

Psychology of Language

10 Discourse processing

Fall 2023

Tues/Thur 5:00-6:15pm

Emma Wing
Drop-in hours:
Wednesdays 3-4pm
& by appointment
[Webex link](#)

Road map

- Review from 9 Sentence processing
- Unit 2: The Mature System
 - 10 Discourse processing

Review from 9 Sentence processing

- Key Concepts from last time (chat or think alone)
 - E.g., Can you recall an example? Can you define it? Can you explain an experiment that tests it?
- ✓ Grammaticality vs. acceptability
- ✓ Syntactic processing is automatic
- ✓ Incremental processing
- ✓ Syntactic ambiguity: local and global
- ✓ The role of prediction in syntactic processing
- ✓ The role of linguistic and visual context in syntactic processing
- ✓ Processing strategies: late and early closure

Unit 2:

The Mature system

10 Discourse processing

Learning objectives

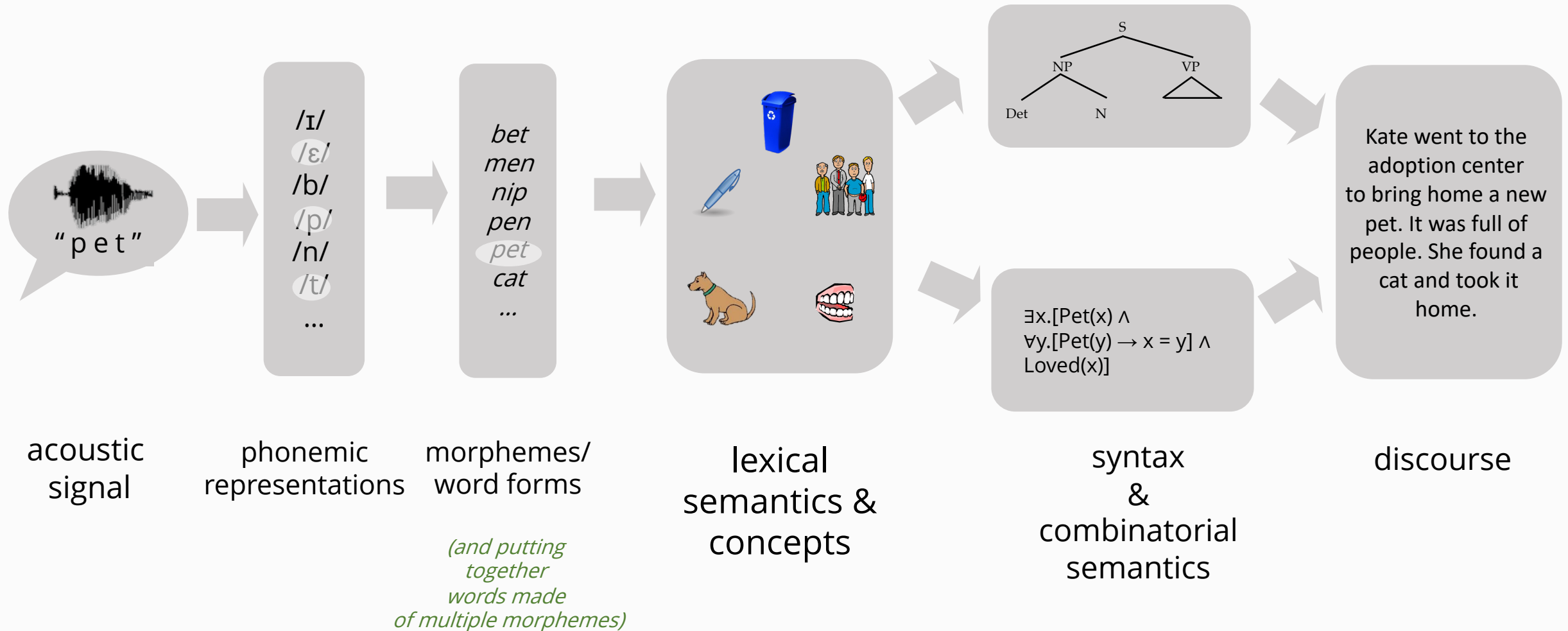
- Information flow during comprehension
- Name 3+ examples of a discourse
- Understand the role of prediction and inference
- Name 2 things we rely on for anaphoric reference
- Describe three types of discourse representation and their relationship with time
 - Surface form; propositional form; Situation (mental) model
- Describe 1+ experiments testing mental models

Information flow

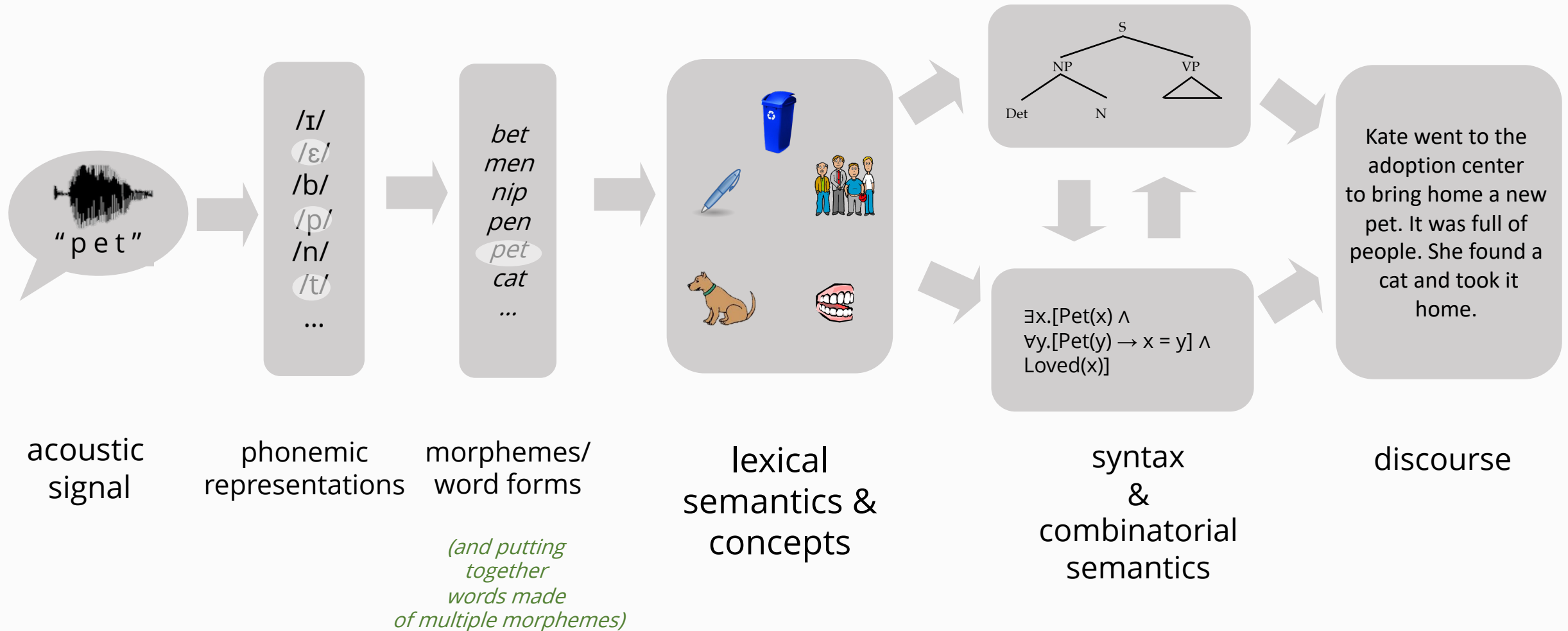
- Put these in order based on the flow of information during comprehension
 - Combinatorial semantics
 - Phonemic representations
 - Syntax
 - Lexical semantics & concepts
 - Discourse
 - Acoustic signal

*Make sure to think about backwards arrows!

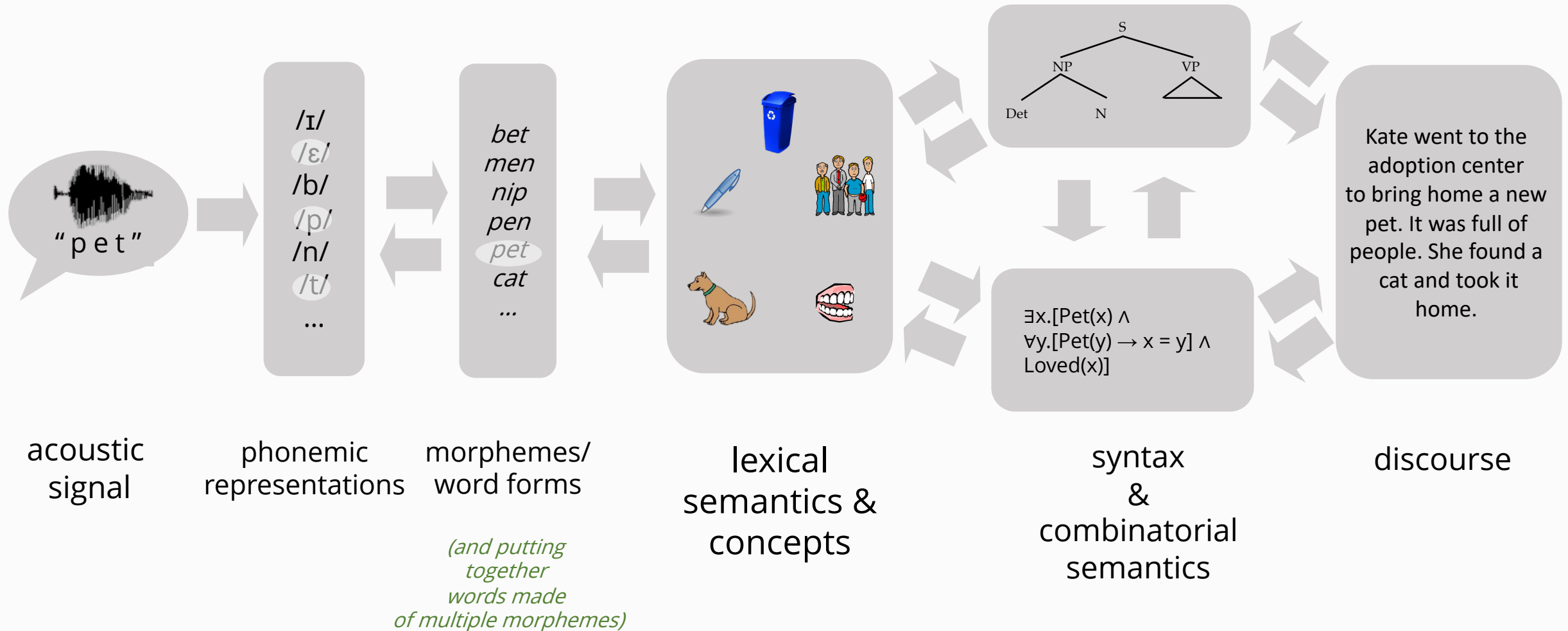
Information flow



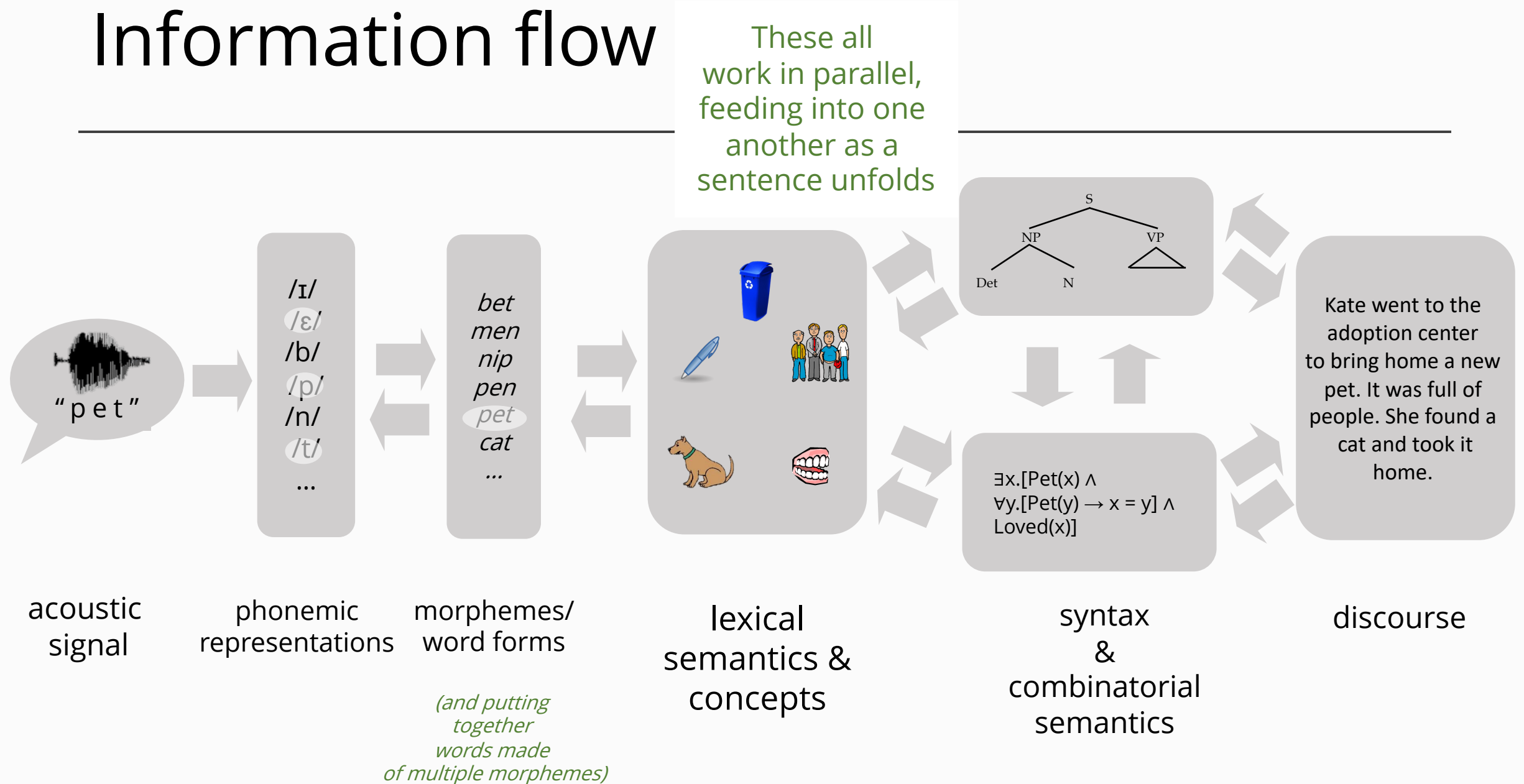
Information flow



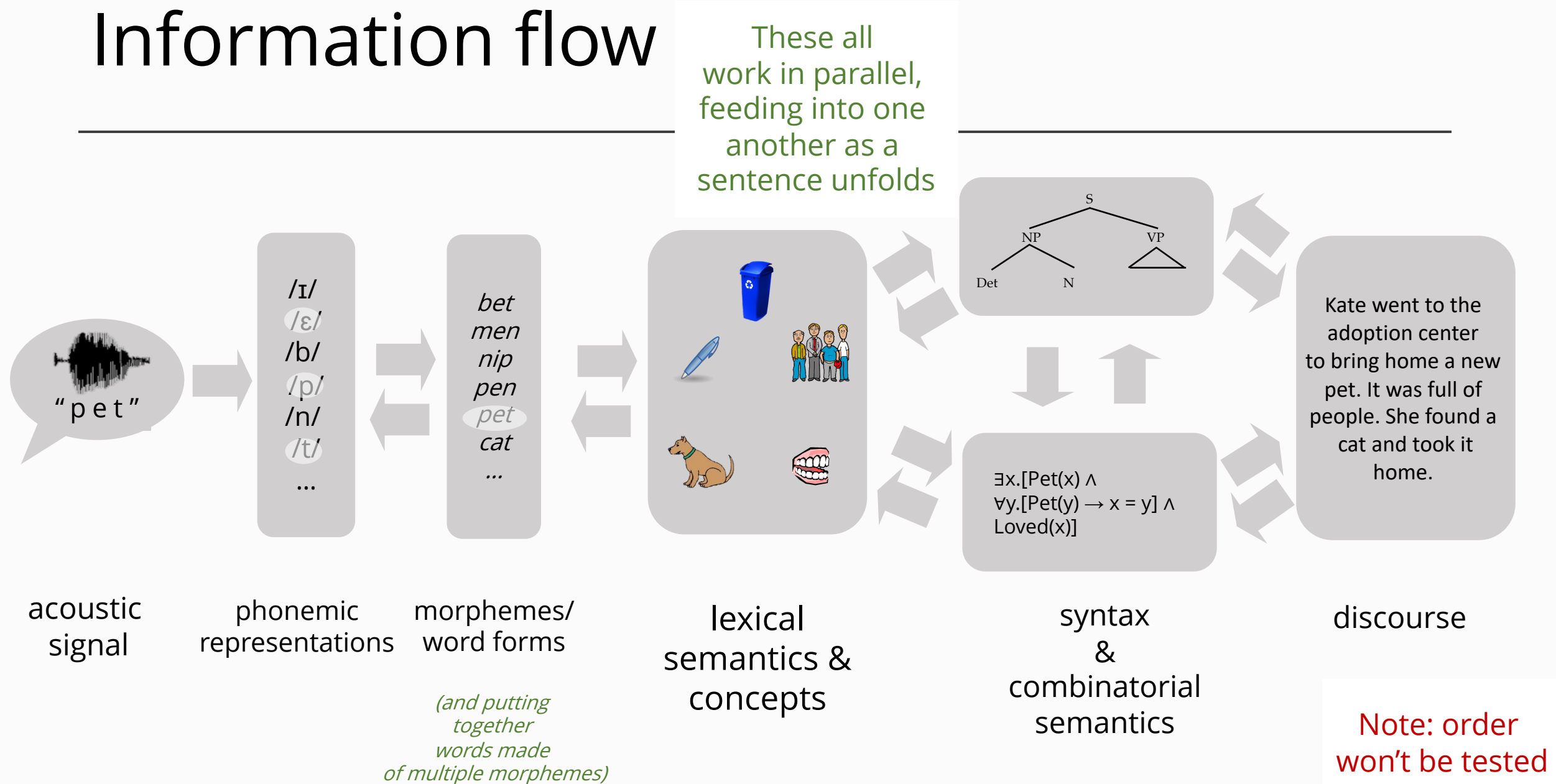
Information flow



Information flow



Information flow



Discourse

- **Discourse:** strings of sentences together which make up conversations, texts, narratives, letters (a level higher than the sentence)
- What do we need in order to understand discourse?
 - More than just sentence meaning
 - Knowledge of topic
 - World knowledge
 - Context and function of discourse
 - Attitude & emotional bias
 - Knowledge of inferences

The role of prediction

- A stonemason and his apprentice set down a block of `xxxxxx` by the side of the road. `Xxxx` were hungry. The stonemason had left `xxxxxx xxxxxx` under a nearby olive tree. It was a hot day but fortunately `xxx xxxx` was still `xxxx`. There was a large piece of nougat too, but when the apprentice tried to cut through `xx`, `xxx xxxxxx xxxxxx`. `Xxxx` decided to eat `xx` later. After lunch, the stonemason picked up `xxx` tools, and headed towards the tower. Another few weeks and `xx` would be finished.

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Illusions

- How many animals of each kind did Moses take on the Arc?
- After a plane crash, where should the survivors be buried?
- Real-world knowledge can sometimes make expressions sound reasonable when they don't make sense

Inference

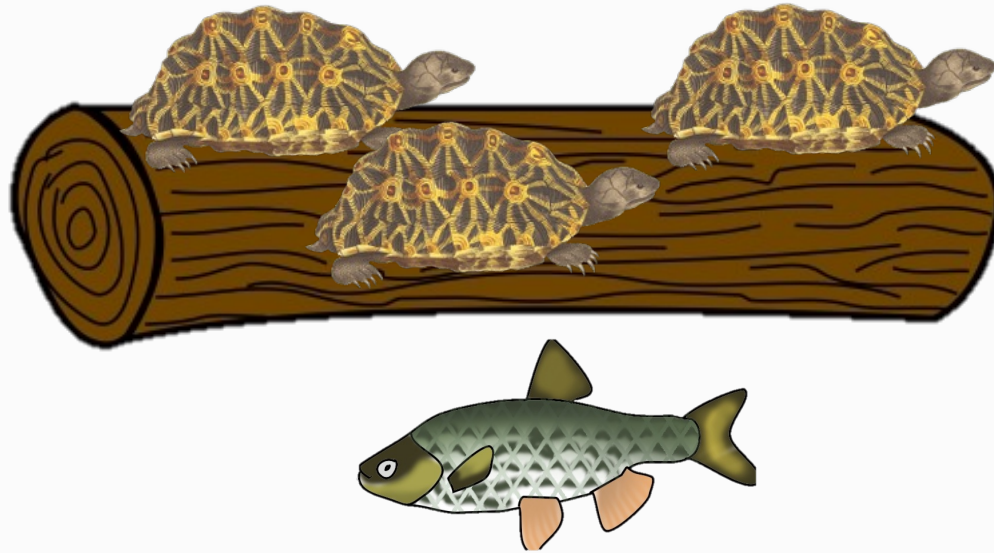
- **Inference** helps us understand more than what the sentence explicitly says
 - Example: spatial inference

What image do you have in your head when reading these sentences?

1. Three turtles rested on a floating log and a fish swam beneath it.
2. Three turtles rested beside a floating log and a fish swam beneath it.

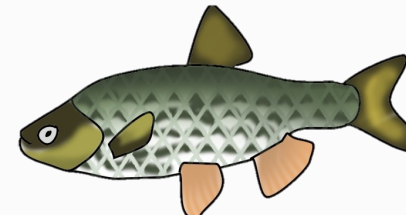
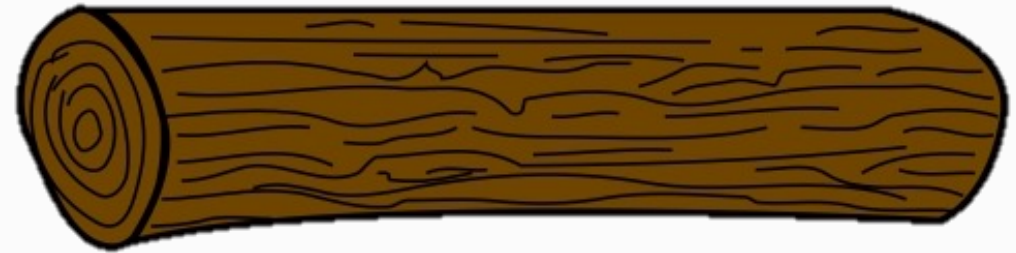
Inference

1. Three turtles rested on a floating log and a fish swam beneath it.



Inference

2. Three turtles rested **beside** a floating log and a fish swam **beneath** it.



Anaphoric reference

- **Anaphor:** a linguistic device that refers to someone or something that has been mentioned in the previous context. Anaphor creates a coherent text.
- Examples
 - **Pronouns:** *she, he, them*
 - To understand these, you have to choose the right referent if there is more than one grammatically possible one
 - **Definite noun phrases:** *the carpet, the manager*

Anaphoric reference

- **Anaphor**: a linguistic device that refers to someone or something that has been mentioned in the previous context. Anaphor creates a **coherent** text (examples: he; the carpet)
1. John wanted to lend his friend some money. He was hard up and really needed it.
 2. John wanted to lend his friend some money. However, he was hard up and couldn't afford to.
- The combination of semantics and real-world knowledge helps us determine the correct referent

Anaphoric reference

- Which context better facilitates reading times at the target sentence?

Preceding context A:

In one corner of the room was an upholstered chair. A broadloom rug in rose and purple colors covered the floor. Dim light from a small brass lamp cast shadows on the walls.

Preceding context B:

A broadloom rug in rose and purple colors covered the floor. Dim light from a small brass lamp cast shadows on the walls. In one corner of the room was an upholstered chair.

Target sentence: The chair appeared to be an antique.

- Reading times for the target sentence were faster after Context B
- Why? Because discourse focus helps us identify the correct referent
 - The clause preceding the anaphor helps put that information in focus over previous information

Types of discourse representation

- Activity: Listen to the paragraph.

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- **Activity:** Listen to the paragraph.
- Which of the following sentences was in the paragraph?
 1. Jack checked online
 2. Jack found out the movie times
 3. Jack went on the internet
 4. None of the above

Types of discourse representation

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It was Friday night and Jack and Melissa wanted to go out and catch a movie. Jack went on the internet and found out that they could just make it to the 9 o'clock performance of the new Tom Cruise film. They really enjoyed it.

Types of discourse representation

- Why was that so hard?
- There are three types of discourse representation
 - 1. Surface form:** recall the meaning and the exact words
 - *Jack went on the internet*
 - 2. Propositional form:** recall the meaning but different words
 - *Jack checked online*
 - 3. Situation (mental) model:** recall a different meaning, same idea
 - *Jack found out the movie times*

↓ This is the order of representation usually recalled as time passes

Mental models

- **Mental model:** a mental representation of a situation

Experiment 1: Participants hear the following paragraph with either “put on” or “took off”, and then answer the question.

John was preparing for a marathon. After doing a few warm-up exercises inside, he put on / took off his sweatshirt and went jogging. He jogged halfway along the lake without too much difficulty.

Question: Was sweatshirt mentioned in the sentence?

Mental models

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- Which condition do you think elicited faster responses?
- Why?

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Question: Was sweatshirt mentioned in the sentence?

- Which condition do you think elicited faster responses? – “Put on”
- Why? – We build a mental model in which John still has the sweatshirt on at the end of the paragraph.

Mental models

Experiment 2: Participants read the following sentences. Then, they see an image and have to respond as quickly as possible to say whether it was mentioned in the sentence.

1. The ranger saw the eagle in the sky. **OR**
2. The ranger saw the eagle in the nest.

+



(a)

OR



(b)

Mental models

Experiment 2: Which picture do you think was responded to faster after each sentence?

1. The ranger saw the eagle in the sky. **OR**
2. The ranger saw the eagle in the nest.

+



(a)

OR



(b)

Mental models

Experiment 2: There were faster responses when the shape of the bird matched its implied shape in the sentence.

1. The ranger saw the eagle in the sky. **OR**
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+

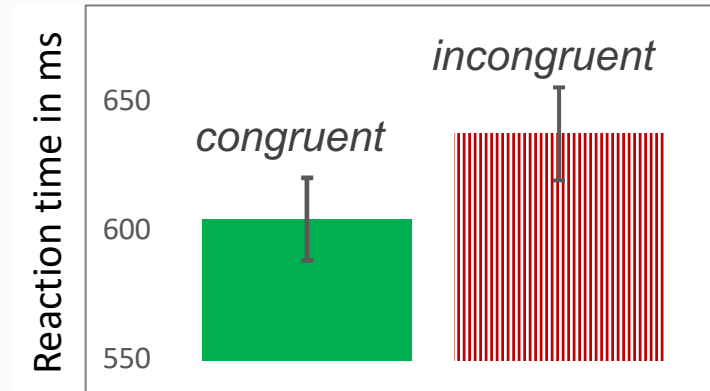


(a)

OR



(b)



Key concepts

- ✓ Information flow during language comprehension
- ✓ Examples of discourse
- ✓ The role of real-world knowledge and inference
- ✓ The role of prediction
- ✓ Anaphoric reference
- ✓ Discourse focus
- ✓ Types of discourse representation across time
- ✓ Mental models