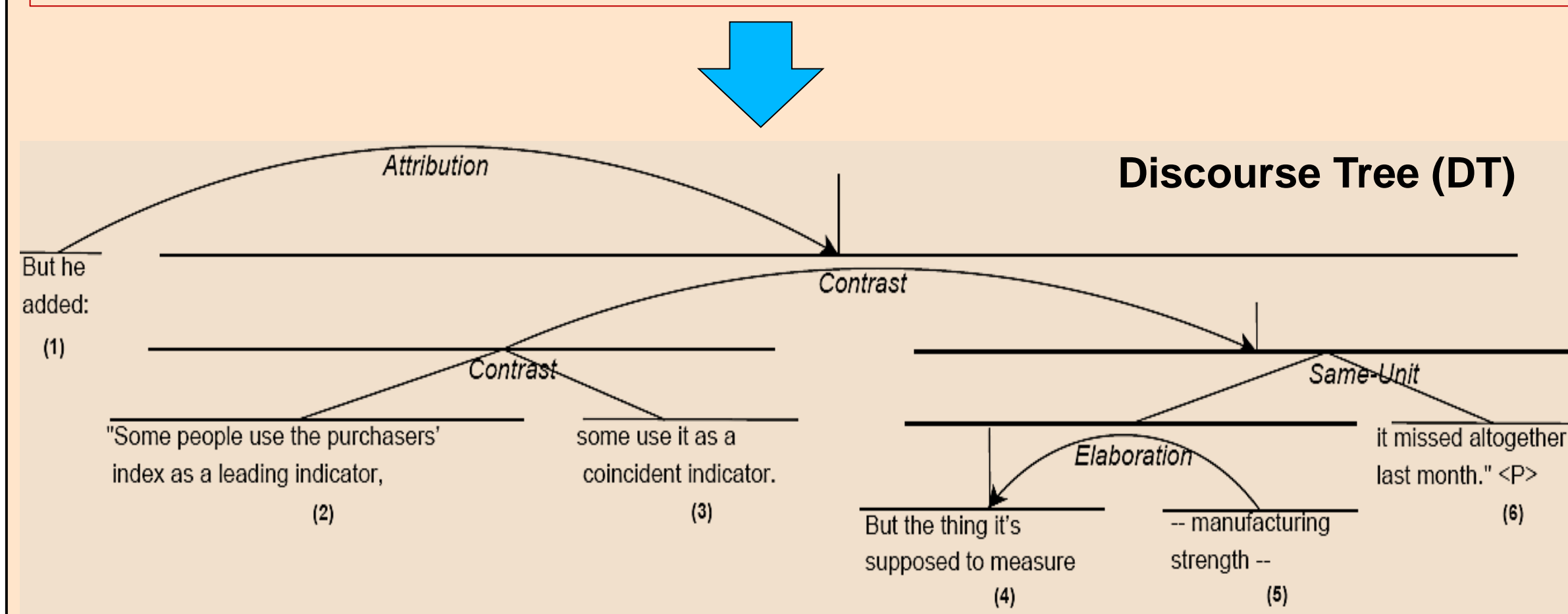
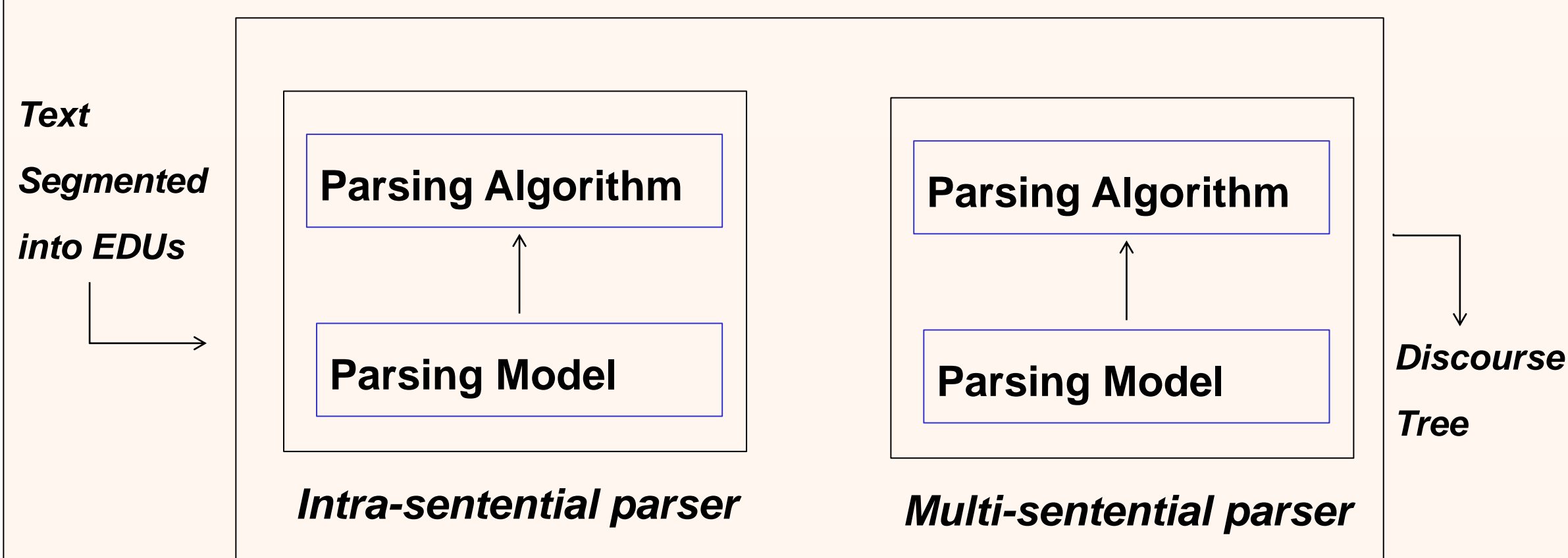


## The Problem

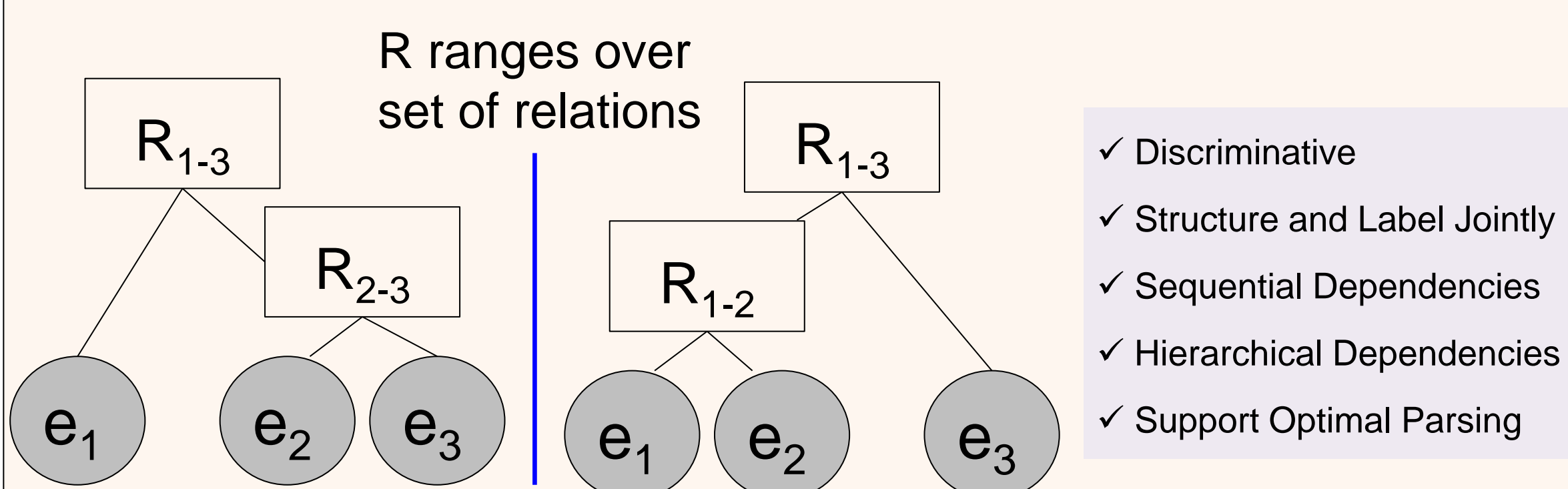
[But he added:]<sub>1</sub> ["some people use the purchasers' index as a leading indicator,]<sub>2</sub> [some use it as a coincident indicator.]<sub>3</sub> [But the thing it's supposed to measure]<sub>4</sub> [-- manufacturing strength --]<sub>5</sub> [It missed altogether last month"] <P><sub>6</sub>



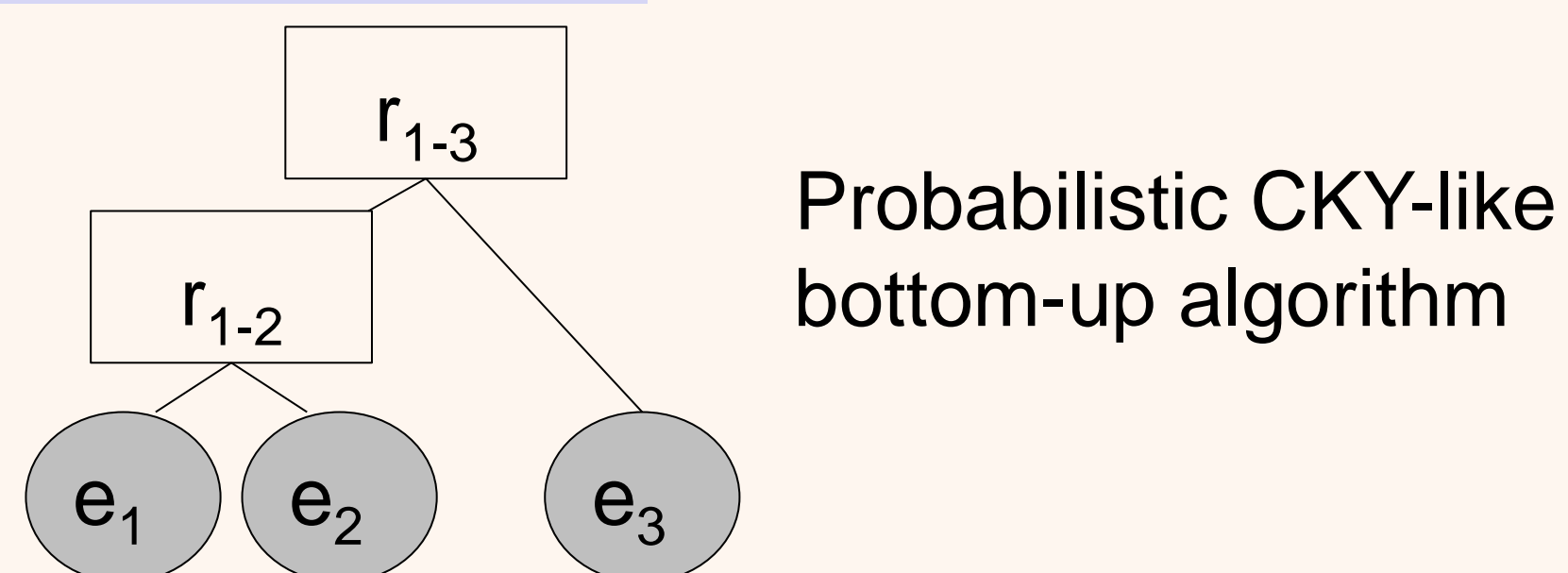
## Discourse Parsing Framework



**1. Parsing model** assigns probabilities to all possible DTs

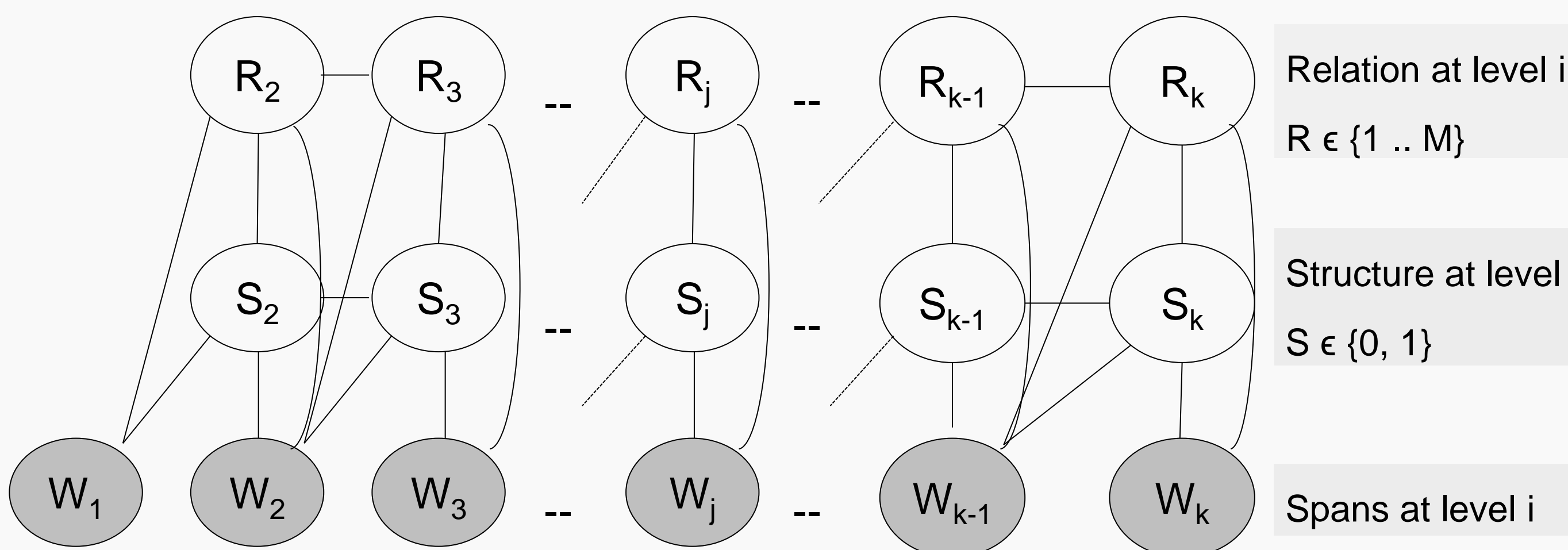


**2. Parsing algorithm** finds the most probable DT

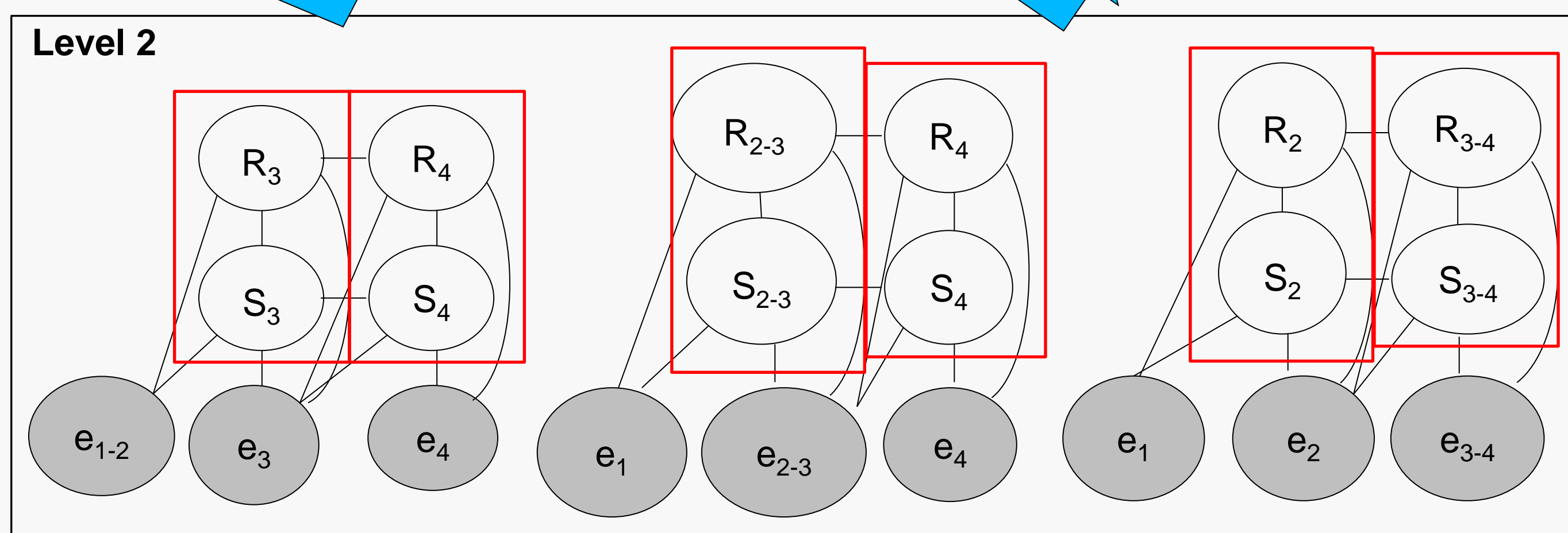
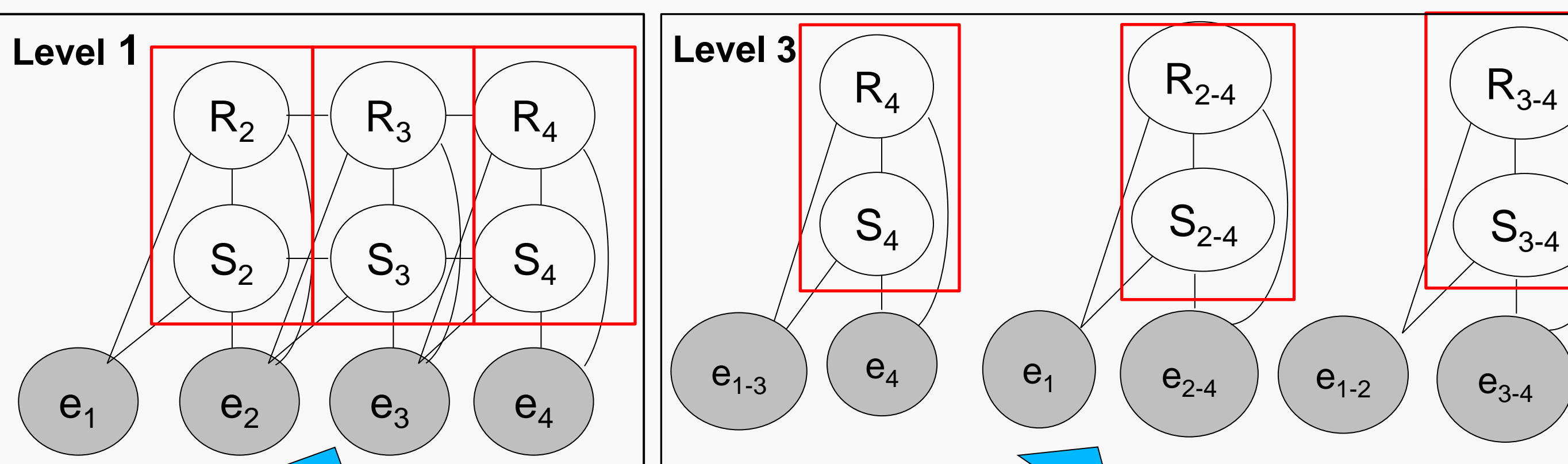


## Parsing Models

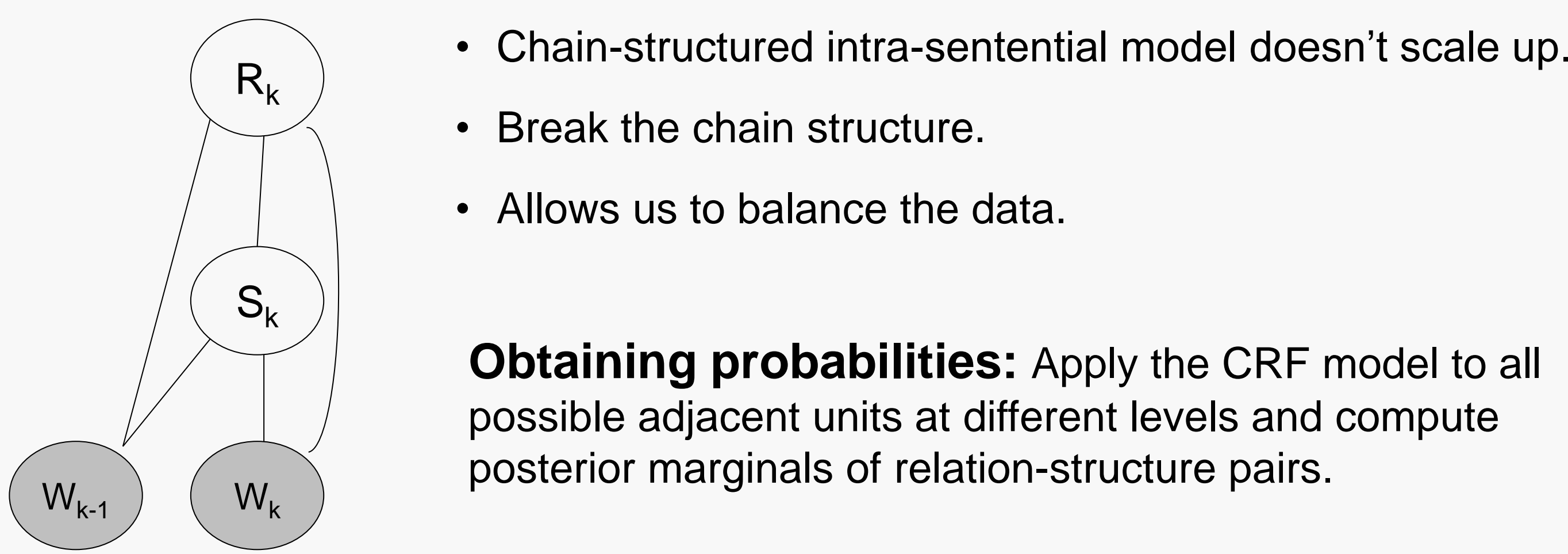
**1(a). Intra-sentential Parsing model** [Joty et al, EMNLP'12]



**Obtaining probabilities:** Apply the DCRF model to all possible sequences at different levels and compute posterior marginals of relation-structure pairs.



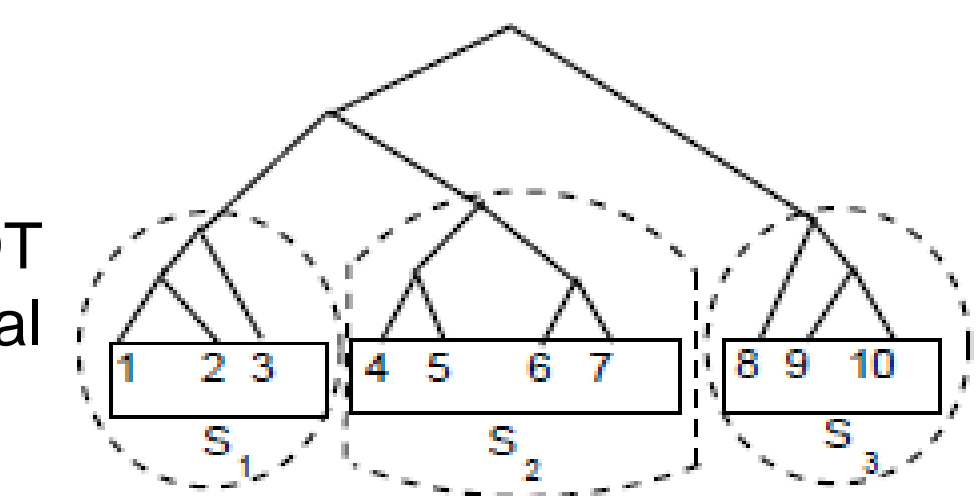
**1(b). Multi-sentential Parsing model**



## Combining Intra- and multi-sentential

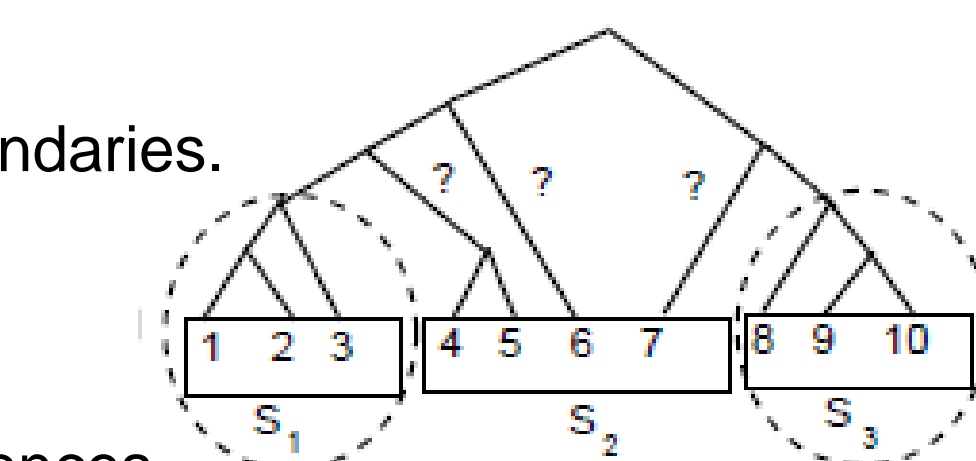
**1S-1S (1 Sentence- 1 Sub-tree)**

The Intra-sentential parser first constructs a DT for every sentence, then the multi-sentential parser builds full DT on top of those.



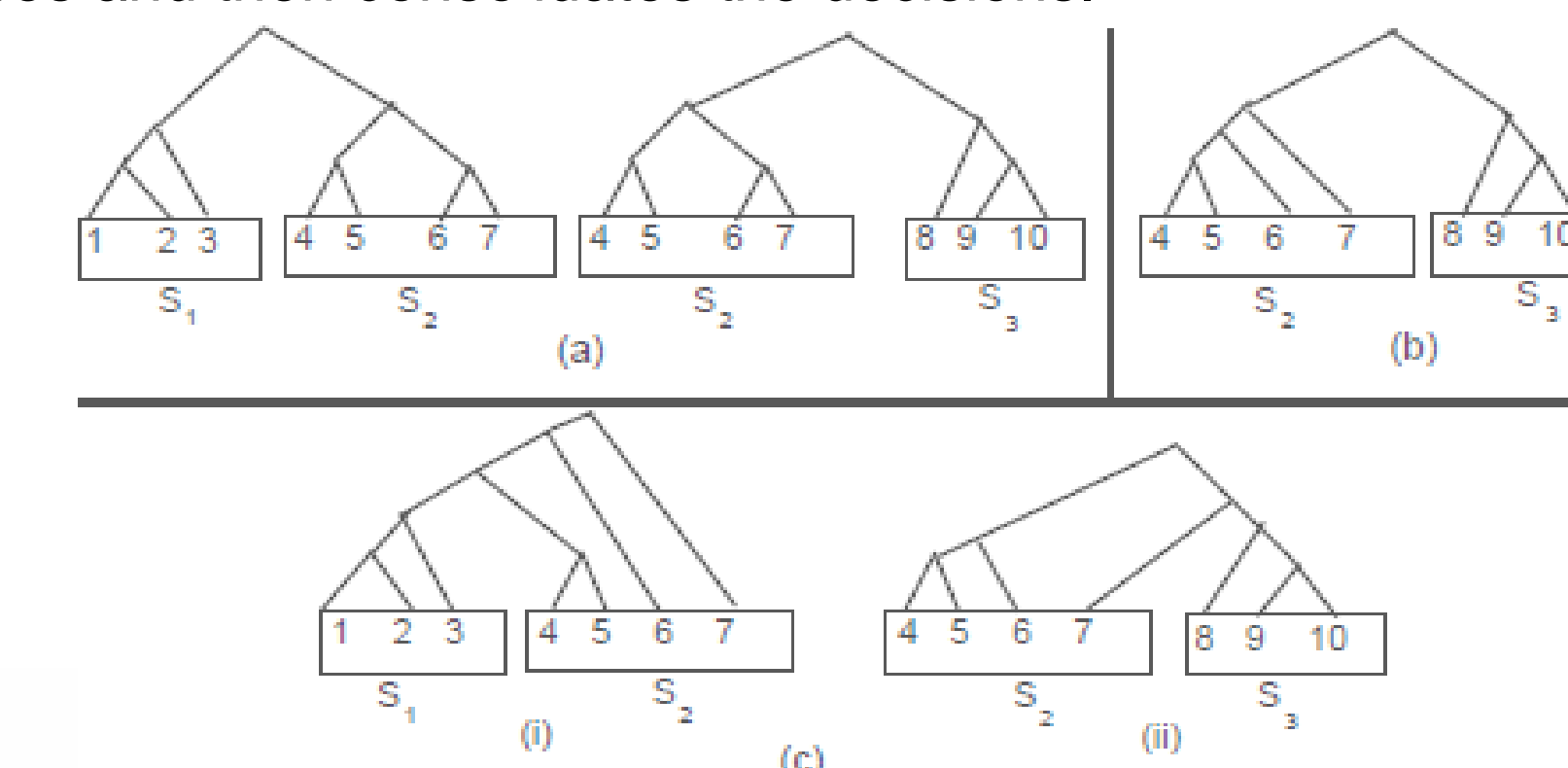
**Sliding Window**

- Discourse structures may violate sentence boundaries.
- 5% and 12% sentences don't have a DT in RST-DT and Instructional corpora, respectively.
- Often the units are connected to adjacent sentences.
- In Sliding Window, the intra-sentential parser builds a DT for each window of two consecutive sentences and then consolidates the decisions.



**Consolidation: 3 cases**

- Same in both
- Different but no cross
- Cross



## Experiments

### Experimental Setup

**Corpora**

- **RST-DT:** 347 train, 38 test; 18 relations (41 with Nucleus Satellite attached).
- **Instructional:** 151 train, 25 test; 26 relations (76 with Nuc. Sat. attached).

**Systems Compared with**

- **HILDA** (Hernault et al., 2010) on RST-DT corpus.
- **ILP-based system** of Subba and Di-Eugenio, (2009) on Instructional corpus.

### Parsing Results

Used standard unlabeled (span) and labeled (nuclearity, relation) metrics [Marcu'00]

	RST-DT				Instructional		
	HILDA	TSP 1-1	TSP SW	Human	ILP	TSP 1-1	TSP SW
<b>Span</b>	74.7	82.5	82.7	88.7	70.35	79.67	80.88
<b>Nuclearity</b>	58.9	68.4	68.4	77.7	49.47	63.03	63.10
<b>Relation</b>	44.3	55.7	55.7	65.8	35.44	43.52	43.58

- Our parsers TSP 1-1 and TSP SW outperform existing systems by a wide margin
- TSP SW outperforms TSP 1-1 only in span (i.e., tree structure).
- TSP SW tends to induce noise from its neighbours for relation labels.

**Reference:** [1] S. Joty, G. Carenini and R. T. Ng. Combining Intra- and Multi-sentential Rhetorical Parsing for Document-level Discourse Analysis. In *ACL'13*. [2] S. Joty, G. Carenini and R. T. Ng. A Novel Discriminative Framework for Sentence-Level Discourse Analysis. In *EMNLP'12*.