



2017

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### Recommended Citation

Shwayder, Kobey (2017) "Morphosyntactic Interleaving in Vietnamese and Pacoh," *University of Pennsylvania Working Papers in Linguistics*: Vol. 23 : Iss. 1 , Article 29.  
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## Morphosyntactic Interleaving in Vietnamese and Pacoh

### Abstract

Interleaving, a surface configuration in some languages in which the parts of two adjacent words are interspersed with each other, has been argued to be a phonological phenomenon. In this paper, I investigate interleaving in Vietnamese and a related language, Pacoh (Katuic, Mon-Khmer), and argue that it is the result of morphosyntactic operations and structures and not a phonological operation. I present three pieces of evidence that interleaving is morphosyntactic in nature: (i) interleaving cannot apply to all syllables, only those in certain morphosyntactic environments; (ii) interleaving manipulates polysyllabic units and can apply to 3-part compounds, showing that it is manipulating morphosyntactic structure and not phonological structure; and (iii) interleaving creates extra syntactic-semantic force, suggesting a change in the syntax. I propose an analysis in which interleaving is the result of the structure of coordinate compounds, whose members have no precedence relation with each other, in combination with an alternate traversal of the syntactic tree during linearization.

# Morphosyntactic Interleaving in Vietnamese and Pacoh

Kobey Shwayder\*

## 1 Introduction

The phenomenon of *interleaving* is a description of a surface configuration in some languages in which the parts of two adjacent words are interspersed with each other. Schematically, the elements of one word *AB* and another word *XY* are rearranged such that the parts of each word are no longer immediately adjacent to each other, as shown in (1):<sup>1</sup>

(1) Basic Schematic of Interleaving:  $AB + \underline{XY} \rightarrow \underline{AX} \underline{BY}$

This phenomenon is puzzling because it appears to be a violation of wordhood criteria, specifically the criterion of *cohesiveness* that the elements of a grammatical words “always occur together, rather than scattered through the clause” (Dixon and Aikhenvald 2002, p. 19). Because of this, some researchers have argued that interleaving is purely a phonological phenomenon, i.e., some sort of phonological metathesis (Emeneau 1951; Schiering et al. 2010, *i.a.*).

However, in this paper, I investigate *interleaving* in Vietnamese and a related language, Pacoh (Katuic, Mon-Khmer), and argue that it is the result of morphosyntactic operations and structures and not a phonological operation. I present three pieces of evidence that interleaving is morphosyntactic in nature: (i) interleaving cannot apply to all syllables, only those in certain morphosyntactic environments; (ii) interleaving manipulates polysyllabic units and can apply to 3-part compounds, showing that it is manipulating morphosyntactic structure and not phonological structure; and (iii) interleaving creates extra syntactic-semantic force, suggesting a change in the syntax.

In my analysis, I propose that interleaving is the result of the structure of coordinate compounds in which the members have no precedence relation with each other and an alternate traversal of the syntactic tree during linearization. That is, the surface pattern found in interleaving is derived from morphosyntactic structure and the linearization of that structure rather than from purely phonological manipulation.

## 2 Basic Data and Previous Analyses

In Vietnamese, it is relatively common to see interleaving between two adjacent compound words in a phrase, examples given in (2):

(2)	Interleaving Word Order in Vietnamese	(Thompson 1965; Nhàn 1984; Noyer 1998)
a.	bàn-tìm + <u>muu-kế</u> discuss-search “discuss in quest of”	→ bàn <u>muu</u> tìm <u>kế</u> “discuss strategy”
b.	canh-giữ + <u>vườn-tực</u> watch-keep “guard”	→ canh <u>vườn</u> giữ <u>tực</u> “guard gardens”
c.	mặt-mày + <u>dạn-dày</u> face-RED inured-RED	→ <u>mặt</u> <u>dạn</u> <u>mày</u> <u>dày</u> (idiom) “utterly shameless person”
d.	buôn-bán + <u>gian-lận</u> trade-sell “trade”	→ <u>buôn</u> <u>gian</u> <u>bán</u> <u>lận</u> “cheat in commerce”
e.	ăn-mặc + <u>sung-sướng</u> “lead a social life”	→ <u>ăn</u> <u>sung</u> <u>mặc</u> <u>sướng</u> “lead a luxurious life”

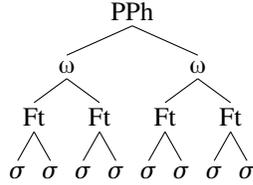
\*Thanks to participants in UPenn’s F-MART reading group and the audience at PLC40 for thoughts and suggestions on this work. Thanks also to Tuan Tran and Huy Tran for judgments.

<sup>1</sup>Throughout this paper, underlining is used simply as an aid in the identification of compound parts.

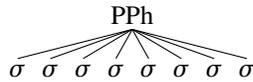
As shown in (2), the two adjacent compound words can be interleaved such that the component elements of each individual compound are no longer directly adjacent to each other.

Because interleaving violates the cohesiveness criterion of wordhood, it has been argued that that Vietnamese does not have phonological words (Emeneau 1951; *Nhàn* 1984; Schiering et al. 2010)!<sup>2</sup> Rather than a standard Prosodic Hierarchy in which syllables must combine into feet and words before phrases, as shown in (3a), Schiering et al. (2010), for example, propose that the Prosodic Hierarchy of Vietnamese goes directly from syllables to phrases, as shown in (3b).

- (3) a. Standard Prosodic Hierarchy (Selkirk 1981, 1984; Nespor and Vogel 1986, *et seq.*)



- b. Proposal for Vietnamese by Schiering et al. (2010)



Essentially, Schiering et al. propose that interleaving in Vietnamese cannot violate the cohesiveness criterion of wordhood because Vietnamese does not have words. Thus, the interleaving process can freely move syllables around without regard to word boundaries.

However, there are at least three problems with this type of solution. First, Vietnamese speakers clearly believe that their language has words. It is an extreme move to remove an important part of the Prosodic Hierarchy to theoretically satisfy a marginal phenomenon.

Second, phonological syllable metathesis does not explain all forms of interleaving, although the examples given above with two adjacent compounds could be explained by phonological metathesis. However, this is not the only form of interleaving. Interleaving can occur with a single element adjacent to a compound, resulting in that single element being copied and interspersed between the elements of the adjacent compound. All three schemata of interleaving are shown in (4) and examples of the single element interleaving are shown in (5).

- (4) Interleaving Schemata (Nhan 1984)

- Two Compounds:  $AB + \underline{XY} \rightarrow \underline{AX} \underline{BY}$
- Single + Compound:  $A + \underline{XY} \rightarrow \underline{AX} \underline{AY}$
- Compound + Single:  $AB + \underline{X} \rightarrow \underline{AX} \underline{BX}$

- (5) Single element interleaving (Thompson 1965; *Nhàn* 1984; Noyer 1998)

- |    |                                  |   |                                    |   |   |
|----|----------------------------------|---|------------------------------------|---|---|
| a. | <i>làm</i><br>“do, make”         | + | <i>giàu-có</i><br>“be wealthy”     | → | <i>làm giàu làm có</i><br>“make wealthy”                  |
| b. | <i>đập</i><br>“beat”             | + | <i>bàn-ghế</i><br>“furniture”      | → | <i>đập bàn đập ghế</i><br>“beat all over the furniture”   |
| c. | <i>ốm</i><br>“be sick”           | + | <i>lăn-lóc</i><br>“lying around”   | → | <i>ốm lăn ốm lóc</i><br>“extremely sick”                  |
| d. | <i>buôn-bán</i><br>“do business” | + | <i>đâu</i><br>“anywhere, wherever” | → | <i>buôn đâu bán đâu</i><br>“wherever (one) does business” |

Note that in the cases in (5) an element is copied, meaning the solution cannot simply be phonological metathesis. An adjustment to the Prosodic Hierarchy thus does not explain these cases of interleaving.

<sup>2</sup>The strong morpheme-to-syllable correspondence in Vietnamese is sometimes given as additional evidence for the lack of phonological words. However, see Schiering et al. (2010) and Thompson (1965) for examples of non-corresponding syllables and morphemes. While it is true that Vietnamese does have this strong correspondence, it is not always the case and thus not grounds for removing the phonological word from the Prosodic Hierarchy of Vietnamese.

Finally, there are a variety of pieces of evidence from the morphosyntactic and semantic behavior of interleaving that indicate that it is not a purely phonological phenomena: (i) not all syllables can be interleaved, only particular morphosyntactic situations; (ii) interleaving can involve polysyllabic units and primarily respects morphological boundaries not phonological ones; and (iii) Interleaving carries additional semantic/pragmatic meaning, suggesting a syntactic operation. This evidence is investigated more fully in the following section.

### 3 Evidence against Interleaving as a Phonological Phenomenon

Interleaving shows sensitivity to morphosyntactic and semantic environments that it should not show if it were a purely phonological phenomenon. This sensitivity includes morphosyntactic conditioning, respecting and manipulating morphosyntactic units, applying to three-part compounds, and adding additional semantic or pragmatic force.

#### 3.1 Morphosyntactic Conditioning

Interleaving cannot apply to any adjacent syllables, rather only certain morphosyntactic configurations allow for interleaving. There are two ways in which the application of interleaving is mediated by the morphosyntax. First, only certain syntactic constituents can interleave, as shown in (6a). These constituents are those usually considered to be in some sort of syntactic relationship, as compared to non-constituent pairs, such as those in (6b) which cannot be interleaved.

- (6) a. Constituent pairs may be interleaved:
- Light Verb + Verb
  - Adverb + Verb
  - Noun + Adjective
  - Negation + Verb
  - Verb + Object
- b. Some non-constituent pairs that cannot be interleaved:
- Noun + Adverb
  - Subject + Verb
  - Verb + Adjective

Second, even in proper constituent configurations, not all not all polysyllabic or compound words can interleave. It appears that only coordinative compounds (sometimes called *dvandva* compounds) are able to be interleaved (Noyer 1998). Words (often borrowed) that are polysyllabic but not polymorphemic cannot undergo interleaving. Similarly, non-coordinative compounds of other types are unable to undergo interleaving.

- (7) Indivisible polysyllabic words (Noyer 1998)
- a. xà-phòng “soap” (< French *savon*) [borrowed]  
 \*Tôi uống xà uống phòng.  
 I drink sa- drink -von  
 Intended: “I drink soap”
- b. ba-ba “tortoise” [non-breakable]  
 \*Tôi có ba có ba  
 I have *ba* have *ba*  
 Intended: “I have the tortoise”
- c. ngã-lòng “despair” (fall+heart) [non-coordinative]  
 Tôi đã ngã (\*đã) lòng  
 I PAST fall (\*PAST) heart  
 “I despaired”

The converse of this effect is also true. Interleaving is always available to compounds that are clearly coordinative. One such instance is reduplicated compounds, which are common in Vietnamese and are always able to undergo interleaving.

- (8) Interleaving of reduplicated compounds (Nhàn 1984)
- bậy “wrong” → bậy-bạ “very wrong”
  - đập “hit” + bậy-bạ → đập bậy đập bạ “hit rampantly and wildly”

The fact that interleaving only affects certain configurations of syntactic objects and is not able to be applied to any adjacent syllables is strong evidence that it is a morphosyntactic operation and not a phonological one.

### 3.2 Manipulating Morphosyntactic Units

In addition to the restriction in application of interleaving, there is also evidence that interleaving manipulates morphosyntactic units rather than phonological units. In Vietnamese, interleaving can apply to multiply reduplicated compounds that have more than one syllable. This shows that interleaving is manipulating the morphosyntactic unit rather than the phonological syllable. When multiply reduplicated compounds are interleaved in Vietnamese, only the top-level morphological division is respected. Interleaving cannot be applied to the inner constituents of the compound. An example is given in (9):

- (9) Interleaving with a multiply reduplicated compound (Thompson 1965; Nhàn 1984)
- khóc* “weep, cry” → *khóc-lóc* “cry pitifully”
  - khóc-lóc* “cry pitifully” → *khóc-lóc khóc-liếc* “wail like a cry-baby”
  - đừng *khóc-lóc khóc-liếc* hoài như thế!  
don’t *wail-like-cry-baby* always like so  
“don’t be such a crybaby”
  - Người đó không *khóc-lóc* không *khóc-liếc* gì đâu.  
person that NEG *wail-like-cry-baby*<sub>1</sub> NEG *wail-like-cry-baby*<sub>2</sub> TAG.PH  
“That person won’t weep at all (don’t be ridiculous)”  
(N.B. \*... không *khóc* không *lóc* không *khóc* không *liếc* ...)
  - Em đó hay *khóc-lóc* hay *khóc-liếc*, không bao giờ nín.  
child that habit *wail-like-cry-baby*<sub>1</sub> habit *wail-like-cry-baby*<sub>2</sub> NEG ever silent  
“That child cries continuously, never stops”  
(N.B. \*... hay *khóc* hay *lóc* hay *khóc* hay *liếc* ...)

In (9a-b), we see that *khóc* “weep, cry” can be doubly reduplicated (in two different patterns) with an intensifying meaning for each reduplication. This double reduplication *khóc-lóc khóc-liếc* can then be used as a unit (9c), but can also be broken up by interleaving, as shown in (9d-e). Note that it is ungrammatical to interleave in the smallest constituent units of the compound.

The evidence that interleaving primarily respects morphosyntactic units and not phonological units is bolstered by evidence from related language Pacoh. Pacoh is a Katuic (Mon-Khmer) language that is spoken in the central highlands of Vietnam. Like Vietnamese, Pacoh frequently makes coordinate compounds, such as those in (10).

- (10) Some Pacoh compounds (Watson 1980; Alves 2000, 2006)
- duŋ “house” + vɛ:l “village” → duŋ-vɛ:l “society”
  - ?a.ʔi: “mother” + ?a.ʔam “father” → ?a.ʔi:-?a.ʔam “parents”
  - tiən “money” + praʔ “silver” → tiən-praʔ “wealth”

However, unlike Vietnamese, Pacoh has a wider range of polysyllabic morphemes. Because of this, when interleaving occurs in Pacoh, it is clearly manipulating morphemes and not syllables. Some examples of interleaving with polysyllabic morphemes in Pacoh are given in (11):

- (11) Interleaving in Pacoh (Alves 2000, 2006)

- a. *ʔa.kəp* “don’t” + *rew-ʔi.ri:* “sad” → *ʔa.kəp rew ʔa.kəp ʔi.ri:* “Don’t be sad”
- b. *taʔ* “work, make, do” + *pruəʔ-təm.paʔ* “work (n.)”  
→ (*ŋa:j*) *taʔ pruəʔ taʔ təm.paʔ* “(They) are working”
- c. *cə:m* “to know” + *ʔu.raʔ-ʔu.ʔar* “writing”  
→ (*də:*) *cə:m ʔu.raʔ cə:m ʔu.ʔar* “(He) is literate”
- d. *taʔ* “work, make, do” + *kər.riəŋ-kər.rə:ŋ* “fences”  
→ *taʔ kər.riəŋ taʔ kər.rə:ŋ* “make fences”

As shown in (11), the interleaving operation is manipulating the morphological pieces of the compound, not phonological syllables. Further evidence of the morphosyntactic status of interleaving comes from compounds in Pacoh with more than two constituents. In addition to the binary compounds shown above, Pacoh can create three-part coordinate compounds, examples shown in (12). When these compounds are involved in interleaving, each of the elements is divided into its own unit. In the example in (13), the single element is copied three times and interleaved before each of the compound constituents.

- (12) Three-part compounds in Pacoh (Alves 2000, 2006)
- a. *ʔn.truəj* + *ʔa.cə:* + *ʔa.lik* → *ʔn.truəj-ʔa.cə:-ʔa.lik*  
“chicken” “dog” “pig” “domestic animals”
- b. *praʔ* + *ti.riəʔ* + *ʔa.kaj* → *praʔ-ti.riəʔ-ʔa.kaj*  
“money” “buffalo” “child” “wealth”
- (13) Interleaving with a three-part compound (Alves 2000, 2006)
- jo:l* + *praʔ-ti.riəʔ-ʔa.kaj* → *jo:l praʔ jo:l ti.riəʔ jo:l ʔa.kaj*  
“still have” “wealth” “still have wealth”

This additional evidence of polysyllabic monomorphemes in Pacoh, combined with the multiple reduplication compounds in Vietnamese, provides clear evidence that interleaving is respecting (and manipulating) morphosyntactic units rather than phonological units.

### 3.3 Additional Semantic Force

The final piece of evidence against a phonological solution to interleaving is the fact that interleaving adds some additional semantic (or perhaps pragmatic) force to the meaning of the phrase. That is, interleaving is not an obligatory process; Not all configurations which can undergo interleaving must undergo it. When interleaving appears, there is some additional intensive or extreme semantics to the basic meaning. In the examples given in (14), the non-interleaved phrase in each subexample (ii) is perfectly grammatical. The interleaved version of the phrase in each subexample (iii) show the change in meaning from the basic one.

- (14) Extra semantic force in interleaved order (Nhàn 1984)
- a. i. *bàn-ghế* ‘furniture’  
ii. *đập bàn-ghế* ‘beat the furniture’ (*đập* ‘to beat, hit’)  
iii. *đập bàn đập ghế* ‘bang all over the furniture’
- b. i. *bậy-bạ* ‘very wrong’  
ii. *đập bậy-bạ* ‘hit rampantly’ (*đập* ‘to beat, hit’)  
iii. *đập bậy đập bạ* ‘hit rampantly and wildly’
- c. i. *lăn-lóc* ‘lying around’  
ii. *ốm lăn-lóc* ‘lying around sick’ (*ốm* ‘to be sick, ill’)  
iii. *ốm lăn ốm lóc* ‘extremely sick, almost die of sickness’
- d. i. *quần-áo* ‘clothes’

- ii. *mặc quần-áo* ‘to dress up’ (*mặc* ‘to put on’)
- iii. *mặc quần mặc áo* ‘to dress up hurriedly’

The additional semantic force added interleaving occurs suggests that there is an additional syntacticosemantic head in the structure, adding more evidence to the argument that interleaving is the result of a morphosyntactic operation and not a purely phonological one.

### 3.4 Interim Summary

So far, I have presented evidence that interleaving is not the result of a purely phonological operation based on its interaction with morphosyntactic and semantic structures or features. I showed that interleaving only occurs in certain morphological/syntactic situations and only occurs to certain compound types (coordinate compounds). I presented examples of interleaving applying to units larger than 1 syllable and to more than binary compound units. Additionally, I provided evidence that interleaving involves some additional semantic or pragmatic force. The result taken from this evidence is that interleaving is not phonological in nature.

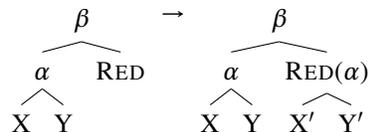
## 4 Analysis

Given the evidence presented above, I propose that interleaving is the result of one or more morphosyntactic structures or operations.

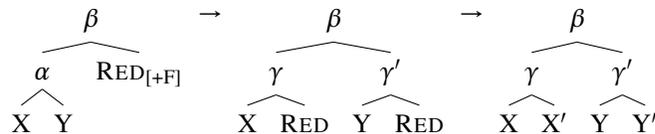
There has been some previous work proposing that interleaving is be a morphosyntactic operation that rearranges the terminal nodes in a way that matches the linear output. Specifically, *Nhàn* (1984), *Noyer* (1998), and *Shwayder* (2015) propose similar solutions to interleaving that involve an algebraic reconfiguring of the syntax. The general idea of these analyses is that interleaving is a special form of reduplication. Whereas normal reduplication copies a neighboring node (RED copying  $\alpha$ , for example, in 15a), interleaved reduplication involves a distribution of the RED node into its neighboring node resulting in the interleaved word order, as shown in (15b).

- (15) Interleaving as a morphosyntactic operation like reduplication  
(*Nhàn* 1984; *Noyer* 1998; *Shwayder* 2015)

- a. Normal Reduplication:  $XY \rightarrow XY X'Y'$



- b. Interleaved Reduplication:  $XY \rightarrow XX' YY'$



In (15a), the RED node straightforwardly copies its sister. However, in (15b), with the addition of some feature, given here as [+F], the RED node is copied into its sister node. *Noyer* (1998) likens this sort of operation to arithmetic distribution of the form  $a*(b+c) = a*b + a*c$ .

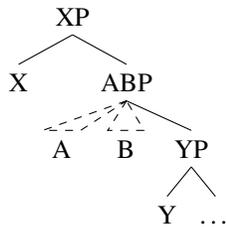
While this solution seems reasonable for the cases of interleaving that are a single element being copied and distributed into a compound (i.e.,  $A + \underline{XY} \rightarrow \underline{AX} \underline{AY}$ ), there are some problems with it. This special reduplication does not naturally explain the cases of interleaving of two compounds (i.e.,  $\underline{AB} + \underline{XY} \rightarrow \underline{AX} \underline{BY}$ ). There is no copying or reduplication in these cases. This solution also does not fully account for the interleaving with 3-part compounds in *Pacoh*, nor does it fully explain why multiply reduplicated compounds in Vietnamese can only be interleaved at the top layer. In all, the reduplication solution has some merits, but does not fully explain all the possible forms of interleaving.

While I build upon many of the observations made in these previous analysis, I instead propose that phenomenon of interleaving is the result of three (potentially separate) structures and operations: (i) coordinate compounds are attached “orthogonally” to the syntactic spine, meaning there is no precedence relationship between the members of the compound; (ii) there are two possible ways of traversing or linearizing a syntactic tree with these coordinate compounds; and (iii) there is an operation to “promote” a syntactic terminal to “orthogonal” status under a certain feature [F]. Each of these claims will be discussed individually below.

#### 4.1 Orthogonal Coordinate Compounds

I propose that the elements of coordinate compounds hang from the same spot on the syntactic spine, orthogonal to spine direction (marked here with dashed triangles). This is an implementation of the idea that the members of coordinate compounds do not have a syntactic precedence relationship with each other (cf. Goodall 1987). In (16), for example, the members of the coordinate compound AB are attached to the same node of the syntax and have no precedence relationship with each other.

(16) Example Structure with Coordinate Compound AB



Note that I am *not* making a claim that all coordination instances have no precedence. This is obviously not true, given examples such as that of anaphor binding in (17), in which the precedence order is important for grammaticality.

(17) *John and his dog* vs. *\*his dog and John* (Zhang 2009)

However, there is evidence that for the specific case of coordinate compounds the members are not ordered with respect to each other. In Vietnamese, in particular, the members of coordinate compounds are able to be reversed without changing the meaning (even idiomatic meaning) of the compound, examples given in (18).

(18) Some reversible coordinate compounds in Vietnamese (Nhàn 1984; Schiering et al. 2010)

bàn-ghế	~	ghế-bàn	‘furniture’ (bàn ‘table’ + ghế ‘chair’)
quần-áo	~	áo-quần	‘clothes’ (quần ‘trousers’ + áo ‘tunic’)
chọn lựa	~	lựa chọn	‘to select’ (chọn ‘choose’ + lựa ‘choose’)
nhà-cửa	~	cửa-nhà	‘house, building’ (nhà ‘house’ + cửa ‘door’)
chính-tà	~	tà-chính	‘both sides’ (chính ‘good’ + tà ‘evil’)
bối-rối bối-rối	~	bối-rối bối-rối	‘be troubled’ (bối-rối ‘be uneasy’ + RED)

This reversibility of coordinate compounds is not limited to Vietnamese. It is common in many other languages, including English.<sup>3</sup>

(19) Reversible Coordinate Compounds in Other Languages

(Huang 1998; Arcodia et al. 2010; Miller 2014)

<sup>3</sup>Note that not all coordinate compounds are reversible. Although *actor-singer* seems to be reversible in English, a similar compound *singer-songwriter* does not, cf. *\*songwriter-singer*. I propose that the fossilization of coordinate compounds falls under the purview of *use* rather than *grammar proper*. That is, certain orderings of these compounds come to have specific meanings or be the usual way of saying something such that other orderings sound strange and suggest a new meaning. This follows Chao (1965), who discusses coordinate compounds in Chinese that are not usually reversed: “the reversed forms do occur, with a slight effect of freshness in style because of their relative infrequency” (p. 269).

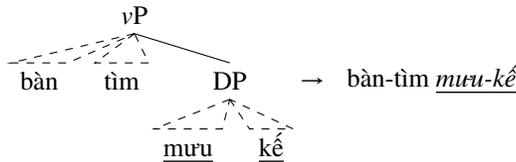
- a. Chinese: *chū-yǎn* ~ *yǎn-chū* “performance”  
*hé-píng* ~ *píng-hé* “peaceful”
- b. Kannada: *kurci mēju* ~ *mēju kurci* [chair-desk] “furniture”
- c. Italian: *studente lavoratore* ~ *lavoratore studente* “student worker”
- d. English: mother-child ~ child-mother (relationship)  
singer-actor ~ actor-singer  
England-Germany ~ Germany-England (match)

This lack of precedence order in coordinate compounds does not immediately lead to interleaving word order. However, it is a necessary step which, in combination with the proposal for the alternate tree traversal/linearization process proposed below, will result in the interleaved surface word order.

#### 4.2 Alternate Tree Traversal

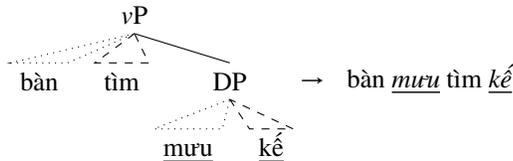
In order to account for the surface word order of interleaved phrases, I propose that there are two ways to linearize a tree which contains orthogonal nodes. Under the normal linearization algorithm, all terminals under a higher node must be spelled out before the terminals of a lower head, as shown in (20). This is possible with coordinate compounds, resulting in the non-interleaved surface order.

- (20) Normal Linearization: *bàn-tìm* *murú-ké* “discuss strategy”



However, I propose that there is also a possibility to traverse the tree in an alternate way during linearization. Under this alternate traversal, a single terminal from each of the compound nodes is chosen first and then repeated. If we think of the orthogonal nodes as sticking out on either side of the spine, this traversal goes all the way down the left, and then all the way down the right. This is schematized in (21) with dashed triangles as one side and dotted triangles as the other.

- (21) Alternate Traversal Linearization: *bàn murú* *tìm ké* “discuss strategy”



Put another way, this alternate linearization has to do with a method of interpreting the precedence relationships. Let us assume that the elements of each coordinate compound have no precedence relationship with each other but that the two compounds as whole units are in a precedence relationship. The interleaving order seems to be a particular way of satisfying these precedence requirements by having each member of the first compound ordered before one of the members of the second compound.

Note that both the normal linearization and the alternate traversal linearization are available to the grammar. Recall, however, that the interleaved word order adds some sort of extra semantic force to the meaning of the phrase. Because of this, I propose that the alternate traversal is triggered (at least partially) by some [F] feature on a node above the coordinate compounds. This will be explained more fully in the following section.

#### 4.3 Promotion under [F]

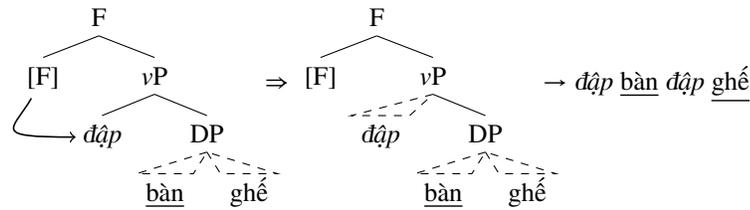
The alternate traversal proposed above can derive the instances of interleaving that are two adjacent compounds. However, it does not account for interleaving instances of a single element and a

compound without some further adjustments.

I propose that there is a morphosyntactic feature [F] which triggers the alternate traversal and also triggers what I will call “promotion” of next node to orthogonal status, allowing it to be a part of the alternate traversal linearization path. For example, in (22), the [F] feature promotes *đập*, and then triggers alternate traversal. The result is that *đập* is linearized immediately before both elements of the following compound (resulting in surface copying).

(22) Promotion and Interleaving

*đập bàn-ghế* ‘beat the furniture’ → *đập bàn đập ghế* ‘bang all over the furniture’



Note that this proposal is, in principle, similar to the proposal made by Noyer (1998). Noyer’s solution, however, explicitly involves reduplication of the first element before interleaving occurs. Given that interleaving is optional and that *\*đập đập bàn ghế* is ungrammatical, it seems that we need a way of explaining the surface form without an explicit reduplication step. “Promotion” allows for the copying of the single element only when it is involved in the alternate tree traversal. A tree without the [F] feature would show the non-interleaved version in which the single element only appears once (i.e., *đập bàn ghế*).

There is some marginal additional evidence for this type of traversal across larger units of the syntactic tree. Noyer (1998) reports that it is possible (although with slightly degraded grammaticality) to have interleaving with two grammatical elements copied before each member of a coordinate compound, as shown in (23).

(23) Longer traversal unit:

(Noyer 1998)

*sẽ không canh-giữ* → ?*sẽ không canh sẽ không giữ* “will not guard”  
 FUT NEG watch-keep FUT NEG watch FUT NEG keep

This sort of multiple element copying is difficult to explain with a reduplication analysis. If the alternate traversal is able to target a larger section of the syntactic structure, however, we can derive this multi-unit copying.

The promotion and alternate tree traversal solution also provides a solution for the 3-part compounds in Pacoh. Assuming that each member of the 3-part compounds has no precedence relationship with each other, as in the 2-part compounds, the alternate tree traversal will need to linearize a single element once for each compound member, resulting in three copies, one before each compound member.

## 5 Conclusion

In this paper, I presented evidence that the phenomenon of interleaving in Vietnamese and Pacoh is not a phonological phenomenon. Evidence from the morphosyntactic conditioning showed that interleaving is sensitive to morphosyntactic structure. The fact that interleaving does not apply to any syllable, but only those in certain morphosyntactic situations and also to larger units (polysyllables in Pacoh and multiply reduplicated compounds in Vietnamese) provided proof that the phenomenon is primarily dealing morphological units and not phonological units. Finally, the optionality and additional semantic force added by interleaving lends weight to an analysis with a difference in syntactic structure.

Following this evidence, I proposed that interleaving is the result of three interacting features of the morphosyntax. First, the fact that coordinate compounds are orthogonal to syntactic spine and have no precedence relationship between the members. Second, that there is an alternate traversal

of the syntactic tree available during linearization. And third, that single heads can be “promoted” to interact with this alternate traversal. These features together can derive the patterns found in interleaving phenomena.

Although I focused on Vietnamese and Pacoh in this paper, interleaving does appear in other languages, some examples shown in (24):

- (24) Interleaved in other Languages (Wälchli 2005; Lee-Kim 2016)
- a. Chinese: *da* “big” + *hong-lǎij* “red-green” → *da-hong-da-lǎij* “gaudy”
  - b. Korean: *ca* “self” + *mwun-tap* “ask-answer”  
→ *ca-mwun-ca-tap* “ask and answer to oneself”
  - c. Sochiapan Chinantec: *ciil*<sup>L</sup> DIM + *ʔlaʔ<sup>MH</sup>-naiʔ<sup>M</sup>* “cricket-grasshopper”  
→ *ciil*<sup>L</sup> *ʔlaʔ<sup>MH</sup>* *ciil*<sup>L</sup> *naiʔ<sup>M</sup>* “hopping insects”

I leave a fuller investigation of the phenomenon in these languages for future research.

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