



Discourse Relations

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Outline

- Definition
- Discourse Graph
- Application
- Granularity
- Taxonomy
- Headedness
- Polymorphism/Metonymy/Projection/Conversion
 - Wrapped Arguments
 - Relation with Other Types of DCs

Definition

A discourse relation is

- a relation among eventualities (including utterance events? and **reported beliefs**) and/or their types

- [I worked hard] **to** {pass the exam}.

event
(\$1)

purpose
relation

event type
(\$2)

- semantic (informational), pragmatic (presentational), or both.

- [Tom came] **because** {Mary came}.

conclusion

pragmatic

evidence

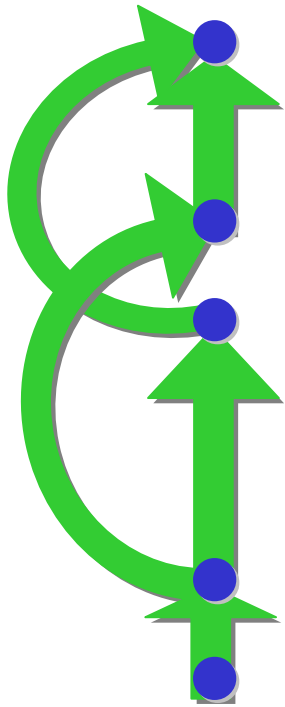
- = [I infer [Tom came]] **because** {Mary came}.

result

semantic

cause

Discourse Graph (not Tree)



A huge amount of content is necessary **to** implement ubiquitous information service.

So content must be easy to create.

Also, the retrieval of content must be quick and easy **to implement ubiquitous information service.**

Hence semantic annotation is necessary.

So intelligent content technology is necessary.

Applications

- Description of pragmatic/semantic structure of discourse
 - annotation
- Semantic Authoring
 - = Ontology-Based Composition
 - improvement of content quality
 - reduction of authoring cost
 - generation of text and other presentations
 - entrance to Semantic Web

Semantic Authoring TODOs

- Anaphora
- Access control
- Speedup of communication
→ replace e-mails, blogs, wikis

Granularity

- Relations vs. Discourse Connectives
- Rhetorical Structure Theory (RST)
 - 40~80 relations
- Penn Discourse TreeBank (PDTB)
 - 250 explicit connectives
- Ichikawa (1957, 1963, 1978)
 - about 30 relations
- Only finitely many basic relations/connectives
 - fifteen minutes after = fifteen minutes + after

Taxonomy

- RST: relations
 - mononuclear (single head)
 - presentational, subject-matter (informational)
 - multinuclear (multiple heads)
- PDTB: connectives
 - explicit
 - conjunction
 - subordinate, coordinate
 - adverbial
 - implicit

Taxonomy (cont.)

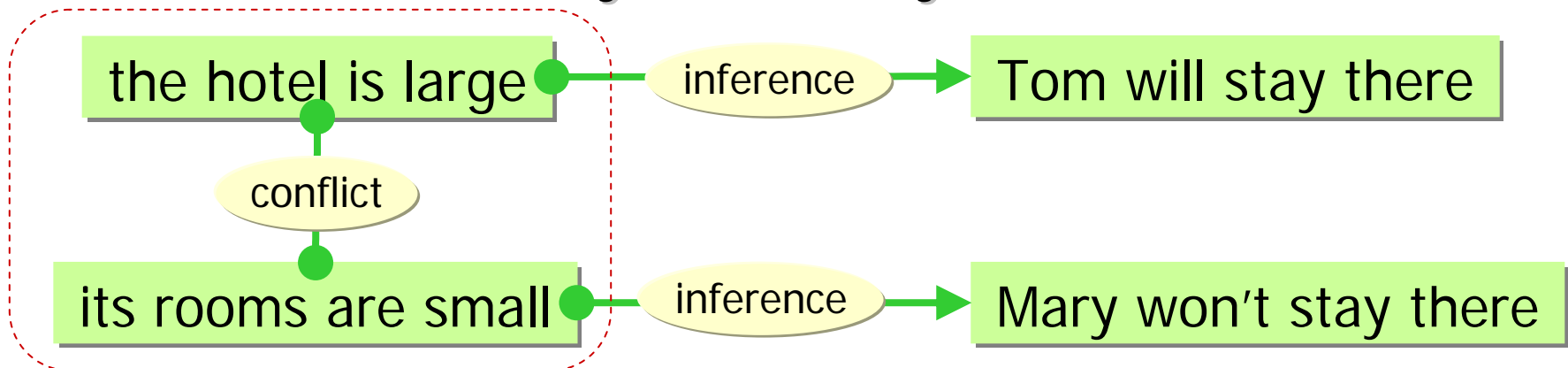
- Ichikawa
 - logical relations
 - derivation, concessive, others
 - multilateral relations
 - addition, comparison, diversion, others
 - elaborative relations
 - parallelism, complement, chain
- Merging RST and Ichikawa
 - about 50 relations, modulo headedness

Ichikawa's taxonomy

- logical connection
 - Cause: causes, trigger
 - Enablement: purpose, enablement
 - Reason: evidence, explanation, motivation
 - Evaluation: evaluation, **interpretation**, conclusion, **comment**
 - Condition: condition, otherwise, unconditional, compromise
- multilateral relation
 - Comparison: comparison, **preference**, similarity, proportion
 - Contrast: contrast, **conflict**, concession, dissimilarity, disjunction, substitution
 - Manner-Means: manner, **means**
 - Additive: coordination, addition
- expansive relation
 - Elaboration: general-specific, part-whole, process-step, **object-attribute**, set-member, example, extraction, minimum, summary-elaboration, restatement, definition
 - Complement: constraint, supplement
 - Attribution: attribution-content
 - Background: background, circumstance
- dialogue act?
 - Topic-Comment: problem-solution, reply, approval, disapproval, topic-comment
 - Topic Change: **topic-shift**, **topic-drift**
- temporal relation
 - before-after, until, simultaneous

Headedness

- Abstract headedness (importance) away, because which argument is the head (nucleus) depends on the context.
 - The hotel is large though their rooms are small. So Tom will stay there.
 - Although the hotel is large, its rooms are small. So Mary won't stay there.



Polymorphism, Metonymy, and Projection

● Object/Eventuality

domain=range

- similar
- dissimilar
- general-specific
- set-member
- whole-part
- example
- restatement
- comparison
- attribution-content
- means-purpose
- comment-topic

● Temporal Projection

- circumstance
- before-after
- until
- simultaneous

● Instance/Type

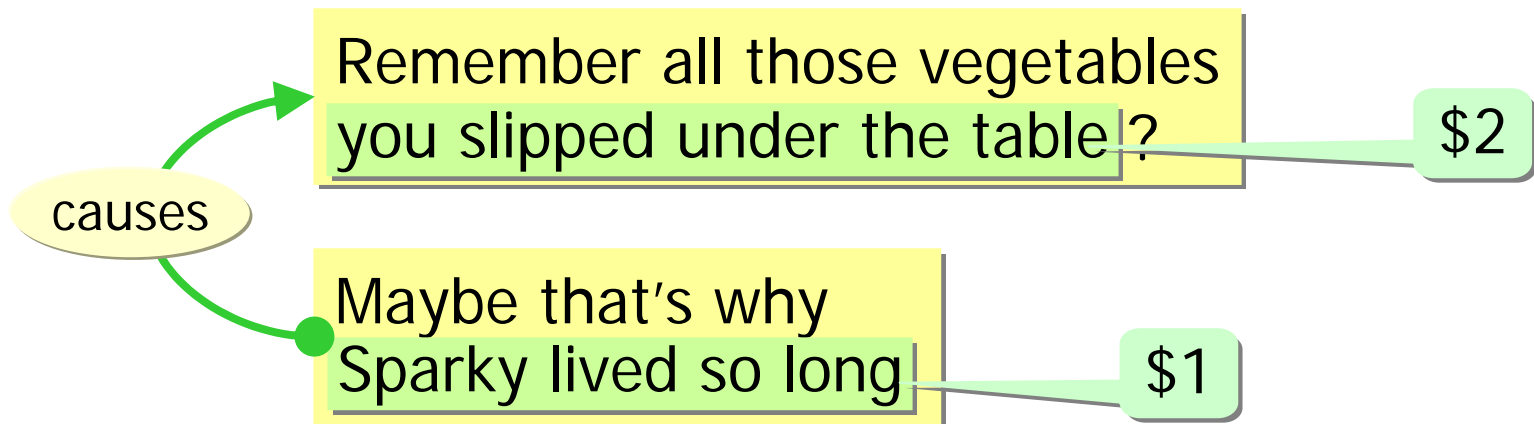
- purpose
- conditional
- unconditional

● Semantics/Pragmatics

- enablement

Wrapped Arguments/Metonymy

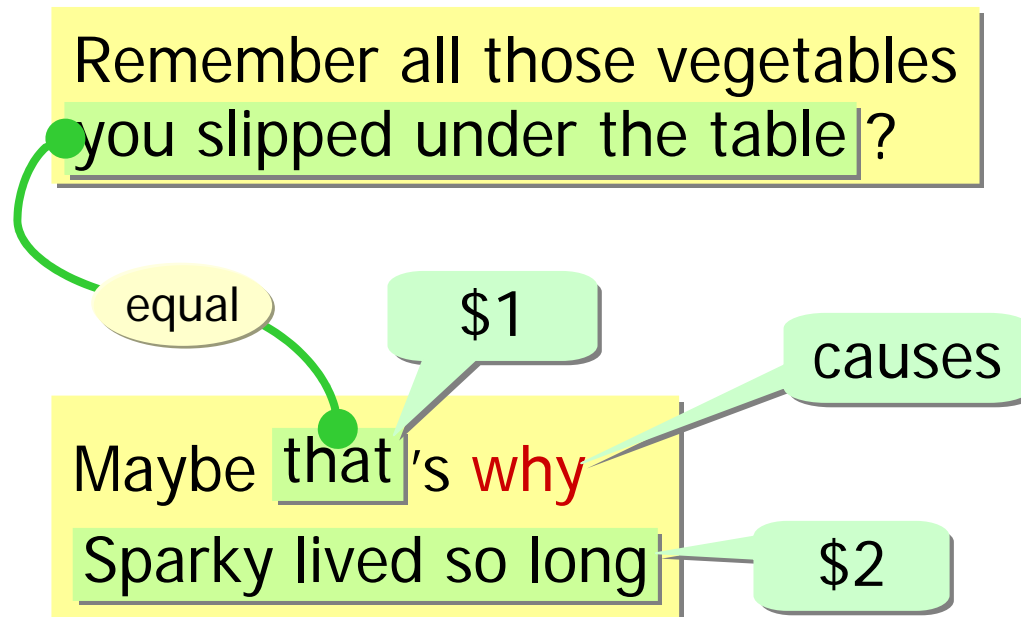
- In previous annotation practices, discourse relation may concern not the whole apparent argument but its core wrapped in an attitude report, a modal operator, etc.



- How to identify the core (real argument)?
 - exact annotation

Exact Annotation

- Relations and their arguments be annotated to specify the exact corresponding text spans.



Object/Eventuality

- comparison
 - [Tom is taller] **than** {Mary is tall}.
- attribution-content
 - [I believe] **that** {he's right}.
 - the [belief] **that** {he's right}
- means-purpose
 - [cut it] **with** {this sword}
 - [cut it] **by** {using this sword}

Temporal Projection

- [Tom came] **at** {8 o'clock}.
- [Tom came] **when** {Mary came}.

time
(semantic role)

equality or
projection?

circumstance
(discourse rel.)

Instance/Type

- purpose
 - [I used this sword] **to** {cut it}.
- conditional
 - **If** {you're going to school}, [it's eight o'clock].

you're going to school.

conditional

it's eight o'clock.

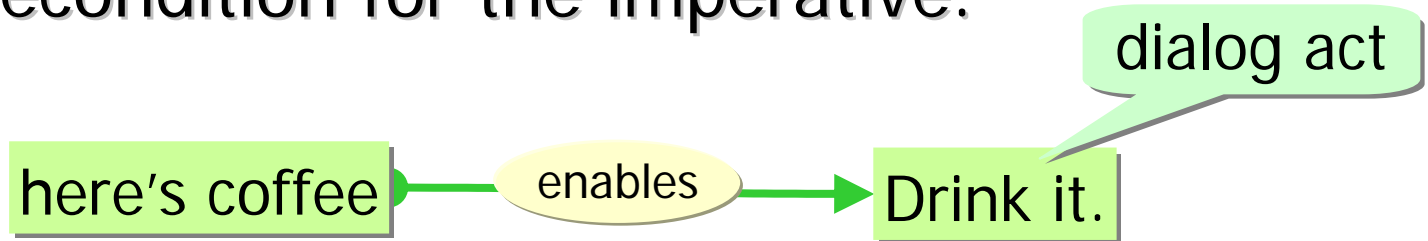


Semantics/Pragmatics

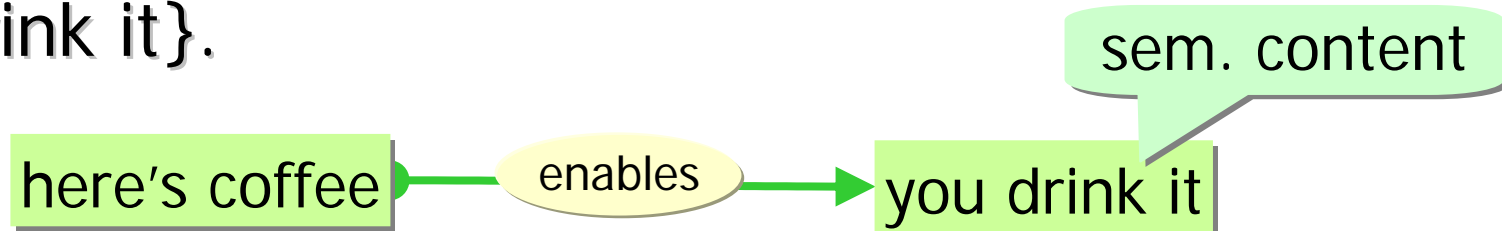
- enablement

- [Here's coffee.] **So** {drink it.}

The fact that here's coffee enables the precondition for the imperative.



- **Since** [here's coffee], **it's possible that** {you drink it}.



Approach

- Granularity
 - multiple granularities in taxonomies
- Taxonomy
 - multiple taxonomies for a DC registry
 - No single taxonomy is perfect.
 - Ichikawa's + RST taxonomy as baseline
 - discourse connectives in a different hierarchy
- Headedness
 - abstract headedness away from discourse relations as much as possible, to reduce #relations.
- Polymorphism/Metonymy/Projection/Coersion
 - Wrapped Arguments
 - exact annotation (irrelevant to our mission)
 - Relation with Other Types of DCs
 - share DCs to reduce their number and clarify relations among different types of DCs.
 - But can we do this by Syntax Suite?