PEARL (2021A, 2021B)

SYNTACTIC ISLANDS AND UG+ STATISTICAL LEARNING

BY
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WHAT ARE SYNTACTIC ISLANDS?

Definition:

Syntactic isalnds are structures that block long-distance dependencies, such as wh-movement.

What to know?

The learner must know which syntactic paths are allowed and which ones are not. (6b-6e)

- (6a) Allowed
- (6b-e) Not allowed

(6) ✓ a. What does Jack think that Lily said that the goblins stole t_{what}?

✗ b. *whether* island

*What do you wonder [whether Jack bought t_{what}]?

✗ c. complex NP island

*What did you make [the claim that Jack bought t_{what}]?

✗ d. subject island

*What do you think [the joke about t_{what}] was hilarious?

✗ e. adjunct island

*What do you worry [if Jack buys t_{what}]?

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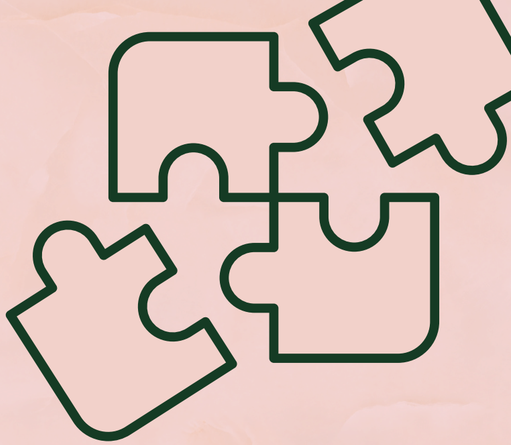
TRADITIONAL UG APPROACH (SUBJACENCY)



The Subjacency Condition

No movement across more than two bounding nodes.

- UG specifies bounding nodes (NP, CP, IP) that can't be crossed together.
- Highly language-specific knowledge; children must learn which nodes are bounding.
- Difficult for learners to acquire with no negative evidence.

CRITICISM:

It requires complex innate structure only for learning islands.

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PEARL & SPROUSE'S ALTERNATIVE

"Children can learn syntactic islands through statistical learning over structural patterns."

- Focus on probabilistic structure instead of bounding notes.
- A wh-dependency can be described by the phase structure path that it travels through.
- The paths are broken down into syntactic trigrams, which are the sequences of 3 phrase nodes)
- Island violations are rare/low-probability trigram paths → learned dispreference.

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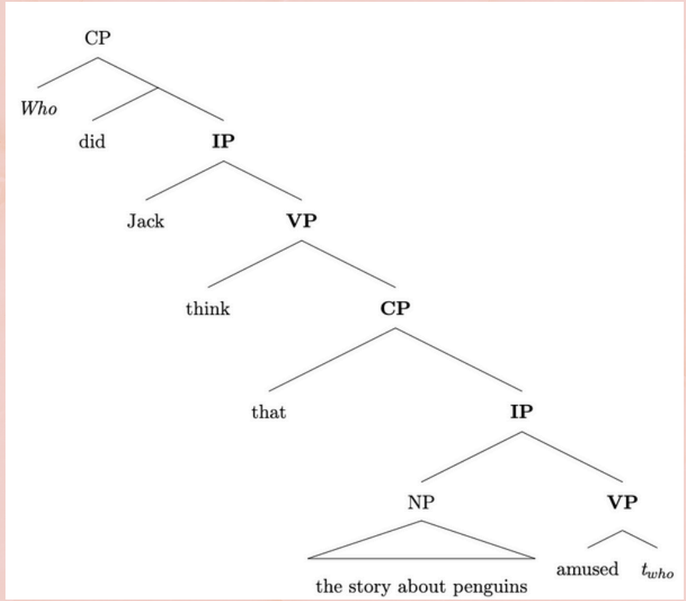
MODELING THE PATH

Example: Who did Jack think that the story about penguins amused ____?

Phrase structure path →



Trigrams created from this path:

- start–IP–VP
- IP–VP–CPthat
- VP–CPthat–IP
- CPthat–IP–VP
- IP–VP–end

These are tracked by the model to assess frequency.

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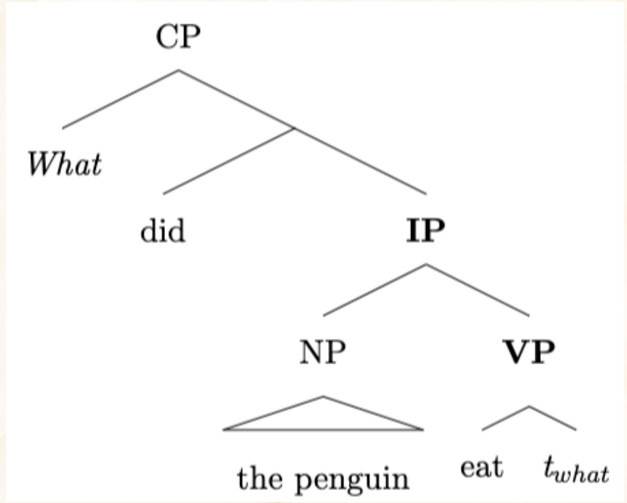
SIMPLER GRAMMATICAL PATH

Example: What did they penguin eat ____?

Phrase structure path →



Trigrams created from this path:

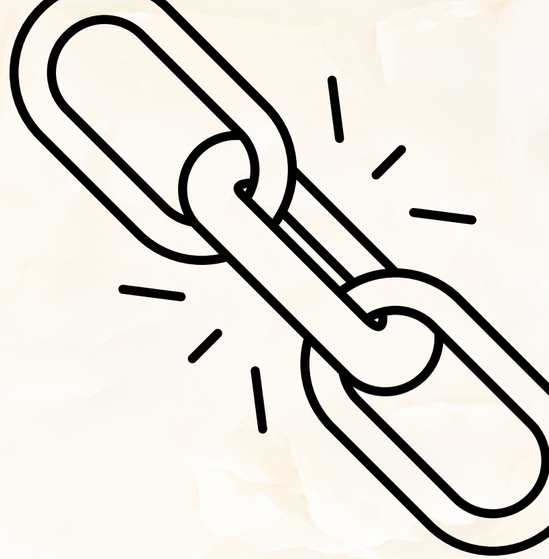
- start–IP–VP
- IP–VP–end

These are frequent and high-probability in the input → interpreted as grammatical.

HOW LEARNING WORKS

- The model uses realistic English child-directed input from corpora.
- It tracks trigram frequency across all wh-dependencies.
- Any new wh-path is broken into trigrams and its overall probability is estimated.
- Low trigram probability is likely an island violation.
- Model output matched human acceptability judgements from Sprouse et al. (2012)
    - This suggests children can acquire island knowledge in this way.

WHY TRIGRAMS ARE IMPORTANT



- They have a more general purpose than bounding nodes.
- Trigrams can be utilized for learning other syntactic constraints, not just islands.
- Require only phrase structure knowledge, not constraint specific UG rules.
- It still respects the intuition that ‘islands paths are structurally weird’, but defines that as statistical rarity, not rule-breaking.

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IMPLICATIONS FOR UG & LANGUAGE LEARNING

- Pearl's approach minimizes what UG must contain.

UG may only need to provide:

- Phrase structure categories
- Ability to recognize syntactic paths

Statistical learning does the rest; efficient, input-driven, generalizable

↓

✅ Aligns with the Minimalist Program: fewer innate rules, more learning input.

REFERENCES

Pearl, L. (2021a). How statistical learning can play well with Universal Grammar. In N. Allott, T. Lohndal, & G. Rey (Eds.), The Cambridge Handbook of Chomsky (pp. 267–286). Wiley-Blackwell. (Section 1.4.2: Linguistic knowledge for syntactic islands)

Pearl, L. (2021b). Theory and predictions for the development of morphology and syntax: A Universal Grammar + statistics approach. Journal of Child Language, 48(5), 907–936. (Section 3.6: A more complex thing: Constraints)