



# REFERENCE RESOLUTION

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dream

I still have a dream

I still have a dream  
Pron      Adv      Verb      Det      Noun

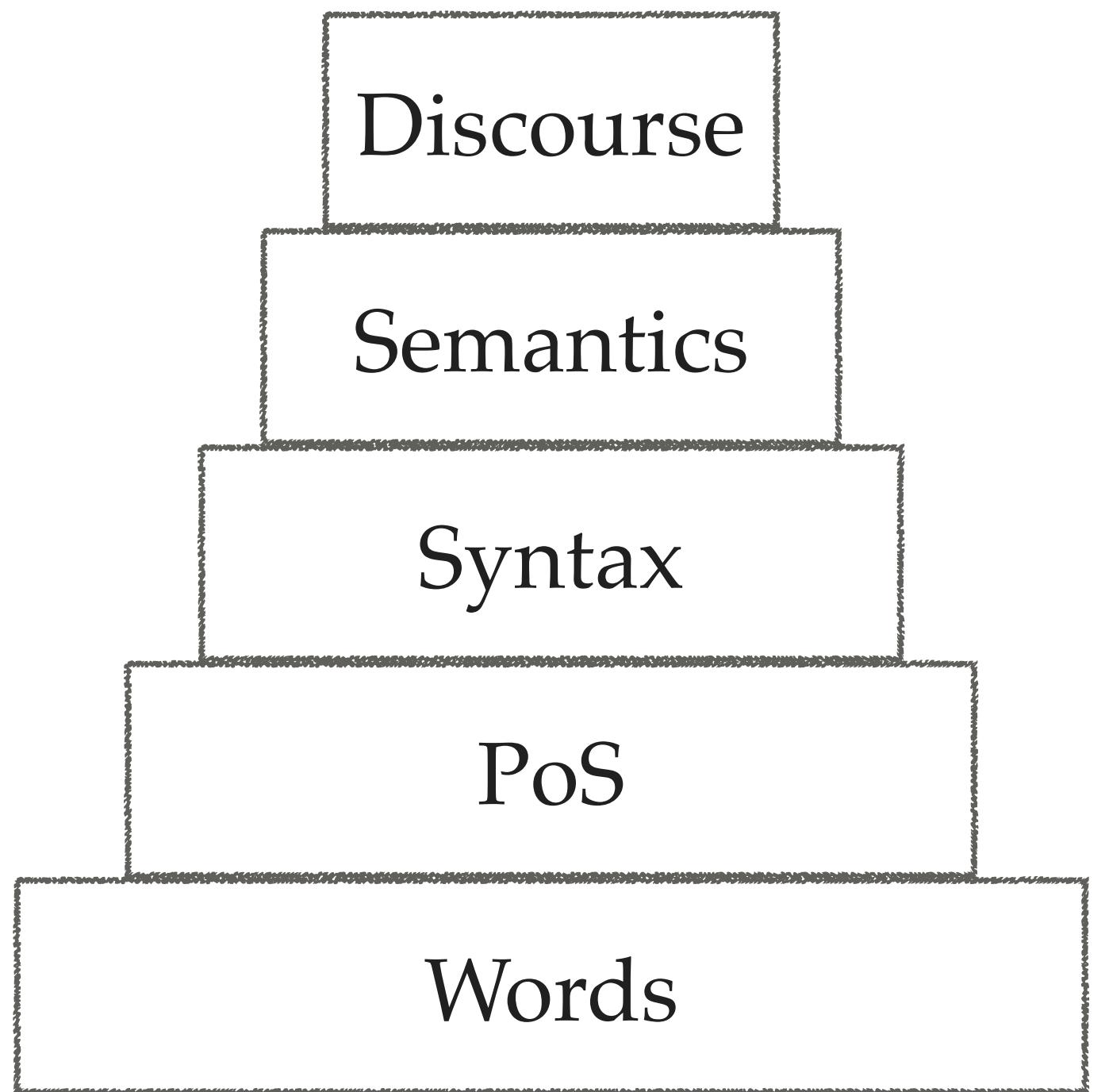
I still have a dream

Pron      Adv      Verb      Det      Noun

And so even though we face the difficulties of today and tomorrow, **I still have a dream**. It is a dream deeply rooted in the American dream.

I have a dream that one day this nation will rise up and live out the true meaning of its creed: "We hold these truths to be self-evident, that all men are created equal."

I have a dream that one day on the red hills of Georgia, the sons of former slaves and the sons of former slave owners will be able to sit down together at the table of brotherhood.



# DISCOURSE

- The analysis of language “beyond the sentence boundary”
- Examples:
  - Conversational analysis
  - Rhetorical analysis



**LUKE**  
I'll never join **you!**

**VADER**  
If you only knew the power of the  
dark side. Obi-Wan never told  
you what happened to **your father.**

**LUKE**  
He told me enough! It was **you**  
who killed **him.**

**VADER**  
No. **I** am **your father.**

**LUKE**  
No. No. That's not true!  
That's impossible!

**VADER**  
Search your feelings. You know  
it to be true.

**LUKE**  
No! No! No!



**LUKE**

I'll never join you!

**VADER**

If you only knew the power of the dark side. Obi-Wan never told you what happened to your father.

**LUKE**

He told me enough! It was you who killed him.

**VADER**

No. I am your father.

**LUKE**

No. No. That's not true!  
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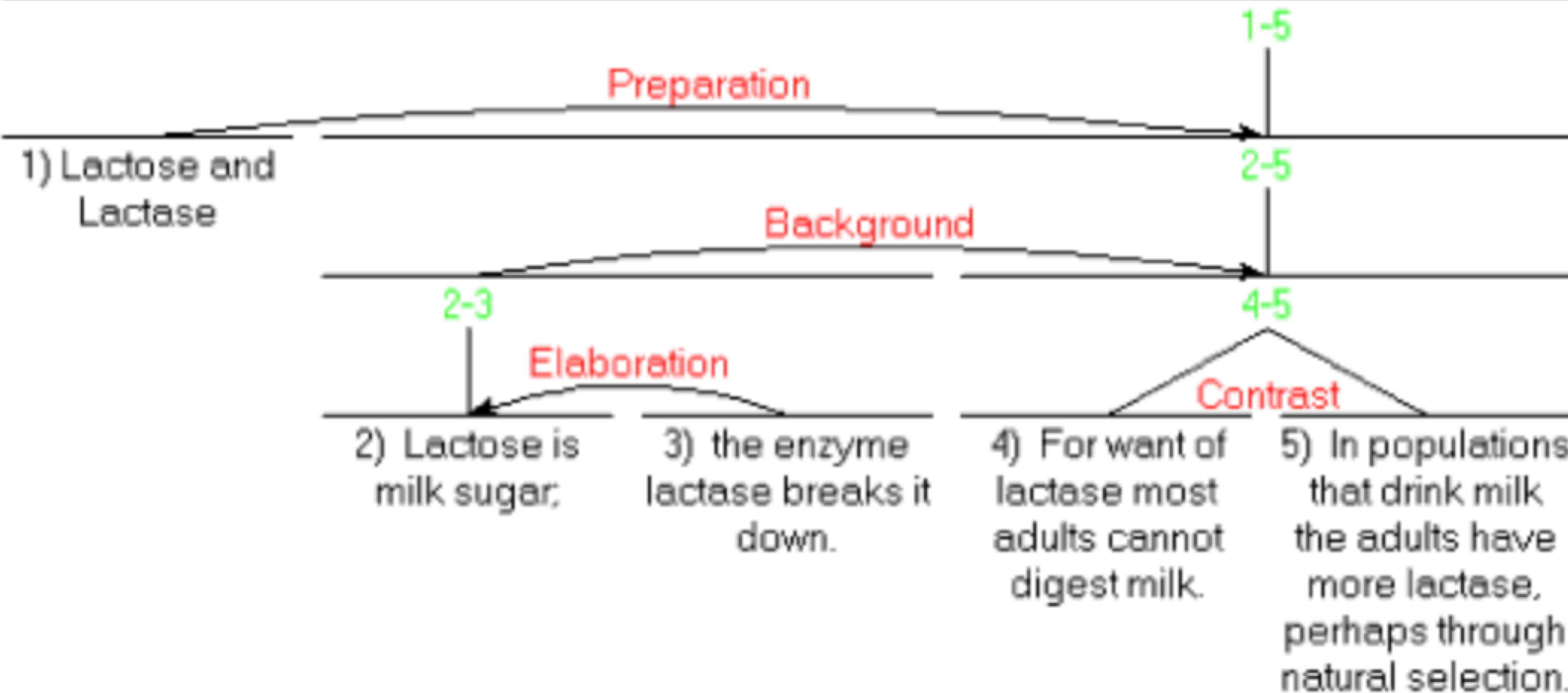
**VADER**

Search your feelings. You know it to be true.

**LUKE**

No! No! No!

Slide from David Bamman's ANLP class



Source: <https://www.sfu.ca/rst/01intro/intro.html>

- Discourse relations connect sentences or parts of sentences

# COREFERENCE RESOLUTION

Jürgen Norbert Klopp (German pronunciation: [ˈjyʁgn̩ ˈklɔp] ⓘ; born 16 June 1967) is a German professional football manager and former player who is the manager of Premier League club Liverpool. He is widely regarded as one of the best football managers in the world. [2][3][4][5]

# COREFERENCE RESOLUTION

John mentioned his father was ill; he wasn't able to visit him because of Covid

What is “he” referring to?

# COREFERENCE RESOLUTION

John mentioned his father was ill; he wasn't able to visit him because of Covid

What is “him” referring to?

# COREFERENCE RESOLUTION

- **Referent:** Entities in the real world that the text points to

John mentioned his father was ill; he wasn't able to visit him because of Covid

# COREFERENCE RESOLUTION

- Referent
  - John
  - Father
  - Covid

John mentioned his father  
was ill; he wasn't able to  
visit him because of Covid

# COREFERENCE RESOLUTION

- **Referring expressions:** Text spans that point to entities

John mentioned his father was ill; he wasn't able to visit him because of Covid

# COREFERENCE RESOLUTION

- Referring expressions: Text spans that point to entities

John mentioned his father was ill; he wasn't able to visit him because of Covid

# COREFERENCE RESOLUTION

- **Coreference:**  
Bucketing the spans  
that refer to the  
same entity

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# COREFERENCE RESOLUTION

- **Coreference:**  
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John mentioned his father  
was ill; he wasn't able to  
visit him because of **Covid**

# COREFERENCE RESOLUTION

- Coreference

- {John, his, he}
- {his father, him}
- {Covid}

John mentioned his father  
was ill; he wasn't able to  
visit him because of Covid

# NAMED ENTITY LINKING

- Recognize spans that are named entities
- Also, resolve the named entities to their references
- Usually, by linking them to some external database

Paris is the capital of France

[Paris]<sub>LOC</sub> is the capital of [France]<sub>LOC</sub>

Paris, Arkansas

Paris, France

[Paris]<sub>LOC</sub> is the capital of [France]<sub>LOC</sub>

<https://en.wikipedia.org/wiki/Paris>



[Paris] is the capital of [France]



<https://en.wikipedia.org/wiki/France>

# TOPOONYM RESOLUTION

- Named entity linking but restricted to geographic entities.
- The objective is usually to link a span of text that marks a geographic entity to geographical coordinates on a map

# TOPOONYM RESOLUTION

## **High-speed rail between Toronto and London by 2025, premier says**

Wynne: 'Time to take a serious look at an idea that's been around for decades.'

CBC News · Posted: May 19, 2017 9:22 AM EDT | Last Updated: May 19, 2017

<https://www.cbc.ca/news/canada/kitchener-waterloo/wynne-ontario-high-speed-rail-report-1.4123183>

# GEOGRAPHICAL COREFERENCE

- If two geographical entities refer to the same place

Old Trafford is a great place to  
watch football.

Many careers have been  
flourished or derailed at the  
theater of dreams

Old Trafford is a great place to  
watch football.

Many careers have been  
flourished or derailed at the  
**theater of dreams**

**Old Trafford** is a great place to watch football.

Many careers have been flourished or derailed at the **theater of dreams**



# EVENT COREFERENCE

If referring expressions refer to the same event

Apple acquired the software  
firm last month

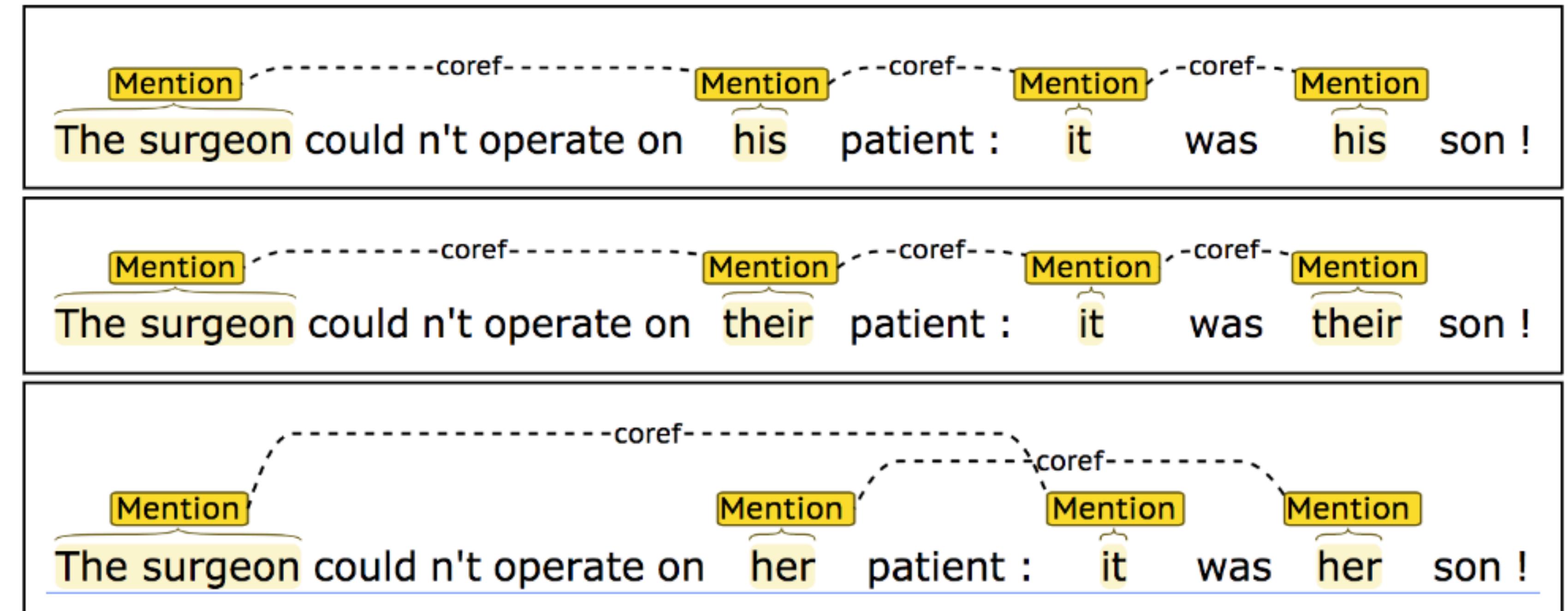
Apple paid Softie in equity and  
future options to complete the  
deal

Apple **acquired** the software  
firm last month

Apple **paid** Softie in equity and  
future options to complete the  
deal

“What can we do if we have a coreference system?”

Coreference  
ambiguities can be  
used to measure  
gender bias



Rudinger et. al.

Referential gender  
used as a way to  
count number of  
characters and  
differentiate between  
genders

