng/ [líng] *[líong] *[líwng] cf. */lí-o-**âng**/ *[líwâng]
'I will go'

Important for our analysis, the *-âng* allomorph of 1SG does not appear after a consonant *-w* as Jose's account might predict. It is ONLY ever found in the context of past tense *-m*.[11]

Second, the alternative deletion account with a single underlying form /-âng/ struggles to account for the pattern of morpheme doubling and inversion (just as we stated for the alternative characterization of *-âng*/*-ng* as phonologically-conditioned allomorphy). Under this alternative, we might assume that displacement of *-m* occurs to avoid a deletion of [â]. However, if a constraint against deletion (e.g. of the MAX family) were ranked high enough to trigger displacement, it is unclear why this constraint would also not prevent the deletion of [â] in neutral aspect contexts (17) (where it would also prevent the deletion of the aspect marker itself).

We conclude that while a phonological account of the form of Tiwa subject agreement is compatible with the simplest data, it does not provide a straightforward way of accounting for inversion and doubling patterns. Moreover, the only consonant that ever results in the *-âng* form of 1SG is the *-m* of the past tense marker. It is this very morpheme that is implicated in the post-syntactic displacement patterns that are our focus here. Therefore, we assume that there is a close morphological relationship between *-âng* and *-m*, the details of which we turn to now.

4 Displacement and locality in allomorphy

Our analysis is couched within the core tenets of Distributed Morphology (DM; Halle and Marantz, 1993, a.o.). This model is non-lexicalist (i.e. "syntax all the way down") and realizational (i.e. "late insertion" of phonological primitives via Vocabulary Insertion). Under the DM model, all allomorphy is decided post-syntactically. Our realizational rules for the two allomorphs of 1SG agreement are repeated in (18).

(18) a. [1SG] ↔ -âng / [PST] __
b. -ng

Following the general terminology used in DM (Embick, 2015), the entire 'x↔y' mapping in (18) is the 'vocabulary item', the righthand string of phonological segments is the 'exponent', and the conditions which are required by the exponent are the 'context' (provided after the /). We see that the *-âng* allomorph is qualified by a specific context where it is allowed, namely in the context of the feature PST (exponed by *-m*). This contrasts with the 'elsewhere' form *-ng*, which has no such conditioning context. We can consider the contextually conditioned allomorph *-âng* to be the *target* of allomorphy while the context itself, here PST (*-m*), is the *trigger* of allomorphy.

[11] A deletion account must also contend with the fact that the *-âng* allomorph has underlying falling tone. There is no trace of this tone in the environments where *-ng* surfaces.

Crosslinguistically, we see a strong preference for locality between the trigger and target in situations of contextual allomorphy. In perhaps the majority of cases, the relevant notion of locality for the purpose of conditioning allomorphy is (linear or structural) adjacency (Adger et al., 2003; Embick, 2003, 2010; Arregi and Nevins, 2012; Bobaljik, 2012, a.o.). From a functional perspective, it is clear why adjacency between trigger and target would be favored as it requires the learner or language user more generally to attune only to the immediate environment of a morph to determine the conditioning of its form.

When the default linearization of a structure results in linear adjacency between trigger and target of allomorphy, the strictest definition of locality will be satisfied, allowing the contextually specified allomorph to be inserted. However, when the default linearization of a structure does not result in adjacency between trigger and target, languages differ in how they respond to these 'non-local environments'.

In many well-known cases cross-linguistically, non-local environments result in the blocking of contextual allomorphy. This is famously the case in Latin as shown in (19), following Embick (2010, pp. 70–75, and references therein).[12] If the aspect exponent *-vi* PERF (the trigger, underlined) is linearly adjacent to first person singular agreement (the target, bold), this conditions a special allomorph of agreement (*-ī* in 19a). However, if there is an intervening exponent creating a non-local environment (e.g. a phonologically overt tense marker *-sā* in the pluperfect), then 1SG agreement does not surface as *-ī* but is rather exponed as the common exponent *-m*, as shown in (19b).

(19) Latin locality-sensitive agreement allomorphy (Embick, 2010, p. 74)

a. amāvī
am-ā-<u>vi</u>-Ø-**ī**
love-TH-<u>ASP</u>-T-**AGR**
'I loved.' (perfect indicative)

b. amāveram
am-ā-<u>ve</u>-sā-**m**
love-TH-<u>ASP</u>-T-**AGR**
'I had loved.' (pluperfect)

Thus in Latin, we see that non-locality (defined as a lack of linear adjacency) blocks allomorphy.

In contrast to the situation found in Latin (and many other languages), a growing body of evidence demonstrates that strict adjacency between the trigger and target of allomorphy is not required. That is, in non-local environments, allomorphy is not categorically blocked. Such non-local allomorphy patterns have been identified in a diverse set of languages (Merchant, 2015; Moskal, 2015a,b; Moskal and Smith, 2016; Kastner and Moskal, 2018; Božič, 2019; Smith et al., 2019; Choi and Harley, 2019, a.o.). These patterns suggest that in at least some languages, locality restrictions in allomorphy may be defined in a looser way than strict adjacency (e.g. with a domain locality requirement, such as a phase).

One example of allomorphy still applying in a non-local environment comes from Korean (Choi and Harley, 2019), in (20). Here, the trigger is honorific morphology (*-si*, under-

[12] We replicate the glossing and morphological demarcation as in Embick 2010, and take no stance on the morpheme breaks or underlying forms.

lined) and the target is the embedded verb *cwumwusi-* 'sleep' (bold) in its honorific suppletive form (cf. default form *ca-* 'sleep'). As Choi and Harley (2019, p. 1359) emphasize, because this allomorphy holds over the intervening matrix verb *po-* 'try', strict adjacency-based locality fails (whether assessed linearly or structurally).

(20) Korean non-local allomorphy (Choi and Harley, 2019, p. 1355)

halapeci-kkeyse pang-eyse **cwumwusi**-po-si-ess-ta
grandfather-NOM.HON room-in **sleep.HON**-try-HON-PST-DECL
'Grandfather tried to sleep in the room.'

Choi and Harley (2019) argue that in Korean, the relevant domain for allomorphy is the complex head: if two morphs form part of the same complex head, one can condition allomorphy of the other. The Korean pattern thus represents a second possible response to non-local environments in allomorphy. Rather than non-adjacency blocking allomorphy entirely, allomorphy can still apply in some cases if a looser locality condition is met.

Here is where we see the import of Tiwa, which shows a third pattern. In Tiwa, if the default linearization does not result in adjaceny between the trigger (*-m* PST) and target (*-âng* 1SG) of allomorphy (due to an intervening focus clitic), the contextually restricted allomorph can still be inserted, as in Korean. However, the trigger and target of allomorphy do not remain non-local. Instead, a post-exponence "repair" occurs to bring about strict adjacency: the trigger of allomorphy displaces (through either inversion or doubling) to be surface-adjacent to the target of allomorphy, as schematized in (21).

(21) a. ...-PST-FOC-**1SG**
b. /...-m-lô-**âng**/ → [...-lô-m-**âng**] ~ [...-m-lô-m-**âng**]
c. cf. *[...-m-lô-ng] ~ *[...-m-lô-**âng**]

Thus, we see three types of responses to non-local environments in allomorphy: blocking (Latin), non-local application (Korean), or post-exponence displacement (Tiwa).

The Tiwa pattern is significant when considering the crosslinguistic landscape of locality requirements in allomorphy. Within realizational approaches to morphology like DM, it is often assumed that the locality constraints on trigger and target of morphosyntactically conditioned allomorphy arise due to limits on exponence itself. Perhaps contextual restrictions for a vocabulary item can only be stated or assessed over the immediately adjacent context. Alternatively, perhaps Vocabulary Insertion can only be sensitive to other material within a vocabulary item's spell out domain. The Tiwa pattern poses a problem for this narrow view of the locality bias that we find in allomorphy. In Tiwa, no issue arises at the point of exponence – the contextually restricted exponent can be successfully inserted despite being non-adjacent to the trigger. However, post-exponence displacement still occurs to bring about adjacency between trigger and target. Thus the pressure for trigger and target to surface adjacent to one another affects processes beyond exponence. Therefore, looking crosslinguistically, we see that various stages of the derivation can be involved in enforcing locality conditions on allomorphy. With this in mind, we now turn to our analysis of post-exponence displacement in Tiwa.

5 Post-exponence displacement via constraint interaction

As mentioned, our analysis assumes the core tenets of DM, but to model displacement we adopt a constraint-based and output-oriented version of DM, what Rolle (2020) calls Optimality Theoretic Distributed Morphology or OT-DM.[13] All of the core architectural assumptions of DM remain, but rules are replaced with constraints which apply in parallel (à la Optimality Theory; Prince and Smolensky, 1993). The OT-DM framework may come in a strong version in which all post-syntactic operations are taken to apply in parallel at spell-out, or a weaker version in which one set of post-syntactic operations takes place at spell-out while another takes place in a later input-output computation. Within the weaker version, this latter computation can be interpreted either as a separate pre-phonology morphological module, or interleaved within the phonological module itself.

We adopt a weak version of an OT-DM model, assuming two stages in the post-syntactic derivation: a first stage where Vocabulary Insertion takes place, and a second stage where displacement takes place. This roughly follows general DM practice (e.g. Embick and Noyer, 2001, p. 562: "a second variety of Merger, which we term Local Dislocation, occurs after Vocabulary Insertion").

Following much of the morphological literature, we formalize the triggering context in allomorphy as a subcategorization frame (Lieber, 1980; Inkelas, 1990; Booij and Lieber, 1993; Zec, 2005; Paster, 2006; Yu, 2007; Bennett et al., 2018; Brinkerhoff, 2019; Rolle and Hyman, 2019; Tyler, 2019; Kalin and Rolle, 2022, a.o.). Subcategorization approaches are ideal for accounting for idiosyncratic quirks of individual lexical items, which cannot be reduced to a more general system (e.g. as used in Paster, 2006). Our representation of the subcategorization frame for the allomorph *-ânɡ* is in (22). The underlying representation of the allomorph (in white and bold) constitutes the phonological substance of the exponent (i.e. its consonants, vowels, and tones). The contextual structure that is subcategorized for (in gray) is what the exponent requires in order to be well-formed.

(22) Agreement exponent with subcategorization frame

-m	**-âŋ**
PST	**1SG**

The inversion and doubling patterns in Tiwa can be modeled via simple constraint interaction within OT. Our model uses the constraints in (23).

(23) a. ADJACENCY[TARGET-TRIGGER] (ADJ[TA-TR]):
For an exponent that subcategorizes for another exponent, the subcategorizing exponent (the Target) must be surface adjacent to the exponent subcategorized for (the Trigger)

b. R-ANCHOR-IO[EXPONENT] (ANCH-IO):
An exponent at the right edge of a word in the input (I) corresponds to an exponent at the right edge in the output (O)

[13] Such a hybrid model has many predecessors in the literature (e.g. Noyer, 1992; Bonet, 1994; Trommer, 2001a,b, 2002; Bonet et al., 2007; Wolf, 2008; Dawson, 2017; Foley, 2018, a.o.), not to mention OT syntax as a whole (Legendre et al., 2001, a.o.).

c. LINEARITY-IO[EXPONENT] (LIN-IO):
The precedence structure of the exponents in the input (I) is preserved in the output (O)[14]

d. INTEGRITY-IO[EXPONENT] (INT-IO):
No exponent in the input (I) has multiple correspondents in the output (O)

The first constraint (abbreviated ADJ[TA-TR]) references the subcategorization requirements of an exponent to enforce strict locality between the target and trigger of allomorphy. The effect of this constraint is to require adjacency between trigger and target in the output. The latter three constraints have been adapted from common OT reference works (McCarthy and Prince, 1995; Kager, 1999; Yip, 2002; McCarthy, 2008). ANCH-IO prohibits reordering of edgemost exponents, LIN-IO prohibits exponent reordering generally, and INT-IO prohibits exponents from doubling.

Let us walk through how these constraints derive the Tiwa displacement patterns. To illustrate the model, we use the derivation in (23), taken from (12) above.

(23) 'I did not go.'

a. Underlying syntactic structure: /root-NEG-PST-FOC-AGR/

b. Post-syntactic exponent insertion: /lí-ya-m-lô-âng/

c. Displacement: [lí-ya-lô-m-âng] ~ [lí-ya-m-lô-m-âng]

This example corresponds to the tableau in (24) below. The input in this tableau is the string of exponents that was the result of (default) linearization and exponent insertion (i.e. the mapping of the underlying syntactic structure to post-syntax in (23)). At this initial stage, the competition between *-âng* and *-ng* has been resolved, with the special allomorph *-âng* having been chosen because it is in the relevant locality domain of the trigger *-m*.[15] No subsequent operation at this stage can return to the lexicon (i.e. to the Vocabulary) to choose *-ng*, even if such a move would better satisfy a constraint ranking; such structures simply cannot be generated (in OT terms, by GEN).

In this tableau, there are five candidate outputs, whose changes from the input are indicated. The indices (in red) indicate correspondence between exponents in the input and the output. As in other OT models, we assume that inversion and doubling are freely available operations whose outputs are selected only if they are output-optimizing.

[14] A technical definition of LINEARITY from McCarthy (2008, p. 198) is below:

(iii) LINEARITY (LIN)
Let *input* = $i_1 i_2 i_3 ... i_n$ and *output* = $o_1 o_2 o_3 ... o_m$
Assign one violation mark for every pair i_w and i_y
if $i_w \Re o_x$ and $i_y \Re o_z$
and i_w precedes i_y
and o_z precedes o_x

[15] The Tiwa data are compatible with multiple ways of defining the locality conditions relevant for conditioning exponent insertion. For example, we assume that both the trigger and target of allomorphy are within the same phase, and they also surface within the same complex word. Thus we do not take a stance on the exact locality domain that is relevant for conditioning exponent insertion. What is crucial is that surface adjacency is required, despite the fact that linear adjacency is not a necessary condition for allomorph selection.

(24)

Input: /lí$_a$-ya$_b$-m$_c$-lô$_d$-âng$_e$/	ADJ[TA-TR]	ANCH-IO	LIN-IO	INT-IO
a. fully faithful lí$_a$-ya$_b$-m$_c$-lô$_d$-âng$_e$	*!			
b. *-m* inversion ☞ lí$_a$-ya$_b$-lô$_d$-m$_c$-âng$_e$			*	
c. *-m* doubling ☞ lí$_a$-ya$_b$-m$_c$-lô$_d$-m$_c$-âng$_e$				*
d. *-âng* doubling lí$_a$-ya$_b$-m$_c$-âng$_e$-lô$_d$-âng$_e$	*!			*
e. *-âng* inversion lí$_a$-ya$_b$-m$_c$-âng$_e$-lô$_d$		*!	*	

Let us unpack this tableau. First, consider the outputs which violate highly ranked ADJ[TA-TR], which requires that the target of allomorphy be adjacent to its trigger. Candidates where *-âng* (the target) is not adjacent to *-m* (the trigger) incur a violation of ADJ[TA-TR]. This eliminates the fully faithful candidate with no changes (a), as well as the candidate where *-âng* doubles (d).

Two points are in order regarding this portion of the analysis. First, the constraint ADJ[TA-TR] is formulated in such a way that the target must be adjacent to the trigger, but not necessarily that the trigger be adjacent to the target. This built-in asymmetry is necessary to ensure that candidates with multiple copies of the trigger *-m* (i.e. candidate c) not be eliminated. Second, in order for ADJ[TA-TR] to be evaluated, subcategorization frames of individual exponents must still be accessible in the output.

Next consider ANCH-IO which anchors a word-edge exponent to that edge. Such a constraint is violated if the edgemost exponent in the input (*-âng*$_e$) does not have a correspondent in that position in the output. Candidate e with *-âng* inversion violates this constraint.

The combined effects of ADJ[TA-TR] and ANCH-IO result in only candidates where the allomorphy trigger *-m* displaces winning. These candidates are in b and c, showing inversion and doubling respectively. Inversion of *-m* (candidate b) violates LIN-IO because the order of two exponents in the input is reversed, while doubling of *-m* (candidate c) violates INT-IO since an exponent in the input (*-m*$_c$) has two correspondents in the output. Since LIN-IO and INT-IO are equally ranked, both candidates b and c are equally optimal, accounting for the availability of both inversion and doubling patterns.

6 Trigger and target displacement: Altruism and greed

Recall that in Section 4 we discussed three possible responses to non-local environments: blocking (as in Latin), non-local application (as in Korean), and post-exponence displacement (as in Tiwa). In order to achieve locality post-exponence, two logically possible displacement strategies would be 1) to move the trigger, or 2) to move the target. While Tiwa

uses the strategy of trigger displacement (as we discuss further below), we expect that target displacement should also be possible based on comparison with other post-syntactic displacement operations.

The Tiwa pattern of displacement involves movement of the allomorphy trigger: *-m* PST doubles or inverts from its default position to surface adjacent to the allomorphy target *-ângng* 1SG. In this situation, the exponent that has the special contextual restriction (i.e. the subcategorization frame) – *-ângng* – remains in a fixed position. Instead, the exponent that has no contextual restriction on its own realization – *-m* – undergoes displacement to appear adjacent to the element that subcategorizes for it. Borrowing a metaphor from the syntax literature (e.g. Lasnik, 1995, 2003; Zyman, 2017), we can refer to this type of displacement as *altruistic*. This displacement is altruistic in the sense that the displacement of *-m* does not serve to satisfy any requirement of *-m* itself; rather it serves to meet the subcategorization requirements of *-ângng*.

The type of altruistic displacement seen in Tiwa can be found in other instances of post-syntactic displacement that do not involve an allomorphy trigger. One example is a process of ergative displacement within auxiliaries in the Alboniga dialect of Basque. Arregi and Nevins (2012) propose that the tense head (T) in an auxiliary is subject to a NONINITIALITY constraint: if T would (incidentally) be linearized in the initial position within the auxiliary, post-syntactic displacement occurs to ensure that T is in second position within the auxiliary. In Alboniga Basque, if T would be initial, then the ergative marker (ERG) undergoes displacement, resulting in metathesis (inversion) or doubling. This is shown in (25), with a base-generated order /T-DAT-ERG-C/ (where C stands for 'complementizer').

(25) Ergative displacement in Alboniga Basque
(de Yrizar, 1992, Vol. 1, p. 470, as cited in Arregi and Nevins, 2012, p. 284)

a. Base-generated order
/T-DAT-**ERG**-C/

b. Ergative metathesis
ERG-T-DAT-C

s	-eun	-tz	-n	(> [seuntzan])
CL.E.2.SG	-PST.3.SG	-CL.D.3.SG	-CPST	

c. Ergative doubling
ERG-T-DAT-**ERG**-C

s	-eu	-ku	**-su**	-n	(> [seuskusun])
CL.E.2.SG	-PST.3.SG	-CL.D.1.PL	**-CL.E.2.SG**	-CPST	

We can characterize displacement of the ergative agreement affix as altruistic in that it dislocates to satisfy the positional requirement of T (not any requirements it itself has). This example illustrates that altruism need not involve subcategorization for a specific exponent, as in the case of trigger displacement in Tiwa. In Basque, conceivably any exponent before T would satisfy its NONINITIALITY requirement. Thus we see that post-syntactic displacement outside of the context of allomorphy triggers and targets can display a profile that we might describe as altruistic.

Within the syntax literature, the counterpart to altruism is greed (e.g. Bošković, 1995,

2007; Chomsky, 1995).[16] Greedy postsyntactic displacement would involve an element undergoing displacement to satisfy its own requirements. Recall that a logically possible response to non-adjacency between trigger and target in allomorphy would be to displace the target. We could view this as a type of greedy displacement: the allomorphy target, which subcategorizes for a particular exponent (the allomorphy trigger), undergoes displacement to be adjacent to the subcategorized-for element so that its own subcategorization requirements can be met. Given the greedy profile of target displacement we might ask whether greedy displacement is attested in the post-syntax.

One instance that could be categorized as greedy post-syntactic displacement is mesoclisis in Spanish (Haspelmath, 1993; Harris and Halle, 2005; Kayne, 2010; Postma, 2013; Harris, 2017; Arregi and Nevins, 2018, a.o.), albeit not involving allomorphy. In what follows, we base our discussion on the data and analysis in Arregi and Nevins 2018. In some dialects of Spanish, imperative constructions can display inversion or doubling of the plural exponent. The standard order in imperatives is for the plural suffix *-n* to precede the reflexive clitic *-se*, as in (26a). However, in some dialects an inversion pattern between *-n* and *-se* is attested, as shown in (26b), as well as a doubling pattern involving plural *-n*, as in (26c).

(26) Spanish imperative plural: 'Sit down!' (Arregi and Nevins, 2018, p. 626)

a. Standard order
/root-**PL**-CL.REFL/
/siénte-**n**-se/

b. Inversion
root-CL.REFL-**PL**
/siénte-**n**-se/ → siénte-se-**n**

c. Doubling
root-**PL**-CL.REFL-**PL**
/siénte-**n**-se/ → siénte-**n**-se-**n**

Arregi and Nevins (2018) argue that plural *-n* is subject to a constraint NONINITIALITY within the post-verbal clitic group. In response to this constraint, inversion of *-n* with a pronominal clitic or doubling on either side of the clitic results in at least one occurrence of *-n* that is non-initial. These post-syntactic operations are greedy in the sense that *-n* undergoes displacement to satisfy its own NONINITIALITY requirement.

We see then that outside of cases involving allomorphy, post-syntactic displacement can display an altruistic or greedy profile. The type of trigger displacement seen in Tiwa that occurs to bring about adjacency between the trigger and target of allomorphy can be characterized as altruistic: while the allomorphy trigger itself does not have a special subcategorization requirement, it displaces to meet the subcategorization requirement of the allomorphy target. As we have stated, the flipside of trigger displacement would be target displacement, which would display a greedy profile: the allomorphy target would undergo displacement to meet its own subcategorization requirements. Given the general

[16] We note here that we do not ascribe any formal status in the grammar to either greed or altruism. Instead, these terms are intended to simply provide a useful analogy for considering the types of requirements lead to displacement in the post-syntax.

availability of greedy post-syntactic displacement (e.g. Spanish mesoclisis), we predict that post-exponence target displacement to bring about adjacency between allomorphy trigger and target should also be possible. We leave this as an open area for future investigation.

To summarize, in this section we have discussed two logically possible types of post-exponence displacement that could serve to bring about adjacency between an allomorphy trigger and target. We have seen that the altruistic profile of Tiwa trigger displacement is mirrored in other instances of post-syntactic displacement that do not involve creating adjacency between trigger and target. The logically possible option of target displacement would display a greedy profile, which is attested in other instances of post-syntactic displacement, though we leave it open whether this type of greedy displacement is ever driven by locality conditions in allomorphy.

7 Tiwa doubling and the typology of multiple exponence

In the Tiwa doubling pattern, only one morphosyntactic feature [PST] is being exponed, but on the surface it corresponds to two exponents. This meets the definition of multiple exponence (ME) as in Harris 2017. The ME patterns that look most similar to the Tiwa case are Harris's periodic/alternating ME, which involve a Z-X-Y-X exponent string where a exponent X is repeated across an intervening exponent Y. While the Tiwa pattern displays a clear surface parallel to this type of ME, we suggest that its origin differs from the type of grammaticalization processes suggested by Harris and instead arises as a resolution of competing synchronic pressures in the grammar.

One identifiable source of ME patterns are cases where two words are merged into a single word. As Caballero and Inkelas (2018, p. 128) write, ME may result "when a language possesses a compound-like construction requiring agreement, in some property or properties, between its daughters". Examples of this include auxiliaries turning into affixation onto verbs (i.e. univerbation), determiners turning into affixation onto nouns, and lexical compounding generally.

Consider Camling, a Kiranti language of the Sino-Tibetan family (Harris, 2017, p. 56). With verbs in sequence in Camling, each verb root forms its own word and inflection is repeated on both verbs, as shown in (27).

(27) Camling verbs in sequence (Ebert, 1993, p. 91, Harris, 2017, p. 123)

capca nhais-**ung-e**-nʌ ap-**ung-e**
tiger chase-**1.S-NPT**-SEQ shoot-**1.S-NPT**
'I will chase the tiger and shoot him'

It is reasonable to suspect that the verbs in sequence in (27) acted as a predecessor for analogous structures found WITHIN single words where they constitute ME. For example, in (28a) below, the third person patient suffix *-(y)u* is repeated after the secondary functional verb *-ngas*. As an independent verb, it means 'stay, remain, keep', but used in this modificational context it conveys progressive, continuative, and perfect aspect. Similarly, in (28b) the inflectional suffixes *-u* 3.P and *-ng* 1.S are repeated after the suffix *-c* which indicates a third person non-singular patient. Unlike in (27), doubling in (28) cannot straightforwardly be related to an independent verb form, thus illustrating the degree of grammaticalization of ME here.

(28) Camling multiple exponence

(Ebert, 1997, pp. 28, 20, as cited in Harris, 2017, pp. 141, 56)

a. museppa m-ngalung-da map-**u**-ngas-**yu**
ash her-face-LOC rub-**3.P**-V2.stay-**3.P**
'She had rubbed ash on her face'

b. lod-**u-ng**-c-**u-ng**
tell-**3.P-1.S**-3NS.P-**3.P-1.S**
'I told them'

The ME pattern found with Tiwa tense doubling almost certainly involves a different type of diachronic origin than the Camling patterns. The Tiwa pattern does not resemble grammaticalization of a verb compound or verb-auxiliary construction in any clear way and is in fact the opposite of what Harris (2017, p. 56) generalizes regarding the period/alternating type of ME: "in most examples, the carrier morpheme is derivational or inherent inflectional morphology" – for example TAM categories – "while the multiple exponents are contextual inflectional morphemes" – such as subject agreement or case (citing Booij, 1994, 1996). In Tiwa, however, the multiple exponents are instances of a TAM category (PST), while subject agreement is the exponent that triggers the doubling. Thus it does not seem plausible that the diachronic pathway to Tiwa doubling involved auxiliary or compound grammaticalization.

A more likely hypothesis as to the origin of Tiwa ME involves a compromise between multiple competing pressures. We have already discussed that fact that displacement of *-m* PST in Tiwa is motivated by a pressure for adjacency between the trigger and target of allomorphy. In inversion cases, this causes the exponent *-m* to surface in a different position from where it would appeared based on default linearization. Interestingly, in the doubling pattern invloving ME, one instance of *-m* appears adjacent to the allomorphy target (*-âng*) but the other instance of *-m* appears in the position we expect based on default linearization. This ME pattern thus allows the surface string to satisfy both the pressure for locality in allomorphy as well as the pressure for linearized strings to reflect hierarchical structure (i.e. the Mirror Principle; Baker, 1985).

Harris (2017) attributes little role to active copying processes in accounting for ME patterns – "a form-copying solution would seem to be rather limited" (p. 190), citing copying patterns in Kiranti languages. However, a role for synchronic doubling has also been proposed for other instances of ME (see, e.g., Ryan, 2019 on doubling in Bole due to analogical morphotactic pressures, or Hyman, 2003 on the Bantu 'CARP' template, among other references). The Tiwa pattern strengthens the position that ME may be due to a synchronic doubling process, and suggests that competition between conflicting grammatical constraints may give rise to this type of ME.

8 Conclusion

In this paper we have argue that Tiwa shows a pattern of post-syntactic displacement that applies after the point of exponence to bring about adjacency between the trigger and target of allomorphy. When first singular agreement is linearly separated from past tense *-m* by an intervening focus marker, the tense-conditioned allomorph of agreement (*-âng*)

can still be inserted, despite the lack of adjacency with the exponent that it subcategorizes for (*-m* PST). However, a highly ranked constraint requiring adjacency between trigger and target results in subsequent inversion or doubling of *-m* to result in surface adjacency with the agreement exponent that subcategorizes for it.

We have highlighted the way in which this pattern illustrates a unique type of response to non-locality in allomorphy that has not previously received attention in the literature. Rather than allomorphy being blocked or simply applying non-locally with no need for surface adjacency, Tiwa displays displacement to bring about adjacency after the point of allomorph selection. Thus, we see that Tiwa requires adjacency not at the point of exponence but rather on the surface. This lends support for the idea that the locality bias that we see in allomorphy is enforced by multiple grammatical mechanisms and not simply by the process of exponent selection.

The existence of this type of displacement has multiple consequences for our understanding of post-syntactic displacement and morphological patterns more generally. As we discussed, the Tiwa pattern of trigger displacement raises the possibility that we may find another a similar pattern: post-exponence displacement of the allomorphy target. We have categorized Tiwa trigger displacement as a type of altruistic process: one exponent undergoes displacement to satisfy the requirements of a different exponent. The hypothetical pattern of target displacement would display a different profile that we have categorized as greedy: an exponent would undergo displacement to satisfy its own requirements. The existence of greedy post-syntactic displacement outside of instances of contextual allomorphy leads us to expect that greedy target displacement should be attested, even if it may be difficult to diagnose in many cases.

The doubling pattern of Tiwa also has ramifications for the study of ME, as we demonstrated. The competing constraints in Tiwa lead to a grammar where ME is one of multiple equally optimal options. Our findings align with literature suggesting that resolution of competing pressures in the grammar is a possible pathway to ME (Hyman, 2003; Ryan, 2019), and that instances of ME that arise in this way may, in fact, involve active copying processes in the synchronic grammar. We have identified locality between allomorphy trigger and target as one possible grammatical pressure that may interact with default linearization principles to yield ME. Given the evidence that the locality bias in allomorphy is pervasive, we suggest that further investigations of ME involving contextual allomorphy may reveal other cases similar to Tiwa, ultimately yielding insight into both the motivations for ME as well as the typology of locality in allomorphy and displacement in the post-syntax.

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