# A Construction-based Cross-linguistic Analysis of V2 Word Order

Andrew C. Wetta
University at Buffalo

Verb second (V2) word order is determined by considering the absolute position of clausal constituents. Previous accounts of such word order in HPSG have been developed for individual V2 languages (predominantly German) but are often not cross-linguistically applicable. I propose a set of generalized mechanisms in linearization-based SBCG which accounts for cross-linguistic V2 data by use of: (1) a simple two-valued feature rather than many-typed topological domains, (2) constructionally-determined domain positions, and (3) domain compaction. Not only does this analysis account for V2 placement, but it can also model verb third (V3) placement and other positionally-stipulated word orders.

## 1 Data

The word order of V2 languages is typically relatively free which allows many variations in the linearization of constituents. However, in all permutations, the finite verb of a V2 clause is restricted to the second position, as illustrated in (1) where the finite verb is shown in boldface.

(1) a. Peter **wollte** dem Jungen das Buch schenken.
Peter want.PST the.DAT boy.DAT the.ACC book give.INF
b. Dem Jungen **wollte** Peter das Buch schenken.
c. Das Buch **wollte** Peter dem Jungen schenken.
d. Schenken **wollte** Peter dem Jungen das Buch.
'Peter wanted to give the book to the boy.' *German* (Uszkoreit, 1987, 156)

In this particular German sentence, the finite verb is consistently after exactly one constituent while all other elements may be flexibly placed with respect to syntactic constraints. Although this V2 phenomenon is most cited with Germanic languages, most notably German but including Danish, Dutch, Icelandic, and Yiddish, among others, it also occurs in other non-Germanic languages such as Breton (Celtic), Ingush (Nakh-Daghestanian), Karitiâna (Tupian), Kashmiri (Indic), and Romansch (Romance) as illustrated by examples (2) and (3).

(2) he boued **e tebr** Mona er gegin
her food PRT eat.3SG Mona in.the kitchen
'Mona eats her food in the kitchen' *Breton* (Press, 1986, 197)

(3) [boroja taso oky tykiri] **Ø-naka-hyryp-Ø** õwã
snake man kill PFV 3-PRT-cry-NFUT child
'When the man killed the snake, the child cried.' *Karitiâna* (Storto, 2003, 414)

Even though a language may employ V2 word order, it may not be applied to all clause types. That is, subordinate and question clauses, among others, may exhibit different finite verb placements than verb second positioning. For example, the Kashmiri sentence in (4) contains a subordinate clause which maintains V2 word order, not including the subordinator, however the Breton sentence in (5) attests a verb initial subordinate clause word order.

(4) tem-is chu afsoos [ki yi kitaab **cha-yi** tse par-mets]
he-DAT be.3SG.M regret.PRS.PTCP that this book be.F-2SG you.F.SG.ERG read-PST.PTCP
'He regrets the fact that it is this book that you have read.' *Kashmiri* (Bhatt, 1999, 100)

(5) gwelout a reas Lenaig [**e save** an dour]
see.INF PRT do.PST.3SG Lenaig PRT rise.PST.3SG the water
'Lenaig saw the water was rising.' *Breton* (Stephens, 2002, 399)

In other instances, clause types which usually exhibit V2 word order may display a similar verb third (V3) order as with the sentences in (6) and (7) where the finite verb appears in the third position after two initial constituents.

(6) [Alle Träume] [gleichzeitig] **lassen** sich nur selten verwirklichen
all dreams simultaneously let.3PL self.3PL only seldom realize.INF
'All dreams can seldom be realized at once.' *German* (Müller, 2002b, 115)

(7) raath kyaa **dyut-na-y** rameshan tse
yesterday what.NOM give.PST.M.SG-3SG.ERG-2SG.DAT Ramesh.ERG you.DAT
'As for yesterday, what is it that Ramesh gave you?' *Kashmiri* (Bhatt, 1999, 107)

These data are drawn from an extensive typological survey of clause structure in V2 languages which I have undertaken. The new analysis of V2 word order presented here is a reaction to this survey, for which I seek to provide a generalized syntactic formalization.

## 2 Previous analyses

Previous analyses of V2 word order in HPSG all draw upon a common set of mechanisms: word order domains, linear precedence rules, an INVERTED feature, SLASH, topological fields, and constructions (Pollard, 1996; Kathol, 2000; Borsley and Kathol, 2000; Richter and Sailer, 2001; Müller, 2002a). Yet some of these mechanisms are redundant. For example, the INVERTED feature and SLASH as well as domains and linear precedence (LP) rules both allow the same sort of variety in the linear realization of elements. Similarly, topological fields and constructions both provide the means to constrain clausal elements in particular configurations. In order to avoid these redundancies and to provide an appropriately flexible yet succinct description which generalizes the linearization behavior of all V2 languages, I utilize only word order domains, LP rules, and constructions to stipulate clause-internal word order. This means I do not employ a topological field model or extraction via the HEAD-FILLER SCHEMA to the first position, for reasons I now briefly explain.

**Problems for topological fields** The topological field model, drawn from traditional grammar, provides a precise and accurate way in which to describe the word order of German. But this model becomes problematic when it is applied to other languages (cf. Kathol, 2000, 285). Consider the traditional order of topological fields for German cast into LP rules in (8) by Kathol (2000, 79), which describes the word order placement fields of a sentence.

(8) TOPOLOGICAL LP STATEMENT
*Vorfeld* $\prec$ *complementizer field* $\prec$ *Mittelfeld* $\prec$ *verb cluster* $\prec$ *Nachfeld*

This topological field model relies on competition between a complementizer and a finite verb for the *complementizer field* (i.e. the second position): In a German main clause, the finite verb takes this position, but in a subordinate clause, it is the complementizer which appears here while the finite verb is forced to the *verb cluster* (i.e. clause final position). This competition describes clausal word order patterns like in German, but is inaccurate for V2 languages which do not have this competition, such as Yiddish or Kashmiri, in which the finite verb always appears in the *complementizer field* even in subordinate clauses. This competition could be eliminated for these languages by allowing multiple elements in the *complementizer field*, but their subordinate clauses are also V2 and would have an element in the *Vorfeld* (i.e. the first position) as in (4). Thus, a complementizer would incorrectly appear after the first clausal element. Consequently, an alternative topological field model must be posited for these languages.

Next, this model only allows verbs to be placed in the *complementizer field* or the *verb cluster*. This accounts for the verb placement phenomenon in German where, in a main clause, the finite verb and non-finite verbs enclose all the verbal arguments, except one in the *Vorfeld*. But, Karitiâna and Breton often maintain a linearly contiguous verb phrase, in which case all the verbs remain in the second position. (Other split verb placements may occur, but can be handled with specific constructional schemas.) Furthermore, if a V2 language does split the verb phrase like German, the *verb cluster* may not be the far right edge of the sentence, excluding extraposed items in the *Nachfeld*. Yiddish, among others, allows verbal arguments to appear after the *verb cluster* position.

Various modifications have been proposed to adapt the topological field model to other languages (Kathol, 2000; Borsley and Kathol, 2000), but no uniform and generalized model exists for all V2 languages. So, it is unclear if such a model may be used when describing a generalized V2 word order placement. Instead, I use constructions in my analysis to determine the clausal positions of constituents.

**Problems for extraction** All analyses except for Richter and Sailer (2001) utilize the HEAD-FILLER-SCHEMA to front a constituent before a clause-initial finite verb to effectively produce V2 word order. This schema is typically associated with a class of constructions that link a filler to an arbitrarily embedded gap such as topicalization, non-subject relative clauses, and wh-interrogatives, all of which license otherwise impossible word orders. However, given the flexible word order of V2 languages and the ability of constituents to shuffle under normal circumstances, it is possible to derive V2 word order without the HEAD-FILLER-SCHEMA.

The HEAD-FILLER-SCHEMA subsumes a set of constructions which allow unbounded extraction, that is, the realization of arbitrarily embedded elements in an alternative location, usually clause initial. For example, non-subject wh-interrogatives in English are realized as a filler in the first position. However, subjects which already appear first do not require this schema and may be licensed by non-question clause constructions (cf. Sag, 2010, 533). Similarly, because word order domains allow any clausal element to appear in the first position via shuffling in V2 clauses, the HEAD-FILLER-SCHEMA need not be employed to realize the initial element. Although there is cross-linguistic evidence which indicates that even subject wh-interrogatives are reflected in the morphosyntax as extraction phenomena (Hukari and Levine, 1995; Sag, 2005), the language-specific constructions which license these clauses may also stipulate the appropriate details.

Finally, if the HEAD-FILLER-SCHEMA were utilized to realize the first element of a V2 clause, it is unclear where this construction would appear in a FILLER-HEAD-CONSTRUCTION hierarchy such as in (Sag, 2010, 533). None of these constructions appropriately predict V2 in all of its instances. A TOPICALIZATION CONSTRUCTION would appropriately allow V2 word order but also includes the corresponding prosodic and pragmatic information associated with topicalization which are not appropriate for pragmatically focused constituents or elements with no emphasis, in particular, expletives. So, some V2-FILLER-HEAD-CONSTRUCTION would need to be posited to allow V2 word order without any additional prosodic or pragmatic information. Additionally, because the first element must be realized clause internally (i.e. it may not appear in a higher matrix clause), this V2-FILLER-HEAD-CONSTRUCTION would need to be constrained so that the filler could not cross clausal boundaries so that it would in fact be a bounded dependency. Such constraints are clearly very different than those of the TOPICALIZATION CONSTRUCTION. Thus, a HEAD-FILLER-SCHEMA approach would require the definition of two nearly identical constructions.

The analysis I propose here avoids the redundancies between HEAD-FILLER-SCHEMAS and word order domains to realized V2, and captures the V2 word order by using only word order domains. Unbounded dependencies still exists under my analysis and may be used in a V2 clause, but are not necessary to realize V2.

# 3 Constructionally-determined word order

Conceptually, the generalized analysis I propose here places all constituents of a clause into a *word order domain*. These domain elements are by default *flexible*, that is, able to shuffle, via Reape's shuffle operator ◯, and produce a variety of word orderings from a single set of domains. However, constructions may place positional restrictions on particular domain elements by specifying that they are *fixed* and stipulating their linear position within a clause. Linear precedence rules may only affect *flexible* domain elements and do not interact with *fixed* elements. In this way, free word order and strict positional stipulations may simultaneously exist within a single clause. Thus, a V2 construction would specify that the finite verb is *fixed* and must appear in the second position. All other *flexible* elements may then shuffle around this *fixed* verb, which is exempted from linear precedence constraints.

Formally, I describe this generalized analysis within the Sign-Based Construction Grammar (SBCG) (Sag et al., 2003; Sag, 2010, 2011) framework. As such, I incorporate *domains* into the structure of a *sign*, like Reape (1994, 1996), via a DOM attribute which itself is a list of *signs*. Re-formulating the *Constituent Ordering Principle*, a *sign's* FORM is then the concatenation of the FORM values of its domain elements.

**Two-typed domain elements** In order to facilitate the division between *flexible* and *fixed* domain elements, I introduce a new attribute LIN with *linearization* values: *flexible* and *fixed*, as depicted in (9). This LIN attribute is part of a domain *sign* and has a default value of *flexible* defined by the constraint in (10). *Persistent Default Unification*, as described by Lascarides and Copestake (1999), is employed to ensure that the default value remains a part of the feature structure during unification and may be realized in a fully licensed construct when no other value overrides it, namely *fixed*. That is, unless otherwise specified, the *linearization* value of a domain element in a construct is *flexible*. The *fixed* value is only assigned by constructions to override the default *flexible* value.

(9) *linearization*
  *flexible*   *fixed*

(10) $sign \Rightarrow \left[\text{DOM } list\left(\left[\text{LIN } /flexible\right]\right)\right]$

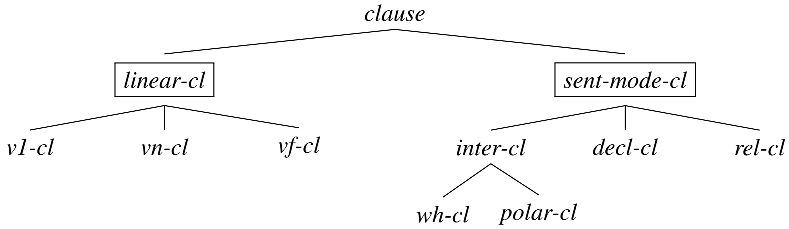
(11) $\begin{bmatrix}\text{LIN } flexible \\ \text{FOCUS -}\end{bmatrix} \prec \begin{bmatrix}\text{LIN } flexible \\ \text{FOCUS +}\end{bmatrix}$

In this way, linear precedence rules may only affect domain elements with a LIN value of *flexible*, as illustrated by the sample LP rule in (11). This allows *fixed* domain elements to remain in a constructionally-determined position without affecting the placement of the other *free* elements.

**Domain compaction** Following Reape, there are two kinds of DOMAIN CONSTRUCTIONS: LIBERATING, which keeps the daughter domain elements of a construction independent in the mother, and COMPACTING, which concatenates the morphological material from all of the daughter domain elements into a single new domain element in the mother thus preventing any further shuffling. The compacting mechanism allows multiple elements, when appropriate and specified by language-specific constructions, to form a single domain element which may appear in a single constructionally-determined domain position. This allows, for example, partial verb phrases in German to appear in the first position in a single *flexible* domain, or complex predicates in Breton to appear second in the single *fixed* finite verb domain.

**Generalized cross-linguistic constructions** Drawing from the constructional approach taken by Kathol (2000, Ch.7), my analysis similarly constrains clauses by a combination of *linear* and *sentence mode* constructions. Using the attested linearization patterns in V2 languages, I propose a general set of common clausal constructions for word order determination, provided in (12), which describe the mutually occurring syntactic constraints in all V2 languages. The *sentence mode* constructions license various clause types such as declarative, relative, and interrogative. And as illustrated by the sentences in (4) and (5), the clause type influences the position of the finite verb in a clause, thus making the *sentence* *mode* a necessary component when specifying linear order. Each language independently stipulates the combination of *linear* and *sentence mode* constructions which license a complete clause.

(12) Hierarchy of clausal constraints common to all V2 languages:




The linear clause constraints are formally defined by the rules in (13)–(15). Each of these constructions explicitly states the location of the domain for the finite verb. The V1 and VF CLAUSE CONSTRUCTIONS straight-forwardly stipulate that the domain element with the finite verb form must appear either clause initially or finally, respectively, which itself could be the result of the compaction of multiple other verbal domain elements. Notice that the finite verb domain element is constructionally stipulated to be *fixed*.

(13) a. In a verb initial clause, the domain element with the finite verb appears *before* all other domain elements.

b. $$\textit{v1-cl} \Rightarrow \left[\text{MTR}\left[\text{DOM}\left\langle\begin{bmatrix}\text{LIN}\ \textit{fixed}\\ \text{SYN}\left[\text{CAT}\left[\text{VFORM}\ \textit{finite}\right]\right]\end{bmatrix}\right\rangle \oplus \ldots\right]\right]$$

(14) a. In a verb final clause, the domain element with the finite verb appears *after* all other domain elements.

b. $$\textit{vf-cl} \Rightarrow \left[\text{MTR}\left[\text{DOM}\ \ldots \oplus \left\langle\begin{bmatrix}\text{LIN}\ \textit{fixed}\\ \text{SYN}\left[\text{CAT}\left[\text{VFORM}\ \textit{finite}\right]\right]\end{bmatrix}\right\rangle\right]\right]$$

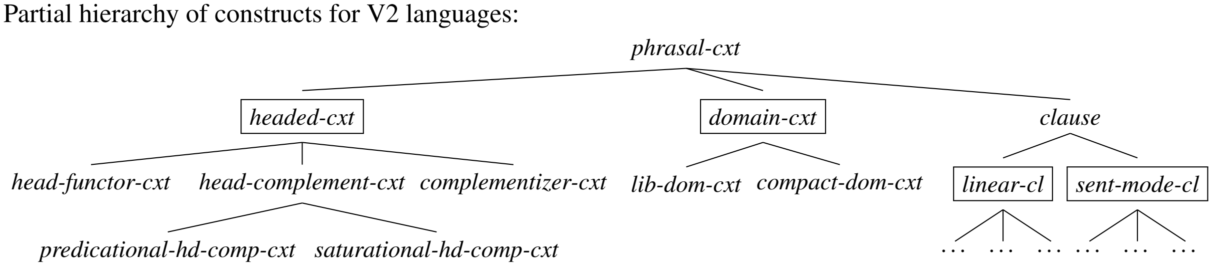
(15) a. In a clause which positions the finite verb domain element in the $n$th position from the beginning, the finite verb is preceded by exactly one *flexible* domain element and any number of *fixed* domain elements, in any order, and followed by all other domain elements.

b. $$\textit{vn-cl} \Rightarrow \left[\text{MTR}\left[\text{DOM}\left(\textit{list}\left(\left[\text{LIN}\ \textit{fixed}\right]\right) \bigcirc \left\langle\left[\text{LIN}\ \textit{flexible}\right]\right\rangle\right) \oplus \left\langle\begin{bmatrix}\text{LIN}\ \textit{fixed}\\ \text{SYN}\left[\text{CAT}\left[\text{VFORM}\ \textit{finite}\right]\right]\end{bmatrix}\right\rangle \oplus \ldots\right]\right]$$

The VN CLAUSE CONSTRUCTION in (15) must not only specify the position of the finite verb domain element, but must also limit the number and types of elements that precede it so that V2 or V3 may be realized. In the absence of any other constructions to specify *fixed* domain elements before the finite verb, only one element appears before the verb, namely a *flexible* element, thus creating V2 word order. If there is an additional construction specifying *fixed* elements before the finite verb, it then becomes possible to define V3 word order or, for that matter, V4, V5, and so on. This construction is remarkable in that it licenses all placements of the finite verb in some $n$th position from the beginning of a clause in exactly the same way.

**Language-specific clause licensing** The use of the generalized mechanisms to describe the clause structure in a particular language may be illustrated by a fuller hierarchy of PHRASAL CONSTRUCTIONS in (16). The HEADED CONSTRUCTIONS, adopted from SBCG (Sag, 2010, 2011), are not necessarily shared among V2 languages, but illustrate where they may exist in the phrasal hierarchy. Thus, constructs may now be fully licensed by a combination of HEADED, DOMAIN, LINEAR CLAUSE, and SENTENCE-MODE CLAUSE CONSTRUCTIONS.

(16) Partial hierarchy of constructs for V2 languages:



For example, given the language-specific constructions for German in (17), which utilize the generalized V2 constructions, it is possible to license the sentence in (1b) with the resulting domain structure shown in (18).

(17) Some PHRASAL CONSTRUCTIONS for German

a. *determiner-cxt* $\Rightarrow$ *head-functor-cxt* $\wedge$ *compacting-domain-cxt*

b. *main-lib-sat-hd-comp-cl* $\Rightarrow$ *saturational-head-comp-cxt* $\wedge$ *liberating-domain-cxt* $\wedge$ *vn-cl* $\wedge$ *declarative-cl*

The DETERMINER CONSTRUCTION licenses the construction of 'dem Jungen' and 'das Buch', which are then compacted into a single domain element. Next, the MAIN-LIB-SAT-HD-COMP-CLAUSE CONSTRUCTION licenses the saturation of the finite verb's complement list while keeping all of the domain elements liberated and free to shuffle except for the finite verb itself, which is constructionally specified as *fixed*, according to the VN-CLAUSE CONSTRUCTION, and is relegated to the position after a single *flexible* domain. Language-dependent LP rules determine the positions of the *flexible* elements, such as constraining the non-finite verb domain element to the end of the clause.

(18)
$$\begin{bmatrix} \text{DOM} \left\langle \begin{bmatrix} \text{LIN } \textit{flexible} \\ \text{FORM} \left\langle \textit{dem, Jungen} \right\rangle \\ \text{SYN NP}\begin{bmatrix}\textit{dat}\end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{LIN } \textit{fixed} \\ \text{FORM} \left\langle \textit{wollte} \right\rangle \\ \text{SYN V}\begin{bmatrix}\textit{finite}\end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{LIN } \textit{flexible} \\ \text{FORM} \left\langle \textit{Peter} \right\rangle \\ \text{SYN NP}\begin{bmatrix}\textit{nom}\end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{LIN } \textit{flexible} \\ \text{FORM} \left\langle \textit{das, Buch} \right\rangle \\ \text{SYN NP}\begin{bmatrix}\textit{acc}\end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{LIN } \textit{flexible} \\ \text{FORM} \left\langle \textit{schenken} \right\rangle \\ \text{SYN V}\begin{bmatrix}\textit{base}\end{bmatrix} \end{bmatrix} \right\rangle \end{bmatrix}$$

A V3 construction can be licensed with the same VN-CLAUSE-CONSTRUCTION with further language-specific information. An adverb and subject are permitted before the finite verb in (6) by the construction in (19) which licenses the domain structure in (20). By specifying the adverb as *fixed*, it ensures that it does not influence other LP constraints.

(19) ADVERB V3 CONSTRUCTION for German

$$\textit{adverb-V3-cl} \Rightarrow \textit{vn-cl} \wedge \begin{bmatrix} \text{DOM} \left\langle \left( \left\langle \begin{bmatrix} \text{LIN } \textit{fixed} \\ \text{SYN ADV} \end{bmatrix} \right\rangle \bigcirc \left\langle \begin{bmatrix} \text{LIN } \textit{flexible} \end{bmatrix} \right\rangle \right) \oplus \ldots \right\rangle \end{bmatrix}$$

(20)
$$\begin{bmatrix} \text{DOM} \left\langle \begin{bmatrix} \text{LIN } \textit{flexible} \\ \text{FORM} \left\langle \textit{alle Träume} \right\rangle \\ \text{SYN NP} \end{bmatrix}, \begin{bmatrix} \text{LIN } \textit{fixed} \\ \text{FORM} \left\langle \textit{gleichzeitig} \right\rangle \\ \text{SYN ADV} \end{bmatrix}, \begin{bmatrix} \text{LIN } \textit{fixed} \\ \text{FORM} \left\langle \textit{lassen} \right\rangle \\ \text{SYN V}\begin{bmatrix}\textit{fin}\end{bmatrix} \end{bmatrix}, \ldots \right\rangle \end{bmatrix}$$

Similarly, the V3 Kashmiri question clause in (7) may be licensed by the language-specific construction in (21) which also utilizes the common VN CONSTRUCTION and has the resulting domain structure in (22). This construction uniquely specifies a *fixed* question word domain which appears before the finite verb, thus allowing verb third word order.

(21) CONTENT QUESTION CONSTRUCTION for Kashmiri

$$\textit{content-question-cl} \Rightarrow \textit{vn-cl} \wedge \textit{wh-cl} \wedge \begin{bmatrix} \text{DOM} \left\langle \begin{bmatrix} \text{LIN } \textit{flexible} \end{bmatrix}, \begin{bmatrix} \text{LIN } \textit{fixed} \\ \text{SYN WH} \end{bmatrix}, \ldots \right\rangle \end{bmatrix}$$

(22)
$$\begin{bmatrix} \text{DOM} \left\langle \begin{bmatrix} \text{LIN } \textit{flexible} \\ \text{FORM} \left\langle \textit{raath} \right\rangle \\ \text{SYN ADV} \end{bmatrix}, \begin{bmatrix} \text{LIN } \textit{fixed} \\ \text{FORM} \left\langle \textit{kyaa} \right\rangle \\ \text{SYN WH} \end{bmatrix}, \begin{bmatrix} \text{LIN } \textit{fixed} \\ \text{FORM} \left\langle \textit{dyutnay} \right\rangle \\ \text{SYN V}\begin{bmatrix}\textit{fin}\end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{LIN } \textit{flexible} \\ \text{FORM} \left\langle \textit{rameshan} \right\rangle \\ \text{SYN NP} \end{bmatrix}, \begin{bmatrix} \text{LIN } \textit{flexible} \\ \text{FORM} \left\langle \textit{tse} \right\rangle \\ \text{SYN NP} \end{bmatrix} \right\rangle \end{bmatrix}$$

# 4 Conclusion

By examining the mutually-shared characteristics of V2 languages it is possible to define the common mechanisms which accurately describe their word orders, namely: a shared set of LINEAR, SENTENCE MODE, and DOMAIN CONSTRUCTIONS; *flexible* and *fixed* domains; language-specific constructions which specify *fixed* domain elements; domain compaction; and linear precedence rules which only affect *free* domain elements. Furthermore, in addition to the examples here, grammar fragments for the word order in Breton, German, and Kashmiri have been developed utilizing these mechanisms. This illustrates the accuracy of the analysis to describe V2 word order while also being flexible enough for all other non-V2 word orders in these languages.

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