

Computational Linguistics

CSC 485/2501
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2D

2d. Syntax and Interpretation

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Reading: Jurafsky & Martin: 12.3.4–6, 15.0–3;
[Allen: 4.1–5]; Bird et al: 9.

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Goal of parsing

- A representation of properties relevant to meaning and interpretation:
 - Things
 - Predicates (events)
 - Roles

} **Entities** (e.g., in a knowledge base)

} **Relations** between things and predicates.
- Syntactic structure helps in:
 - Determining **things** and **predicates**.
 - Determining mapping of **things** to **roles** of **predicates**.

Example

The goalie kicked the ball.

Event: *kicked*

Role: Agent
(doer)

Role: Theme
(thing affected)

Thing: *The goalie* Thing: *the ball*

kick (agent=goalie, theme=ball)

Syntax ↔ interpretation

- Mapping from structure to *objects of interpretation*
 - Things: NPs, Ss
 - Predicates: verbs, preps, APs
 - Roles: ??
- What are the roles in these examples?

Sara left.

Joan found the treasure in the garage.

Ken put the ball in the garage.

Tim cut the wire with a pair of scissors.

Melissa visited Ottawa with Nadia.

Andrew felt like a failure.

Syntax \leftrightarrow interpretation

- Mapping from structure to *objects of interpretation*
 - Things: NPs, Ss
 - Predicates: verbs, preps, APs
 - Roles: ?? **(thematic roles)**
- What are the roles in these examples?

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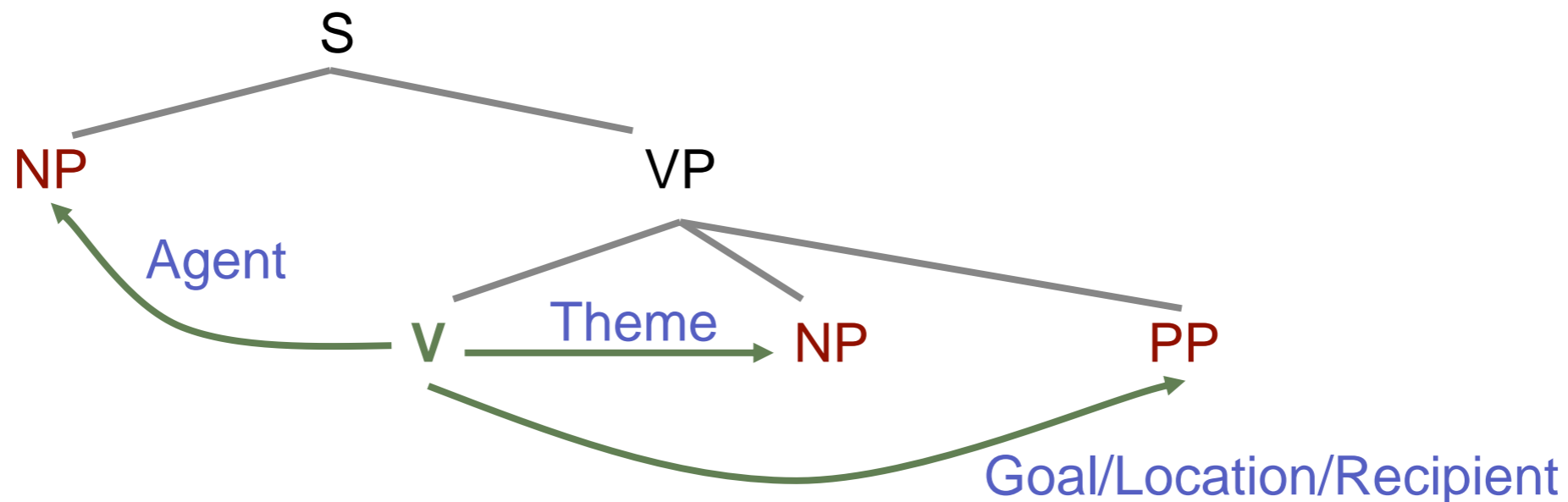
Syntax \leftrightarrow thematic roles

- Parse trees more or less indicate grammatical function:

Subject \approx Agent

Object \approx Theme

Object of preposition \approx Goal/Location/Recipient



- This mapping is used to determine appropriate semantic representation.

Case vs. Grammatical function vs. Thematic role

- Mapping from case to grammatical function is entirely regular (in English, but not 1-to-1):
Subject: nominative/subjective
Object: accusative/objective
Object of preposition: accusative/objective
- Mapping from grammatical function to thematic role is more or less regular:
Subject \approx Agent / Experiencer
Object \approx Theme
Object of preposition \approx Goal/Location/
Recipient / Instrument
- The latter mapping is used to determine appropriate semantic representation.

Verb subcategorization

- **Problem:** Constraints on individual verbs and their complements not at all regular.

*Nadia told / instructed / *said / *informed Ross to sit down.*

*Nadia *told / *instructed / said / *informed to sit down.*

*Nadia told / *instructed / *said / informed Ross of the requirement to sit down.*

Nadia gave / donated her painting to the museum.

*Nadia gave / *donated the museum her painting.*

Nadia put / ate the cake in the kitchen.

*Nadia *put / ate the cake.*

- We will return to this later...

Diathesis 1

The goalie kicked the ball.

Event: *kicked*

Role: Agent
(doer)

Role: Theme
(thing affected)

Thing: *the goalie* Thing: *the ball*

kick (agent=goalie, theme=ball)

Diathesis 2

The ball was kicked.

Event: *kicked*

Role: Theme
(thing affected)

Thing: *the ball*

kick (agent=?, theme=ball)

Diathesis 3

The ball was kicked by the goalie.

Event: *kicked*

Role: Theme
(thing affected)

Role: Agent
(doer)

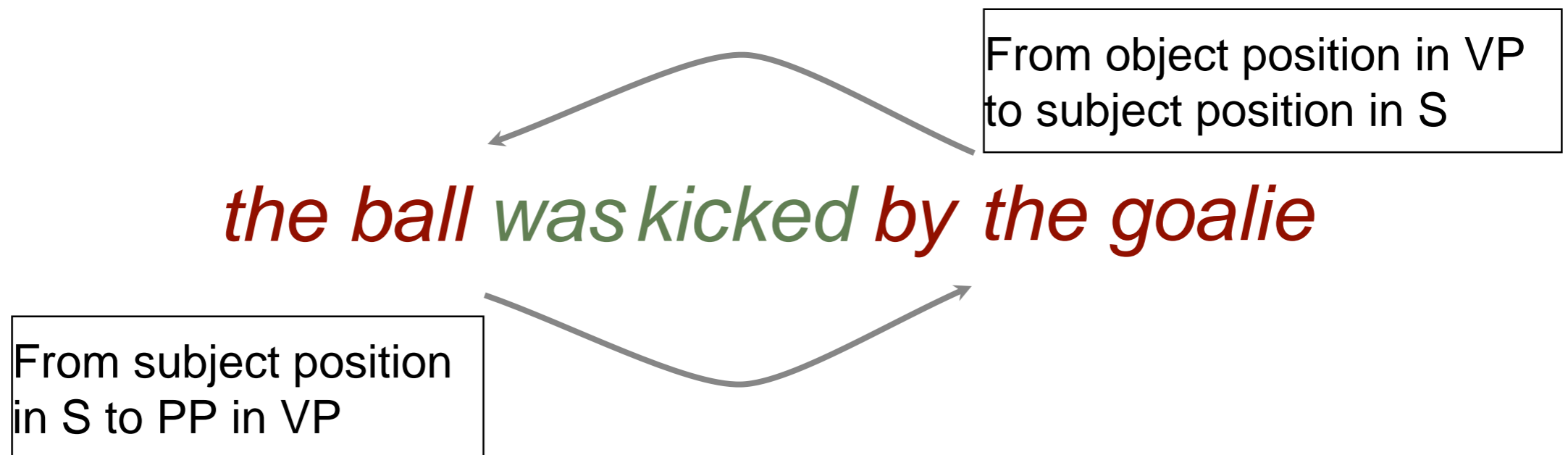
Thing: *the ball* Thing: *the goalie*

kick (agent=goalie, theme=ball)

Diathetic alternation

the goalie *kicked* *the ball*

Diathetic alternation



But the semantic representation doesn't change