

Psychological reality	Descriptive adequacy	Typological explanation
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Typology

Some proposed universals:

- # of arguments = # of complements (e.g. θ criterion) (only a tendency; explanation of tendency. 12 slides)
- Linking rules (only modest version holds; explanation for modest version. 9 slides)
- Head-direction parameter (only a tendency; explanation for tendency. 6 slides)
- Pro-drop parameter (no interesting version holds. 4 slides)
- Recursion (Piraha. 12 slides)
- Island constraints (alternative explanation, evidence. 42 slides)
- *Adj N Numeral (doesn't hold. explanation for experimental result. 27 slides)

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Psychological reality	Typological explanation
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proposed universals related to
ARGUMENT STRUCTURE

of arguments = # of complements (cf. theta criterion)

(Lidz et al. 2003)

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Typological explanation	
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Examples of general tendency in English

of arguments expressed = # of semantic arguments

Meaning	Form
X moves (to) Y	Subj V PP X Y
X causes Y to move Z	Subj V Obj PP X Y Z
X causes Y to become Z	Subj V Obj RP X Y Z
X causes Y to receive Z	Subj V Obj Obj2 X Y Z

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Typological explanation	
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ENGLISH (intrans)	ÉWÉ (transitive)
run	Essegbey 1999, to appear fu _V "course _{NP} "
swim	fu _V "water _{NP} "
blow	blow _V "air _{NP} "

Lao (Ameka to appear): At most two arguments per verb.

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Typological explanation

Do we need a generalization that is *specific to language*?

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Typological explanation

- Grice (1975): Maxim of Quantity: Say as much, and only as much, as is needed for the communicative goal.

: Pragmatic assumption in all kinds of linguistic and non-linguistic communicative acts.

(cf. also Paul 1889; Zipf 1935; Horn 1984; Levinson 2001)

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Typological explanation

Pragmatic Mapping Generalizations

(Goldberg, 2004, *Cognition*)

A) The arguments that are expressed are interpreted to be *relevant* to the message being conveyed.

B) Any semantic arguments in the event being conveyed that are *relevant* and *non-recoverable* from context *must be overtly indicated*.

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Typological explanation

...Pragmatic generalization

- Expressed --> Relevant
- Relevant & Non-recoverable --> Identifiable

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Typological explanation

Arguments that are recoverable or irrelevant?

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Typological explanation

Recoverable arguments are commonly omitted cross-linguistically

Chinese

A: gei3
give

" [I] give [you] [some peach]" (Mok and Bryant 2006)

[Korean](#), [Japanese](#), Thai, Hindi, Hungarian, Kannada, Laos...

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Typological explanation

Thai:

Recoverable arguments are generally omissible.

Yet speakers often use proper name NPs (nicknames) to refer to self when talking to intimates

Speaker Mai (Ratitumkul 2007):

Mai waa Mai tham_ʔa ʔa-Dy kwaa raan ʔik na
Mai think Mai make Part. delicious more restaurant more Part.
Mai[speaker] thinks Mai[speaker] made (it) better than the restaurant.

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Typological explanation

English: arguments are not generally omissible, and yet we do have special constructions:

	# arguments expressed	# semantic arguments
Short Passives (e.g., <i>Pat was killed</i>)	1	2: (Pat, Pat's killer)
The deprofiled object construction (e.g., <i>The tiger killed again</i>) (Goldberg 2001)	1	2: (the tiger, the tiger's prey)

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Typological explanation

So Isomorphic Mapping principle does not hold, but Pragmatic Mapping generalizations do.

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Typological explanation

Proposed Cross-Linguistic Universals

E.g., Dowty (1991) (cf. also Van Valin 1990):

- **if** there's a subject and an object, and
- **if** there's an ACTOR and an UNDERGOER then
 - ACTOR -> subject;
 - UNDERGOER -> object,

except when they're linked the **opposite way**, in certain (syntactically ergative) languages.

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Typological explanation

- Dowty: relatively weak claim
- Oversimplified account of ergativity
 - Yidin' is syntactically ergative with nominals; syntactically accusative with pronouns (Dixon 1979)
- Also, what counts as "subject" "object" differs cross-linguistically (Keenan 1976; Van Valin 1981; Fried 1993; Morris 1997; Croft 2001; Barðdal 2005)

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Typological explanation

Reformulation of Dowty's generalization:

Actors and undergoers tend to be expressed in prominent slots

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Typological explanation

Reformulation of Dowty's generalization:

Actors and undergoers tend to be expressed in prominent slots

Prominent slots may be:

- obligatory
- lack case marking
- closer to the verb
- indicated by verb agreement

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Typological explanation

Actors are salient

--Visual attention tends to be centered on the actor in an event (Robertson and Suci, 1980; Leslie 1982; 1984).

--Agent bias (*chase vs flee*) (Fisher *et al.* 1994)

--9 month olds: attribute intentional behavior to even inanimate objects (Csibra *et al.* 1999)

--16 month olds: distinguish intentional vs accidental actions (Carpenter *et al.* 1998).

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Typological explanation

Undergoers are salient

- Easier to discriminate between events that have distinct endpoints than distinct onsets (Regier and Zheng 2003)
- 6 month olds attend more to changes of state than to changes of motion without corresponding state-change (Woodward 1998; 1999)
- subjects use a wider range of more specific verbs to describe endpoint-focused actions than onset-focused actions (Landau, 2003).
- Eng and Fr speakers are more likely to mention goal-directed paths of motion than atelic paths when describing video clips (Pouard, 2004).


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Typological explanation



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Typological explanation



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Typological explanation

Reformulation of Dowty's generalization:

Actors and undergoers tend to be expressed in prominent slots

Tendency is explained by the fact that we **attend** to actors and undergoers.

Particular constructions allow for exceptions (e.g., passive)

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Typological explanation

"universals" of UG

The "head-direction" parameter (if VO <-> PO)

It is a true universal? Persian is OV and PO

Latin (from Ivan Sag): *[[leges sine moribus] vanae]*
 "Laws without character are in vain" (the UPenn motto).

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Typological explanation

Is there an alternative explanation for the tendency?

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Typological explanation

Diachronically, Ps often evolve from Vs (due to semantic similarity/conceptual metaphor):

a. Akan (spoken in Ghana)
o-ye adwunma **ma** ne nua barima no
he-does work **gives** his brother the
Lit, "He gave his brother the work" (Intended, "He does work **for** his brother.")

b. Medieval Chinese
Shuo **yu** ta dao
Speak **give** him Dao
"Speak **to** him (about) Dao"

c. Thai
Than ca bin **caak** krungthep.
He will fly **leave** Bangkok.
"He will fly **from** Bangkok."

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Typological explanation

d. Thai
Than ca bin **maa** krungthep.
He will fly **come** Bangkok.
"He will fly **to(wards)** Bangkok."

e. Efik (Niger-Congo family spoken in Nigeria)
Da ekuri sibe eto
Take axe cut tree
Cut the tree **with** an axe.

f. Chinese
Shoushi le dongxi **gen** wo lai
Prepare things **follow** me come
"Prepare (your) things and come **with** me."

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Typological explanation

Also, processing motivation has been proposed:
less cost to keeping V&P close in the string
(Hawkins 1994; Newmeyer 2005)

VO & PO: V[PO]
OV & OP: [OP]V

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Typological explanation

How are parameters supposed to be set exactly?

A problem:
Oddball constructions often provide misleading triggers:
Bagels, I like.

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Typological explanation

Glossary definition

Recursion
See "Recursion"

Recursion
If you still don't get it, see "Recursion"

Typological explanation

- Does the human conceptual system involve recursion? yes
- Do we presume that all languages *necessarily* have recursive syntactic patterns?

Typological explanation

- Does the human conceptual system involve recursion? yes
- Should we presume that all languages *necessarily* have recursive syntactic patterns?
- Is it complicated to represent recursion in constructionist approaches? No.
- Sometimes the issue is blocking recursion.

Typological explanation

Elicitation Jan '07 by Gibson, Frank, Fedorenko, and Everett

Tried to elicit embedded possessives: “Kohoi’s spouse’s parent’s dog.”
→ None produced (possible task demand issue)

Embedded clauses:

“Hoagaioxai said she is not giving birth”.

Hoagaioxai spoke. Hoagaioxai spoke. She is not giving birth.

Compelling evidence for recursion would be to find subject relative clause
[Subj [embedded clause] main verb]

Tried to elicit: The man who killed the jaguar fell down.

→ Non-embedded paraphrases produced (“The man killed the jaguar. He fell down.”)

Typological explanation

Piantadosi, Stearns, Everett, Gibson (2012):

- Analysis of corpus of stories collected by Sheldon and Everett.

Working with Pirahã:
• Arlo Heinrichs: 1959-1966
• Steve Sheldon: 1967-1976
• Dan Everett: 1977-2007

- 15 stories (14 by Sheldon, 1 by Everett)
- Approx. 1000 sentences
- Transcribed morpheme by morpheme by Sheldon with overall glosses
- Tagged for part of speech

Typological explanation

Piantadosi, Stearns, Everett, Gibson (2012)

160 instances of *NP said/speaks* followed by clause.

E.g., Lit, “I speak-do. He move on the ground. Crying, TixohOI.”

or Unclear whether best gloss is:

- “I said that TixohOI is crying on the ground”
- “I spoke. He is moving on the ground. TixohOI is crying.”
- Semantic dependency doesn’t imply syntactic dependency:
 - You drink, you drive, you go to jail (Everett 2010)

Typological explanation

Piantadosi, Stearns, Everett, Gibson (2012)

[Subj [embedded clause] main verb]

No instances of this in the corpus.

Typological explanation

Piantadosi, Stearns, Everett, Gibson (2012)

68 possessives. i.e., 68 per 1000.

If possessives are as likely to have possessors as nouns are, should expect $.068 * 68 = 4$ or 5 embedded possessives.

None found.

Typological explanation
Piantadosi, Stearns, Everett, Gibson (2012)

- No conjunctions or disjunctions.
- No clear relative clauses
- No unambiguous embedded phrases
- No recursive possessives

→ Looks like no clear evidence for recursion.
(very hard to prove non-existence)

Typological explanation
Piantadosi, Stearns, Everett, Gibson (2012)

Iterative recursion in repetition of arguments?

E.g., He foreigner Martins foreigner intends to sleep.

Typological explanation
Piantadosi, Stearns, Everett, Gibson (2012)

- Authors note a caveat: these may be false starts followed by repairs.
- If grammatically licensed, these cases pose a different sort of challenge to the Universal Grammar Hypothesis.

(cf. theta criterion).

Typological explanation
Piantadosi, Stearns, Everett, Gibson (2012)

Most frequent sentence structures

Order count

Legend:

- S=Subject
- V=Verb
- O=Object
- I=Indirect object
- T=Topic
- V=Locative
- L=locative
- P=temporal marker

Typological explanation

Consider
Numeral Noun and Adjective Noun orders.

Typological explanation

All fixed word orders are attested:

ORDERING	EXAMPLES	LANGUAGES	% (# OF LNGS)
1. Adjective-Noun & Numeral-Noun	<i>red birds & three birds</i>	English, Cherokee	27% (227)
2. Noun-Adjective & Noun-Numeral	<i>birds red & birds three</i>	Japanese, Yoruba	52% (443)
3. Noun-Adjective & Numeral-Noun	<i>birds red & three birds</i>	Sp., It, Hebrew	17% (149)
4. Adjective-Noun & Noun-Numeral	<i>red birds & birds three</i>	Sinhala, Newari	4% (32)

Numbers provided by Culbertson, Smolensky & Legendre based on Dryer 2008a, b²

Typological explanation

Other logical possibilities are also attested

- Variable A N order (eg., French)
- Variable N Num order (eg., Russian; Sikkimese, Jugli, and Mao Naga; three distinct Tibeto-Burman language families Dryer 2000: 31)
- No Numerals (Piraha Frank et al. 2008)
- No grammatical category of Adjectives (Dixon 1977)

Typological explanation

- Greenberg Universal:

	Noun-Adj	Adj-Noun
Num-Noun	149 (17%)	227 (27%)
Noun-Num	443 (52%)	32 (4%)

	N-Adj	Adj-N
Num-N	3. unmarked	1. harmonic
N-Num	2. harmonic	4. marked

Culbertson, Smolensky Legendre 2012, *Cognition* 44

Typological explanation

Proposed substantive universal

- Greenberg Universal:

	Noun-Adj	Adj-Noun
Num-Noun	149 (17%)	227 (27%)
Noun-Num	443 (52%)	32 (4%)

	N-Adj	Adj-N
Num-N	3. unmarked	1. harmonic
N-Num	2. harmonic	4. marked

Culbertson, Smolensky Legendre (2012, *Cognition*) 45

Typological explanation

A N Num

Dominant in 25 known languages, including 9 distinct Tibeto-Berman languages (Dryer 2000).
E.g., Purki:

rdamo bomo ngis
beautiful girl two
'two beautiful girls' (Rangan 1989: 122)

Typological explanation

- Artificial grammar learning task: exposed people to one of the four language types: orderings of Noun with Adjectives or Numerals.
- Tested their production of new combinations.

Culbertson, Smolensky Legendre (2012, *Cognition*) 47

Typological explanation

(a) Condition 3: Unmarked orders		(b) Condition 1: Harmonic (=Eng)	
0.3 $S_{Adj} \rightarrow Adj N$	0.7 $S_{Adj} \rightarrow N Adj$	0.7 $S_{Adj} \rightarrow Adj N$	0.3 $S_{Adj} \rightarrow N Adj$
0.7 $S_{Num} \rightarrow Num N$	0.3 $S_{Num} \rightarrow N Num$	0.7 $S_{Num} \rightarrow Num N$	0.3 $S_{Num} \rightarrow N Num$

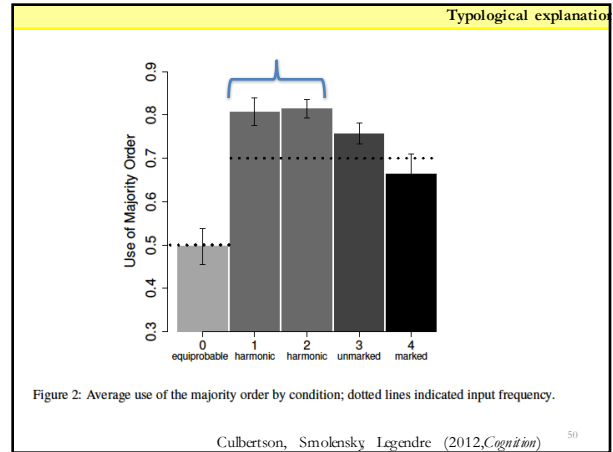
(c) Condition 2: Harmonic (\neq Eng)		(d) Condition 4: Marked orders	
0.3 $S_{Adj} \rightarrow Adj N$	0.7 $S_{Adj} \rightarrow N Adj$	0.7 $S_{Adj} \rightarrow Adj N$	0.3 $S_{Adj} \rightarrow N Adj$
0.3 $S_{Num} \rightarrow Num N$	0.7 $S_{Num} \rightarrow N Num$	0.3 $S_{Num} \rightarrow Num N$	0.7 $S_{Num} \rightarrow N Num$

(e) Condition 0: Equiprobable control			
0.5 $S_{Adj} \rightarrow Adj N$	0.5 $S_{Adj} \rightarrow N Adj$	0.5 $S_{Num} \rightarrow Num N$	0.5 $S_{Num} \rightarrow N Num$

Culbertson, Smolensky Legendre (2012, *Cognition*)

Typological explanation

- Ppts were given feedback: awarded points for matching order of informant (known to lead to probability boosting)



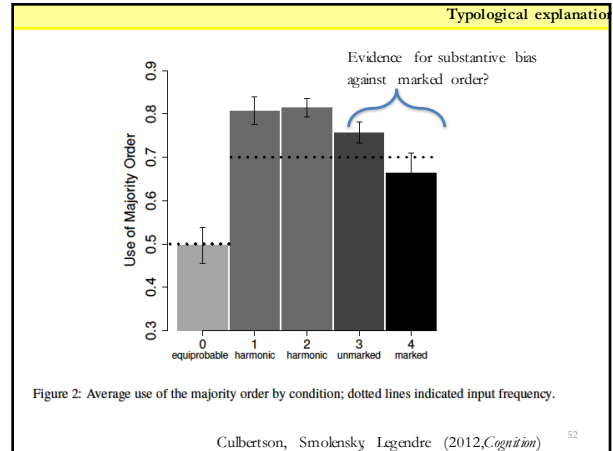
Typological explanation

a. Regularization bias: acquire grammars that minimize variation [induces reduction of variation that may be present in the input to learning]

: domain-general preference for **consistency** (doing one thing is easier than doing two):

- {A, Num} N or N {A, Num}

Culbertson, Smolensky, Legendre (2012, *Cognition*) 51



Typological explanation

b. Substantive bias: acquire grammars that do not incorporate particular [dis-favored] structures

{N A, Num N}	>	{A N, N Num}
Num N A	>	A N Num

Culbertson, Smolensky, Legendre (2012, *Cognition*) 53

Typological explanation

CSL are explicitly agnostic about the “locus, scope, experience-dependence, and ultimate source” (pg 307) of the bias against A-N + N-Num,

but they claim that the bias “does not plausibly reflect a domain-general constraint it therefore constitutes evidence for the existence of cognitive biases specific to language” (pg 323).

Typological explanation

why should this order be more difficult to learn?

Typological explanation

Learning biases exist

Humans \neq star nosed mole

Is there a bias against *Adj N; N Num?

Typological explanation

Where would bias *without a function* come from?

How and why would such a specific constraint evolve?

Not life-threatening nor sexually unattractive to produce A-N + N-Num

No spandrel story has been proposed.

Non-functional biases are only descriptive until one motivates how they arise in the course of evolution and how they unfold during development

(see Blumberg 2006; Deak 2000; Karmiloff-Smith 1994 for relevant discussion)

Typological explanation

The role of function

– If bias leads to increased procreation, it may have evolved.

– If bias serves some other sort of useful function, it may emerge via learning or language change.

Typological explanation

CSL suggest possible explanation

Syntactic, functionless:

Final-Over-Final constraint (Biberauer, Holmberg and Roberts 2010).

*[[α c]_{αP} β]_{βP}

Typological explanation

CSL suggest possible explanation

Syntactic, functionless:

Final-Over-Final constraint (Biberauer, Holmberg and Roberts 2010).

*[[α c]_{αP} β]_{βP}

[[A N] Numeral]

Requires that the A is the head of the [A N] phrase

Typological explanation

FOFC is categorical constraint, but ppts produced A N Num structure 60% of the time.

Latin (from Ivan Sag):
 [[*leges sine moribus*] *vanae*]
 "Laws without character are in vain" (the UPenn motto).

Typological explanation

More plebian explanation: Transfer effects

Undergraduates at Johns Hopkins and might be expected to be familiar with Spanish, a type 3 language (N-A + Num-N).

CSL sent questionnaires to the 60 ppts
 Received only 23 responses, divided into four categories.

Lack of significant correlation is inconclusive.

Typological explanation

Possible transfer effect from minor **English** constructions:

He likes all *things linguistic* [[*thing*]_{NP} Adj]
 He owned *something blue*.

He saw *the man naked*. Depictive secondary predicate
 He hammered *the metal flat*. Resultative secondary predicate

The man, big and hairy, scared the child. Heavy postnominal Aps

Goldberg, 2013, *Cognition*

Typological explanation

Boys 25 and under \neq 25 boys
 Thing I and Thing II \neq 1 thing and 2 things

Goldberg, 2013, *Cognition*

Typological explanation

Sample of <N> <Adj> constructions	# of instances with modification interpretation (lower bound given)	Potential <N> <Num> constructions	# of instances with quantification interp.
<i>all things</i> <adj>	≈300 ⁵	<i>all things</i> <Num>	0
<i>something</i> <adj>	≈25,000	<i>something</i> <Num>	0 ⁶
<i>made it</i> <adj>	≈6000	<i>some things</i> <Num>	0
<i>[find] <pronoun> <adj></i>	≈4000	<i>made them</i> <Num>	0
Heavy postposed construction (sample list)		Heavy postposed construction (possibly exhaustive list):	
<i>N <adj> than</i>	≈2000	<i>N_{pl} <Num> in all</i>	3
<i>N <adj> with</i>	≈2000	<i>N_{pl} <Num> at a time</i>	200
<i>N <adj> of</i>	≈4000	<i>N_{pl} <Num> in number</i>	5

Table 2: Frequencies of a small sample of constructions that allow N-<Adj> order with a modification meaning and an attempt to find *all* of the constructions that allow N <Num> order with quantification meaning. (Searches performed on 450 million word COCA corpus on 8/7-17/2012, 12/6-13/2012).

Goldberg, 2013, *Cognition*

Typological explanation

- Domain general preference for consistency/simplicity.
- Possible transfer effect from Spanish or minor constructions in English

Goldberg 2013, *Cognition*

Typological explanation

Culbertson and Newport 2015:

No evidence of a bias against Adj N, N Num order in attempted replication with **children**

Typological explanation

Moral: be suspicious of proposed functionless universals...almost all claimed universals have functional motivations that allow exceptions.

Consistent with the perspective that languages are learned for the purpose of communication.