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## Our Task

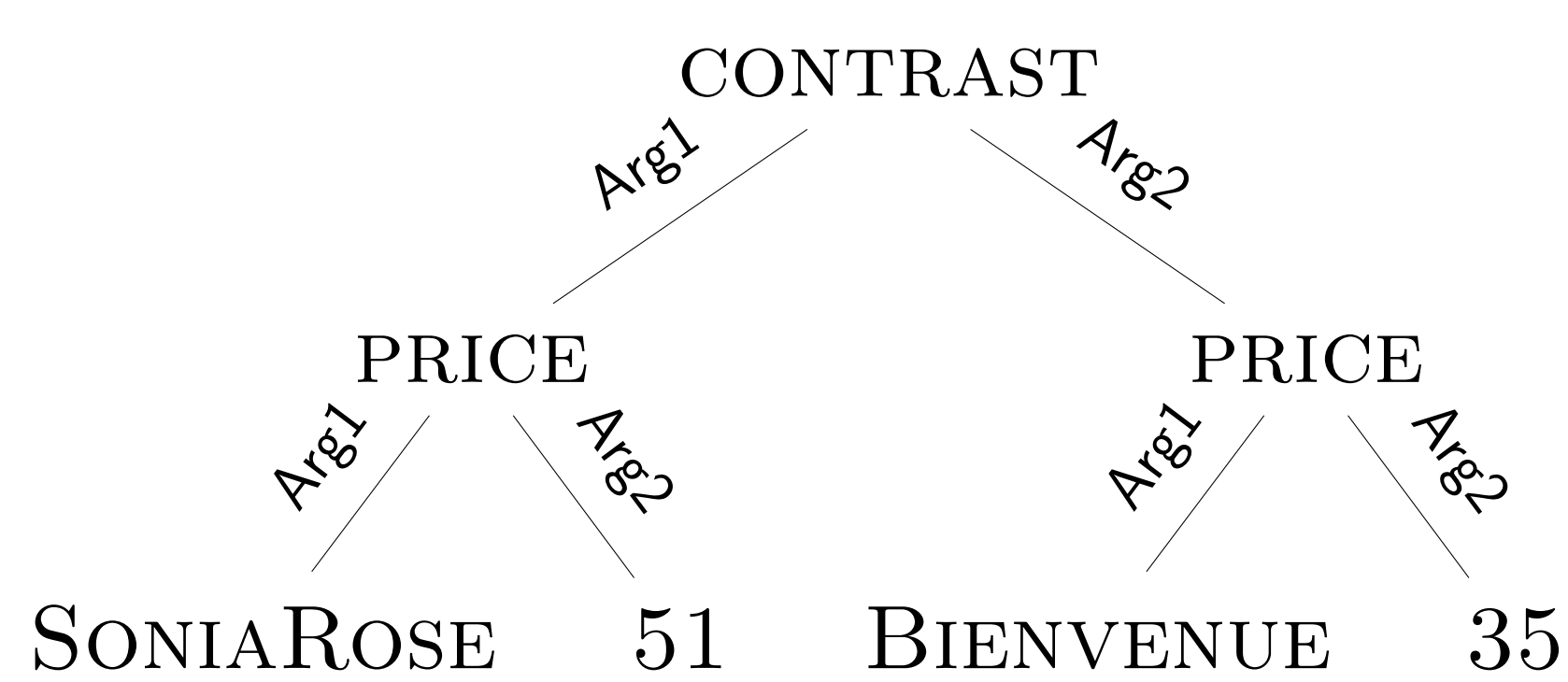
Learn **sentence planning rules** as **tree-to-tree mappings**

- ▶ Use existing tools for surface realization
- ▶ Treat sentence planning as synchronous derivation
- ▶ Use simple linguistic priors to guide the search

## Representations for Sentence Planning

### Input for Sentence Planning:

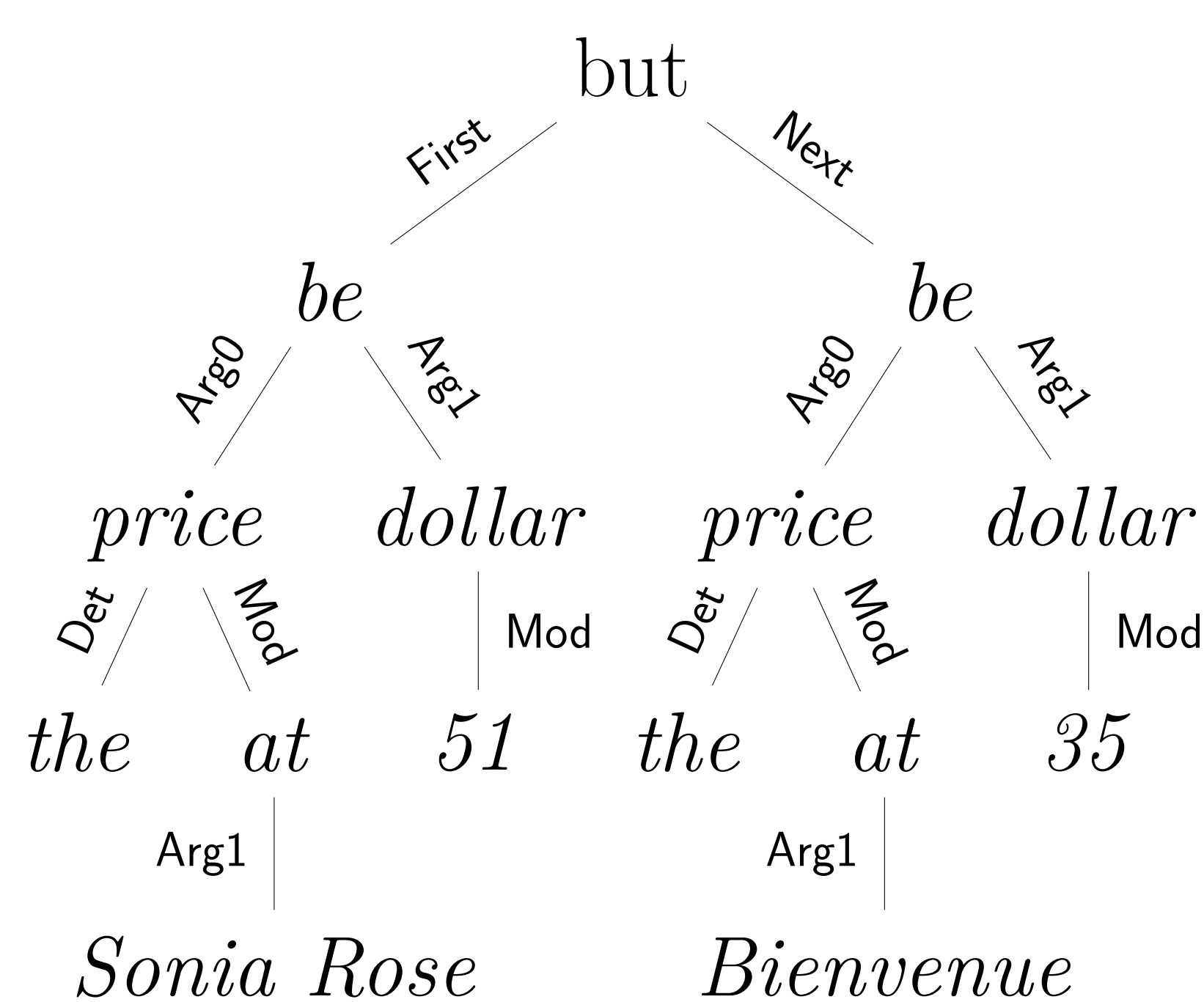
*Text Plans*: trees encoding propositions and discourse structure



### Output for Sentence Planning:

*Logical Forms*: OpenCCG's input representation

- ▶ For the CCGbank-derived grammar, LFs resemble lemmatized dependency parses with morphosyntactic annotations.



## Our Pipeline

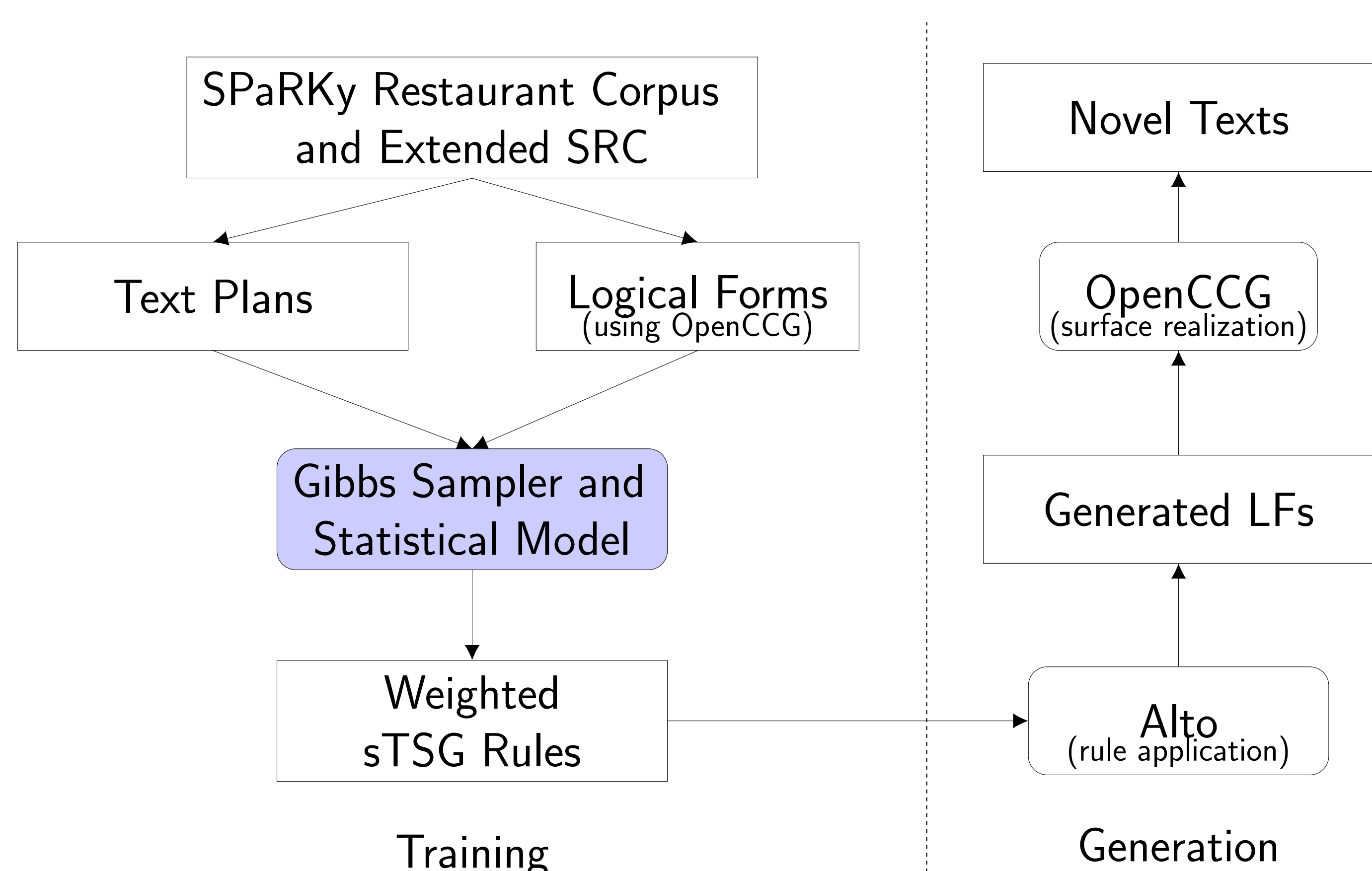
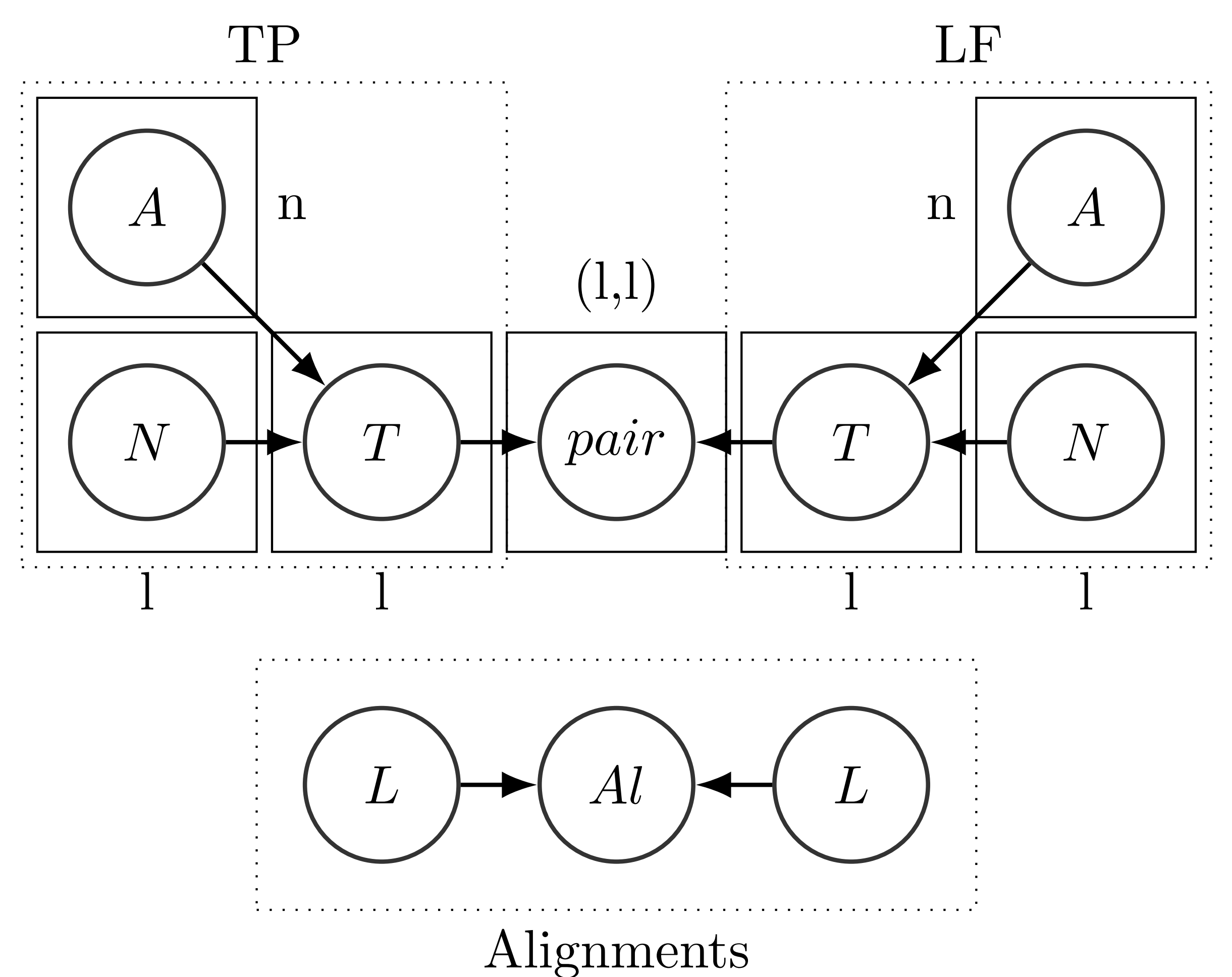


Figure: Rectangles indicate data, rounded edges represent processes or programs. This paper's contribution highlighted in blue.

### Novel Gibbs Operators for Bayesian Inference

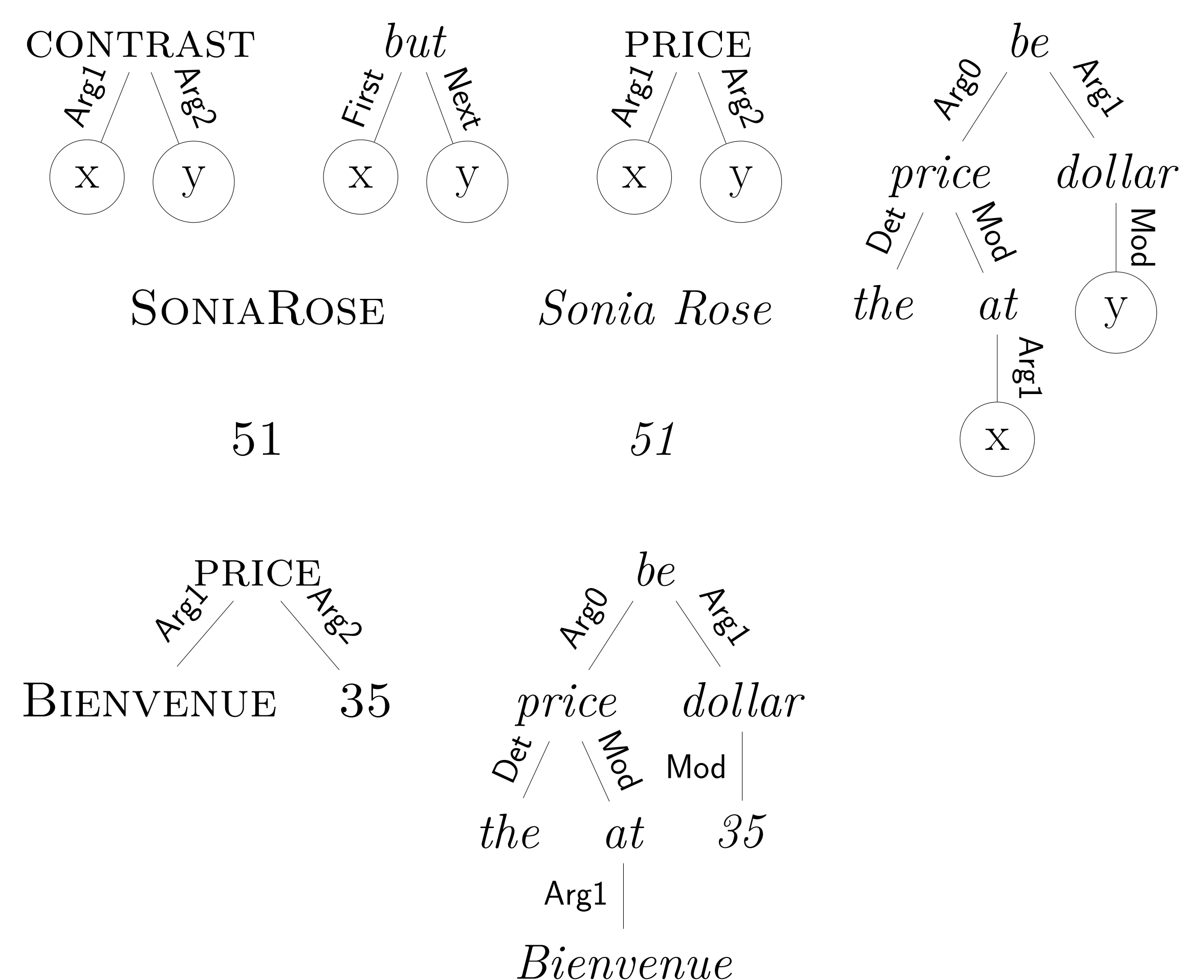
- ▶ **split-and-align**  
sample substitution sites in TP based on probability of resulting elementary tree pairs and alignments
- ▶ **sliding alignment**  
consider moving the LF-side of each alignment up one level or to a child of the current alignment site

## Hierarchical Dirichlet Process Model of sTSGs



- ▶  $n \in \{\text{node labels}\}$ ;  $l \in \{(\text{node label, arc label}) \text{ pairs}\}$
- ▶ *A*: DP with uniform prior over arc labels
- ▶ *N*: DP with uniform prior over node labels
- ▶ *T*: DP with structured prior  $P_{tree}$  over trees
- ▶ *pair*: DP with prior treating  $T_{TP}$  and  $T_{LF}$  as independent
- ▶ *L*: DP with prior over  $\{l\}$
- ▶ *Al*: DP for alignments with prior over pairs of  $l$

## Example Rules



## Example Texts

- ▶ Chanpen Thai has the best overall quality among the selected restaurants. Its price is 24 dollars and it has good service. **This Thai restaurant** has good food quality, with decent decor.
- ▶ **Since** Komodo's price is 29 dollars and it has good decor, it has the best overall quality among the selected restaurants.
- ▶ Azuri Cafe, **which** is a **Vegetarian** restaurant has very good food quality. Its price is 14 dollars. It has the best overall quality among the selected restaurants.
- ▶ Komodo has very good service. It has **food food quality, with very good food quality, it has very good food quality** and its price is 29 dollars.