

Constituency Deficits in Bonobo Comprehension of Spoken English

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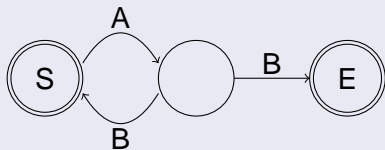
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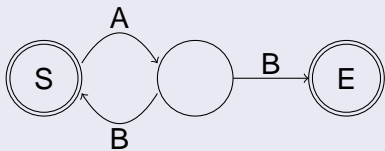
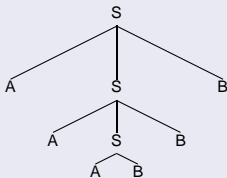
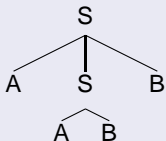
- Humans can recognise patterns generated by **regular grammars** and **context-free grammars**.
- Cottontop tamarins can **only** recognise patterns generated by regular grammars.

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- But we can never be sure that a subject is making use of nontrivial constituency while ever
 - They don't have to **generalise** beyond the input;
 - They don't have to **interpret** the patterns.

Semantics as Evidence for Constituency

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 - [The ticket collector]. . .
 - *[The ticket] collector. . .
- Material in NP forms a semantic unit in its own right, and externally (as an argument of V)
- Getting the correct interpretation without constituency is not impossible over a finite corpus, but requires positing massive lexical ambiguity for most function words (*the*, *and*, . . .).

Prediction

Without constituency, a subject should struggle to interpret such function words.

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- If the apes are using a sub-context-free model of English grammar, they will struggle whenever they need to treat a substring of the full utterance as a semantic unit.
- This includes NPs with determiners, coordinated NPs, etc.

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All following data taken from Savage-Rumbaugh *et al.*'s (1993) corpus of Kanzi's responses to 660 English requests.

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- Kanzi makes use of ordering information, and so interprets utterances on the basis of some sort of grammar.
- Do we have evidence for semantic constituency too?

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- I think we need to give the balloon to Kelly →
- Give the balloon to Kelly.

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- *Kanzi, go get a carrot for Rose, carrot.* [Kanzi starts taking carrots out of a 50lb bag and pushes several towards Rose]

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- Other functional material (auxiliaries, prepositions) is treated similarly.

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Conclusion: This evidence may support the hypothesis that Kanzi lacks constituency, but needs to be treated with caution in the light of these potential confounds.

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- But what if Kanzi only cared about **nouns**, not noun **phrases**?
- A word-level θ -criterion: each **noun** receives a θ -role and each θ -role is assigned to a **noun**.

Thematic Relations and NP-Coordination

- NP-coordination leads to a discrepancy between the number of **nouns** and the number of **noun phrases** in a sentence: $[_{NP_1} [_{NP_2} \text{Det } N_1] \text{ and } [_{NP_3} \text{Det } N_2]]$

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- This is a prime case where we need constituency to get the interpretation right: externally, NP_1 functions as a unit, despite its internal complexity.

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- This is a **species-specific, construction-specific** deficit.

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- These are the only cases in the corpus which require sensitivity to constituency for correct interpretation.
- **Conclusion:** Kanzi's syntax cannot give him the constituents he needs to interpret these constructions.

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- The question is pertinent to Hauser, Chomsky and Fitch's (2002) claim that recursive embedding distinguishes the narrow language faculty from general cognition.
- An answer would require consideration of vision, planned action, navigation, social cognition, etc. Here, just one case study.

Human Planning I

- Humans can productively combine a finite set of fixed routines into novel problem solving plans.

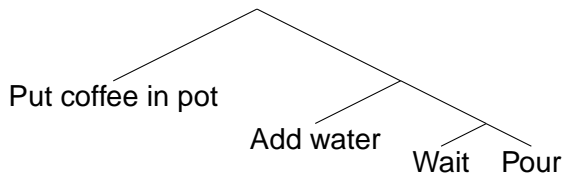
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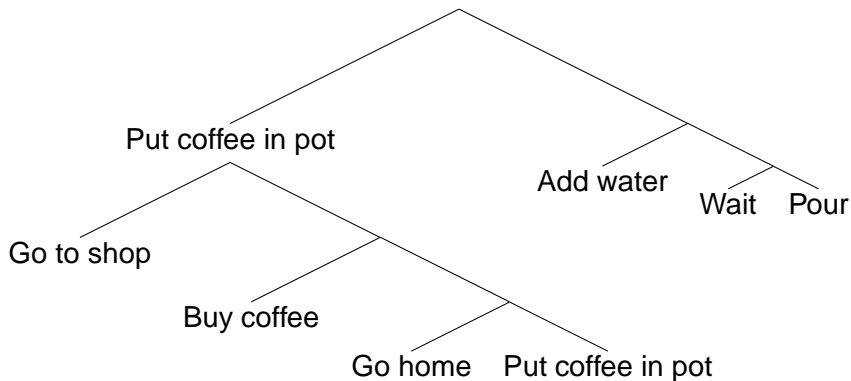
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- This ability to insert internally complex structures anywhere within a larger structure looks like the same notion of constituency that we find in human syntax.

Human Planning II



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 - The chimp doesn't get the box and push it under the banana.

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Chimp Planning II

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- If goals define units for planning, then their planning deficit here is formally very close to Kanzi's phrase structure deficit.

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- How domain-general remains to be seen. . .