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Domains of ordering

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Abstract
This paper develops a theory of linearization in which the LCA (Kayne, The antisymmetry of syntax, MIT Press, 1994) linearizes one portion of the clause, with a secondary algorithm linearizing a second portion of the clause when the LCA-determined order of terminals would conflict with other principles of the morphosyntax. The empirical focus is the correspondence or lack thereof between scope and word order in Japanese, Tagalog, and English: for one portion of the clause, there is a strict correspondence between the linear order of certain elements and their scope, while for another portion of the clause, this correspondence breaks down. Given a theory of LCA-determined linear order and clause structure following Biberauer [Linguist Inq 45(2):169–225, 2014], alongside a restricted theory of reconstruction, we show that the portion of the clause for which the LCA determines linear order is that which displays the strict correspondence between linear order and scope, while that for which the secondary algorithm determines linear order is where the correspondence between scope and linear order breaks down.

1 Introduction

A classic result in generative syntax is that the relative linear order of elements within a phrase is tightly constrained: for instance, complements to a head are always at least as close to the head as specifiers and adjuncts to the phrase. Kayne (1994) attempts to derive these principles of linear order from a linearization algorithm—the Linear Correspondence Axiom[1]—which is sensitive to c-command relationships

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[1] Strictly speaking, the LCA as proposed in Kayne (1994) is a requirement that structures be ordered in a particular way. I follow much of the literature in using "LCA" to refer to an algorithm to obtain such an ordering—which makes crucial reference to asymmetric c-command relationships—rather than the requirement that there be an ordering.

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between elements in the clause.[2] This algorithm predicts exactly one order of heads, specifiers, and complements when they do not occupy a derived position: spec > head > comp. Any departure from this order reflects movement to a derived position. For instance, prefixing verb-initial and apparent cases of right-adjunction in SVO languages require a certain type of remnant movement, while head-final languages require iterated instances of comp-to-spec movement.

In this paper, we examine various cases where the LCA leads us to expect a certain sequence of derivational steps to have taken place—in other words, I take seriously the predictions that adopting the LCA should lead us to expect. Using scope as a diagnostic for the derivational history, we get mixed results: the LCA-compliant derivation makes the right predictions for the relative scope of some of the elements in the clause, but not others. In this, a pattern emerges: the ordering of these two sorts of elements— those which are LCA-compliant and those which are not—seems to not be arbitrary. The elements for which the LCA-compliant derivation makes the right predictions for scope consistently precede the elements for which it does not—in other words, elements which are surface scope-rigid with respect to each other consistently precede elements which are not.

The theory developed is one in which the LCA is partially right and partially wrong. The LCA is used to generate a 'core' set of linearization statements for some, but not all, of the elements in the clause: these are the elements for which the LCA makes the correct predictions about scope. The other elements are those which—for independent reasons—cannot be linearized according to the LCA. The linear order of these 'peripheral' elements is determined by a separate algorithm, which appends linearization statements to the set of 'core' statements generated by the LCA.

The paper begins with a discussion of two verb peripheral languages: Tagalog (verb initial) and Japanese (verb final). Both languages display relatively free ordering of their arguments, commonly accounted for as the result of the availability of a scrambling movement operation; the languages differ in terms of the effect of scrambling on scope. We then see that an LCA-compliant analysis of both languages—following particularly analyses proposed in Biberauer et al. (2014)—makes certain predictions about scope and how scrambling might interact with it, which are in part correct and in part incorrect. The final generalization is that the two languages are remarkably similar when looked at in the right way. In both languages, one portion of the clause—that preceding the verb—displays a strict correspondence between linear order and scope, while the other portion of the clause—that following the verb—does not display this strict correspondence. This motivates the proposal at the heart of the paper: that the LCA is overriden when the linearization statements it would generate would come into conflict with an independent condition on morphosyntactic adjacency. It is shown that the theory neatly captures a number of aforementioned differences between the two languages. An extension of the account is developed to account for certain differences between clause-medial and sentence-final adjuncts in English.

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[2] See Chomsky (1995); Moro (2000) and Richards (2010) for refinement and development on various aspects of the theory developed in Kayne (1994), and see also Abels and Neeleman (2012) for a different set of critiques of Kayne's LCA.

2 Head-peripheral languages: Tagalog and Japanese

Our discussion begins with two head-peripheral languages: Tagalog and Japanese. Japanese is verb-final, with relatively free ordering of its arguments—i.e. it has scrambling (Saito 1992; Miyagawa 2001, a.m.o.).

(1) **Japanese scrambling**
    a. Taro-ga ringo-o   tabeta
       T.-NOM apple-ACC eat.past
       'Taro ate an apple.'
    b. ringo-o   Taro-ga tabeta
       apple-ACC T.-NOM eat.past
       'Taro ate an apple.'   Erlewine (p.c.)

Tagalog is verb-initial, and it also has scrambling among its postverbal arguments (Kroeger 1993). As is common in many languages of the Philippines, it has a voice system. One element, marked with *ang*, is selected as the pivot, with the thematic role of the pivot corresponding with a particular choice of verbal voice morphology. In the cases below, the pivot is the agent, and thus the verb appears in its actor voice form.

(2) a. Lumunon   [ang ina   ] [ng mani]
       AV.swallowed NOM mother   GEN peanut
       'The mother swallowed a peanut.'
    b. Lumunon   [ng mani] [ang ina   ]
       AV.swallowed GEN peanut   NOM mother
       'The mother swallowed a peanut.'   Richards (2017)

As we will see shortly, the scopal properties of these languages are distinct. In introducing these facts, we will also discuss what the LCA would require us to say to account for the relative order of the verb and its arguments in these languages. In particular, we follow an approach to head-initial and head-final word order under the LCA like that developed in Biberauer et al. (2014), on which information-structure neutral movement operations to produce the surface word order are both highly local and iterative.[3]

For Japanese, in any case where a head H introduces an argument but follows the verb, the following derivational sequence is required: the projection containing the verb must move above the argument, attracted by H below. Then the argument must move above the projection hosting the verb.

(3) [ARG [H [$_{VP}$ …]]] →   ARG H V
    [[$_{VP}$ …] [ARG [H <[$_{VP}$ …]>]]] →   V ARG H
    [ARG [[$_{VP}$ …] [<ARG> [H <[$_{VP}$ …]>]]]]   ARG V H

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[3] See Koopman (2005); Ishizuka (2012); Tokizaki and Kuwana (2013) for similar proposals specifically about Japanese, and Fukui and Takano (1998) for an argument against.

When these steps are iterated for multiple projections that introduce arguments, we make a desirable prediction: the relative scope of arguments in the clause should echo their linear order. Consider (4) which illustrates how the head introducing an external argument comes to follow the verbal complex, while delivering at the same time an SOV order. First, the complement of *v* is attracted to a position local to its origin, above both the subject and *v*. Then, the subject itself moves to a higher position, placing it above the object as well as the rest of the verbal complex.

(4) $[_{vP}$ SUBJ $[v [$ OBJ $[[_{VP} …] [<$OBJ$> [$ H $<[_{VP} …]>]]]]]]$ SUBJ *v* OBJ V H
$[[$ OBJ $[[_{VP} …] [<$OBJ$> [$ H $<[_{VP} …]>]]]] [_{vP}$ SUBJ $[v <[$ OBJ … VP …$]>]$
$]]$ OBJ V H SUBJ *v*
$[$ SUBJ $[[$ OBJ $[[_{VP} …] [<$OBJ$> [$ H $<[_{VP} …]>]]]] [_{vP}$ SUBJ $[v <[$ OBJ … VP
…$]>]]]]$ SUBJ OBJ V H *v*

As a consequence of this, the subject is consistently in a position from which it c-commands all other elements in the clause, and consequently we expect it to outscope them. For instance, as shown by the binding facts below in (5), objects cannot bind into subjects unless subsequently moved into a position above the subject. This follows by and large from the theory developed here: the object will be contained in the projection which contains the verbal complex in (5a). Provided the subject is unable to reconstruct to a lower, vP-internal position, we correctly predict that the linear order of arguments correctly predicts their scope.

(5) **Scope rigidity between arguments**
   a. *[soko$_i$-no   syain-ga   ] [mittu-izyoo-no   kaisya$_i$-o   ]
        it-GEN   company-NOM   three-or.more-GEN employee-ACC

      tyoosasita
      investigated

      'Their$_i$ employees investigated three or more companies$_i$.
      Structure for (5a) [S [[O V] [<S> T [O V]]]]
   b. [Mittu-izyoo-no   kaisya$_i$-o   ] [soko$_i$-no syain-ga   ]
        three-or.more-GEN company-ACC   it-GEN   employee-NOM

      tyoosasita
      investigated

      'Their$_i$ employees investigated three or more companies$_i$.   Takano (2010)
      Structure for (5b) [O [S [[<O> V] [<S> T [O V]]]]]

However, this approach makes the wrong predictions for negation. Subjects and objects in Japanese may (at least in principle) scope below negation, as shown in (6) (see also Shibata 2015a and references therein for further discussion). Suppose that NEG in Japanese is consistently projected in a position above the thematic positions of all arguments (following Kishimoto 2008; Shibata 2015a, b). This leads us to an impasse: we see from (6a) that the object has the option of scoping above negation, although it need not. This would seem to suggest that there is at least one position that the object—or the constituent containing it—may occupy in an SOV utterance that allows

the object to scope above negation. In (6b) we expect the subject to be able to outscope negation, given what we have said before for Japanese under the LCA.

(6) **Scope flexibility between argument and negation**
  a. John-wa zen'in-o tasuke-nakat-ta
     J.-NOM   all-ACC   help-NEG-PAST
     'John didn't help everyone.'   QP>Neg, Neg>QP (Hara 2003)
  b. Go-nin-izyoo-no seito-ga   sono hon-o   yoma-nakat-ta
     five-CL-more-GEN student-NOM that book-ACC read-NEG-PAST
     'Five or more students did not read that book.'   QP>Neg, Neg>QP
                                                            (Kataoka 2006)

But the fact that the subject is able to scope below negation is surprising when considered in combination with what we have seen so far. This would suggest that the subject may reconstruct to a low position in the clause, below negation, and more importantly, below a position from which the object takes scope. Here the problem arises: if the subject may reconstruct to this position, yet the object need not reconstruct below negation, we should expect the object in an SOV clause to be able to bind a variable in the subject through an identical process of reconstruction.

What we see here is that we get mixed results for head-final languages when we consider the predictions a straightforward, LCA-compliant approach makes for scope. The analysis sketched here, in line with Biberauer et al. (2014), leads us to expect linear order and scope to be tightly correlated. On such an approach, iff one element precedes another, then that first element should outscope the second, since both are determined by the same underlying syntactic relationship, namely asymmetric c-command. Here, the analysis seems correct for the relative scope of one set of elements in the clause: it makes the right predictions for arguments which precede the verbal complex, or for arguments with respect to other arguments. But it makes the wrong predictions for the scope of elements preceding the verbal complex with respect to scope-taking elements in the verbal complex itself. One span of the clause displays the tight correlation between linear order and scope we expect from such a theory, while another portion violates this expectation.

We will turn now to Tagalog, which is in many ways the mirror image of Japanese. Tagalog is a head-initial prefixing language,[4] with relatively free word order, as shown in (7). As mentioned earlier, Tagalog has an intricate voice system. Many analyses have been proposed for Tagalog voice (see Rackowski (2002) and Aldridge (2004) for two prominent approaches); for concreteness, I adopt a theory like that in Chen (2017), in which all arguments remain in-situ, although I believe the account developed here could be made compatible with other analyses.

(7) **Tagalog is head-inital with scrambling**
  a. Lumunon   [ang ina   ] [ng   mani   ]
     AV.swallowed   NOM mother   GEN peanut
     'The mother swallowed a peanut.'

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[4] I assume here that infixes in Tagalog are syntactic prefixes subject to morphophonological reordering, following McCarthy and Prince (1993).

b. Lumunon   [ng   mani] [ang ina   ]
   AV.swallowed   GEN peanut   NOM mother
   'The mother swallowed a peanut.'   Richards (2017)

Assuming the approach to word order adopted here, a different sequence of derivational steps is necessary to derive the relative order of head, argument, and verb in Tagalog. The argument must first move out of the constituent it is a specifier of. This must then be followed by subsequent movement of the phrase the argument has evacuated, to a slightly higher position than the derived position of the argument.

(8)   [ARG [HP H [VP …]]] →   ARG H V
    [ARG [HP <ARG> [H [VP …]]]] →   ARG H V
    [[HP <ARG> [H [VP …]]] [ARG <[HP <ARG> [H [VP …]]]>]]   H V ARG

Given such an LCA-compliant derivation for Tagalog word order, we have an expectation about the relative scope of negation and arguments in the clause: if negation precedes an argument, the argument should scope under negation, whereas if an argument precedes negation, the argument should scope above it. As we see in (9), this seems to be correct in Tagalog.[5]

(9)   **Surface scope rigidity between argument and negation in Tagalog**
    a. Hindi na-kita ni   Juan ang maraming batanot
       NEG PV-see GEN John NOM many   child
       'John didn't see the many children.'   ✓Neg > many, *many > Neg
                                             (Byma 1986)
       [[<TH> [NEG [VP …]]] [TH <[<TH> [NEG [VP …]]]>]]
    b. Maraming usang hindi b-in-aril ng   mga hunter
       many   deer NEG PV-shoot GEN PL hunter
       'Many deer were not shot by the hunters.'   ✓many > Neg (Miller 1988)
       [TH [[<TH> [NEG [VP …]]] [<TH> <[<TH> [NEG [VP …]]]>]]]

However, as we see below in (10), the LCA makes the wrong prediction for the relative scope of arguments in Tagalog: regardless of the relative order of the theme and agent in (10), the theme is unable to outscope the agent. This again contrasts with Japanese,

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[5]   Miller (1988) notes that for some speakers, nominals quantified with *marami*, "many", are able to take flexible scope with respect to negation when they appear in a post-verbal position, contrasting with Byma (1986) (as well as Aldridge (2005), for arguments, and Kaufman (2004), for quantificational adverbs). I suspect this has to do with the methodology employed by Miller (1988) to determine relative scope, rather than indicating two populations with different judgments about the relative scope of negation and post-verbal quantificational arguments. Rather than elicit the relevant sentences in a context that would preclude one of two possible scope relationships, Miller provided his language workers with two paraphrases, and asked them to choose which of the two "better captured the relative scope of negative particle and quantifier", absent a framing context. This method of elicitation is currently dispreferred (see Matthewson (2004) for some discussion of both the importance of context and whether speaker evaluations of paraphrasis should be taken as linguistic data). Given that these judgments stand by and large in contrast with what has been reported in the literature, and the aforementioned methodological concerns, I do not give much weight to Miller's claims about the relative scope of post-verbal quantifier and negation in Tagalog. Ultimately, further work is needed.

where the relative order of arguments seemed to straightforwardly predict their scope.[6]

(10) **Surface scope non-rigidity between argument and argument in Tagalog**
    a.   *N-agma-mahal [ang kanyang$_i$ ama] [ng bawat anak$_i$]
          AV-ASP-love   NOM POSS   father   GEN every child
          'His/her$_i$ father loves every child$_i$.'
    b.   *N-agma-mahal [ng bawat anak$_i$] [ang kanyang$_i$ ama]
          AV-ASP-love   GEN every child   NOM POSS   father
          'His/her$_i$ father loves every child$_i$.'   (Rackowski and Richards 2005)

What we see, then, is that the LCA correctly predicts certain interpretive possibilities for some but not all elements in the clause in both languages. For both languages, the elements that do not comply with the correspondence between linear order and scope we expect, given the LCA, are at the right edge of the clause: the verbal complex in Japanese, and the argument cluster in Tagalog. Put another way, the clause in both languages is bipartite: there is an initial portion of the clause where linear order cleanly maps to scope, and a later portion of the clause where linear order and scope do not correspond.

3 Proposal

We have seen that the LCA makes good predictions for portions of the clause in Japanese and Tagalog, but bad predictions for other portions. In Japanese, the scope of arguments preceding the verb is tied to their linear order with respect to each other, but not with respect to the verb itself. In Tagalog, the scope of elements preceding the verb is again tied to their linear order with respect to other elements, but the scope of elements following the verb does not correspond with their relative linear order. The basic idea presented here is that certain material in a clause may be forced to be linearized in a non-LCA compliant way as a result of conflict with independent morphosyntactic requirements, with material thus linearized consistently ending up to the right of elements that have been linearized through the LCA. This bifurcates the clause into an LCA-compliant section, and an LCA-non-compliant section, with the former always preceding the latter.

    I now present such a theory and discuss some of its consequences. I propose a pair of operations which apply to "salvage" structures whose LCA-determined linearization would lead to morphosyntactic conflict. I suggest that elements which would lead to a violation of such conditions may be marked as having **Exit**ed from the clause. The

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[6] As discussed in Rackowski and Richards (2005), the choice of voice in Tagalog has an effect on variable binding: in the patient voice, a quantificational patient may bind a variable in the agent. This has little impact on the analysis that follows: Tagalog pivots are commonly taken to be able to move to a clause-medial position above the agent (Guilfoyle et al. 1992; Aldridge 2004; Rackowski and Richards 2005; Hsieh 2020, a.o.), which would presumably feed variable binding. Provided this position is relatively low, the analysis presented in the next section should extend to these cases as well.
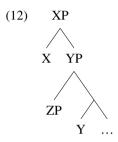
result of this is that their linear order with respect to other elements in the clause is not determined by the LCA.

(11) **Exit**
A element targeted by **Exit** (and the elements it dominates) is ignored by the LCA for elements that are not contained within that element.

Consider the following structure, where ZP cannot appear in the position it is in for reasons related to the morphophonology of X and Y (to be made more specific shortly): if in (12) ZP is targeted by Exit, then it will not be linearized with respect to X or Y, and thus will allow the morphophonological needs of X and Y to be met, since ZP does not appear in this problematic position.

(12)   XP
       /\
      X YP
         /\
       ZP /\
          Y …

This of course raises the question of how ZP is to be pronounced at all.[7] Here, I propose that a 'secondary' linearization strategy, given in (13), is used to ensure that elements that have undergone Exit are pronounced at all. This linearization scheme is parasitic on the linearization statements generated by the LCA: it takes the last/rightmost element for which linearization statements have been generated, and appends a linearization statement 'onto' this rightmost element.[8] The result of this is that elements that have not been linearized through the LCA will always follow elements that have.

(13) **Re-entry of Y:**
Add $<X, Y>$, where for Y Exited, there $\neg\exists$ statements of the form $<Y, \_\_\_\_>$, $<\_\_\_\_, Y>$, and there is a linearization statement involving X.

In other words—at least in languages where (12-13) are operative—the clause will be partitioned in two, as shown in (14). There will be one set of elements whose linear order is directly determined by the LCA—for these elements, linear order will also be a good predictor of the scope that they take. There will be another set of elements whose linear order is not directly determined by the LCA—for these elements, their linear position with respect to other elements will not be a good predictor of their scope. Furthermore, the latter set of elements will consistently follow the former.

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[7] One possibility is that it is not pronounced at all—that is to say, no linearization statements involving ZP are generated. This could plausibly account for the fact that null pronominals in Japanese appear to be derived through argument ellipsis (**saito2007east**; Oku 1998; Kim 1999, a.o.). Argument ellipsis, on this approach, would simply reflect that a specifier has been targeted for Exit, without subsequent Re-entry.

[8] I follow Kayne (1994) in representing linearization statements as ordered pairs of the form $<X, Y>$, which denotes that X precedes Y.

(14) **Clausal partitioning**
[ORDERED BY LCA] [ORDERED BY RE- ENTRY]

The second part of the theory sketched here is a particular sort of morphological condition, drawing on certain proposals made in Richards (2016), that may come into conflict with the statements of linear order that the LCA derives. The core idea is that there is a requirement that elements which stand in a selection relationship be required to be linearly adjacent, defined in terms of linearization statements, as in (15).

(15) **Selectional Contiguity:**
¬∃Z: <X, Z>, <Z, Y>, when X and Y are in a selectional relationship and X precedes Y.

Note that the presence of a specifier or adjunct between the heads X X and Y will result in a violation of (15): it will be linearized 'between' X and Y—yet X here selects for Y(P).

(16) [$_{XP}$ X [$_{YP}$ ZP [Y …]]]
Linearization statements by LCA: <X, ZP>, <X, Y>, <ZP, Y>

Movement of the specifier ZP to a higher position might be one way that such relationships come to be satisfied. Alternatively, the set of linearization statements could be directly altered, through the application of Exit and Re-entry as discussed above.[9,10,11]

For concreteness, we will now see how this system allows us to account for Japanese and Tagalog. In Japanese, the clause structure looks something like that in (17), here illustrated with an active transitive clause.[12] This tree is in violation of selectional Contiguity: intuitively, in the tree above, the subject, for instance, intervenes between T and v, and the object intervenes between v and V.
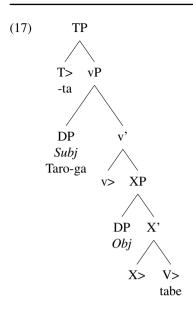
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[9] The proposal here is similar to one made in Richards (2016) for Japanese, but differs in its technical details. In particular, the theories make distinct predictions when extended to Tagalog. For the theory developed here, we will correctly predict the relative order of postverbal nominals to be free. With Richards' theory, we incorrectly predict obligatory VOS word order, with the highest nominal in the clause consistently being rightmost.

[10] The idea that morphological requirements might come into conflict, with one being satisfied at the expense of another, has antecedents in the literature: see most recently Kusmer (2020) and Zukoff (2022), who propose explicitly that other factors of the morphophonology may lead to violations of Kayne's linearization algorithm.

[11] The idea that heads and phrases might be linearized according to distinct principles has a spiritual antecedent in Kural (1997).

[12] I here use XP as a placeholder for the position the object occupies in order to precede the verb. This could be an independent projection in which internal arguments are introduced, as proposed by Ahn (2022). Alternatively, the object could move from comp,V to spec,VP, following more traditional assumptions. In either case, the problematic configuration should be generated: the object appears between v and the head of the phrase v selects.

(17)   TP
            ╱   ╲
        T>   vP
        -ta   ╱ ╲
            DP   v'
          Subj   ╱ ╲
         Taro-ga v>   XP
                       ╱   ╲
                    DP   X'
                  Obj   ╱ ╲
                        X>   V>
                              tabe

(18) Taro-ga ringo-o   tabeta
      T.-NOM   apple-ACC eat.past
      'Taro ate an apple.'

Consider this now in a more formal light. If this tree is linearized solely by the LCA, we will generate at least the following set of linearization statements—the left element in each ordered pair c-commanding the right element.

(19) **Partial list of LCA-determined linearization statements for (18)**
      $<T,DP_{subj}>$, $<DP_{subj},v>$, $<T,v>$, $<v,DP_{obj}>$, $<v,V>$

To ensure that selectional Contiguity is satisfied, all the heads in the extended verbal projection of Japanese are targeted by Exit: nodes that have been targeted by Exit are flagged by a $>$ in the tree above. Consequently, only the subject and object are linearized according to the LCA. The subject c-commands the object—as the strict scope facts discussed in the previous section would lead us to expect—and so must be linearized before the object. Note that (18) derives an expected SOV word order without recourse to a sequence of iterated movement operations like that discussed in Biberauer et al. (2014); however, it does properly capture a prediction of that theory, which is that for elements whose linear order is governed by the LCA, precedence should directly map to scope.

Once an order has been determined for elements that have not undergone Exit by the LCA, Re-entry then takes place to establish the linear order of the elements targeted by Exit: in the case of Japanese, this is the verb and its associated affixes. Iterated application of Re-entry then establishes a set of selectional Contiguity compliant linearization statements for these heads—accounting for the fact that the verb in Japanese is sentence final.[13] Each statement in (20b) is created through successive application of Re-entry.

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[13] We could imagine other factors—such as morphophonological templates—also being a factor which might determine the relative ordering of elements subject to Exit and Re-entry.

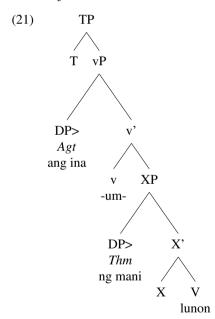(20) **Partial list of linearization statements post-Re-entry**
    a. <DP$_{subj}$,DP$_{obj}$>   *Determined by the LCA*
    b. <DP$_{obj}$,V>, <V,v>, <v,T>   *Determined by Re-entry*

This analysis predicts that the linear order of arguments directly reflects their scope in Japanese, since their linear order is derived through a mechanism sensitive to c-command, which also determines scope. The linear order of elements in the verbal complex does not, in contrast, since their linear order is not determined by c-command. In particular, the flexible scope of negation could reflect the possibility that it can adjoin at various positions in the clause in Japanese, with Re-entry and selectional Contiguity—considered together—consistently resulting in it being placed in one position in the verbal complex, irrespective of the scope it takes.[14]

    We turn now to Tagalog. Following Chen (2017), I adopt a theory of Tagalog clause structure on which post-verbal arguments generally remain in their thematic position. Tagalog, for this system, is just like Japanese, but it forces arguments and satellites to **Exit**, rather than the verbal complex, indicated again by > in the tree below. Unlike in Japanese, a singular syntactic structure in Tagalog may be mapped to different linear orders—those in (22)—as a consequence of the arguments, rather than the verb, having been subject to Exit.

(21)

(22) a. Lumunon   ang ina   ng mani
             AV.swallow NOM mom GEN peanut
             'The mother swallowed a peanut.'
      b. Lumunon   ng mani ang ina
             AV.swallow GEN peanut NOM mom
             'The mother swallowed a peanut.'
                            Richards (2017)

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[14] Interestingly, this feature of negation seems to be common to other head-final languages with SOV and A-scrambling. Beck and Kim (1997) note that negation in Korean behaves similarly, and Storoshenko (2004) draws further parallels between the languages in this respect. Kelepir (2001) observes the same flexible scope for negation in Turkish. One reason for this—provided the account developed here extends to the languages in question—could be that learners are unwilling to assign fixed scopal interpretations to elements whose linear order is not directly determined by c-command.

For the tree in (22), the same problem emerges: if the structure as a whole is linearized following the LCA, a conflict will emerge between these ordering statements and selectional Contiguity.

(23) **Partial list of LCA-determined linearization statements for (22)**
$<T,DP_{subj}>$, $<DP_{subj},v>$, $<T,v>$, $<v,DP_{obj}>$, $<v,V>$

 The solution favored here involves applying Exit to each DP in the tree, rather than the heads in the clausal spine. T will precede v, which in turn precedes V, deriving the head-initial order of the Tagalog verbal complex. There are here two options for the relative ordering of arguments—which would of course proliferate were more arguments to be added to the clause. Applying Re-entry to the theme before the agent would result in the additional linearization statements given in (24b), while applying Re-entry to the agent before the theme would result in the set of linearization statements given in (24c).

(24) **Options for linearization statements derived through Re-entry**
   a. $<T,v>$, $<v,V>$
   b. *Option 1:* $<V,DP_{thm}>$, $<DP_{thm},DP_{agt}>$
   c. *Option 2:* $<V,DP_{agt}>$, $<DP_{agt},DP_{thm}>$

The relative order of post-verbal arguments is thus free, since there is no necessary ordering in which Re-entry applies to these arguments (unlike that in Japanese).[15] Their linear order is thus underdetermined. Scope in contrast is read directly off the hierarchical representation. A consequence of this is that the linear order of arguments in Tagalog does not reflect their scope, since their ordering is not contingent on c-command. Rather, it is their underlying position in the clause which determines their scope.[16]

We now have an understanding of, among other things, the distinction between pre-verbal scrambling in Japanese, which alters scope, and scrambling in Tagalog, which does not. The former involves elements whose order is determined by c-command; rearranging such elements creates new c-command relationships, resulting in additional scope-taking possibilities. The latter results from the ordering of Re-entry being underdetermined, and does not reflect any alternation in the underlying syntactic structure. In the subsections that follow, we investigate some further consequences of the theory developed here.

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[15] Note that there are some well-known *tendencies* regarding more or less frequent ordering of post-verbal constituents—see for instance Payne (1982) and Guilfoyle et al. (1992)—but as shown by Kroeger (1993), all permutations of postverbal arguments are in principle available. See also Erlewine (2018) and Erlewine and Lim (2022) for similar proposals about free generation of linearization statements for post-verbal elements in two other Austronesian languages.

[16] It is of course important that the theme in (25) is blocked from A-scrambling above the agent in the syntax. Were this possible, we should expect the theme to be able to scope above or below the agent, independent of their relative order. This problem will be addressed shortly.

3.1 Scope rigidity and string-vacuous scrambling

It is important for the theory developed here that post-verbal nominals in Tagalog preserve their relative height in syntax. Were these arguments able to scramble in the narrow syntax, we should expect themes to be able to scope flexibly with respect to agents. Since they cannot, we will need some way of ruling out this sort of scrambling. I suggest that this is a result of a more general ban on string-vacuous scrambling (Saito 1985; Chomsky 1995; Sabel 2005), a formulation of which is given below:[17]

(25) **Ban on string vacuous movement:**
Movement is banned if it results in no new linearization possibilities being generated.

  If (25) holds in addition to the theory developed so far, the result will be that post-verbal arguments in Tagalog will be unable to move to a clause-medial position in the syntax. If an argument appears post-verbally, this is a result of it having been subject to Exit, and thus ignored by the LCA for the purposes of generating linearization statements. As a result of this, movement of an argument to a position where it would still need to be targeted for Exit would not be allowed, since it would be string vacuous: no new linearization statements could be created as a result of this movement, since the position moved to does not allow an element to be pronounced in said position. For instance: A-scrambling of a theme to an outer spec,vP in Tagalog would be barred, since an element which occupies this position is subject to Exit; movement to such a position cannot alter the relative order of the moved element and any elements it has crossed in the syntactic structure. This ensures that Tagalog post-verbal arguments will always remain structurally in-situ, which appears to be correct given the scope inflexibility of post-verbal arguments.

  The effect of this ban can of course also be seen in Japanese, a language for which bans like (25) have been proposed. In Japanese, null pronominal subjects always trigger a condition C violation with a coindexed possessor contained in an object, as shown below (Hoji 1985). This contrasts with overt subjects, scrambling across which is able to rescue a condition C violation.

(26) **Condition C with null subject**
    a. *pro_i [Taroo-no$_i$ hahaoya-o] semeta
            T.-GEN   mother-ACC   blamed
      'He$_i$ blamed Taroo$_i$'s mother.'   Erlewine (p.c.)
    b. [Taroo-no$_i$ hahaoya-o] kare-ga$_i$ semeta
        T.-GEN   mother-ACC   he-NOM blamed
      'He$_i$ blamed Taroo$_i$'s mother.'   Erlewine (p.c.)

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[17] It's worth noting here, as pointed out to me by two reviewers, that the ban in (25) is incompatible with movement of the sort necessary for prefixing, assuming a theory like Biberauer et al. (2014). As far as I can tell, this is not particularly problematic: all this would seem to suggest is that prefixing, verb-initial languages place their arguments in a post-verbal position as a result of a process like that put forth in this paper.

We know that scrambling in Japanese is possible, and that it affects binding. Nevertheless, it seems to be the case that scrambling of the object across the subject in (26) is ruled out. This is accounted for by (25): such movement would cross a phonologically null element, and therefore no new linearization statements would be generated by scrambling the object to the left of the subject. The ban in (25) thus locks the object in-situ in cases like (26).

3.2 Scrambling and stress

Scrambling in Tagalog and Japanese behave differently in another way: they differ in whether or not they have an effect on the determination of nuclear stress within the clause. Much work suggests that certain movement operations matter for the determination of nuclear stress, which is itself determined by the relative depth of embedding of various elements in the clause (Bresnan 1971; Cinque 1993; Kahnemuyipour 2009, a.m.o.). In Japanese, scrambling affects nuclear stress assignment: nuclear stress falls on the object in an SOV clause, but falls on the subject in an OSV clause (Ishihara 2000; Miyagawa and Tsujioka 2004; Sato 2009; Ishihara et al. 2018). For the theory developed here, this follows more or less straightforwardly: movement of the object to the left of the subject necessarily reflects that the object actually occupies a position in the syntactic structure from which it c-commands the subject. This alters the relative depth of the arguments in the clause, and thus changes which of the two is eligible for nuclear stress assignment.

In Tagalog, as discussed in Richards (2017), the facts are different. To understand this discussion, it will be helpful to discuss the Tagalog voice system, since it has not yet been pertinent. Tagalog, like many Phillippine languages, has an elaborate voice system; one nominal argument is selected as the pivot (for the cases discussed throughout this paper, the agent), which receives the marker *ang*; the choice of pivot is furthermore reflected in the morphology of the verb: if an agent is the pivot, then the verb surfaces in an *actor voice* form, while if a patient is pivot, the verb surfaces in a *patient voice* form. The pivot in Tagalog is syntactically privileged: Ā-extraction of pivots is generally free, contrasting with all other arguments; pivots scope over all other elements for the purposes of binding and, furthermore, pivots are valid controllers of PRO in adjunct clauses (see Kroeger (1993) for more discussion of the properties of pivots in Tagalog). Theories of the Tagalog voice system vary: Aldridge (2004); Rackowski and Richards (2005) propose that non-agent pivots undergo movement above the agent, while Chen (2017) adopts an Agree-based analysis where pivots remain in-situ.

Keeping this in mind, we can now return to our discussion of the stress facts in Tagalog. Richards shows that the relative order of subject and object does not determine which is assigned nuclear stress: in agent voice clauses, for instance, a theme will always be more prominent than an agent in a comparable position. Richards suggests that this is a result of themes always bearing nuclear stress. For the theory developed here, this follows straightforwardly. In agent voice clauses—those in which the agent is the pivot—the agent is always higher in the clause than the theme—and as a result,

it will always be the theme which is targeted for nuclear stress assignment. Perhaps more interestingly, the same is true in patient voice clauses: here too it is the agent which is more prominent than the patient. This would be suggestive of the theory of Tagalog voice adopted earlier, where arguments generally occupy their base-generated or thematic position, in line with proposals about the Tagalog voice system like Chen (2017).

4 Right adjunction in English

We have now seen how the proposed system for linearization accounts for a variety of facts in Japanese and Tagalog, particularly with respect to scrambling. We have a more general expectation at this point: any element which is merged in the middle of the clause in a verb-medial language should either be required to evacuate this position through movement, or be subjected to Exit. In this section we turn our attention to English adverbs, and see that this indeed appears to be the case.

As has long been noted, scope-taking adverbs in English can appear in at least two distinct positions in the clause, as shown below.

(27) **Position 1**
    a. John twice slammed the door.
    b. John intentionally slammed the door.

(28) **Position 2**
    a. John slammed the door twice.
    b. John slammed the door intentionally.   following Andrews (1983)

There is a clear distinction between clauses with multiple adverbs in position 1 on the one hand, and multiple adverbs in position 2 on the other (Andrews 1983; Pesetsky 1995; Takano 2003; Larson 2004, a.o.). The relative order of position 1 adverbs is fixed.[18]

(29)   a. (?) John twice intentionally slammed the door.
     b. * John intentionally twice slammed the door.   following Andrews (1983)

But the relative order of position 2 adverbs is free.

(30)   a. John slammed the door twice intentionally.
     b. John slammed the door intentionally twice.   following Andrews (1983)

The pattern in (29) is more or less what one expects: the adverbs in question must adjoin in a certain hierarchical order (Cinque 1999; Ernst 2002), and the LCA determines their linear order based on that hierarchy.[19] And indeed, as noted in Andrews

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[18] See also Cinque (1999, p. 25ff) and references therein for discussion of these and related facts.

[19] The choice of Cinque or Ernst here bears little on the subsequent discussion, as far as I can tell.

([1983](#)), the relative scope of the adverbs in (29) is fixed: *twice* must scope above *intentionally.*

(30), then, is somewhat surprising. If the order of position 2 adverbs is to be determined solely by the LCA, the following set of movement operations must take place to derive the order in (29).

(31) a. [intentionally VP]
b. [VP [intentionally ~~VP~~]]
c. [twice [VP [intentionally ~~VP~~]]
d. [[VP [intentionally ~~VP~~]] [twice ~~[VP [intentionally VP]~~]]]

However, the derivation makes a prediction about NPI licensing: for sentences involving multiple post-verbal adverbs which follow from derivations like that in (31), we should expect the rightmost adverb to be unable to license an NPI in the first adverb.[20] For the first adverb to occupy a position from which the LCA will determine it to precede the second, it must move to a position from which the second adverb no longer c-commands it. But this is incorrect—as we see in (32a-b), a structurally high position 1 adverb may license an NPI either in a lower position 1 adverb, or in a position 2 adverb. Surprisingly for the pure LCA approach, in (32c), we see that a position 2 adverb may license an NPI in another position 2 adverb which precedes it, as pointed out in Branigan ([1992](#)). This is contrary to the expectation that we have if (32c) reflects a derivational sequence like that in (31).

(32) a. John has [only twice] [at all intentionally] slammed this door.
b. John has [only twice] slammed this door [at all intentionally].
c. John has slammed this door [at all intentionally] [only twice].

There are at least two reasons to believe that (32c) is truly surprising if it is to result from an LCA-compliant derivation, as in (31). The first is that other instances of VP movement in English do not seem to allow reconstruction for NPI licensing (Huang [1993](#)), as shown below.

(33) a. [Slammed this door (*at all) intentionally], John [only twice] has.
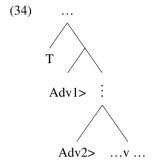b. [Slammed this door (*at all) intentionally], John has [only twice].

The second has to do with our discussion of Japanese in Sect. [2](#). There, we saw that—on a purely LCA-based approach to Japanese clause structure—objects in SOV clauses move to a position from which they could potentially scope over a reconstructed subject. The Japanese facts could be accounted for if movement for LCA-compliance generally does not allow for reconstruction—but were this the case, this would leave (32c) as a surprise, as the sort of movement that would give rise to (32c) would involve a sort of movement for which reconstruction is generally blocked.

I would like to suggest that position 2 adjuncts in English may in principle arise as a result of Exit and Re-entry, analogous to portions of the clause structure in Japanese and Tagalog, as discussed before in Sect. [2](#). The basic idea is that position 2 adjuncts

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[20] See also Takano ([2003](#)) for discussion of comparable facts.

in English originate in a clause medial position, similar to that which position 1 adjuncts occupy.[21] Crucially, as schematized below, this position is between T and v. As a result—if position 2 adjuncts remain in this position—a problem will arise for selectional Contiguity: v and T will not be linearly adjacent, yet are in a selectional relationship. In such cases, position 2 adjuncts are subject to Exit and subsequent Re-entry, forcing them to appear at the right periphery of the clause. In cases where more than one position 2 adjunct is present in the clause, the result will be that the relative ordering of these adjuncts will be underdetermined.

(34)   …

    T

    Adv1>   ⋮

        Adv2>   …v …

On this approach, the clause in English is bifurcated: the linear order of everything in the clause up to and including internal arguments is determined by the LCA—the order of elements past that is determined by Re-entry.

A particularly interesting interaction arises when we consider the possible orders of position 2 adjuncts in combination with heavy NP shift (see also Ross 1967; Bresnan 1976; Larson 1988, a.o.) for some discussion of this construction). HNPS is a case of apparent rightward movement, as shown in (35).

(35)   John ate quickly a bowl of delicious chicken noodle soup.

There is evidence that HNPS does involve overt movement of the object to a higher scopal position. This is evinced by, among other things, the fact that an object which has undergone HNPS is able to license parasitic gaps (Nissenbaum 2000), as shown below. Given that parasitic gaps are generally licensed only through A-movement, this would suggest that HNPS is not simply a result of Exit and Re-entry.

(36)   John approved _____

                without actually reading _____
                  a large number of fraudulent travel requests

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[21] We might, of course, wonder where in the clause position 1 adjuncts—those which appear preverbally—are adjoined. If they are adjoined below T, for instance, it will be important that Selectional Contiguity not subject them to Exit. Here there are several possibilities. One is that they appear between heads that are not in the relevant sort of selectional relationship which selectional Contiguity is sensitive to, while position 2 adjuncts are. This could predict potentially subtle interpretive distinctions between position 1 adjuncts and position 2 adjuncts with respect to other scope taking elements in the middle of the clause. I leave this topic for future work.

As proposed in Kayne (1998), HNPS across an adjunct involves a derivational sequence like the following.

(37) a. [V O]
      V O
   b. [ADV [V O]]
      ADV V O
   c. [[V O] [ADV < [V O] >]]
      V O ADV
   d. [O [[V < O >] [ADV < [V O] >]]]
      O V ADV
   e. [[[V < O >] [ADV < [V O] >]] [O [[V < O >] [ADV < [V O] >]]]]
      V ADV O

An interesting consequence of this approach—in light of the theory of position 2 adjuncts determined above—is that HNPS of an object will 'extend' the portion of the clause whose linear order is determined by the LCA. The order of an HNPS'd element is determined by the LCA. Re-entry of a previously Exited element cannot place that element between two elements that are ordered by the LCA. Any post-verbal element across which HNPS has taken place, then, must also have arrived in this position as the result of an LCA-compliant derivation.

Holding Kayne's proposal about HNPS to be correct, an expectation, then, is that post-verbal, position 2 adjuncts should display restricted word order when HNPS takes place across them. As we see below, HNPS may in principle pass a position 2 adjunct—presumably following a derivational sequence like that outlined above in (37).

(38) a. John opened intentionally the beautiful mahogany door.
   b. John opened twice the beautiful mahogany door.

However, when there is more than one position 2 adjunct which has been crossed by HNPS, the adjuncts display the ordering restrictions that they would have, were they to occupy position 1, as shown below.[22]

(39) a. John opened twice intentionally the beautiful mahogany door.
   b. * John opened intentionally twice the beautiful mahogany door.

As proposed above, HNPS involves generation of an adjunct within the clause, with an instance of remnant movement deriving a structure from which the LCA will determine the relative order of verb, adjunct, and object. We have furthermore seen that there is only one LCA-derivable order of the adverbs in question. In cases like (39), this order is observed, and the sentence is admissable. In cases like (39), this order is not observed, and the sentence is not admissable. HNPS across the adverbs in question forces these adverbs to be linearized according to the LCA—for which

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[22] These judgments are in-line with my own judgements as a native speaker, as well as those of two other speaker-linguists I have confirmed them with.

only one of the two orders arises, that which is associated with their relative order in position 1.

(40) [[[V < O >] [ADV1 [ADV2 < [V O] >]]] [O [[V < O >] [ADV1 [ADV2 < [V O] >]]]]]
    → [[[V] [ADV1 ADV2]] [O]]   *representation* sans *deleted copies*
    → V ADV1 ADV2 O   *resultant linear order*

We should, of course, expect this rigidity of position 2 adverbs not to be generally true of post-verbal adjuncts in HNPS contexts—the restriction should arise only when the object shifts across adverbs. For instance, as shown in (41), HNPS to a position to the left of the adverbs in question does not enforce an ordering restriction on these adverbs. These elements lie outside of the domain of the sentence for which the LCA alone determines linear order.

(41) a. John mentioned to Mary these astonishing facts twice intentionally.
     b. John mentioned to Mary these astonishing facts intentionally twice.

Before moving on, it is worth discussing some scopal facts of adverbs in position 1 and adverbs in position 2. As we noted in Japanese and Tagalog, linear order seemed to be dissociated from scope for elements whose order was determined by Exit and Re-entry: in Japanese, for instance, negation seemed to scope quite freely, because it could adjoin in multiple positions in the clause, with Re-entry forcing to be pronounced in a particular position. There is a distinction between position 1 adverbs and position 2 adverbs in terms of their scope which seems somewhat analogous. As noted in Andrews (1983), the relative scope of position 1 adverbs is fixed: the leftmost adjunct obligatorily outscopes the right.[23]

(42) John twice intentionally slammed the door.   (✓twice > int.; *int. > twice)

This is what we should expect for elements whose order is determined solely by the LCA: their relative order reflects the c-command relationships between the two, which in turn determines their scope. However, as noted in Phillips (1996); Takano (2003), the same is not true of elements in position 2. The scope of these elements, instead, seems to be determined by whichever of the two bears stronger stress—the more prominent element outscopes the less prominent. So, for sentences like (43), both readings are in principle available, determined solely by which of the two is more heavily stressed, completely independent of their relative order.[24,25]

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[23] See also Kaufman (2004) for similar facts regarding the scope of adverbs from Tagalog.

[24] I set aside exactly what allows for inverse scope in the examples that follow, and leave instead the following observation as a potential avenue for further investigation. To my ear, the example in (29b) improves considerably if the initial adverb—there, *intentionally*—bears focal stress. Plausibly, the cases discussed here, where *intentionally* is able to scope above *twice* when it is stressed, would reflect an underlying structure where *intentionally* appears above *twice*, licensed through focal stress on *intentionally*. While this does not provide an answer to the puzzle here, it does tell us where such an answer could be found: the right theory of why focused adverbs may appear outside of the order we expect given Cinque's hierarchy.

[25] As a reviewer notes here, these facts bring to mind the question of what factors, if any, restrict the relative order of post-verbal arguments. As noted in Hawkins (1990, et seq.), principles of parsing presumably play a

(43) a. John slammed the door TWICE intentionally.   twice > intentionally
      b. John slammed the door INTENTIONALLY twice.   intentionally > twice
      c. John slammed the door twice INTENTIONALLY.   intentionally > twice
      d. John slammed the door intentionally TWICE.   twice > intentionally

As we should expect, HNPS across postverbal adverbs enforces scopal rigidity between the two, in addition to enforcing the restriction on linear order characteristic of adverbs in position 1.[26]

(44) John opened twice intentionally the beautiful mahogany door.

(✓twice > int.; *int. > twice)

What we have seen is that the effects of Exit and Re-entry can be found in head-medial languages as well. The introduction of adjoined material in a clause-medial position forces certain elements to undergo Exit and Re-entry, allowing them to be freely ordered. More interestingly, we saw here that the analysis of HNPS developed in Kayne (1998) appears to be on the right track, when considered alongside the proposal made here. On that approach, HNPS involves a series of remnant movements, made obligatory if the LCA is to determine the order of HNPS'd objects. This led us to expect that HNPS across multiple postverbal adverbs should preclude orders of the adverbs which could only arise as a result of Exit and Re-entry, and we found that our expectation was borne out.

5 Recap and potential extensions

What we have seen here is that—across a variety of languages—there is a particular pattern: for one portion of the clause, the linear order of elements seems to by and large determine their scope, but for another portion of the clause, the scopal properties of elements is not predictable based on their linear order. I suggested that this reflected whether or not the LCA determined the linear order of the relevant constituents, and developed a theory (based on an idea in Richards (2016)) which accounted for these facts. This ended up allowing us to account for distinctions between Tagalog and Japanese with respect to scrambling, as well as differences between pre- and post-verbal adverbs in English. Perhaps more surprisingly, we saw that an analysis of HNPS proposed in Kayne (1998) ends up making a number of correct predictions in combination with the theory of linearization developed here. The upshot of this is that the LCA is correct, but not for the entire clause—and that there are a certain set of properties which hold cross-linguistically for elements which are linearized by the secondary mechanism proposed here.

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role in determining the relative order of adjuncts; factors like the relative complexity of constituents as well as prosodic salience might play a factor here. Such factors have been argued to play a role in the ordering of post-verbal arguments in verb-initial languages, for instance Mam (Mayan) (Minkoff 2000). See also Erlewine and Lim (2021) for some discussion of a particularly strong preference to avoid ambiguity in Pangasinan, an Austronesian language of the Philippines.

[26] However, the particular intonational characteristics of HNPS may present a potential confound for these examples, as it is no longer possible to make one adverb noticeably more prominent than the other.

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