3.2.3

Syntactic Islands

Constraints on wh-dependencies

Long Distance Dependencies

- LDD: relationships between two words in a sentence that are not adjacent to each other
- Can be potentially infinite in length
- Syntactic structures that long-distance dependencies cant cross are called syntactic islands
- Children must infer the constraints on long distance dependencies that allow them to recognize which wh-dependencies are not allowed

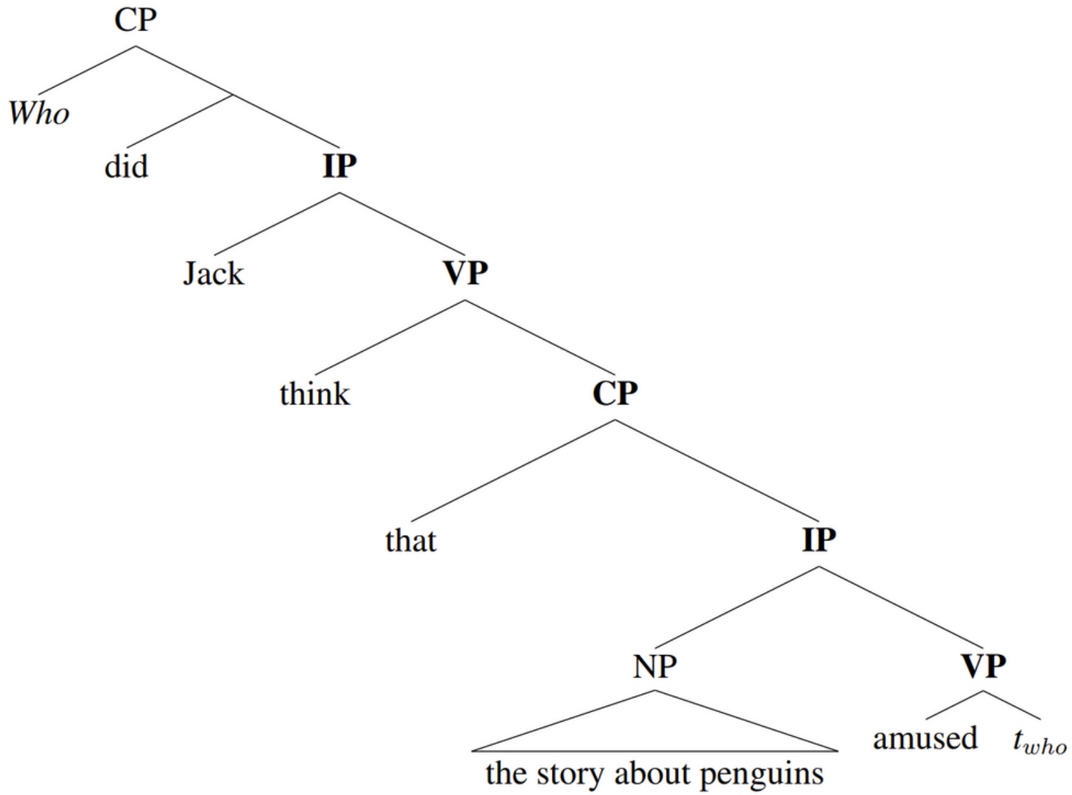
(11)
a. What does Jack think that Lily said that the goblins stole t_{what}?
b. *What do you wonder [whether Jack bought t_{what}]? (whether island)
c. *What did you make [the claim that Jack bought t_{what}]? (complex NP island)
d. *What do you think [the joke about t_{what}] was hilarious? (subject island)
e. *What do you worry [if Jack buys t_{what}]? (adjunct island)

The Model

"This probabilistic learning model relies on the idea that children can characterize a long-distance dependency as a path from the head of the dependency (e.g., Who in (12)) through the phrasal nodes that contain the tail of the dependency"
To do this, children have to learn which long-distance dependencies have acceptable syntactic paths and which ones dont

(12) Who did Jack think that the story about penguins amused t_{who}?

a. Phrasal node structure containing the *wh*-dependency headed by *Who*:



Who did [$_{IP}$ Jack [$_{VP}$ think [$_{CP}$ that [$_{IP}$ the story about penguins [$_{VP}$ amused t_{who}]]]]]?

b. Syntactic path of *wh*-dependency:
start-IP-VP-CP$_{that}$-IP-VP-*end*

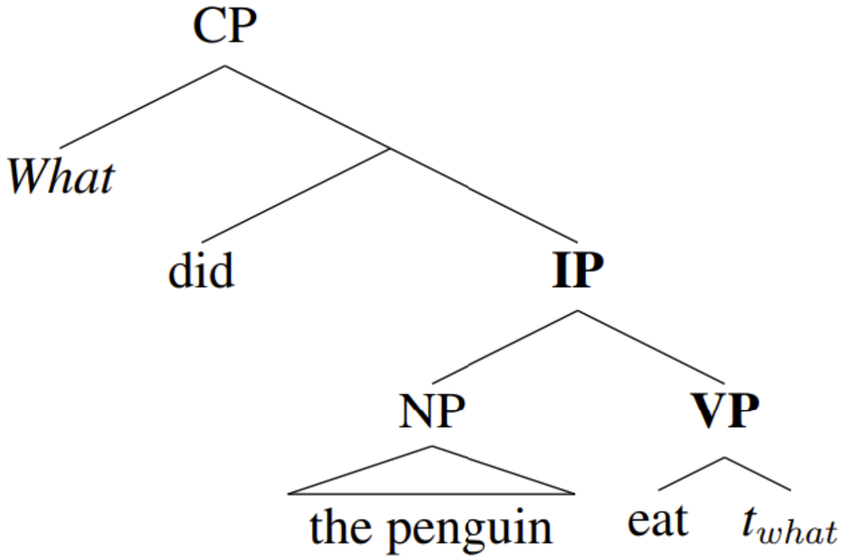
c. Syntactic trigrams $\in Trigrams_{start-IP-VP-CP_{that}-IP-VP-end}$:
= *start*-IP-VP
IP-VP-CP$_{that}$
VP-CP$_{that}$-IP
CP$_{that}$-IP-VP
IP-VP-*end*

How the model works

"The learning strategy implemented in the model tracks the frequencies of these syntactic trigrams in children's acquisitional intake, which come from every instance of a wh-dependency that the modeled learner perceives. The learner later uses these frequencies to calculate probabilities for all syntactic trigrams comprising a wh-dependency. This allows the modeled learner to generate the probability of any wh-dependency because any wh-dependency can be broken into a subset of these same syntactic trigrams"

(13) What did the penguin eat t_{eat}?

a. Phrasal node structures containing the *wh*-dependency:



What did [$_{IP}$ the penguin [$_{VP}$ eat t_{what}]]?

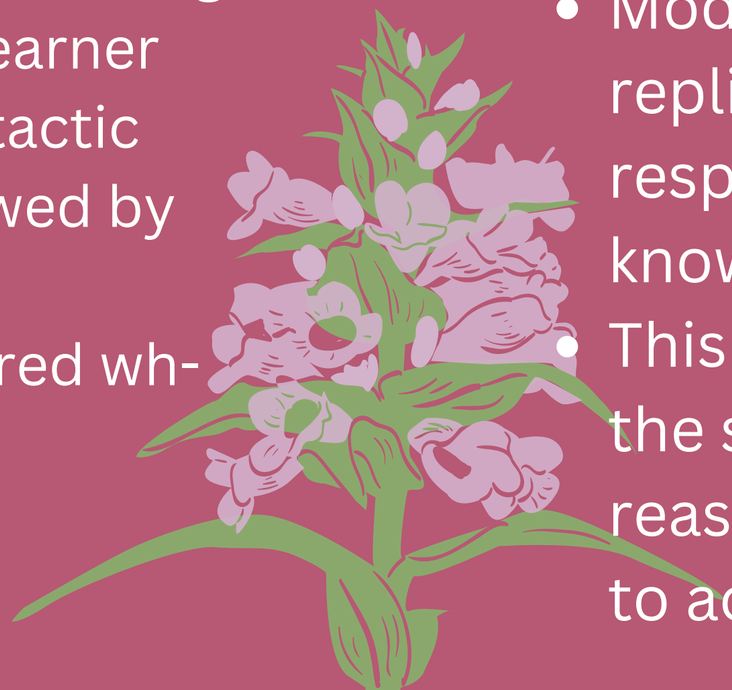
b. Syntactic path of *wh*-dependency:
start-IP-VP-*end*

c. Syntactic trigrams $\in Trigrams_{start-IP-VP-end}$:
= *start*-IP-VP
IP-VP-*end*

Model Conclusion

- Pearl and Sprouse (2013a,b, 2015) gave the modeled learner quanitative and qualitative child-directed speech

- After incrementally encountering this input, the modeled learner was able to estimate syntactic trigram posibilities, followed by the ability to generate probabilities for any desired wh-dependency



- Pearl and Sprouse drew on acceptability judgement data from Sprouse, Wagers and Phillips (2012) about the four syntactic islands to provide a behavioral target for the models output
- Modeled learner was able to to replicate the observed acceptability response pattern that indicated knowledge of these syntactic islands
- This learning strategy of relying on the syntactic trigrams was a reasonable way for Enfglish children to acquire knowledge of these islands

Subjacency Condition

Subjacency Condition: dependencies cant cross two or more bounding nodes: if a dependency crosses two or more bounding nodes, a syntactic island occurs

Although children know via UG about the restriction the SC imposes and the set of possible bounding nodes, they need to learn which bounding nodes are in their language

While Pearl and Sprouse share the intuition that there's a local structural anomaly when syntactic islands occur, they suggested that it could be a low probability region with respect to the phrase structure nodes that characterize the syntactic path of wh-dependency

How does the learner recognize this low probability region?

Do you need to know about syntactic trigrams specifically to learn islands??

Conclusion?

Children would need to identify the phrase structure nodes containing the wh-dependecy and break the syntactic path into syntactic trigrams (Requires innate linguistic knowledge).

Not as much as the knowledge about bounding nodes and how to use them. But they may be useful for other syntactic phenomena.

Representation side: syntactic trigrams comprised of simple phrase structure nodes will do instead of bounding nodes, and no hard-coded constraint about which abstract units a wh-dependency can cross is required.
Aquisition side: English children would leverage the proposed syntactic trigram representation to acquire a constraint about the units a wh-dependency can cross, deriving directly from a simple dislike of low probability items, rather than being specific to the acquisition of syntactic islands.