A brief history of harmony

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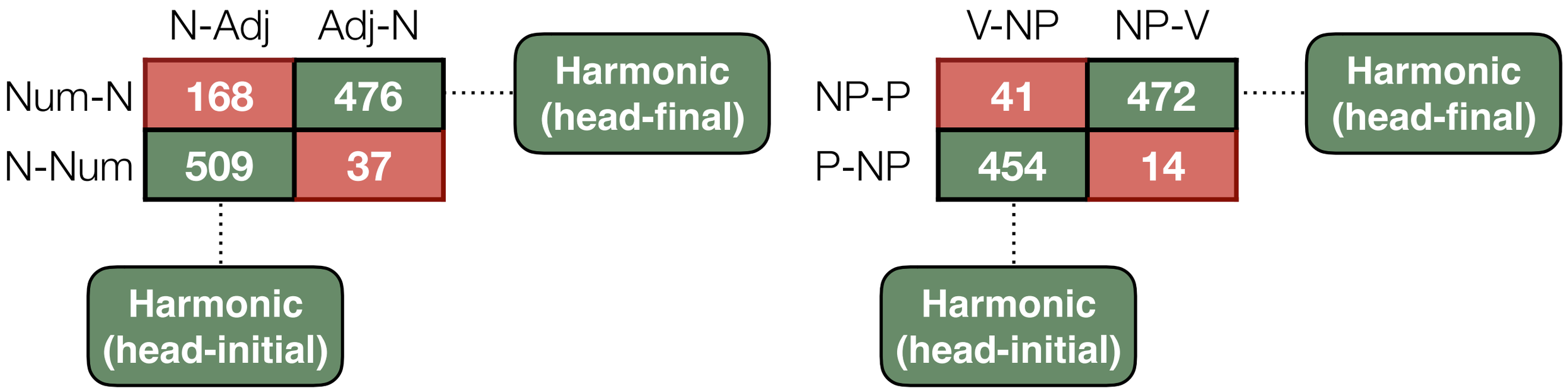
Word order harmony

Greenberg (1963)



- **Harmony:** consistent order of heads and modifiers/ dependents
- **Explanations:** learning, processing, shared ancestry, language change

Harmony and learning

- **Simplicity:** simpler patterns, involving fewer, more general rules, are easier to learn
- Harmonic patterns re-use the same rule across phrases

Head-initial across phrases

pet doggie
to me
picture of mommy
doggie big
trains two

Mixed head order across phrases

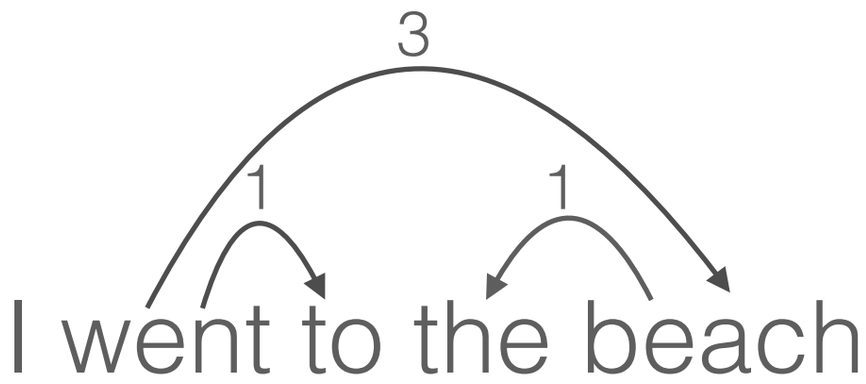
pet doggie
to me
picture of mommy
*big **doggie**
*two **trains**

Vennemann (1976), Baker (2001), Culbertson & Kirby (2016)

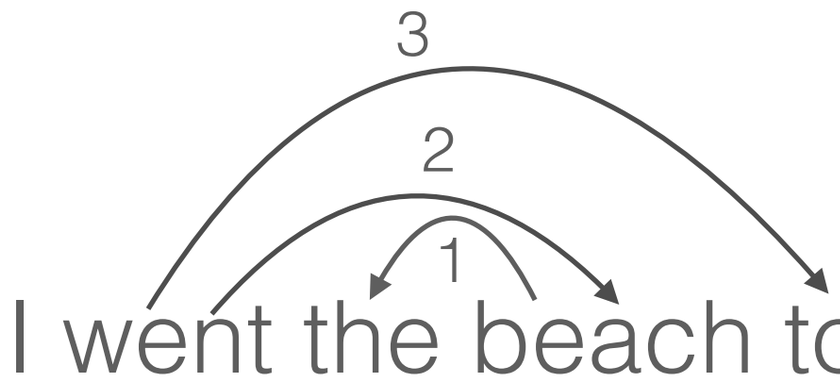
Harmony and processing ease

- **Dependency length:** distance (in words) between a head and its dependents
- Shorter DLs = easier on working memory
- (At least some) harmonic patterns have shorter DL

Head-initial:
Verb Object, **Prep.** Noun



Mixed:
Verb Object, Noun **Post.**



Hawkins (1990), Futrell et al. (2015)

Harmony and pathways of change

- **Grammaticalization:** function words (e.g., prepositions) are derived historically from lexical items (e.g., verbs)

(1) *mo fi àdé gé nạkằ.*
I took machete cut wood
'I cut wood with the machete.'

Yoruba is VO and PrepN
with ← *took*
Prep ← Verb

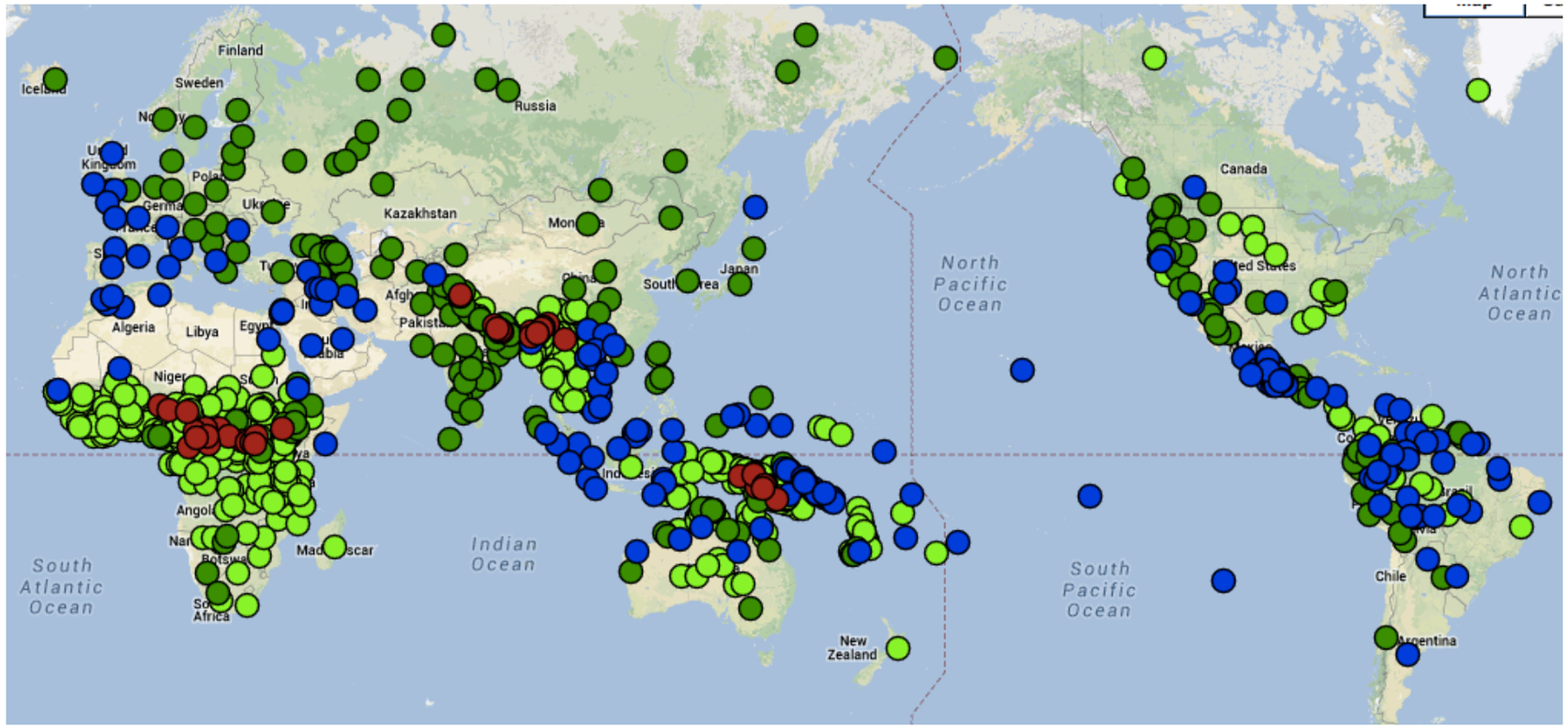
- If prepositions used to be verbs…it's no surprise they are in the same order!

- Harmony holds among diachronically related elements

Aristar (1991), Kaufman (2009)

Harmony and shared ancestry

- **Shared ancestry:** languages look alike because they are related through a common ancestral language
- Harmony may be over-estimated by *raw frequencies*
- Preference may hold only for *some* language families



	N-Adj	Adj-N
Num-N	168	476
N-Num	509	37

Dunn et al. (2011)

Taking stock

What we know:

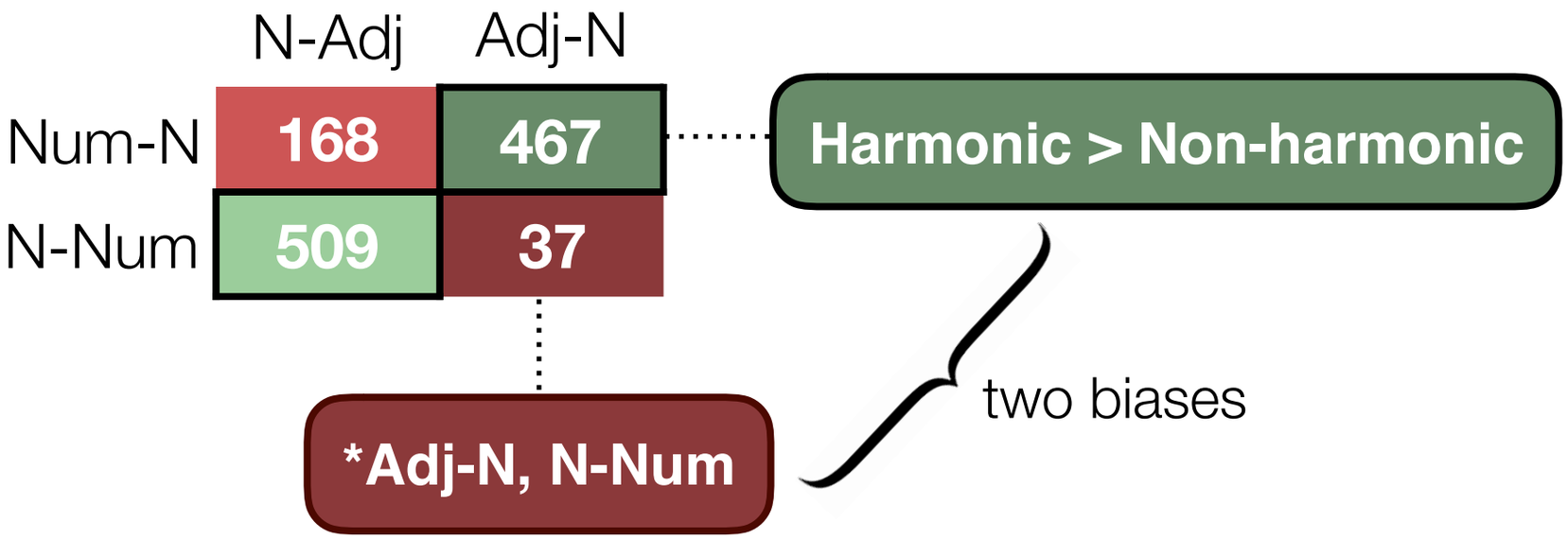
- Lots of languages feature harmony across phrase types
- It's a "statistical universal" — a generalization with exceptions

What we don't know:

- Is harmony just a historical accident?
- If not, does it have to do with the way languages change over time?
- If not, does it have to do with processing?
- Or, does it have to do with learning?

Testing Universal 18

Hypothesis: U18 reflects two cognitive biases in learning



- Weak individual biases (amplified by transmission)?
- Bias present in **adults**?
- Bias present in **children**?

Question point.

Earlier, we talked about the hypothesis that a preference for harmony might reflect a preference for *shorter dependencies* – a processing explanation.

Take a moment to answer the following question:

1. It's not always true that harmonic orders have shorter dependencies. Can you show whether or not this is the case for dependencies in the noun phrase?

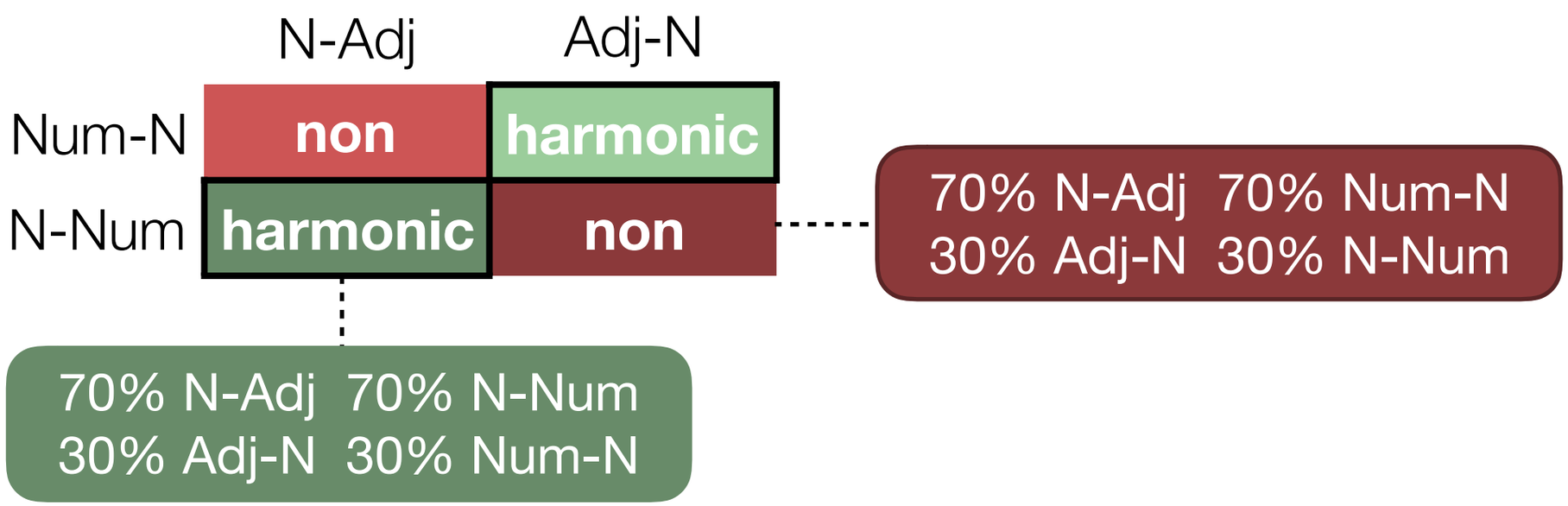
   HINT: remember that dependencies got between heads (e.g., nouns) and their dependents (e.g., modifiers)

Testing Universal 18

Artificial language learning experiment

- **Paradigm:** "Regularization" (cf. Hudson Kam & Newport 2009)
- **Input:** noun with a single modifier (Adj or Num)

Manipulation



Prediction: If harmonic patterns are easier to learn, then participants will *regularize harmonic patterns more*

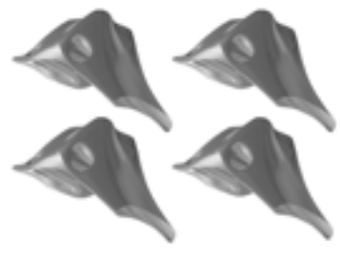
Stimuli & Procedure

Lexicon/Stimuli

[**nerka** fush]
[fush **nerka**]

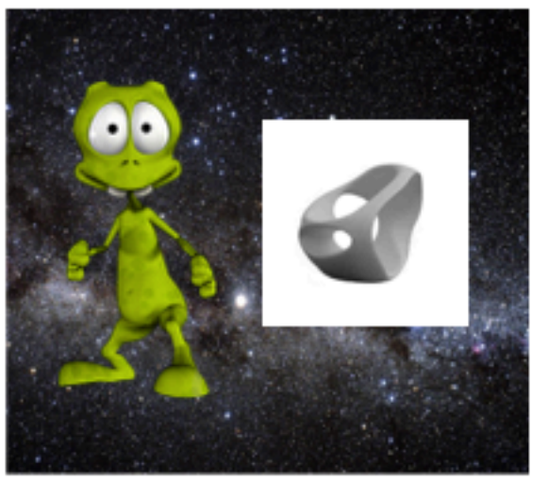
[**flarma** cherg]
[cherg **flarma**]

[**grifta** kez]
[kez **grifta**]

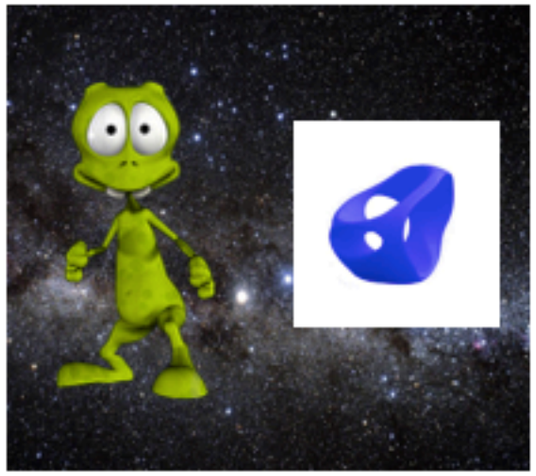


[**mauga** glawb]
[glawb **mauga**]

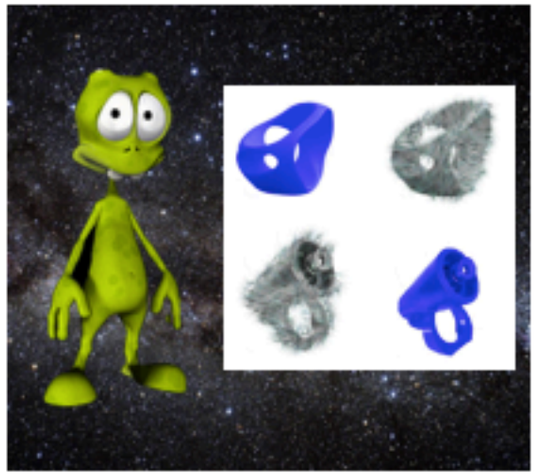
Procedure



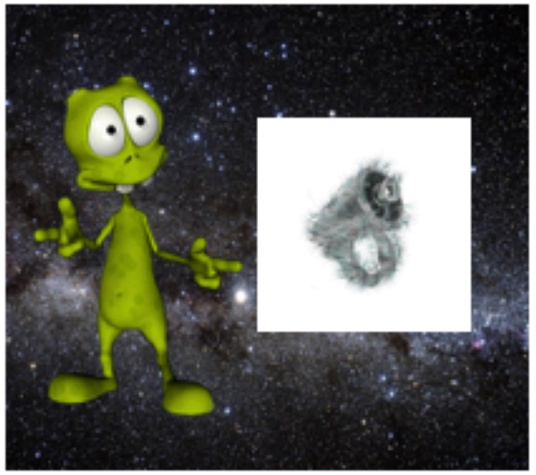
noun training/ testing



phrase training



phrase comprehension



phrase production

Question point.

The participants in this experiment were English speakers.

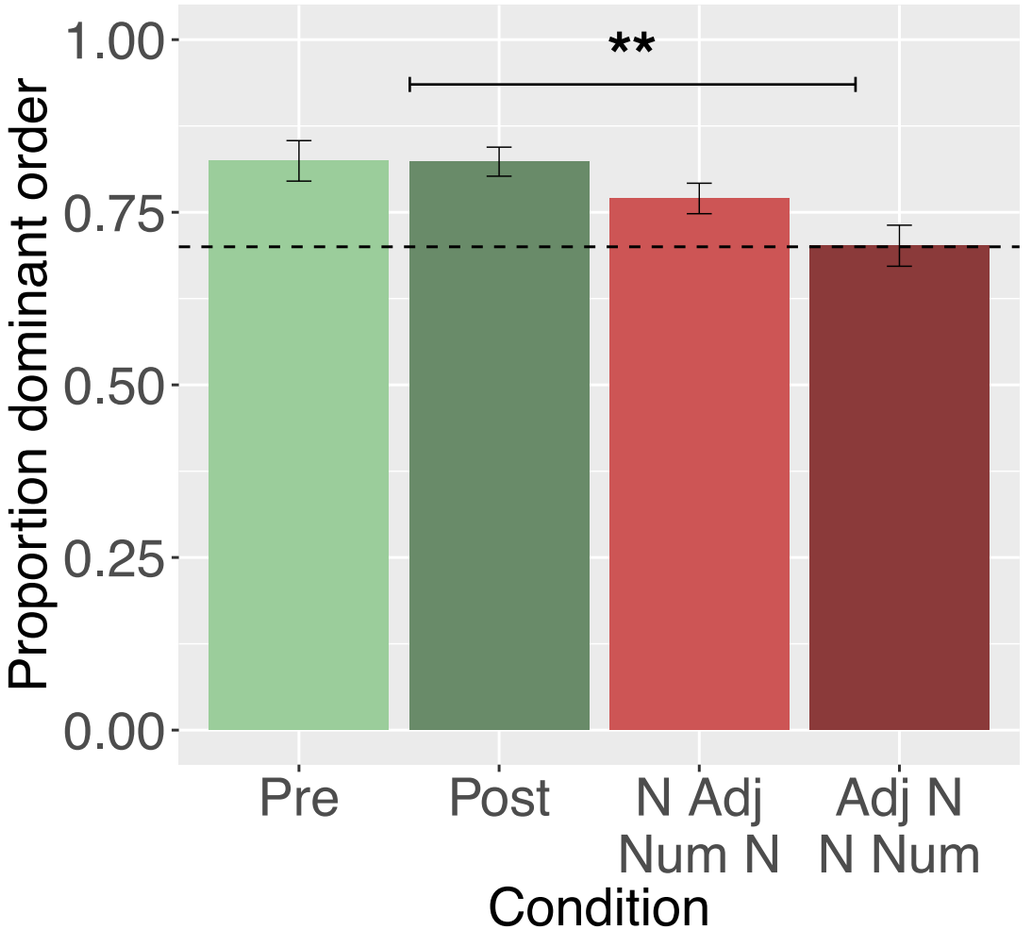
Take a moment to answer the following questions:

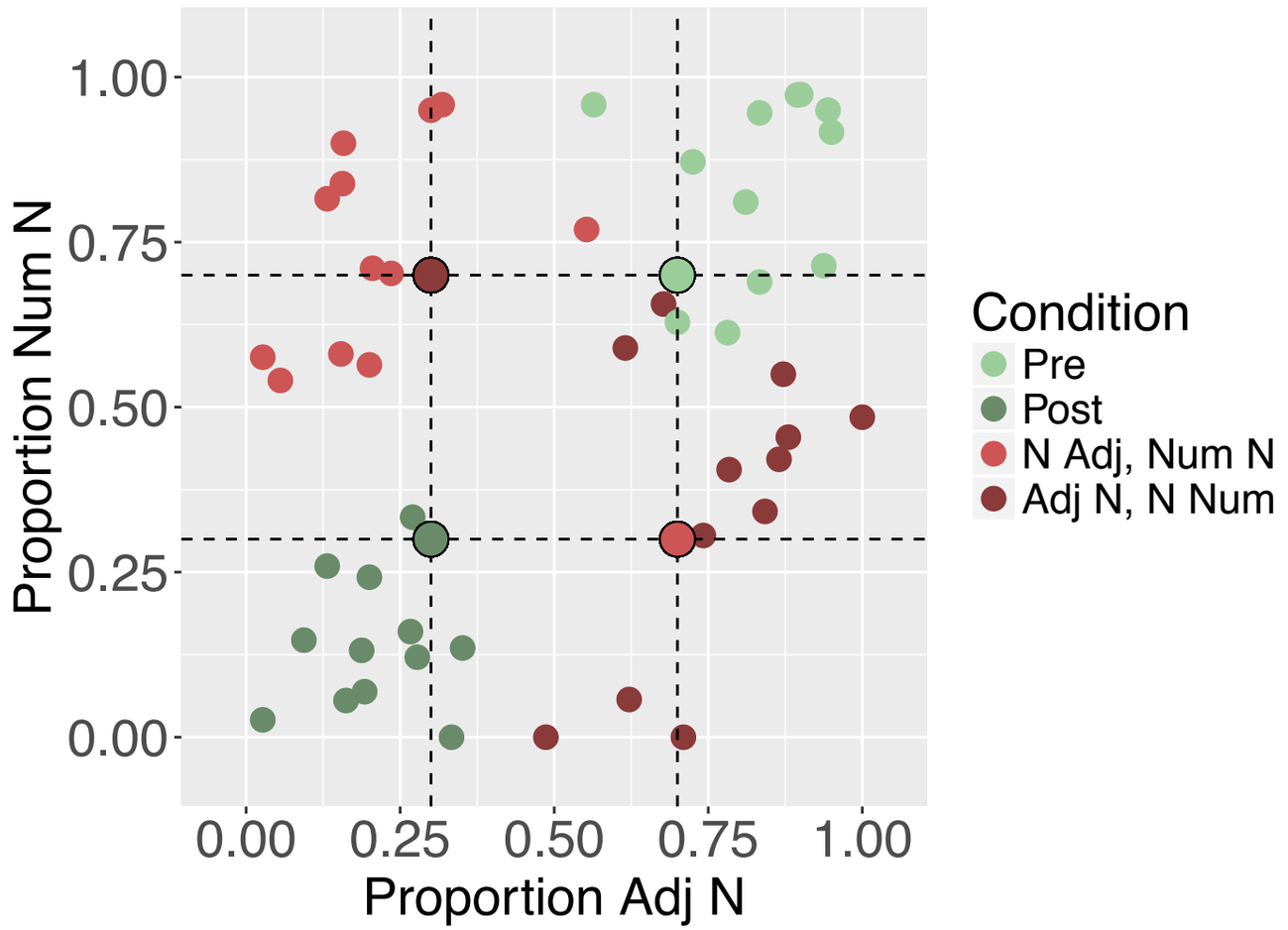
1. Does English have a harmonic order? Why?
2. Does French have a harmonic order? Why?
3. I outlined one prediction for how participants might behave in this experiment based on a hypothesized harmonic bias. Can you generate some alternative predictions for how English speakers might behave and what it would tell us about how their mind works?

   HINT: Think about what other biases learners might have (or not).

Results

Adult English speakers



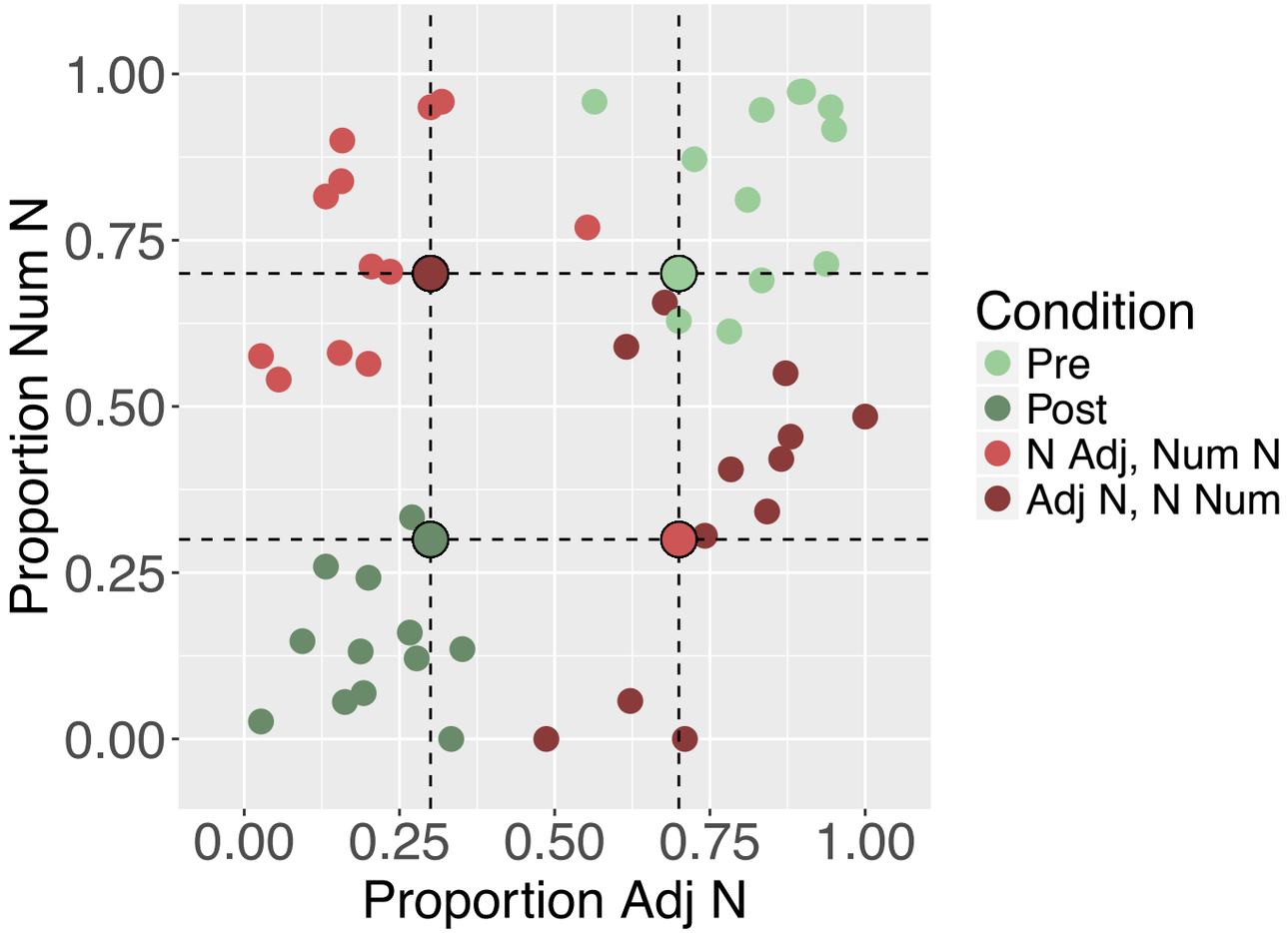


More **regularization** of **harmonic** patterns than non-harmonic, shift of non-harmonic to harmonic

Culbertson et al. (2012) *Cognition*

Results

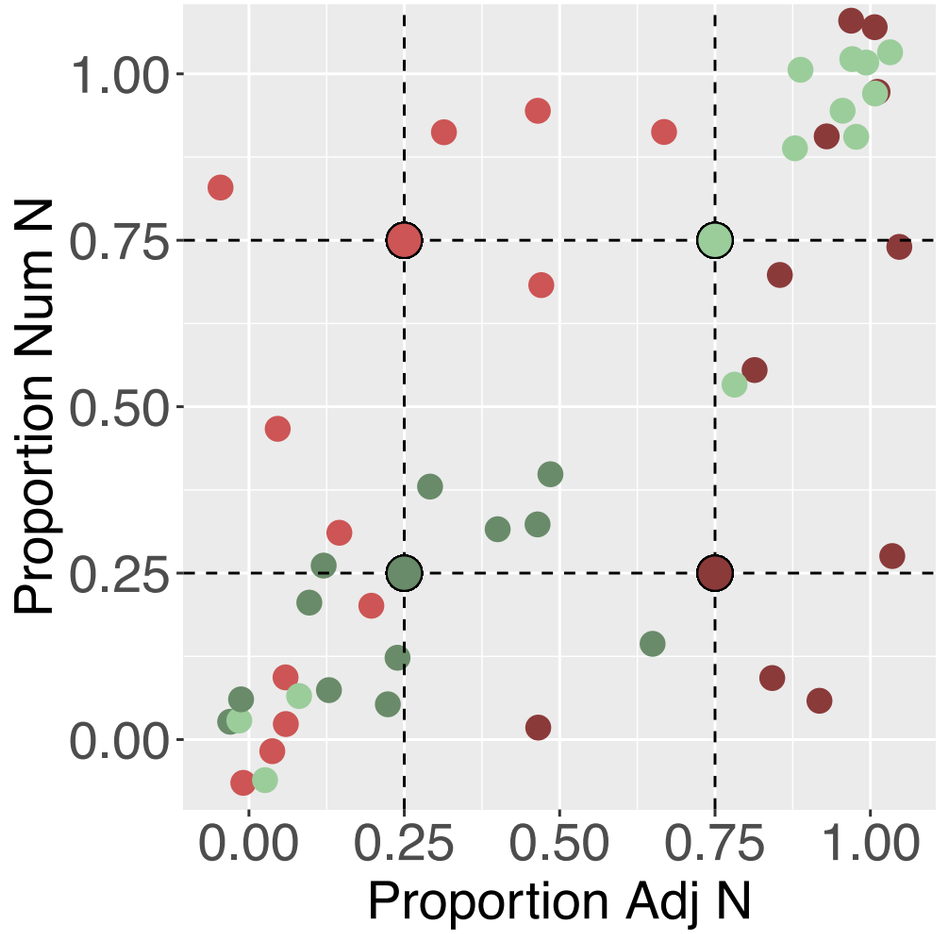
Adult English speakers



More **regularization** of **harmonic** patterns than non-harmonic, shift of non-harmonic to harmonic

Culbertson et al. (2012) *Cognition*

Child English speakers



More regularization of harmonic and systematic **shift of non-harmonic** patterns to harmonic

Culbertson & Newport (2015) *Cognition*

Question point.

These results show that both adult and child English speaking learners prefer harmonic patterns – either pre-nominal *or* post-nominal.

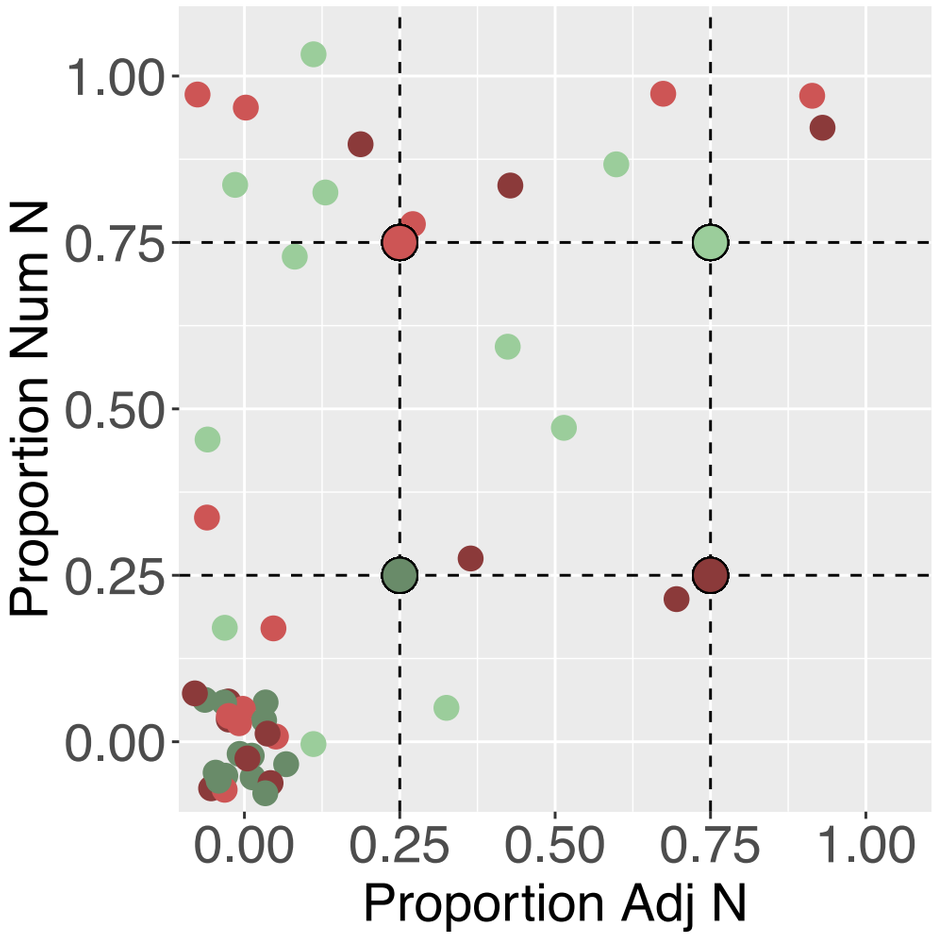
Take a moment to answer the following questions:

1. Could this finding still be compatible with the hypothesis that they are influenced by their native language? Why?

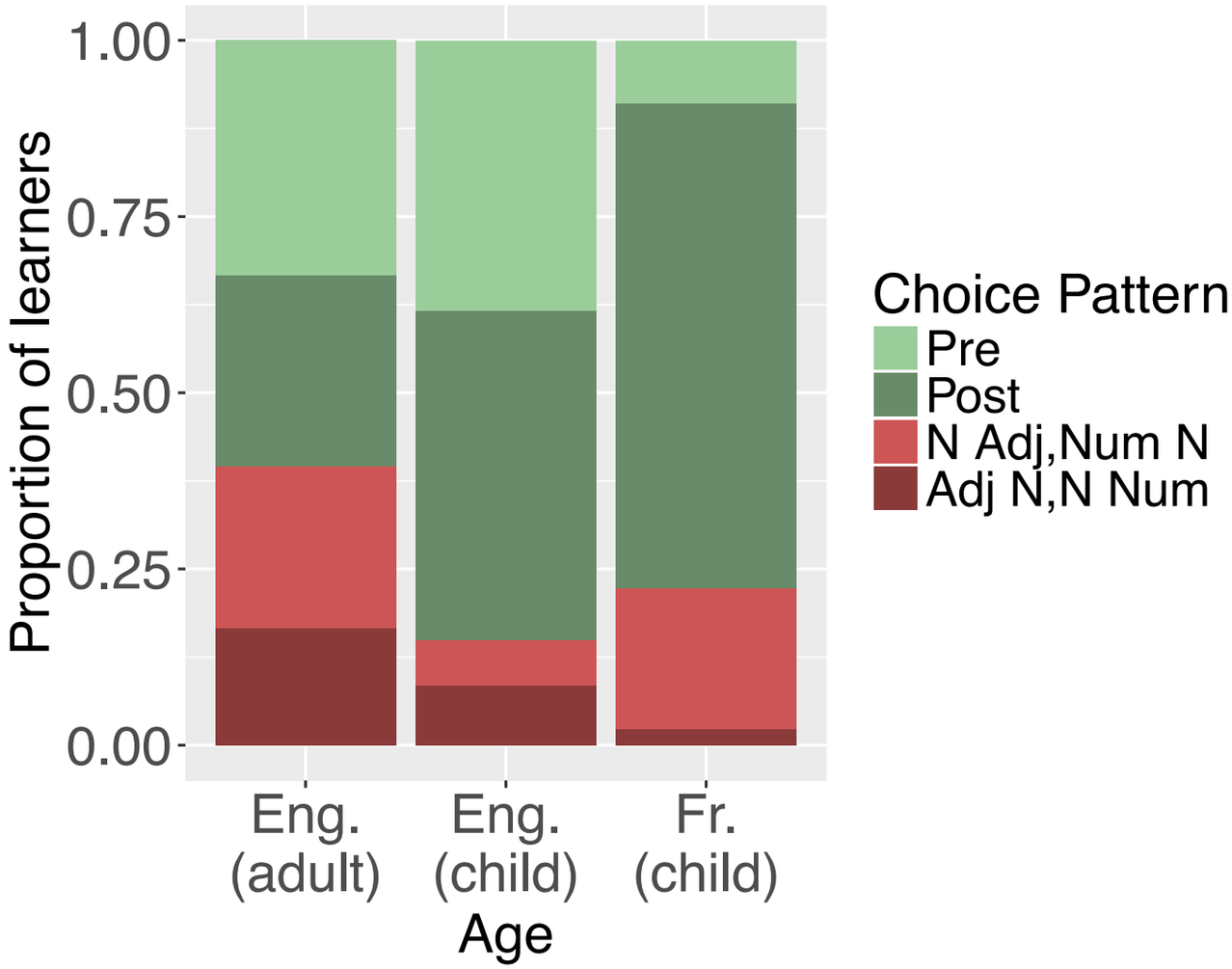
2. What would be the prediction of this hypothesis, and how could you test it?

Results

Child French speakers



Summary



More regularization of, and **shift** to **post-nominal harmonic** order

Preference for harmonic in both **L1s**, particularly strong bias in **children**

Braquet & Culbertson (2017) *CogsciProc*

Question point.

Consider the child data; they are similar in their overall tendency to regularize harmonic orders, but differ in the extent to which they prefer one pattern relative to the other.

To help formulate a *post-hoc* explanation for this, let's take a look at some typological data on adjective order.

1. Go to: http://wals.info/ and click 'Features'
2. Find 'Order of Adjective and Noun' (#87A) and click it.
3. What do you notice about adjective order?

Question point.

4. Now that you see this typological difference, could you explain the difference between English and French children as arising (partly) due to influence from their L1?

5. How could you test that hypothesis?

Conclusions

A brief history of harmony

- First documented in the 1960s
- Potential cognitive *and* cognition-external explanations
- Experimental evidence for cognitive bias in learning
- But the research is ongoing!