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Deriving scrambling with word order freezing

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A number of languages allow for flexible word order between arguments that are sufficiently distinguishable, but "frozen" relative word order for arguments that are not. We present a new, derivational approach to such effects that involves positing optional scrambling probes that target various formal features that pre-exist on potential goals. In particular, there are no special-purpose "scrambling features," contra Müller (1997; 1998) and Grewendorf & Sabel (1999) a.o. The features that these optional probes can target may be restricted and subject to variation. Evidence for the proposal comes from the observed speaker variation in postverbal word order possibilities in Pangasinan, a predicate-initial Austronesian language of the Philippines. We show that our proposal is also compatible with facts that at first glance suggest a functionalist account of freezing effects.

1 Introduction

The nature of free word order has been a subject of recurring interest in linguistic theory. Ross (1967: 75) proposed an optional rule of "scrambling" for languages such as Latin and much subsequent work since Saito (1985) has treated scrambling as a form of optional movement. A central question then has been whether scrambling could or should be described as a feature-driven movement (see e.g. Saito & Fukui 1998; Grewendorf & Sabel 1999), especially given the now widely-adopted Minimalist Program assumption that all movement is driven by probe features of functional heads (Chomsky 1995; 2000). Alternative, non-movement approaches attribute free word order to the adjunction of apparent arguments as in Jelinek (1984), Baker (1996), and Bošković & Takahashi (1998), or to an altogether distinct mode of linearization as in Fowlie (2013) and Branan (2022), building on earlier intuitions as in Hale (1980; 1983).

In this paper, we contribute to this debate by highlighting the susceptibility to *word order freezing* as a key explanandum for the nature of free word order. In a number of languages that allow for flexible word order, the relative order of two arguments becomes fixed if they are formally similar, as famously observed in Russian by Jakobson (1963: 269) and in German by Chomsky (1965: 126). We illustrate this freezing effect in Pangasinan, a predicate-initial Austronesian language of the Philippines which will provide our motivating case study here. Postverbal arguments in Pangasinan can be introduced by case-invariant demonstrative articles. When two such arguments differ in number, postverbal word order is free:[1]

(1)   **Free postverbal word order in Pangasinan:**
        A-nengneng $=$ to$_i$ { [**may** bii]$_i$ [**ira-may** la~laki] / [**ira-may** la~laki]
        PV-see   GEN.3SG   DEM woman PL-DEM PL-man   PL-DEM PL-man
        [**may** bii]$_i$ }.
         DEM woman
        'The woman saw the men.' / *'The men saw the woman.'

However if both arguments match in number, their order is "frozen" and limited to an "agent < theme" order:

(2)   **Word order freezing when two arguments are formally indistinguishable:**
        A-nengneng $=$ to$_i$ [**may** bii]$_i$ [**may** laki].
        PV-see   GEN.3SG DEM woman   DEM man
        'The woman saw the man.' / *'The man saw the woman.'

Described in terms of the applicability of scrambling, freezing effects suggest that only phrases that can be formally distinguished may be reordered by scrambling. We claim that the existence of categorical freezing effects of this form is a crucial hint for the nature of scrambling itself.

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[1] As we discuss below, a postverbal pronoun doubles the agent (here, third-singular *to*) in such examples, uniquely identifying the singular 'woman' as the thematic agent here, regardless of word order.

Here we present a new approach to scrambling as syntactic movement that naturally derives word order freezing effects as a consequence thereof, based on standard assumptions regarding the locality of movement. We begin by presenting our core proposal in section 2. Then, in section 3, we present our case study of Pangasinan word order, based on elicitation work with seven native speakers, which serves to illustrate and motivate our proposal. Finally, in section 4, we address the analytic intuition that word order freezing occurs when two arguments are potentially confusable, as well as Jakobson and Chomsky's observations, and related questions related to the acquisition of scrambling.

2 Proposal

We propose a conception of scrambling as a particular kind of feature-driven movement, which will then naturally explain free word order that is susceptible to word order freezing effects. Specifically, we propose that scrambling reflects a grammar's ability to posit optional movement-triggering probes that target one of a number of features that the language makes available for scrambling. Importantly, we claim that no annotation is added to the target of scrambling in order to identify it as such. Scrambling instead always targets pre-existing features of targets.

This last point is in contrast to the prominent existing approach to scrambling as a feature-driven movement, which involves positing a "scrambling feature" on the target of scrambling. This "scrambling feature" approach was pioneered by Müller (1997; 1998) and Grewendorf & Sabel (1999), who call the relevant feature [scr] and [Σ] respectively, and has been widely adopted in subsequent work on scrambling (e.g. McGinnis 1998; Sauerland 1999; Müller 2002; Kawamura 2004; Sabel 2005; Ko 2005; Ko 2014; Heck & Himmelreich 2017; Bailyn 2020). We start by presenting our own proposal and then discuss how it contrasts with this more traditional approach below.

Consider first how scrambling on our proposal can change the word order of two featurally distinct constituents α and β where α c-commands and precedes β in the base order, (3a). Assuming that β bears a feature [Y] that is not shared by α, we can introduce a scrambling head with [PROBE:Y] which will skip α and attract β for movement. This results in a word order where α and β are reversed, in (3b).

(3)   **Reversing the order of featurally distinct constituents by scrambling:**
    a.   Base structure: … [… α[X] … [… β[Y] … $\Rightarrow$ "… α … β …"
    b.   [PROBE:Y] … [… α[X] … [… β[Y] … $\Rightarrow \beta$ … [… α … [… t_β … $\Rightarrow$ "β … α …"

Now consider a case where α and β are featurally identical. Following widely adopted assumptions regarding the locality of probing and movement (Rizzi 1990; Chomsky 1995; see also Branan & Erlewine to appear), if a matching scrambling probe is introduced, it will necessarily target the

structurally closer goal α. There is no way for a scrambling probe to change the relative order of α and β, although the order of α with respect to other constituents can be changed.[2]

(4)   **Scrambling cannot reverse the order of featurally identical constituents:**
[PROBE:X] … [… α[X] … [… β[X] … $\Rightarrow \alpha$ … [… t_α … [… β … $\Rightarrow$ "α … β …"

Concretely, suppose that postverbal arguments in Pangasinan are generated with "agent < theme" order. (We support this assumption through our discussion of Pangasinan clause structure in the following section.) In a structure for 'The woman saw the men' in (5), it is possible to introduce a scrambling probe for a plural goal ([–SG]), high in the postverbal field, resulting in the variable word order attested in example (1) above. In contrast, for 'The woman saw the man' in (6) below, where the two arguments are featurally identical, no scrambling probe can be introduced to change their relative order, explaining the freezing behavior of example (2) above.

(5)   Base structure for (1): … [… DP_{agent}[+SG] … [… DP_{theme}[–SG] …
   a.   without scrambling: "… agent (singular) … theme (plural) …"
   b.   after scrambling with [PROBE:–SG]: "… theme (plural) … agent (singular) …"

(6)   Base structure for (2): … [… DP_{agent}[+SG] … [… DP_{theme}[+SG] …
   necessarily "… agent (singular) … theme (singular) …", even after adding a scrambling probe

An important question for this approach to scrambling is the range of possible features that scrambling probes may target. Repurposing Grewendorf & Sabel's notation, here we will refer to this *set* of features as Σ. We propose that the specification of Σ is subject to variation, both between and within languages. We show how this accounts for patterns of individual variation in word order freezing effects amongst our Pangasinan speakers in the following section, and further discuss the determination of the set Σ in section 4.

   Scrambling has also received attention as an optional syntactic operation, so we comment on the sources of optionality for these two approaches to scrambling as well. With the traditional "scrambling feature" approach as in Müller (1997; 1998) and Grewendorf & Sabel (1999), there are two points of optionality in scrambling: (i) whether or not to introduce a scrambling feature [scr/Σ] and a corresponding movement-triggering probe [PROBE:scr/Σ] and (ii) where to place the [scr/Σ] feature. There are also two points of optionality in our approach to scrambling: (i) whether or not to introduce a scrambling probe [PROBE:F] and (ii) which feature F $\in \Sigma$ to target.[3]

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[2] This basic theory predicts that, in structures with featurally identical constituents α and β, β is limited to being linearized in its base position. We can amend the theory to allow for full word order flexibility of β with respect to other constituents, but still restricted to following α, by allowing scrambling probes to optionally target and move multiple matching goals in an order-preserving fashion, e.g. by "tucking in" (Richards 1997).

[3] Our discussion here is somewhat simplified in order to highlight the difference between these two approaches. Under both approaches, scrambling also has the choice of applying once or multiply. For the scrambling feature approach,

Under both approaches, the choice point in (ii) determines which constituent will be moved by scrambling, but the range of possible results is restricted on our approach precisely in the inability to change the relative order of two constituents which do not vary in the features in the set Σ. Word order freezing remains unexplained under the traditional "scrambling feature" account, but is an immediate consequence of our approach to scrambling. We propose that this basic logic underlies word order freezing effects.

Finally, we address potential concerns regarding our approach to scrambling and constraints on remnant movement. At issue is the Müller-Takano generalization (Müller 1996; 1998; Takano 1994; see also Pesetsky 2013), which states that remnant movement of XP, from which YP has moved out, is not possible if the two movements are "of the same type." In particular, this literature shows scrambling to be one such "type" of movement. One prominent approach explains the generalization as the result of the feature-relativized locality of movement (see Kitahara 1997 and also discussion in Sauerland 1999: 183–184), predicting movements to be "of the same type" if they are triggered by the same probe features.[4] As a reviewer notes, under our proposal, different instances of scrambling may involve probing for different features in Σ, and therefore may allow for derivations that appear to violate the generalization. Here we leave the verification of this prediction for future work. If it turns out that all instances of scrambling — even with different featural triggers on our account — indeed count as "the same type" for the Müller-Takano generalization, we must seek an alternative explanation for the generalization. One solution that is compatible with the basic proposal here would be for scrambling probes to assign a feature to their goals, prohibiting further scrambling probes from probing into them, akin to the feature "Contamination" approach of Müller (2018).

3 A Pangasinan case study

We now present a detailed look at word order possibilities in Pangasinan, which will motivate our proposal. Based on our original elicitation work with seven native speakers, we will show that word order freezing effects in Pangasinan are categorical and subject to minute speaker variation. Our approach to scrambling proposed above, where scrambling targets existing formal features on goals from a designated set Σ, allows us to account for the attested patterns of variation.

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this may involve positing multiple, indexed Σ features (e.g. $[\Sigma_1]$, $[\Sigma_2]$, etc.) (Sabel 2005: 285). For our approach, this may involve positing multiple distinct probes — e.g. [PROBE:F_1] and [PROBE:F_2], for F_1, $F_2 \in \Sigma$ and $F_1 \neq F_2$ — as well as choosing to attract multiple matching goals or not (see note 2).

[4] However, there appears to be some variation in whether particular movements count as "the same type" for the purposes of the generalization. For example, it has been observed that languages vary in terms of whether *wh-* and topic-movement behave as "the same type" or not, as discussed in Aravind (2017) and citations there.

3.1 Voice, case, and word order

We begin with a brief introduction to Pangasinan clausal syntax. Pangasinan exhibits a so-called *Philippine-type voice system*, where one nominal argument is chosen to be the "pivot" in every clause and verbal morphology reflects this choice of pivot (Wolff 1973; Himmelmann 2002; 2005; Reid & Liao 2004; Ross 2002; Erlewine & Levin & Van Urk 2017). In the examples below, the pivot (in bold) is the agent Pedro in (7a), the theme 'banana' in (7b), and the instrument 'his hand(s)' in (7c). Following Philippinist tradition, we refer to these verb forms in (7a,b) as Actor Voice (AV) and Patient Voice (PV). There are also forms that take certain peripheral arguments as their pivots, such as the Instrumental Voice (IV) in (7c).

(7) **Voice alternation in Pangasinan:**   (based on Benton 1971: 167–168)

    a. Man-tanem [**si** **Pedro**] [na ponti].   Actor Voice (AV)
          AV-plant   NOM Pedro   GEN banana
          'Pedro will plant a banana.'

    b. I-tanem [nen Pedro] [**su** **ponti**] [ed lima =to].   Patient Voice (PV)
          PV-plant GEN Pedro NOM banana OBL hand GEN.3SG
          'Pedro will plant the banana with his hands.'

    c. Pan-tanem [nen Pedro] [**so** **lima** =**to**]   [ed ponti]. Instrumental Voice(IV)
          IV-plant   GEN Pedro NOM hand GEN.3SG OBL banana
          'Pedro will plant the banana with his hands.'

Nominal arguments may be introduced by case-marking articles, as in (7) above. Following Kroeger (1991) and many others, we refer to the case on pivots here as nominative, with non-pivot arguments bearing genitive case (that of nominal possessors) or oblique case.[5]

(8) **Case-marking articles:**[6]

	nominative	genitive	oblique
common noun	*so*	*na*	*ed*
personal noun	*si*	*nen*	*kinen*

In examples such as (7), the case-marking articles, together with the choice of voice morphology, uniquely identify the semantic role of each postverbal argument.[7] Word order cues are not necessary, and indeed postverbal word order in such clauses are free, as seen in the PV clause in (9):

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[5] There is also prior work on Philippine-type languages that describe them as morphosyntactically ergative (e.g. Aldridge 2004), but see e.g. Erlewine & Levin & Van Urk (2017) and Kaufman (2017) for critical discussion.

[6] There is also a plural/polite personal noun article series. Common noun articles do not encode number. There is no grammatical gender in the language.

[7] Note that no morphology reflects the φ-features of any argument in these examples, unlike in the examples in the introduction. We discuss examples with such cross-referencing momentarily.

(9) **Free postverbal word order in PV clause with case-marking articles:**
In-sulat   { [na   laki] [su   sulat] / [su   sulat] [na   laki] }.
PV-write   GEN man   NOM letter   NOM letter   GEN man
'A/The man wrote the letter.'

Although both word orders are acceptable for the intended meaning in (9), the "agent < theme" word order in (9) is less marked. As a reviewer notes, this preference is common across Philippine languages (see e.g. Kroeger 1991: 111 on Tagalog). Despite this preference, it is important to note that speakers readily accept both orders in examples such as (9), in sharp contrast to examples where word order freezing applies.[8]

There are also situations where two arguments will bear the same case, such as the agent and non-specific theme in the Benefactive Voice (BV) clause in (10) which are both genitive. We observe that the relative order of the two genitive arguments cannot be changed; see (10b). This same word order restriction has been observed in a number of Philippine languages. For instance, the frozen word order of two genitive arguments is reported in Tagalog for arguments of psych verbs (Billings 2005: 307–308), in recent perfective aspect clauses (Kroeger 1991: 111), and in certain nominalizations (Shibatani 1988: 101–102).

(10) **Frozen relative word order of two genitive arguments:**
a. In-itd-an   [**na**   laki] [**na**   libro] [su   bii].
ASP-give-BV GEN man   GEN book   NOM woman
'The man gave a book to the woman.'

b. #In-itd-an   [**na**   libro] [**na**   laki] [su   bii].
ASP-give-BV GEN book   GEN man   NOM woman
Intended: * 'The man gave a book to the woman.'
Attested: # 'The book gave a man to the woman.'

We discuss word order freezing in Pangasinan in greater detail in the next section. Although most of our examples here will be in Patient Voice (PV), the overall generalization that postverbal word order is free up to freezing also extends to other voices for all examples that we have tested.

Pangasinan also allows for specific, third-person arguments to be introduced by a demonstrative article instead of a case-marking article and doubled in most cases by a corresponding pronoun. Here we adopt the term "apposition" for this construction from Benton (1971: 145,154). The examples in (11) show that a non-pivot agent — introduced by a genitive article in (9) above — can instead be introduced by a demonstrative article and obligatorily doubled by a genitive pronoun. The postverbal word order remains free.

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[8] The acceptability of both orders in (9) — for all of our speakers, and similarly for other sentences of this form — runs counter to the brief description in Mulder & Schwartz (1981: 243–244) (also cited in Sells 2000: 124 and Travis 2010: 186) which suggests that only "agent < theme" orders are available in Pangasinan PV clauses.

(11) **Non-pivot agent apposition:**

    a. In-sulat   *(=**to**$_i$)   { [**may** laki]$_i$ [su   sulat] / [su   sulat] [**may** laki]$_i$ }.

        PV-write   GEN.3SG   DEM man NOM letter   NOM letter   DEM man

        'The man wrote the letter.'

    b. In-sulat   *(=**da**$_i$)   { [**ira-may** la~laki]$_i$ [su   sulat] / [su   sulat] [**ira-may**

        PV-write   GEN.3PL   PL-DEM PL-man NOM letter   NOM letter   PL-DEM

        la~laki]$_i$ }.

        PL-man

        'The men wrote the letter.'

We give the inventory of demonstrative articles in (12). Demonstrative stems encode a three-way distinction between near speaker *ya*, near addressee *tan*, and distal or unmarked *man* (Fernandez Yaptenco 1967: 68; Benton 1971: 47, 78).[9] We encode these distinctions using two binary features for near-author [±DEM.AUTH] and near-participants [±DEM.PART].[10] When used as a prenominal article, they appear with the linker *-y* and the stem-final nasal is dropped: e.g. *man + -y > may*. In addition, demonstrative articles inflect for number, for which we adopt the binary singular feature [±SG] of Noyer (1992) and Harbour (2003; 2008).

(12) **Demonstrative articles:**[11]

		singular [+SG]	plural [–SG]
near speaker	[+DEM.AUTH, +DEM.PART]	*ya-y*	*ira-ya-y*
near addressee	[–DEM.AUTH, +DEM.PART]	*ta-y*	*ira-ta-y*
distal/default	[–DEM.AUTH, -DEM.PART]	*ma-y*	*ira-ma-y*

Pronouns for non-pivot agents (genitive) and for pivots (nominative) are second-position clitics, as is common in Philippine languages (Reid & Liao 2004; Kaufman 2010; Erlewine & Levin 2021), and therefore encliticize to the verb in (11). We give the inventory of these clitic pronouns in (13).

(13) **Third-person clitic pronouns:**

	singular [+SG]	plural [–SG]
nominative	—	=*ira*
genitive	=*to*	=*da*

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[9] We translate phrases with *man*-series demonstratives simply as English 'the' definites in our translations throughout.

[10] This approach reflects the intuition that deictic specifications are based on person features (see e.g. Harbour 2016; Terenghi 2019; Terenghi 2021), which in turn are encoded using [±AUTH, ±PART] (see e.g. Nevins 2007; Harbour 2016).

[11] Speakers sometimes drop the initial *i-* on the plural demonstratives, as well as on the plural clitic pronoun *ira* in (13) below. However, for consistency, we give their full forms here.

Apposition can also target pivots, which are in nominative case, but with minor differences in the use of the pronoun. First, no corresponding pronoun appears with singular pivots, as in (14a). This naturally follows from a general gap in the pronominal inventory of the language (13); see also discussion in Erlewine & Lim & Branan (2022). Second, for plural pivots, the appearance of the third-plural nominative clitic pronoun =ira is optional, as in (14b).

(14)   **Pivot apposition:**
    a.   In-sulat   { [na   laki] [**may** sulat] /[**may** sulat] [na   laki] }.
        PV-write   GEN man   DEM letter   DEM letter   GEN man
        'A/The man wrote the letter.'

    b.   In-sulat ($=$**ira**$_i$)   { [na   laki] [**ira-may** sulat]$_i$ / [**ira-may** sulat]$_i$ [na   laki] }.
        PV-write NOM.3PL   GEN man PL-DEM letter   PL-DEM letter   GEN man
        'A/The man wrote the letters.'

Note that demonstrative articles in Pangasinan do not encode case distinctions (Amurrio 1970: 46; McFarland 2008: 131–133). The demonstrative articles introducing the agents in (11) above and the theme pivots in (14) are therefore the same forms. When apposition applies simultaneously to both the agent and the pivot, then, there will be two postverbal arguments introduced by demonstratives instead of case-marking articles. We turn to such examples in the next section.

3.2 Word order freezing and speaker variation

We now turn to the precise description of word order freezing effects in Pangasinan. All of our examples here will be PV clauses where both the pivot theme and non-pivot agent are introduced by demonstrative articles, with the agent doubled by a genitive clitic pronoun and the theme optionally doubled by a nominative clitic pronoun if available (see (13)). Such structures reflect the straightforward simultaneous application of agent apposition as in (11) and pivot apposition as in (14) above.

Consider example (15) below, which elaborates on example (2) from the introduction. Without context, all speakers judge the sentence as unambiguous, with the first demonstrative-marked nominal ('woman') as the agent and the second demonstrative-marked nominal ('man') as the pivot theme. We discuss the role of context and other manipulations below.

(15)   **Frozen relative order of identical demonstrative-marked phrases:**
      A-nengneng $=$to   ([ed eskuelaan]) [**may** bii]   ([ed   eskuelaan]) [**may** laki].
      PV-see   GEN.3SG OBL school   DEM woman   OBL school   DEM man
      'The woman saw the man (at school).'   (agent < theme)
      *'The man saw the woman (at school).'   (theme < agent)

If instead the two postverbal phrases 'woman' and 'man' in (15) are reversed, the result unambiguously expresses that 'The man saw the woman.' In other words, the relative word

order of the two postverbal arguments is frozen here, with "agent < theme." Note that the requirement reflected in (15) is not for the agent to immediately follow the verb, nor for the pivot to immediately follow the agent. The linear position of demonstrative-marked arguments is still free with respect to other arguments and adjuncts, as seen here with 'at school.' Characterizing free word order as due to an operation of scrambling, as we do, we analyze the frozen "agent < theme" order as reflecting the base order. Scrambling of the theme over the agent fails to apply in this example, as the two are featurally identical, introduced by identical demonstrative articles.

However, as previewed in the introduction, if the two demonstrative-marked phrases differ in their number specifications, their relative order becomes free:

(16) **Free word order of demonstrative-marked phrases with differing number features:**[12]

    a.   A-nengneng = da   { [ira-may la~laki] [may bii] / [may bii]
         PV-see   GEN.3PL   PL-DEM PL-man   DEM woman   DEM woman
         [ira-may la~laki] }.
         PL-DEM PL-man
         'The men saw the woman.'

    b.   A-nengneng = to   (=ira)   { [may laki] [ira-may bi~bii] / [ira-may
         PV-see   GEN.3SG NOM.3PL   DEM man PL-DEM PL-woman PL-DEM
         bi~bii]   [may laki] }.
         PL-woman DEM man
         'The man saw the women.'

Word order flexibility is however not simply a special property of plural nominals. The word order of two plural demonstrative-marked arguments is again frozen, leading again to an obligatory "agent < theme" interpretation for (17):

(17) **Frozen word order between two plural demonstrative-marked phrases:**
    A-nengneng = da   (=ira)   [ira-may la~laki] [ira-may bi~bii].
    PV-see   GEN.3PL NOM.3PL PL-DEM PL-man   PL-DEM PL-woman
    'The men saw the women.'   (agent < theme)
    * 'The women saw the men.'   (theme < agent)

The data so far suggests that the order of agent and theme is free as long as their articles are distinguishable in some way, as in (16), but otherwise limited to "agent < theme" order interpretations. However, unlike number contrasts, a difference in the deictic features of

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[12] Recall that, for apposition of the pivot, the nominative pronoun =*ira* appears optionally for plural apposition (as in (14b) above) and that there is no such pronoun for singulars (see (14a) above), reflecting a general gap in the language's pronominal inventory (13).

demonstratives is insufficient to block word order freezing, as seen through example (18) which allows only an "agent < theme" parse.

(18) **Frozen word order between two demonstrative-marked phrases with a deictic contrast:**

A-nengneng = to   [**yay**   bii]   [**may** laki].
PV-see   GEN.3SG   DEM.AUTH woman   DEM man
'This woman saw the man.'   (agent < theme)
* 'The man saw this woman.'   (theme < agent)

We also note that, in all of the examples so far, the nominals 'man/men' and 'woman/women' are equally likely as the agent and theme of the verb, to 'see.' In what follows, then, we will use various manipulations to bias the relative plausibility of a "theme < agent" construal. In such cases, we shall see that our seven speakers exhibit individual differences in the boundaries of their word order freezing effects.

First, we consider a manipulation in animacy in (19) below. For four of our seven speakers, example (19b) is judged as unnatural because it only has the nonsensical interpretation where a ball kicked a man. For these speakers, word order freezing applies even if there is a clear animacy contrast that may serve to disambiguate the roles of the arguments. However, our other three speakers allow for the plausible, intended interpretation, which requires a "theme < agent" parse of the two arguments. All speakers accept the intended interpretation in (19a), which is interpreted naturally with "agent < theme" order.

(19) **Variable word order freezing with contrasting animacy:**

a. S<in>ipa = to   [may laki] [may bola].
    PV-kick   GEN.3SG   DEM man   DEM ball
    'The man kicked the ball.'   (agent < theme)

b. #$^{4/7}$S<in>ipa = to   [may bola] [may laki].
    PV-kick   GEN.3SG   DEM ball   DEM man
    Intended: *$^{4/7}$ 'The man kicked the ball.'   (theme < agent)
    Attested: # 'The ball kicked the man.'   (agent < theme)

Next, we maintain the equal animacy of arguments but see if world knowledge alone can serve to resist word order freezing. In (20), we modify example (15) to specify that the man is blind, making him a less natural agent of 'seeing.' All speakers allow for the intended interpretation in (20a), where the agent precedes the pivot theme. Reversing the order of arguments, all but one of our speakers interpret (20b) as unambiguously expressing the less likely situation where a blind man sees a woman, and thus report it to be anomalous. Just one speaker allows the intended, more plausible interpretation, reflecting a "theme < agent" parse without freezing.

(20) **Word order freezing despite world knowledge, for most speakers:**

    a. A-nengneng = to   [may bii]   [may bulag ya laki].
        PV-see   GEN.3SG DEM woman DEM blind LK man
        'The woman saw the blind man.'   (agent < theme)

    b. #[6/7]A-nengneng = to   [may bulag ya laki] [may   bii].
        PV-see   GEN.3SG DEM blind LK man   DEM   woman
        Intended: *[6/7] 'The woman saw the blind man.'   (theme < agent)
        Attested: # 'The blind man saw the woman.'   (agent < theme)

We also consider the effect of discourse congruence and manipulating the information-structural status of arguments. We asked four of our speakers[13] to judge examples of the form in (15) in the context of different explicit Questions Under Discussion (QUDs) (Roberts 1996). In response to a question of the form 'Who did the man see?' in (21Q),[14] only one speaker accepted example (15) above (repeated here as (21A)) as a felicitous answer.[15] For (21A) to be congruent to the question in (21Q), the postverbal phrases must be interpreted with a "theme < agent" parse.

(21) **Word order freezing despite discourse context, again for most speakers:**

    Q. Siopa so   a-nengneng = to$_i$ [may laki]$_i$?
        who NOM PV-see   GEN.3SG DEM man
    'Who did the man see?'

    A. #[3/4]A-nengneng = to   [may bii]   [may laki].
        PV-see   GEN.3SG DEM woman DEM man
    Intended: *[3/4] 'The man saw [the woman]$_F$.'   (theme < agent)
    Attested: # 'The woman saw the man.'   (agent < theme)

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[13] The investigation of the effects of discourse context was suggested by a reviewer. Unfortunately, due to the intervening time elapsed, we were unable to consult three of our original speakers for these follow-up tasks.

[14] Argument *wh*-questions take the form of (pseudo)clefts, as in many other Austronesian languages (see e.g. Potsdam 2009), explaining the preverbal nominative marker *so*. The question in (21Q) is unambiguously a theme cleft, with the postverbal demonstrative-marked phrase being the agent; the same is true of example (A") in note 15 below. As we show in Erlewine & Lim (in prep.), clefting in Pangasinan is subject to the familiar pivot-only restriction on Ā-extraction, unaffected by the apposition of any argument.

[15] All speakers consulted accept (A') below as a congruent answer to (21Q), with its "agent < theme" parse. This shows that the unnaturalness of (21A) is not simply due to the answer focus being a postverbal argument, although the use of a cleft as in (A") is volunteered by speakers as the preferred full sentence answer form.

    (A') A-nengneng = to   [may laki] [may bii].
        PV-see   GEN.3SG DEM man DEM woman
        'The man saw [the woman]$_F$.'   (agent < theme)

    (A") [Samay bii]   so   a-nengneng = to$_i$ [may laki]$_i$.
        DEM   woman NOM PV-see   GEN.3SG DEM man
        'It's [the woman]$_F$ that the man saw.'

Demonstratives appear in a *sa*-initial form in clause-initial positions (Amurrio 1970: 47), explaining the form *samay* in (A").

We summarize the points of speaker variation that we have observed here, reporting individual judgments for all seven of our speakers in (22) below. Our speakers sort into three groups with internally consistent patterns of behavior, which we label A, B, and C in (22). Group A speakers show the strictest form of word order freezing, whereas group B speakers allow for phrases with contrasting animacy to maintain free word order, and our one C speaker additionally allows for world knowledge and discourse context to distinguish arguments and resist freezing. We will argue that our proposal for scrambling and freezing in section 2 above can productively account for these three different grammars of Pangasinan in section 3.3 below.

(22)   **Patterns of speaker variation in the availability of "theme < agent" word order:**

agent	theme (pivot)		A				B		C
+SG	+SG	(15)	*	*	*	*	*	*	*
+SG, +ANIM	+SG, −ANIM	(19)	*	*	*	*	✓	✓	✓
+SG	+SG (blind)	(20)	*	*	*	*	*	*	✓
+SG, −FOC	+SG, +FOC	(21)	*	*	·	·	*	·	✓

> ✓ = intended "theme < agent" order acceptable
> * = only "agent < theme" construal possible
> · = no data (see note 13)

We note that, formally, the addition of the explicit QUD in (21) makes the theme in the intended proposition the answer focus, so we hypothesize that the theme bears a [+FOC] feature in contrast to the agent. As the table shows, the one speaker that accepted the dialogue in (21) was the one speaker that accepted (20) above, using world knowledge alone to disambiguate between the arguments. We hypothesize that the additional modifier in (20) supports this speaker's accommodation of an implicit QUD such as 'Who saw the blind man?' or 'Who/What did the woman see?', thus reducing the case of this example to that of our explicit QUD example in (21).

Finally, we note that we have found one attested example in Benton (1971) of a sentence with two arguments introduced by identical demonstrative articles that appears to require a "causee < causer" parse; i.e. in "theme of causative < agent of causative" order. We reproduce this example in (23) with Benton's translation. However, we have presented this example to two of our group A speakers and both reported that it unambiguously means that 'the child made the young man cry,' rejecting Benton's translation.

(23)   **Attested counterexample to expected word order freezing from Benton (1971: 152):**
P<in>a-akis =to_i   [may ogaw] [may balolaki]_i.
PV-CAUS-cry GEN.3SG DEM child   DEM bachelor
'The young man made the child cry.'

We hypothesize that this example must have been produced by a speaker commanding the group C grammar, in a context that makes the two arguments distinguished in their information-structural status.

3.3 Analysis

We now illustrate how our general proposal for word order scrambling and freezing, as in section 2 above, is able to account for the patterns of word order flexibility in Pangasinan and its individual variation.

We begin by describing a set of basic assumptions for the clause structure of Philippine-type languages. We assume that all arguments are introduced within a lower domain of the clause which we call vP. The lexical verb moves out of vP to a position to the left, leaving all material within vP linearized postverbally. Arguments with particular thematic roles are associated with particular positions within vP, in accordance with Baker's UTAH (Baker 1988), and in particular the agent argument is always the highest argument within vP. This suggests that, without further manipulations, the agent will precede any other postverbal noun phrase (NP_X), as illustrated in (24). Here, ART stands in for a prenominal article.

(24) V … $[_{vP}$ ART$=NP_{ag}$ … $[$ … ART$=NP_X$ …
  $\Rightarrow$ "V ART$=NP_{ag}$ … ART$=NP_X$ …"

One of the noun phrase arguments within the clause will be identified as the pivot, receiving nominative case, and this choice will be reflected by voice morphology on the verb. Other nominals in vP may be oblique or express default genitive case (Erlewine & Levin & Van Urk 2020; Erlewine & Lim to appear). After case marking, a Non-Actor Voice (NAV) clause (including the PV clauses described above) will be linearized as in (25).

(25) NAV-V … $[_{vP}$ GEN$=NP_{ag}$ … $[$ … NOM$=NP_{pivot}$ …
  $\Rightarrow$ "NAV-V GEN$=NP_{ag}$ … NOM$=NP_{pivot}$ …"

Next, we make two working assumptions regarding Pangasinan apposition. (Here we present these two properties of Pangasinan apposition as working assumptions, but we develop and motivate a syntax for apposition with both of these properties in Erlewine & Lim in prep.) First, nominals introduced by case-marking articles and demonstrative articles have different structural size — KP and DemP, respectively — and project the features that are encoded on their heads. Case-marking articles (K) in the extended projection of common nouns then bear case features but not φ-features, as in (26a), as case-marking articles for common nouns do not encode φ-feature contrasts (see (8)). In contrast, demonstratives bear the deictic features [±DEM.AUTH, ±DEM.PART] as in (12) and φ-features and potentially other features of their nominal but not case features, as in (26b). Both project [+N], as extended projections of N.

(26)   **Examples of case-marked and demonstrative-marked 'men' and their highest heads:**

a.   *na lalaki*   K[+ N, + GEN]

b.   *iramay lalaki*   Dem[+ N, –DEM.AUTH, –DEM.PART, –SG, (+ ANIM)]

As noted above, we use binary formal features for demonstratives and for φ-features, such as the [±SG] singular feature. We also assume that case values can be decomposed into binary features (see e.g. Jakobson 1936; Bierwisch 1967; Wunderlich 1997), of which we illustrate only [±GEN] here.

The second working assumption for Pangasinan apposition is that the nominals introduced by demonstratives are generated in regular argument positions, rather than for example being adjoined higher as a form of dislocation. Support for this view comes from binding. Binding possibilities in Pangasinan reflect the base positions of arguments, just as in Tagalog (see e.g. Kroeger 1991; 1993; Rackowski 2002): for instance, agents are able to bind into other arguments, but not vice versa, regardless of voice. As example (27) shows, an agent can bind a reflexive or reciprocal within the PV theme pivot. The use of pivot apposition in (28) does not affect these binding possibilities, indicating that these demonstrative-marked nominals are generated in (or very close to) the regular base positions for themes.[16]

(27)   **Agent binds into PV theme pivot, without apposition:**

a.   In-dayew [na   laki]$_i$ [so   *sarili* $= to_i$ $=$ n ának].
     PV-praise   GEN man   NOM self   GEN.3SG LK   PL.child
     'The man$_i$ praised his$_i$ own children.'

b.   S < in > aliw [na   ma~maestra]$_i$ [so   lib~libro na *san-sakey*$_i$].
     PV-buy   GEN PL-teacher   NOM PL-book   LK each-one
     'The teachers$_i$ bought each other$_i$'s books.'

(28)   **Agent binds into PV theme pivot with pivot apposition:**

a.   In-dayew ($=$ **ira**$_j$)   [na   laki]$_i$ [**ira-may** *sarili* $= to_i$ $=$ n ának]$_j$.
     PV-praise   NOM.3PL   GEN man   PL-DEM self   GEN.3SG LK   PL.child
     'The man$_i$ praised his$_i$ own children.'

b.   S < in > aliw ($=$ **ira**$_j$)   [na   ma~maestra]$_i$ [**ira-may** lib~libro na *san-sakey*$_i$]$_j$.
     PV-buy   NOM.3PL   GEN PL-teacher   PL-DEM PL-book   LK each-one
     'The teachers$_i$ bought each other$_i$'s books.'

Based on these assumptions, demonstrative-marked arguments in apposition will have the same base word order as that of their corresponding case-marked variants. (29) below schematically represents an example where both the pivot and non-pivot agent of a Non-Actor Voice clause

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[16] Recall again that the nominative pronoun *ira* appears optionally in plural pivot apposition; see (14b) above.

undergo apposition; corresponding pronouns are not indicated here. Without scrambling, the demonstrative-marked agent will precede the demonstrative-marked pivot.

(29)   NAV-V … $[_{vP}$ DEM＝NP$_{ag}$ … [… DEM＝NP$_{pivot}$ …
         ⟹ "NAV-V DEM＝NP$_{ag}$ … DEM＝NP$_{pivot}$ …"

Finally, we follow Richards (1993; 2013) (see also discussion in Rackowski 2002: 22–27) in the view that postverbal word order flexibility in Philippine languages is the result of optional "scrambling" movements. Following our proposal in section 2, this involves positing optional scrambling probes of the form [PROBE:F] for some feature F ∈ Σ, where Σ is a designated set of features that can be targeted for scrambling. Scrambling probes project above vP but below the surface position of the verb. In (30), we illustrate a case where the scrambling probe [PROBE:F] matches the pivot and moves it over the agent, leading to a word order distinct from the base word order without scrambling in (29).

(30)   NAV-V … [[PROBE:F] … $[_{vP}$ DEM＝NP$_{ag}$ … [… DEM＝NP$_{pivot}$ …
         ⟹ "NAV-V DEM＝NP$_{pivot}$ DEM＝NP$_{ag}$ …"

Following the logic in section 2, a constituent $β$ can be scrambled over a higher constituent $α$ if $β$ has a formal feature in Σ that $α$ does not have. The relative order of two constituents is then frozen in its base "$α < β$" order when there is no feature in Σ that matches $β$ but not $α$. We then model the attested microvariation in scrambling through minor differences in the set of scrambling features Σ for our three different groups of speakers:

(31)   **Speaker variation in scrambling features Σ:**

    a. $Σ_A = \{±N, …, ±SG, …, ±GEN, …\}$

    b. $Σ_B = \{±N, …, ±SG, …, ±GEN, …, ±ANIM\}$

    c. $Σ_C = \{\underbrace{±N, …,}_{\text{category}} \underbrace{±SG, …,}_{φ} \underbrace{±GEN, …,}_{\text{case}} \underbrace{±ANIM,}_{\text{animacy}} \underbrace{±FOC, …}_{\text{IS}}\}$

Using the scrambling feature specifications in (31), all speakers are able to change the word order of constituents that vary in category, $φ$-features, or case features. Additionally, as summarized in (22) above, group B speakers (using $Σ_B$) can use animacy to scramble constituents that are otherwise frozen for our A speakers, and our group C speaker (using $Σ_C$) can additionally use information-structural (IS) features based the discourse context (such as congruence to the QUD) to scramble constituents. We discuss the acquisition of these features in section 4.2 below.

We propose that all postverbal word order variation is due to movement by such scrambling probes.[17] For concreteness, for all Pangasinan examples that we report above with non-default

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[17] In contrast, the placement of constituents in preverbal position is substantially restricted, with nominal arguments obeying the pivot-only restriction on Ā-extraction. Under the approach described here, we conclude that scrambling

word orders, we describe the type of scrambling probe specification involved in its derivation under our proposal:

(32)   **Scrambling probes that derive non-default orders in Pangasinan examples above:**

category:	[PROBE: + Dem]	(14a,b), (15)[18]
φ:	[PROBE:–SG]	(1), (16b)
	[PROBE: + SG]	(16a)
case:	[PROBE: + NOM]	(9), (11a,b)
animacy:	[PROBE:–ANIM]	(19) for B and C speakers
IS:	[PROBE: + FOC] or similar	(20), (21), (23) for C speakers

Note that we hypothesize that scrambling probes in Pangasinan may target the positive or negative value of each feature in Σ, rather than just a marked feature value or privative feature. This choice is empirically motivated for instance by the availability of scrambling a [+ SG] theme over a [–SG] agent using [PROBE: + SG] in example (16a), as well as scrambling a [–SG] theme over a [+ SG] agent using [PROBE:–SG] in example (16b). As a reviewer notes, this symmetry may be surprising given the typological prevalence of plural-probing processes (i.e. 'omnivorous number') and corresponding scarcity of specifically singular-probing processes. However, this assumed universal asymmetry between plural and singular has been challenged; see Murugesan (2021), Raghotham (2021), and Kumaran (2023) for recent arguments that some morphosyntactic processes do in fact make reference to a marked singular feature value.[19]

Finally, we reiterate that we reject the postulation of a purely optional feature [scr/Σ] that can be added arbitrarily to a constituent to designate it as a target of scrambling, as in Müller (1997; 1998) and Grewendorf & Sabel (1999) and much subsequent work. We also reject approaches to Philippine-type languages that allow for flexible postverbal word order through non-movement means, as in Fowlie (2013), Erlewine & Levin & Van Urk (2020), Erlewine & Lim (to appear), and Branan (2022). Our proposal explains the fact that all speakers are susceptible to some form of word order freezing, including our C speaker in the absence of contextual cues (see (15) and (17)), which these alternative accounts do not explain.

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probes cannot be introduced above (to the left of) the surface position of the verb. See Erlewine & Lim (in prep.) for discussion of Ā-extraction in Pangasinan.

[18] Scrambling in examples (14a,b) could also be due to scrambling probes with number specifications. Other specification options may also be possible to derive the variable order of (15), depending on the assumed featural specification and base position of the locative adjunct *ed eskuelaan* 'at school.'

[19] These works echo claims that third-person arguments, which are also typologically less marked, nonetheless may also be specifically targeted by some morphosyntactic processes. See Nevins (2007), Harbour (2013), Grishin (2023), and citations there. Following discussion in Nevins (2007) (in turn based on Calabrese 1995), we hypothesize that different grammatical processes may make reference to all feature values or only marked feature values.

4 Freezing and confusability

A common descriptive intuition for word order freezing effects is that, when two arguments are potentially confusable in terms of their semantic roles, they are required to be in a particular, fixed word order. Such reference to "confusability" suggests that speakers dynamically consider how reliably their sentences can convey their intended meanings to an interlocutor. For example, Bouma & Hendriks (2012: 57) take word order freezing effects to teach us "that the hearer's interpretation may have implications for the speaker's freedom of word order variation… partially motivated by the strive for communicative success." In other words, word order freezing effects reflect communicative pressures to avoid ambiguity and maximize communicative efficiency. Such a causal link between word order freezing and argument confusability has also been modeled formally through bidirectional models (as in bidirectional OT) where both speaker and hearer perspectives are modeled in tandem in order to determine grammaticality and felicity (see e.g. Lee 2003; Bouma 2011; Bouma & Hendriks 2012).

The strongest formulation of this intuition would be to suggest that word order freezing effects are *entirely* a reflection of such communicative pressures. Our Pangasinan case study here presents two challenges for this position, which we may call the strong functionalist account. First, we have seen that word order freezing can take place even in situations where arguments can reasonably be distinguished by context and therefore would not be confused in reality. Recall for instance that most of our speakers are unable to use distinguishing world knowledge or discourse information to circumvent word order freezing. Second, we have observed interspeaker differences in the categorical judgments of certain scrambling possibilities. Such microvariation is unexpected on the strong functionalist account, assuming that speakers all face the same communicative pressures.[20]

In contrast, the derivational account for scrambling and its freezing effects proposed here can account for these effects. Under our approach, the extent of word order freezing and its variation are due to the identity of the feature set Σ, which may be specified differently for different individuals. In the synchronic grammar, freezing is *not* a response to two arguments being potentially confusable, but instead is the predicted consequence of structures where two arguments are featurally indistinguishable as far as the features in Σ are concerned. Nonetheless, we acknowledge the intuitively attractive connection between word order freezing and argument confusability highlighted above. Therefore, in this section, we conclude the paper by addressing how our proposal can also account for facts that appear to suggest a causal link between freezing and confusability. We first address examples where paradigmatic syncretism leads to word order freezing in section 4.1. We then discuss the specification of the feature set Σ and its acquisition procedure in section 4.2.

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[20] For a broader critique of appeals to ambiguity avoidance in language, see also Wasow (2015).

4.1 Syncretism and word order freezing

A traditional argument for the link between freezing and confusability comes from data where morphological syncretism makes particular arguments inflectionally underspecified and concomitantly frozen. Such examples were made famous by Jakobson (1963: 269) for Russian and by Chomsky (1965: 126) for German. Both Russian and German have core case distinctions as well as some degree of word order flexibility; in particular, simple transitive sentences may appear in SVO or OVS order, with arguments distinguished by nominative and accusative case inflections. However, with particular noun phrases where the nominative and accusative case forms are syncretic, only the SVO word order construal is available without additional contextual manipulation.[21]

(33)   **Freezing by syncretism in Russian:**   (Jakobson 1963: 269)
        Mat'   ljubit doč.
        mother.NOM/ACC loves   daughter.NOM/ACC
        'The mother loves the daughter.' (SVO)
        * 'The daughter loves the mother.' (OVS)

(34)   **Freezing by syncretism in German:**   (Chomsky 1965: 126)
        Die   Mutter sieht die   Tochter.
        the.NOM/ACC mother sees   the.NOM/ACC daughter
        'The mother sees the daughter.' (SVO)
        * 'The daughter sees the mother.' (OVS)

As a reviewer notes, at first glance, these facts appear to be challenging for the approach to scrambling and freezing effects that we put forward here. We assume that in the derivation of such examples, the subject is assigned nominative case and the object assigned accusative. If Σ

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[21] Specifically, Chomsky (1965: 126) reports of example (34) that "it seems that the interpretation will invariably be that [the first NP] is the Subject (unless it has contrastive Stress, in which case it may be taken to be the Subject or the Object)." However, Plank (1980: 317) and Fanselow (2015: 115) report that the OVS reading is available in an appropriate context, even without contrastive stress. (Wasow (2015: 31 note 3) similarly expresses skepticism towards German word order freezing claims in Hankamer (1973: 62).) King (1993: 2) offers a similar note regarding the status of (33): "When presented in isolation such a sentence is usually interpreted as SVO, which has led to the assumption that certain 'freezing' effects are operational here (Mohanan 1990). However, given an appropriate context, the above sentence can mean 'the daughter loves (her) mother'…" More recent corpus work on Russian and German by Berdicevskis & Piperski (2020) confirms that the effect of word order freezing by syncretism is statistically significant, but "small" and "not absolute" (p. 32), with the many naturally occurring counterexamples potentially "disambiguated using semantic and pragmatic information, as well as context and background knowledge" (p. 32). We thank Jonathan Bobaljik (p.c.) for bringing Berdicevskis & Piperski's work to our attention.

 The possibility of scrambling licensed by a particular discourse context is not surprising and does not complicate our discussion here. Our proposal allows for scrambling to make reference to information-structural features, as is possible for our Pangasinan group C speaker. Our goal in this section is to address the reported freezing where information-structural features do not distinguish between arguments.

includes case features such as [±ACC], it should be possible to posit a probe [PROBE: +ACC] to attract the object over the subject. The fact that these particular nominals then happen to be realized with forms that are ambiguous in terms of their case should not affect the possibility of such scrambling. The reported sensitivity of freezing to morphological syncretism thus appears to be challenge our approach to scrambling and freezing effects.

Such "freezing by syncretism" interactions can nonetheless be derived under our account, if we assume a derivational architecture where syncretism may bleed the featural distinctions available for scrambling. Here we appeal to rules of *Impoverishment* in Distributed Morphology: language-specific rules that can delete particular features in certain contexts, prior to Vocabulary Insertion (see e.g. Bonet 1991; Noyer 1992). For example, Krifka (2009: 164–165) suggests that the pervasive nominative/accusative case syncretism of feminine nominals in German grammar may be the result of an Impoverishment rule that neutralizes this featural distinction; see (35). We could similarly posit an Impoverishment rule as in (36) for Russian nouns of inflection class III, which includes both the 'mother' and 'daughter' of example (33).

(35) **Impoverishment rule for German feminine nominals:**
       Delete [±ACC] on [+FEM]

(36) **Impoverishment rule for Russian class III nominals:**
       Delete [±ACC] on [class III]

If scrambling applies following the application of Impoverishment, it will naturally be susceptible to freezing by syncretism: features of the form [±ACC] which are underlyingly syntactically active are not present at this point in the derivation.[22]

The idea that Impoverishment may precede scrambling naturally raises questions about the timing of scrambling. One possibility is for scrambling to take place postsyntactically; this would predict it to feed no or very few other syntactic processes. This prediction is borne out for postverbal scrambling in Pangasinan, which does not feed other hierarchy-sensitive syntactic processes such as pivot-oriented Ā-extraction processes (see Erlewine & Lim in prep.), as Richards (2013) also notes for Tagalog. A second possibility is that Impoverishment applies during cyclic Spell-Out of a lower portion of the clause (Uriagereka 1999; Chomsky 2000; 2001; a.o.) with scrambling applying to its output. This would allow for scrambling in narrow syntax

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[22] On this Impoverishment-based approach to the syncretism facts, scrambling may take place following Impoverishment but still prior to the Vocabulary Insertion of terminals. Another alternative would be for scrambling to take place after Vocabulary Insertion, with terminals retaining only those formal features that matched the vocabulary item triggered for insertion (Legate 1999). In other words, on this view, case features need not undergo deletion in the context of [+FEM] or [class III], but if the nominals are realized using vocabulary items that are underspecified for case, their case features are not retained following Vocabulary Insertion. We thank Karlos Arregi and Itamar Kastner (p.c.) for discussion of these points.

— potentially with interpretational reflexes, for example for binding and scope — while still being susceptible to freezing by syncretism. This latter approach appears to be necessary for the German facts above, given Frey's (2006) claim that non-information-structurally-motivated object movement to the prefield is fed by clause-medial A-scrambling.

4.2 On the acquisition of scrambling features

Finally, we discuss the inventory of scrambling features and its determination. As noted above, the phenomenon of word order freezing appears to reflect a functional need to encode grammatical relations in a sufficiently unambiguous manner. Restating in terms of our proposal, there appears to be a functional basis for the inventory of scrambling features Σ: features that do not serve to disambiguate the semantic roles of arguments are not included in Σ. We suggest that this property of the feature set Σ can be explained as an epiphenomenon of the acquisition process involved in learning scrambling feature specifications.

We first describe a concrete and general procedure for the acquisition of scrambling features. We assume here that learners are conservative (see e.g. Snyder 2007; 2011 and Sugisaki & Snyder 2013) and thus require explicit evidence in order to learn an optional grammatical process such as scrambling using particular features. We illustrate this learning procedure using Pangasinan examples from above. To simplify our discussion, we start at a state where the learner hypothesizes the correct base order of arguments, i.e. "agent < theme" for the examples below. Suppose then that the learner encounters an example such as (37), the scrambled variant from example (1) above. Recall that the genitive clitic pronoun in such structures (here, *to*) cross-references the φ-features of the agent, in this case indicating that the agent is the singular 'woman.'

(37) **Learner input that motivates scrambling:**   = (1)

A-nengneng = to   [$_\beta$ ira-may la~laki] [$_\alpha$ may bii].
PV-see   GEN.3SG   PL-DEM   PL-man   DEM   woman
'The woman saw the men.'

Examples such as (37) are unambiguous in their interpretation and necessarily involve scrambling, thereby supporting the learner's postulation of scrambling with a particular feature (here: [−SG]). We highlight the salient properties of example (38):

(38) **Properties of examples that support the postulation of scrambling:**
   a. The semantic roles of postverbal arguments are unambiguous based on cues independent of word order (here, the cross-referencing of the agent's φ-features by the genitive clitic pronoun);
   b. (a) suggests that the arguments are not in their base order ("$\beta...\alpha$" instead of the expected "$\alpha...\beta$");

    c.   there is no obvious semantic motivation for the marked word order; and

    d. β bears a formal feature F not on α.

Examples with the properties in (38) serve as explicit evidence of scrambling for the learner, supporting the postulation of scrambling via an optional probe [PROBE:F], i.e. F ∈ Σ.

Suppose further that the learner encounters an example such as (39), repeated from (19b) above, uttered with the intended interpretation reflected by the translation below. Would such an example lead the learner to postulate a form of scrambling? This depends on whether the learner takes (39) to unambiguous express its intended interpretation (property (38a) above). If the learner interprets the string as a non-scrambled structure, expressing the less plausible interpretation 'The ball kicked the man,' or even considers both parses to be options, the example will not contribute to the postulation of a scrambling feature.[23]

(39)   **Learner input that potentially motivates scrambling:**   = (19b)
        S<in>ipa =to   [$_\beta$ may bola] [$_\alpha$ may laki].
        PV-kick   GEN.3SG   DEM ball   DEM man
        Intended: 'The man kicked the ball.'

However, if the learner *does* treat such an example as unambiguously expressing its intended meaning — perhaps, for instance, if the intended interpretation is also clear from other linguistic or non-linguistic support in the utterance context — they may then take the example to be explicit evidence for a particular form of scrambling that is possible in their target language. Only then would the learner consider identifying a feature that distinguishes β from α — perhaps the inanimate [–ANIM] or else a distinguishing information-structural feature, depending on the context — and consider adding it to Σ.

In reality, as we reported in (19b) above, some but not all Pangasinan speakers accept scrambling of the form in (39). The possibility of producing such an utterance by even a subset of speakers means that the linguistic input of a Pangasinan speaker may include examples of the form in (39), making the above discussion of learner reactions to (39) a possibility worth discussing. At the same time, learner experiences may vary as to whether their input includes (sufficient tokens of) unambiguous utterances of this form, leading to the attested microvariation in scrambling feature specifications across adult speakers.[24]

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[23] See also Fodor (1998) for a more general claim that ambiguous evidence is not considered in the process of acquisition.

[24] A reviewer suggests that the existence of other Agree dependencies in the language, such as overt φ-agreement, may inform the determination of features in Σ. We believe that such "bootstrapping" is possible, but we caution that it cannot be the only means for determining Σ. For instance, to our knowledge there are no other morphosyntactic processes that reflect probing for animacy features, and yet some (though not all) speakers acquire the possibility of scrambling using animacy feature values. This availability of animacy features in Σ, as well as its speaker variation, can be explained by the acquisition procedure that we describe here, but is not explained by the bootstrapping hypothesis alone.

Recall furthermore that two postverbal arguments in Pangasinan that vary only in deictic features are subject to frozen word order, for all of our speakers. The relevant data point is repeated here from above in (40). Note that we predict that at least some Pangasinan speakers (group C) would be able to produce sentences of the form in (40) with its intended interpretation, given an appropriate discourse context that distinguishes the two arguments by information-structural features, and therefore for the input of learners to potentially include examples of this form.

(40)   **Learner input that is very unlikely to motivate scrambling:**   = (18)

A-nengneng	= to	[$_\beta$ yay	bii]	[$_\alpha$ may	laki].
PV-see	GEN.3SG	DEM.AUTH	woman	DEM	man

Intended: 'The man saw this woman.'

The contrasting deictic feature values do not serve to disambiguate the arguments' roles, and unlike in (39), there is not even a clear difference in semantic plausibility of the two possible parses. This makes it very unlikely — although not impossible — for examples of this form to be interpreted unambiguously as involving scrambling and thereby support the learning of scrambling by deictic feature values such as [+DEM.AUTH].

Summarizing the consequences of the discussion above, the proposed procedure for the learning of the featural triggers of scrambling in Σ predicts that formal features that can serve to disambiguate the semantic roles of arguments — for instance, φ-features as in (37) or animacy features as in (39) — are much more likely to be learned as possible grammatical triggers of scrambling. We thereby explain the apparently functional basis for the inventory of scrambling features, without treating word order freezing itself as a dynamic response to argument confusability, as in the strong functionalist account above, and also allowing for individual variation in the categorial judgments of different speakers.

More generally, we assume that the inventory of formal features in grammar must itself be learned from the linguistic input (see e.g. Zeijlstra 2008; Cowper & Hall 2014; Koeneman & Zeijlstra 2014; Biberauer & Roberts 2017; Biberauer 2019). We propose that no learner will hypothesize the existence of an arbitrary syntactic annotation [scr/Σ], with no semantic import (Müller 1998: 43), in order to account for an input utterance with marked word order. The grammatical trigger for the displacement of a constituent must then be attributed to one of its independently detectable features, based to its distinguishing semantics or morphology. These conservative assumptions for the acquisition of individual grammars successfully account for the various observations that at first glance suggest a description of word order freezing as a response to argument confusability.

Abbreviations

Our abbreviations follow the Leipzig glossing rules, with the addition of LK = linker and forms such as PV = Patient Voice which are introduced in section 3.1.

Ethics and consent

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Competing interests

The authors have no competing interests to declare.

Author contributions

The first author led the analysis and writing and the second author led the data collection.

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