

Explaining Syntactic Universals

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6. Universals of word order

1. Word order in generative grammar and in typology

Word order is perhaps **the most widely discussed grammatical phenomenon in Chomskyan generative grammar** (it's much less prominent in other grammatical frameworks such as Relational Grammar, Lexical-Functional Grammar, Role and Reference Grammar, Functional Grammar).

Word order is also the area with the best-known **typological correlations/implicational universals** (the "Greenbergian word order correlations", Dryer 1992).

Greenberg (1963) was building on the work of predecessors such as Schmidt (1926):

Universal 36: UA#2000
 If the genitive precedes the noun it modifies, the language has suffixes and postpositions; if the genitive follows the noun, the language has prefixes and prepositions.

Schmidt 1926:382

"Steht der affixlose Genitiv vor dem Substantiv, welches er näher bestimmt, so ist die Sprache eine Suffixsprache eventuell mit Postpositionen, steht der Genitiv nach, so ist sie eine Präfixsprache eventuell mit Präpositionen."

Universal 37: UA#2000
 If the genitive precedes the noun, the object precedes the verb; if the genitive follows the noun, the object follows the verb.

Schmidt 1926:384

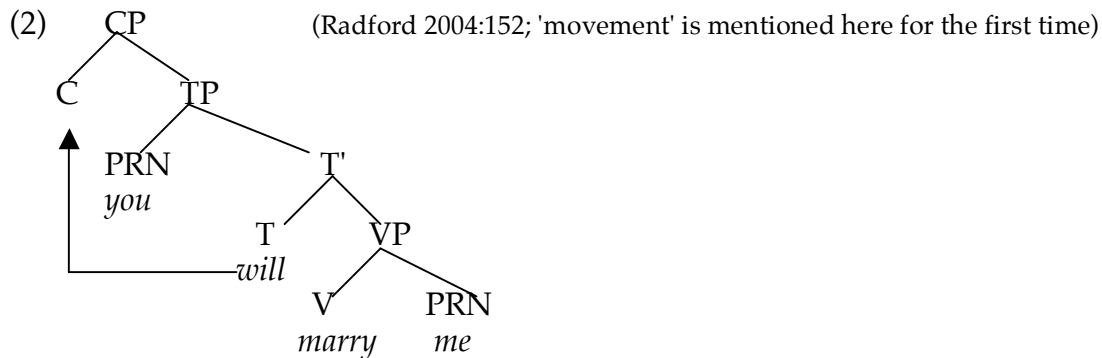
"...wird die Voranstellung des Akkusativs vor das Verb in den weitaus meisten Fällen in solchen Sprachen geübt, die auch den Genitiv voranstellen, und ebenso findet sich Nachstellung des Objektes überwiegend in den Sprachen mit Genitivnachstellung."

– But generative grammarians have typically been occupied with rather different phenomena than word order typologists – because they have been prominently concerned with achieving elegant/cognitively realistic descriptions of individual languages.

2. Verb positioning in generative grammar

verb-subject inversion in English:

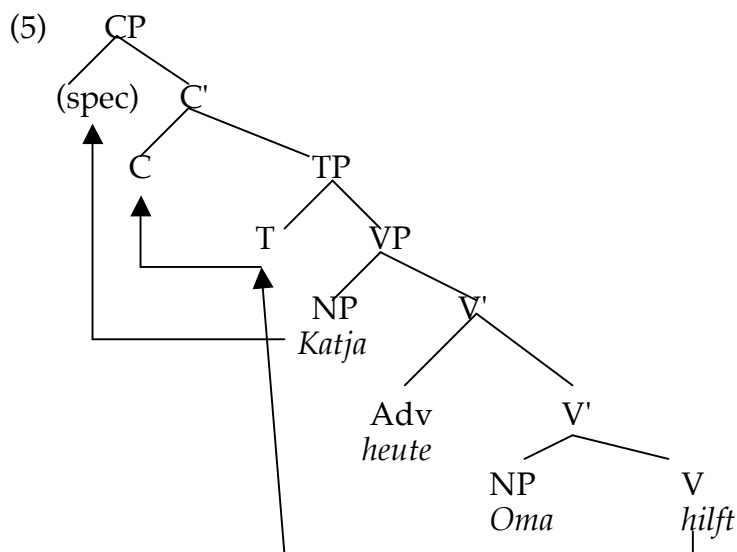
- (1) a. *You will marry me.*
 b. *Will you marry me?*



verb-second word order in German (and other Germanic languages):

- (3) a. *Katja hilft heute Oma.* 'Katja is helping granny today.'
 b. *Heute hilft Katja Oma.*
 c. *Oma hilft Katja heute.*

(4) *...dass Katja heute Oma hilft.* '...that Katja is helping granny today.'



- such abstract movement operations lead to elegant accounts of underlying word order in these languages
- but often these accounts do not make any further claims

Radford 2004:

- why should auxiliaries move from T to C in questions?
- C is a strong head; a strong head position has to be filled
- in main-clause questions, it is filled by a null question particle Q
- Q is affixal and therefore must attach to something;
it bears a strong tense feature and hence attracts the head of TP

analogously for German:

- C is filled by a null declarative particle(?)
- but why is spec-C filled in declaratives but not in questions?

- such abstract analyses only become interesting when they make falsifiable predictions (e.g. V-to-T movement only occurs when the verb bears significant agreement morphology; cf. older English/French vs. modern English)

	subject	T	NEG	V	object
(6) a. French	<i>Aïcha (n')</i>	<i>aime_i</i>	<i>pas</i>	<i>t_i</i>	<i>Mahmoud.</i>
b. 16th c. English	<i>Julia</i>	<i>loves_i</i>	<i>not</i>	<i>t_i</i>	<i>Romeo.</i>
c. modern English	<i>Pedro</i>	<i>(does)</i>	<i>not</i>	<i>love</i>	<i>Dolores</i>
d. Haitian	<i>Boukinèt</i>		<i>pa</i>	<i>renmen</i>	<i>Bouki</i>

? Universal 38:

If a VO language has significant subject-agreement morphology on its finite verb, it has a postverbal negative particle (and vice versa?).

(cf., e.g., DeGraff 1997)

3. The Greenbergian Word Order Correlations

Universals 39ff:

If a language has dominant VO (=verb-object) order, it tends to have the orders in the left-hand column of Table 1; if a language has dominant OV (=object-verb) order, it tends to have the orders in the right-hand column.

Table 1. Correlation pairs reported in Dryer 1992

VO correlate	OV correlate
adposition - NP	NP - adposition
copula verb - predicate	predicate - copula verb
'want' - VP	VP - 'want'
tense/aspect auxiliary verb - VP	VP - tense/aspect auxiliary verb
negative auxiliary - VP	VP - negative auxiliary
complementizer - S	S - complementizer
question particle - S	S - question particle
adverbial subordinator - S	S - adverbial subordinator
article - N'	N' - article
plural word - N'	N' - plural word
noun - genitive	genitive - noun
noun - relative clause	relative clause - noun
adjective - standard of comparison	standard of comparison - adjective
verb - PP	PP - verb
verb - manner adverb	manner adverb - verb

Each of the correlation pairs also tends to correlate with each of the other correlation pairs. So in fact we have 14! universals here.

4. The head directionality parameter

4.1. Heads vs. complements (vs. specifiers)

Chomsky & Lasnik (1993:518)

"We assume that orderings are determined by a few parameter settings. Thus in English, a *right-branching* language, all heads precede their complements, while in Japanese, a *left-branching* language, all heads follow their complements; the order is determined by one setting of the head parameter."

earlier discussions in Lightfoot (1979:52), Hawkins (1983), Haider (1986:130-141); following Vennemann's (1974) pre-X-bar-theory account in terms of the quasi-semantic notions "operator"/"operand" (roughly, 'modifier/head')

Lightfoot (1979:52) also includes "specifiers":

"...This permits a grammar to have specifiers of all categories either preceding or following the head; thus *all* specifiers will be on the same side...if the specifier precedes the head, the complement will follow it, and vice versa...So in English all specifiers precede the head and all complements follow."

- | | | | |
|-----|--|-----|--|
| (7) | [<i>the</i> dog]
[<i>has</i> gone]
[<i>right</i> to the kennel] | (8) | [the picture of <i>Mary</i>]
[lies on <i>the</i> table]
[on <i>the</i> table] |
|-----|--|-----|--|

But how are *operand/operator*, *head/dependent*, *head/complement/specifier* defined?

- Are articles and auxiliaries specifiers or heads?
- Are possessive NPs complements or specifiers?
- How do relative clauses and manner adverbs fit in?
- Wouldn't the order of adjectives, demonstratives, numerals and degree adverbs be predicted to correlate as well?

(I have not found clear answers to these questions. The head directionality parameter's predictions are never discussed in detail, not even in Zepter 2003.)

4.2. What to do with exceptions

None of the correlations is exceptionless. All are statistical universals:

Dryer 2005d,b	verb-object	object-verb
prep-noun	417	10
noun-postp	38	427

Table 2.

Dryer 2005a,b	verb-initial	verb-final
prep-noun	89	8
noun-postp	6	331

Table 3.

Dryer 2005d,e	verb-object	object-verb
noun-genitive	352	30
genitive-noun	113	434

Table 4.

Dryer 2005d,f	verb-object	object-verb
noun-relative	370	96
relative-noun	5	109

Table 5.

Dryer 2005e,f	noun-genitive	genitive-noun
noun-relative	291	135
relative-noun	1 (Tigré)	107

Table 6.

Dryer 2005d,g	verb-object	object-verb
AdvSub-clause	279	54
clause-AdvSub	3 (Buduma, Guajajara, Yindjibarndi)	136

Table 7.

If the correlations are to be explained by a head directionality parameter, why would there be exceptions? The directionality parameter predicts that such languages should not be acquirable.

Is UG perhaps only a kind of preference structure? Prepositions or prenominal relative clauses in OV languages would be dispreferred by UG, but still learnable (or perhaps by a non-core, non-UG general learning mechanism).

Prediction: rare types should be harder to learn
(no evidence for this prediction; Newmeyer 1998:§3.3)

4.3. What to do with relative quantities

Baker (2001: 134):

"Since the difference between English-style and Japanese-style word order is attributable to a single parameter [Head Directionality], there is only one decision to make by coin flip: heads, heads are initial; tails, heads are final. **So we expect roughly equal numbers** of English-type and Japanese-type languages.... Within the head-initial languages, however, it requires two further decisions to get a verb-initial, Welsh-type language [the Subject Placement Parameter and the Verb Attraction Parameter]: Subjects must be added early *and* tense auxiliaries must host verbs. If either of these decisions is made in the opposite way, then subject-verb-object order will still emerge. **If the decisions were made by coin flips, we would be predict that about 25 percent of the head-initial languages would be of the Welsh type and 75 percent of the English type.** This too is approximately correct ..."

Newmeyer (2005:§3.2.2.4):

"There are serious problems as well with the idea that **the rarity of a language type is positively correlated with the number of 'decisions'** (i. e. parametric choices) that a language learner has to make. Baker's discussion of verb-initial languages implies that for each parameter there should be a roughly equal number of languages with positive and negative settings. **That cannot possibly be right.** There are many more non-polysynthetic languages than polysynthetic ones, despite the fact that whether a language is one or the other is a matter of a yes-no choice. The same point could be made for subject-initial head-first languages vis-à-vis subject-last ones and nonoptional polysynthesis languages vis-à-vis optional polysynthetic ones."

4.4. The challenge from Antisymmetry

Kayne (1994:47):

"If UG unfailingly imposes [Specifier-Head-Complement] order, there cannot be any directionality parameter in the standard sense of the term. The difference between so-called head-initial languages and so-called head-final languages cannot be due to a parametric setting whereby complement positions in the latter type precede their associated heads."

All complement-head orders must be derived by movement (e.g. clause-COMP structures are derived from COMP-clause by movement of the clause into spec-COMP) – but is there perhaps a cross-categorical movement parameter?

typological evidence for antisymmetry:

- only postpositions show agreement with their NP complements
- *wh*-movement is generally absent from SOV languages
- verbs only move to the initial position (to COMP), never to final position
- *that*-trace effects are found only with initial complementizers
- there are no languages with number agreement only with postverbal subjects

5. Hawkins's processing-based explanation of the word order correlations

5.1. Early immediate constituents

basic insight: **word orders are often optimized for processing**; this is found both in performance and in competence (=both in language use and in grammars)

language use: e.g. ordering of postverbal PPs

- (9) a. *The woman*_{VP} [*waited*_{PP1} [*for her son*]_{PP2} [*in the cold but not unpleasant wind*]].
 b. *The woman*_{VP} [*waited*_{PP2} [*in the cold but not unpleasant wind*]_{PP1} [*for her son*]].

Table 8: English Prepositional Phrase Orderings by Relative Weight (Hawkins 2000:237)

n = 323	PP2 > PP1 by 1 word	by 2-4	by 5-6	by 7+
[V PP1 PP2]	60% (58)	86% (108)	94% (31)	99% (68)
[V PP2 PP1]	40% (38)	14% (17)	6% (2)	1% (1)

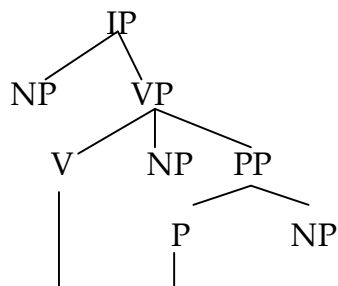
PP2 = longer PP; PP1 = shorter PP

An additional 71 sequences had PPs of equal length (total n = 394)

5.2. Explaining the Greenbergian correlations

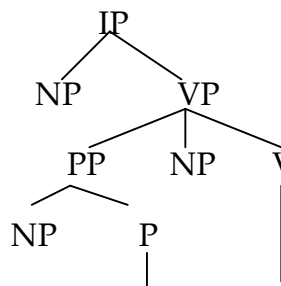
Object-Verb order and Adposition-NP order:

(13) a.



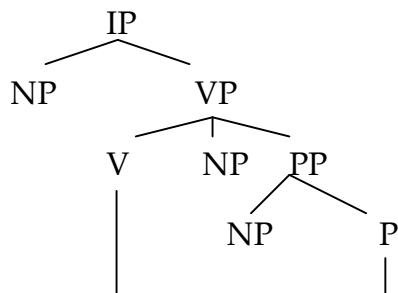
SVO and prepositional (common)
IC-to-word ratio: 3/4 (75%)

b.



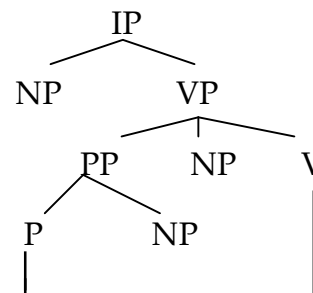
SOV and postpositional (common)
IC-to-word ratio: 3/4 (75%)

c.



SVO and postpositional (rare)
IC-to-word ratio: 3/6 (50%)

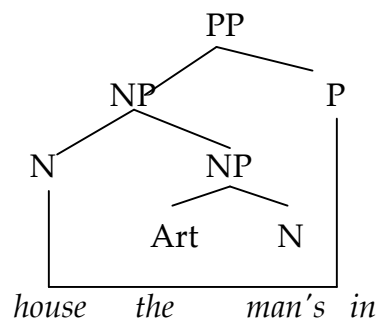
d.



SOV and prepositional (rare)
IC-to-word ratio: 3/6 (50%)

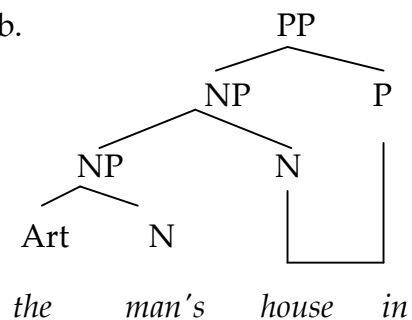
Genitive-Noun order and Adposition-NP order:

(14) a.

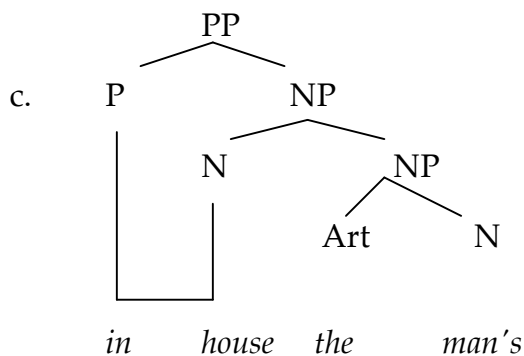


Noun-Genitive and postpositional
(rare)
IC-to-word ratio: 2/4 (50%)

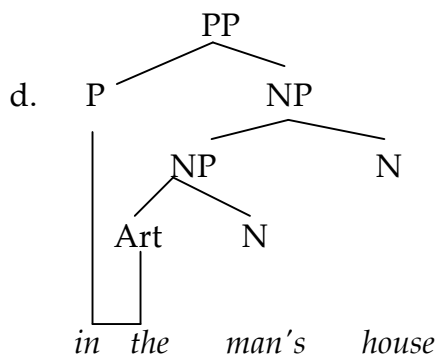
b.



Genitive-Noun and postpositional
(common)
IC-to-word ratio: 2/2 (100%)



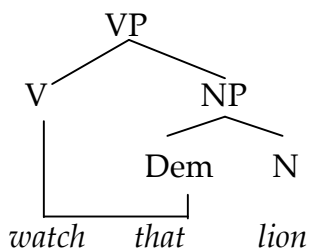
Noun- Genitive and prepositional
(common)
IC-to-word ratio: 2/2 (100%)



Genitive-Noun and prepositional
(rare)
IC-to-word ratio: 2/4 (50%)

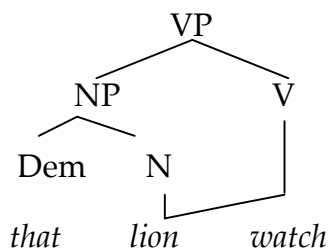
5.3. The noncorrelating categories: nominal modifiers (demonstratives, adjectives, numerals)

(15) a.



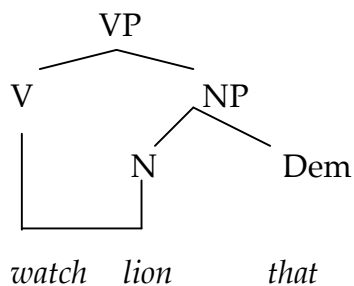
Verb-Object and Dem-Noun
(rare)
IC-to-word ratio: 2/2 (100%)

b.



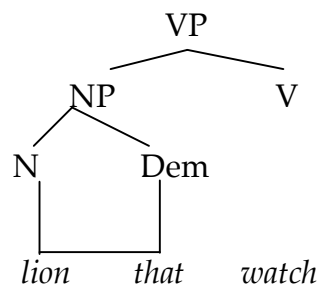
Object-Verb and Dem-Noun
(common)
IC-to-word ratio: 2/2 (100%)

c.



Verb-Object and Noun-Dem
(common)
IC-to-word ratio: 2/2 (100%)

d.



Object-Verb and Noun-Dem
(rare)
IC-to-word ratio: 2/2 (100%)

cross-linguistic distribution: **Table 10.**

Dryer 2005d,h	verb-object	object-verb	
noun-demonstrative	79/322	60/118	
demonstrative-noun	75/147	122/285	(genera /languages)

(no statistical significance according to Dryer, because the trend is not geographically consistent; several macro-areas reverse the trend)

Adjectives have long been known to show less clear correlations (see Dryer 1988, 2005c):

Schmidt 1926:479-83	verb-object	object-verb	VO/OV	noun-adjective	adjective-noun	NA/AN
genitive-noun	18	49	7	39	49	4
noun-genitive	28	5	3	23	10	4

Table 11.

5.4. Word order asymmetries

(16) Maximize On-line Processing (MaOP)

"The human processor prefers to maximize the set of properties that are assignable to each item X as X is processed, thereby increasing **On-line Property to Ultimate Property ratios**. The maximization difference between competing orders and structures will be a function of the number of properties that are misassigned or unassigned to X in a structure/sequence S, compared with the number in an alternative." (Hawkins 2004: 51)

The processor not only prefers minimal domains, but also maximal on-line property assignments. "Garden path" sentences, where misassignment can occur, are dispreferred:

- (17) *Zoo-ga kirin-o taoshi-ta shika-o nade-ta.*
 elephant-NOM giraffe-ACC knock.down-PST deer-ACC pat-PST
 'The elephant patted the deer that knocked down the giraffe.' (Hawkins 1990:253)

At the point where only the first three elements have been processed...

- (18) *Zoo-ga kirin-o taoshi-ta ...*
 elephant-NOM giraffe-ACC knock.down-PST

...a different analysis ('The elephant knocked down the giraffe') is very likely, and misassignments are bound to occur. This is dispreferred.

Competing motivations (Hawkins 2002):

Table 12.

Dryer 2005d,f	verb-object	object-verb
noun-relative	<ul style="list-style-type: none"> • Minimize Domains (MiD) • Maximize On-line Processing (MaOP) 370 languages	<ul style="list-style-type: none"> • Maximize On-line Processing (MaOP) 96 languages
relative-noun	– 5 languages	<ul style="list-style-type: none"> • Minimize Domains (MiD) 109 languages

Minimize Domains and Maximize On-line Processing in competition in basic clause order:

MaOP prefers the order subject before object (because several properties of objects depend on subjects; semantic roles, quantifier scope, c-command)

Table 13. *Efficiency Ratios for Basic Word Orders* (Hawkins 2004:231)

		IC-to-word ratios (aggregate)	OP-to-UP ratios
<i>mS[VmO]</i>	IP CRD: 2/3=67% VP CRD: 2/2=100%	84%	high
<i>[V]mS[mO]</i>	IP CRD: 2/2=100% VP CRD: 2/4=50%	75%	high
<i>[VmO]mS</i>	IP CRD: 2/4=50% VP CRD: 2/2=100%	75%	lower
<i>Sm[OmV]</i>	IP CRD: 2/3=67% VP CRD: 2/2=100%	84%	high
<i>[OmV]Sm</i>	IP CRD: 2/4=50% VP CRD: 2/2=100%	75%	lowest
<i>[Om]Sm[V]</i>	IP CRD: 2/3=67% VP CRD: 2/4=50%	59%	lower

Assumptions (cf. Hawkins 1994:328-339):

Subjects and objects are assigned left-peripheral constructing categories for mother nodes in head-initial (VO) languages, i.e. *mS*, *mO*; and right-peripheral constructing categories in head-final (OV) languages, i.e. *Sm*, *Om*; VP dominates V and O (even when discontinuous), these VP constituents being placed within square brackets [...]; IP dominates S and VP; S = 2 words, O = 2, V = 1; V or O constructs VP, whichever comes first (if O, then VP is constructed at the point *m* which projects to O by Mother Node Construction and to VP by Grandmother Node Construction, cf. Hawkins 1994).

- (19) Minimize Domains: SVO, SOV > VSO, VOS, OVS > OSV
 Maximize On-line Processing: SOV, SVO, VSO > VOS, OSV > OVS
 combined: SOV, SVO > VSO > VOS > OVS, OSV

5.5. Exceptions, relative quantities, asymmetries

- Hawkins's approach allows exceptions, because relatively inefficient languages are learnable. Like inefficient structures elsewhere in the grammar, they can arise occasionally as side effects of other changes.
- Hawkins's approach makes predictions about relative quantities of languages. The better motivated a structure is, the greater the likelihood that it will occur in languages.
- The competing motivations MiD and MaOP predict both symmetries and asymmetries.

6. An Optimality approach to word order typology: Zepter 2003

HEAD LEFT: A head precedes its complement.

HEAD RIGHT: A head follows its complement.

BRANCHING RIGHT: Of two non-terminal sister nodes, the one that is part of the extended projection line follows (= specifiers, phrasal adjuncts, complex functional heads precede their sister nodes)

LEX HEAD EDGE: A lexical head surfaces at an edge of LexP.

GENERALIZED SUBJECT: An XP which is part of a clause has a specifier.

optimal VOS (p. 42):

	LEX HD EDGE	HEAD LEFT	GEN SUBJECT	BRANCH RIGHT	HEAD RIGHT
—> VOS				*	*
VSO			*!		**
SOV		*!			
SVO	*!				*

optimal VSO (p. 53):

	LEX HD EDGE	HEAD LEFT	BRANCH RIGHT	GEN SUBJECT	HEAD RIGHT
VOS			*!		*
—> VSO				*	**
SOV		*!			
SVO	*!				*

optimal SVO (p. 76):

	HEAD LEFT	GEN SUBJECT	BRANCH RIGHT	LEX HD EDGE	HEAD RIGHT
VOS			*!		*
VSO		*!			**
SOV	*!				
—> SVO				*	*

optimal SOV (p. 79):

	HEAD RIGHT	HEAD LEFT	BRANCH RIGHT	GEN SUBJECT	LEX HD EDGE
VOS	*!		*		
VSO	*!*			*	
—> SOV		*			
SVO	*!				*

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