

How syntax gets you to "think"

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Overarching Question

How do children learn to talk about
mental states (e.g. thinking, knowing)
speech acts (e.g. saying, telling)
desire states (e.g. wanting, needing)

Hypothesis:
 linguistic environment plays crucial role

Our approach

Goals

1. Quantify information syntax holds in principle
Methods: *adult psycholinguistics* + *computational modeling*
2. Quantify information in language input
Methods: *corpus analysis* + *computational modeling*
3. Do children in fact use this information?
Methods: *developmental psycholinguistics*

Learning without syntax

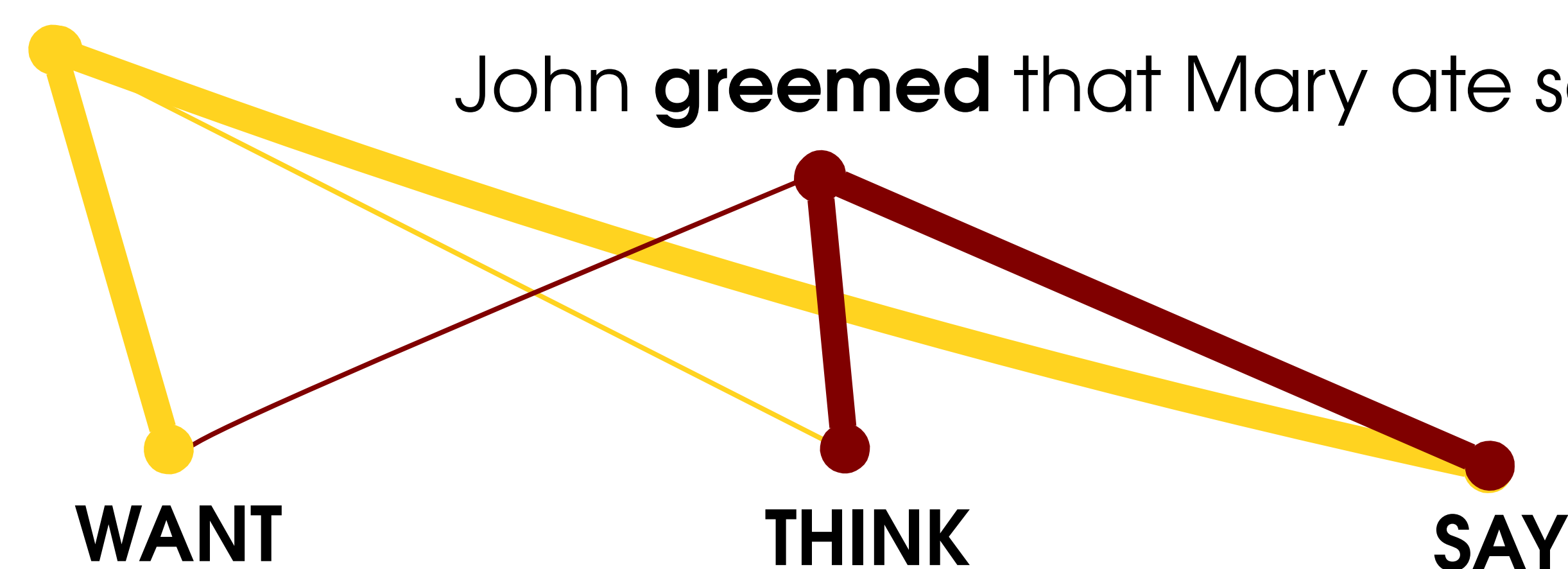


"Dax!"
 WANT? LEAD?
 RIDE? RACE? BIKE? GROUP?

Syntactic cues to meaning

Syntactic features of a sentence might act as a cue to the meaning of unknown words. (**bold line** = more likely given syntax)

John **daxed** to eat some cake.



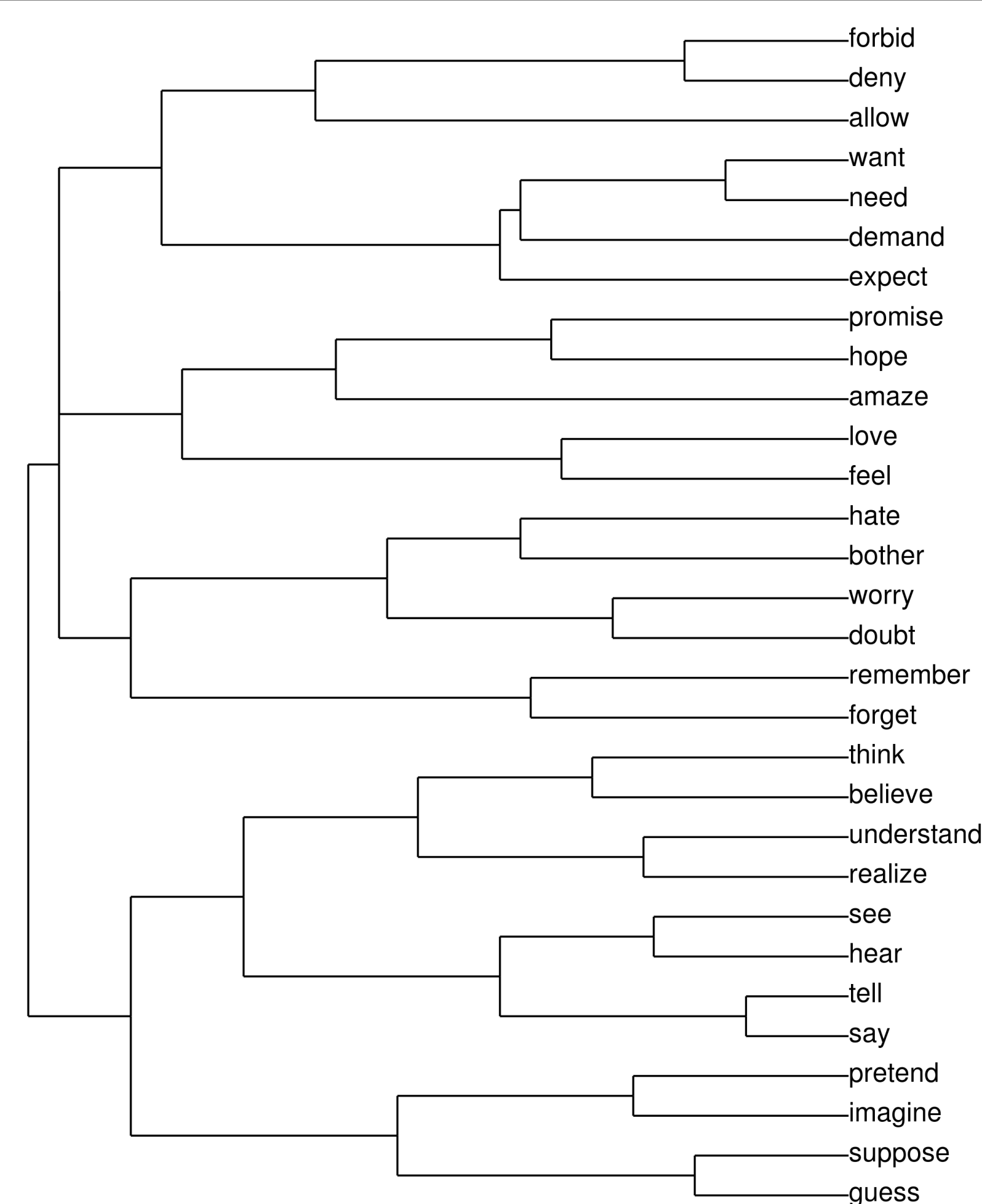
How much **information** does the **syntax** hold about **meanings** of mental state, speech act, and desire words?

Modeling the link in principle

- Sentence**
- 7 She said to put some food in the fish bowl.
 - 7 She heard to put some food in the fish bowl.
 - 7 She needed to put some food in the fish bowl.
 - ...
 - 7 He said there to be a truck at the curb.
 - 4 He heard there to be a truck at the curb.
 - 6 He needed there to be a truck at the curb.
 - ...

Quantify fit between syntactic judgments & semantic judgments

We find that there is significant information present in syntax



Establishing a time course

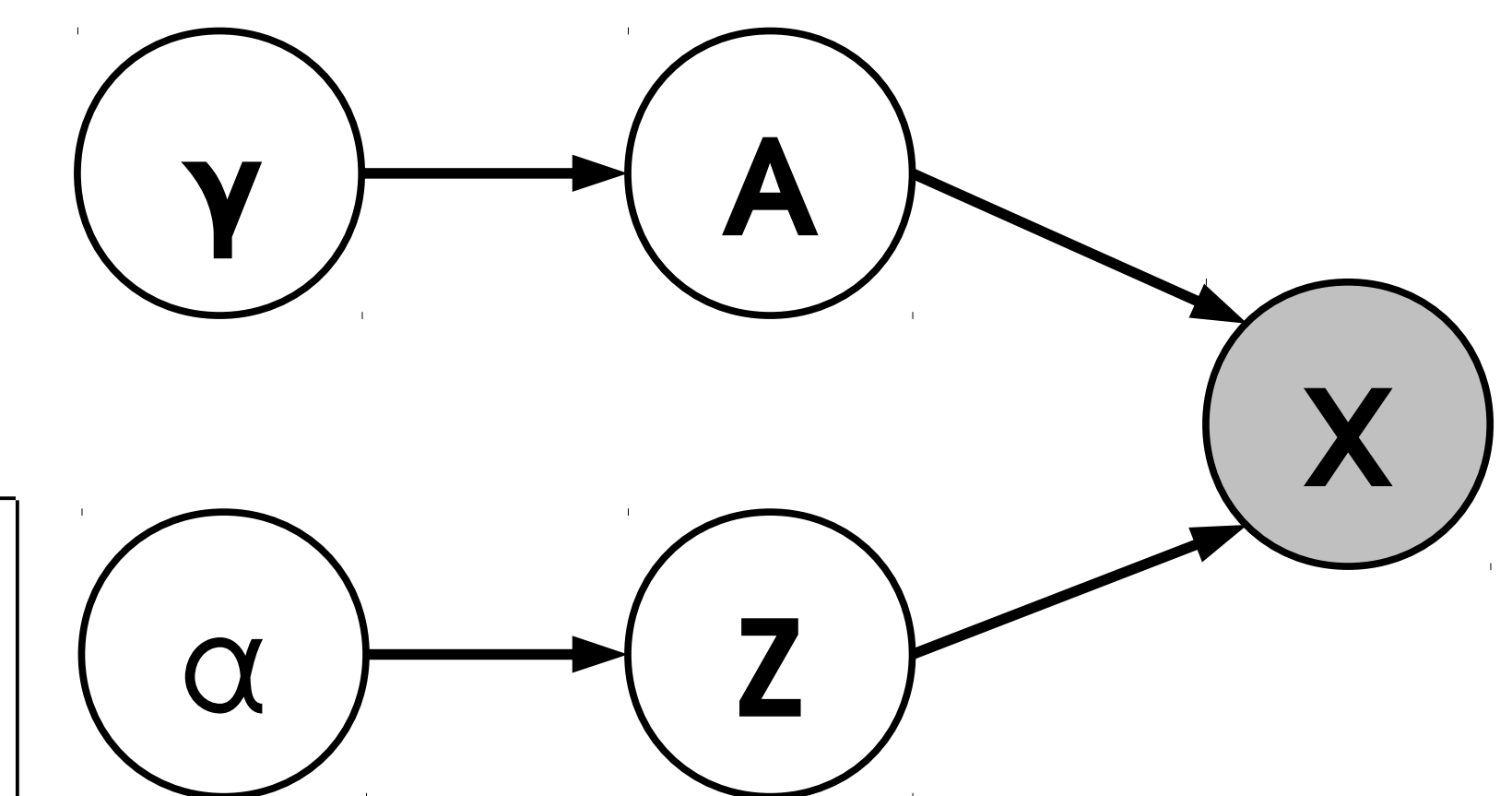
Design instruments to test...

1. ...which words children know at what age
2. ...what children know about *syntax-meaning link*



Modeling the link in practice

Develop **generative models** & use **Bayesian inference** to discover categories of meanings



Broader impacts

Understanding **pathology**

- Which aspects of autism spectrum deficits are linguistic?
- Effects of **Socioeconomic Status**?
- Effect of SES-conditioned differences in language input?

Selected references

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