Ling 566
Oct 13, 2022

Semantics

Announcements

- Midterm survey — see Canvas announcement

Overview

- Some notes on the linguist's stance
- Which aspects of semantics we'll tackle
- Our formalization; Semantics Principles
- Building semantics of phrases
- Modification, coordination
- Structural ambiguity
- Reading questions

The Linguist's Stance:
Building a precise model

- Some of our statements are statements about how the model works:

  “[*prep*] and [AGR *3sing*] can’t be combined because AGR is not a feature of the type *prep*.”

- Some of our statements are statements about how (we think) English or language in general works.

  “The determiners *a* and *many* only occur with count nouns, the determiner *much* only occurs with mass nouns, and the determiner *the* occurs with either.”

- Some are statements about how we code a particular linguistic fact within the model.

  “All count nouns are [SPR < [COUNT +]>].”

Semantics: Where's the Beef?

So far, our grammar has no semantic representations. We have, however, been relying on semantic intuitions in our argumentation, and discussing semantic contrasts where they line up (or don't) with syntactic ones.

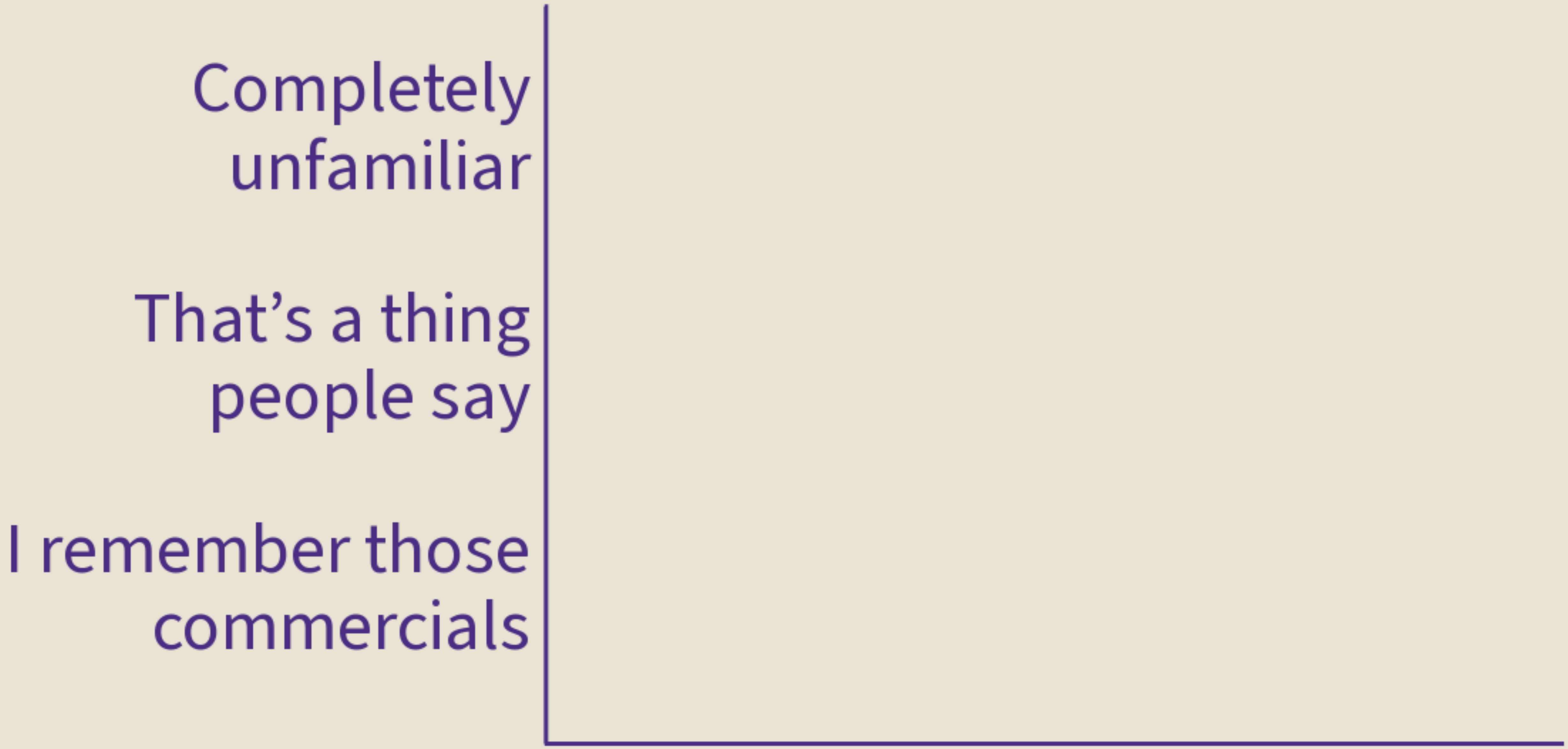
Examples?

- structural ambiguity
- S/NP parallelism
- count/mass distinction
- complements vs. modifiers

When poll is active, respond at **pollev.com/emb**

Text **EMB** to **22333** once to join

"Where's the Beef"?



Our Slice of a World of Meanings

Aspects of meaning we won't account for

- Pragmatics
- Fine-grained lexical semantics:

The meaning of *life* is *life'*, or, in our case,

$$\begin{bmatrix} \text{RELN} & \text{life} \\ \text{INST} & i \end{bmatrix}$$

Our Slice of a World of Meanings

$$
\begin{bmatrix}
\text{MODE} & \text{prop} \\
\text{INDEX} & s \\
\text{RESTR} & \left\langle
\begin{bmatrix}
\text{RELN} & \text{save} \\
\text{SIT} & s \\
\text{SAVER} & i \\
\text{SAVED} & j
\end{bmatrix},
\begin{bmatrix}
\text{RELN} & \text{name} \\
\text{NAME} & \text{Chris} \\
\text{NAMED} & i
\end{bmatrix},
\begin{bmatrix}
\text{RELN} & \text{name} \\
\text{NAME} & \text{Pat} \\
\text{NAMED} & j
\end{bmatrix}
\right\rangle
\end{bmatrix}
$$

"... the linguistic meaning of *Chris saved Pat* is a proposition that will be true just in case there is an actual situation that involves the saving of someone named Pat by someone named Chris." (p. 140)

Reading Questions

- Why is this useful for NLP?

Our Slice of a World of Meanings

What we are accounting for is the compositionality of sentence meaning.

- How the pieces fit together

  Semantic arguments and indices

- How the meanings of the parts add up to the meaning of the whole.

  Appending RESTR lists up the tree

Semantics in Constraint-Based Grammar

- Constraints as (generalized) truth conditions
  - proposition: what must be the case for a proposition to be true
  - directive: what must happen for a directive to be fulfilled
  - question: the kind of situation the asker is asking about
  - reference: the kind of entity the speaker is referring to

- Syntax/semantics interface: Constraints on how syntactic arguments are related to semantic ones, and on how semantic information is compiled from different parts of the sentence.

Feature Geometry

$$
\begin{bmatrix}
\text{SYN} & \begin{bmatrix} \text{HEAD} & \textit{pos} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \textit{list}(\textit{expression}) \\ \text{COMPS} & \textit{list}(\textit{expression}) \end{bmatrix} \end{bmatrix} \\
\text{SEM} & \begin{bmatrix} \text{MODE} & \{\text{prop}, \text{ques}, \text{dir}, \text{ref}, \text{none}\} \\ \text{INDEX} & \{i, j, k, \ldots s_1, s_2, \ldots\} \\ \text{RESTR} & \textit{list}(\textit{pred}) \end{bmatrix}
\end{bmatrix}
$$

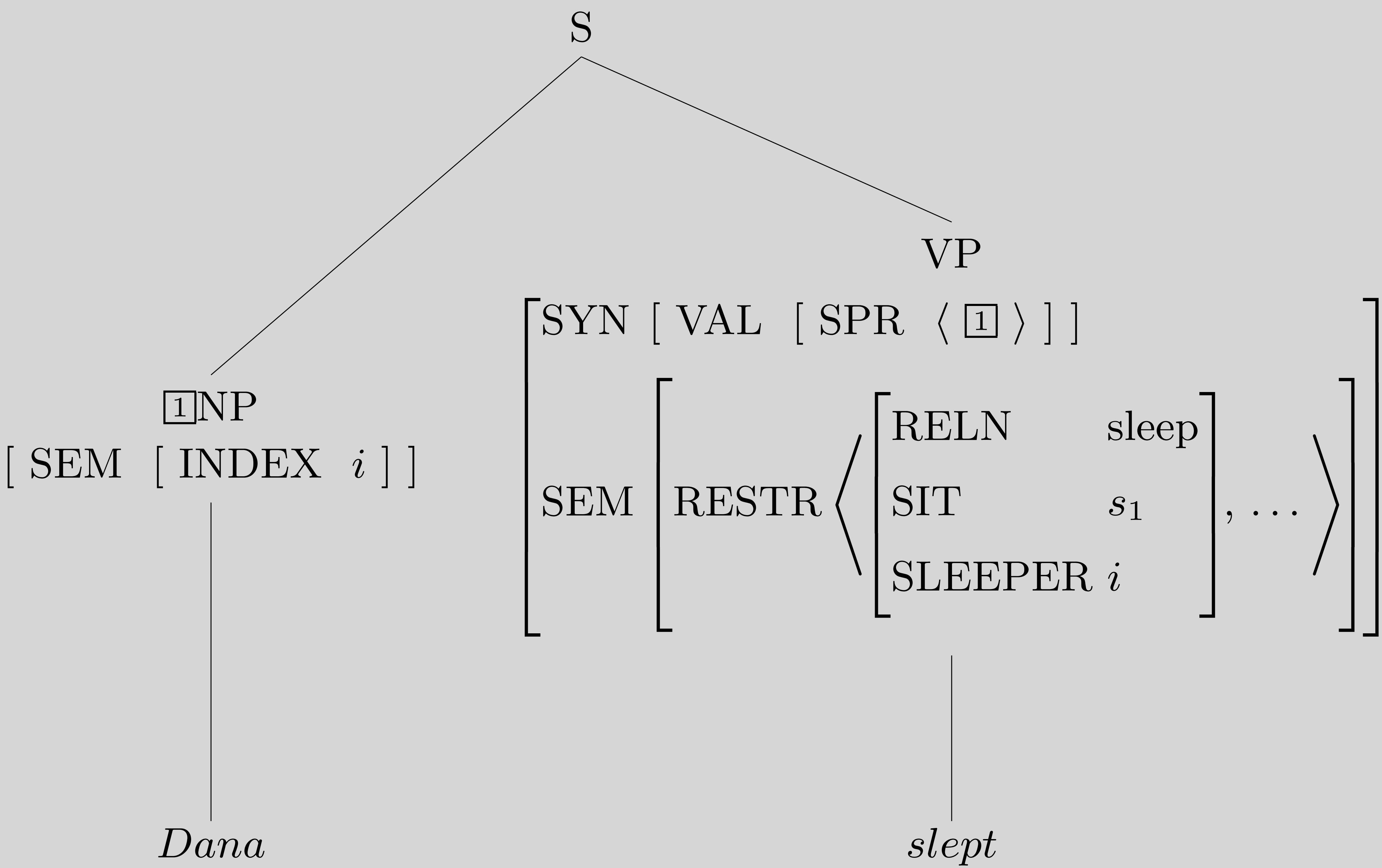
How the Pieces Fit Together

$$
\left\langle \text{Dana}\ ,\ \begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{noun} & \\ \text{AGR} & \textit{3sing} \end{bmatrix} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \langle\ \rangle \\ \text{COMPS} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & i \\ \text{MODE} & \text{ref} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{name} \\ \text{NAME} & \text{Dana} \\ \text{NAMED} & i \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

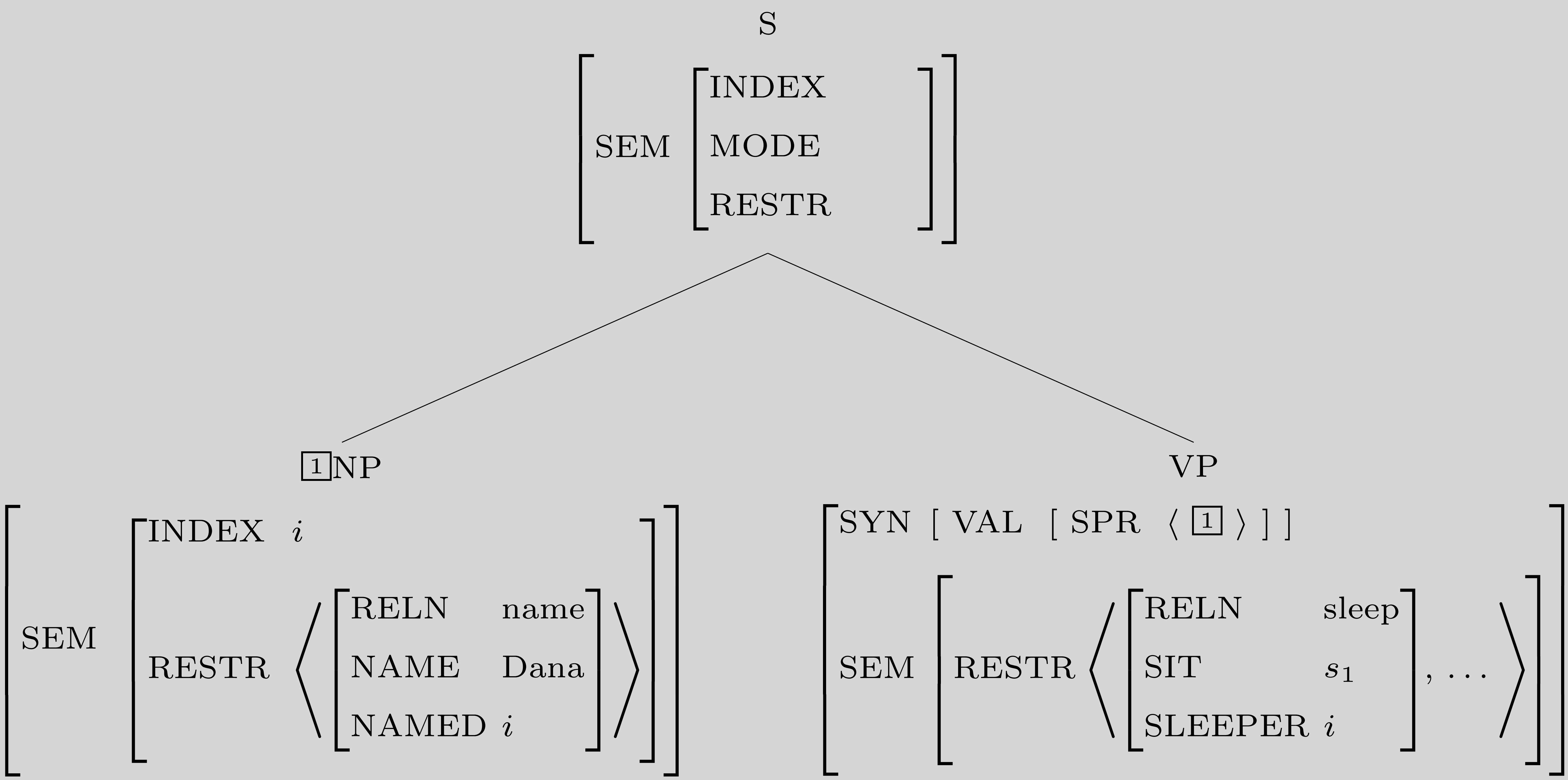
How the Pieces Fit Together

$$
\left\langle \text{slept}, \begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \textit{verb} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \langle \text{NP}_{j} \rangle \\ \text{COMPS} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & s_1 \\ \text{MODE} & \text{prop} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{sleep} \\ \text{SIT} & s_1 \\ \text{SLEEPER} & j \end{bmatrix}, \ldots \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle
$$

The Pieces Together



A More Detailed View of the Same Tree



To Fill in Semantics for the S-node

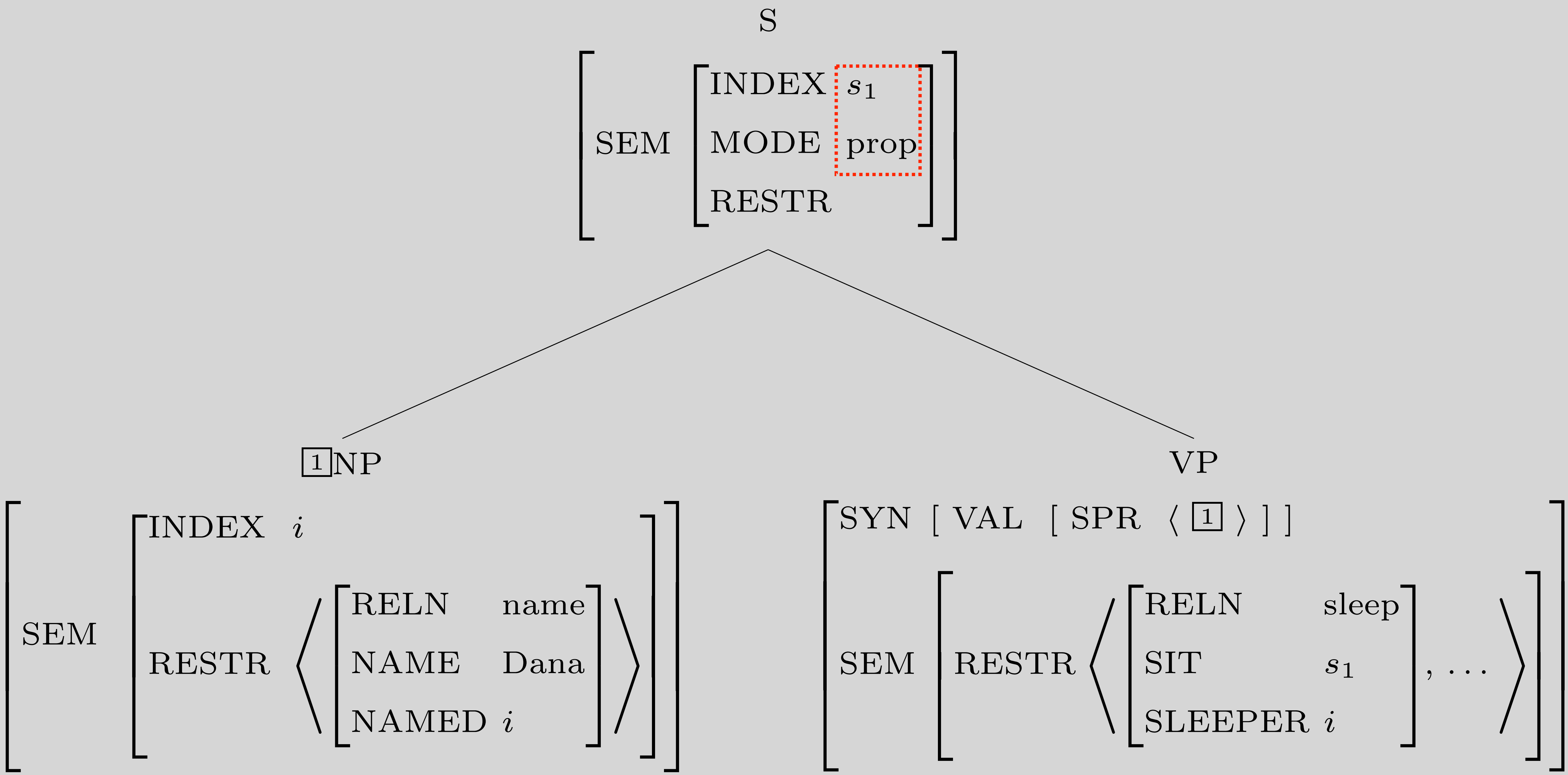
We need the Semantics Principles

- The Semantic Inheritance Principle:

In any headed phrase, the mother's MODE and INDEX are identical to those of the head daughter.

- The Semantic Compositionality Principle:

Semantic Inheritance Illustrated



To Fill in Semantics for the S-node

We need the Semantics Principles

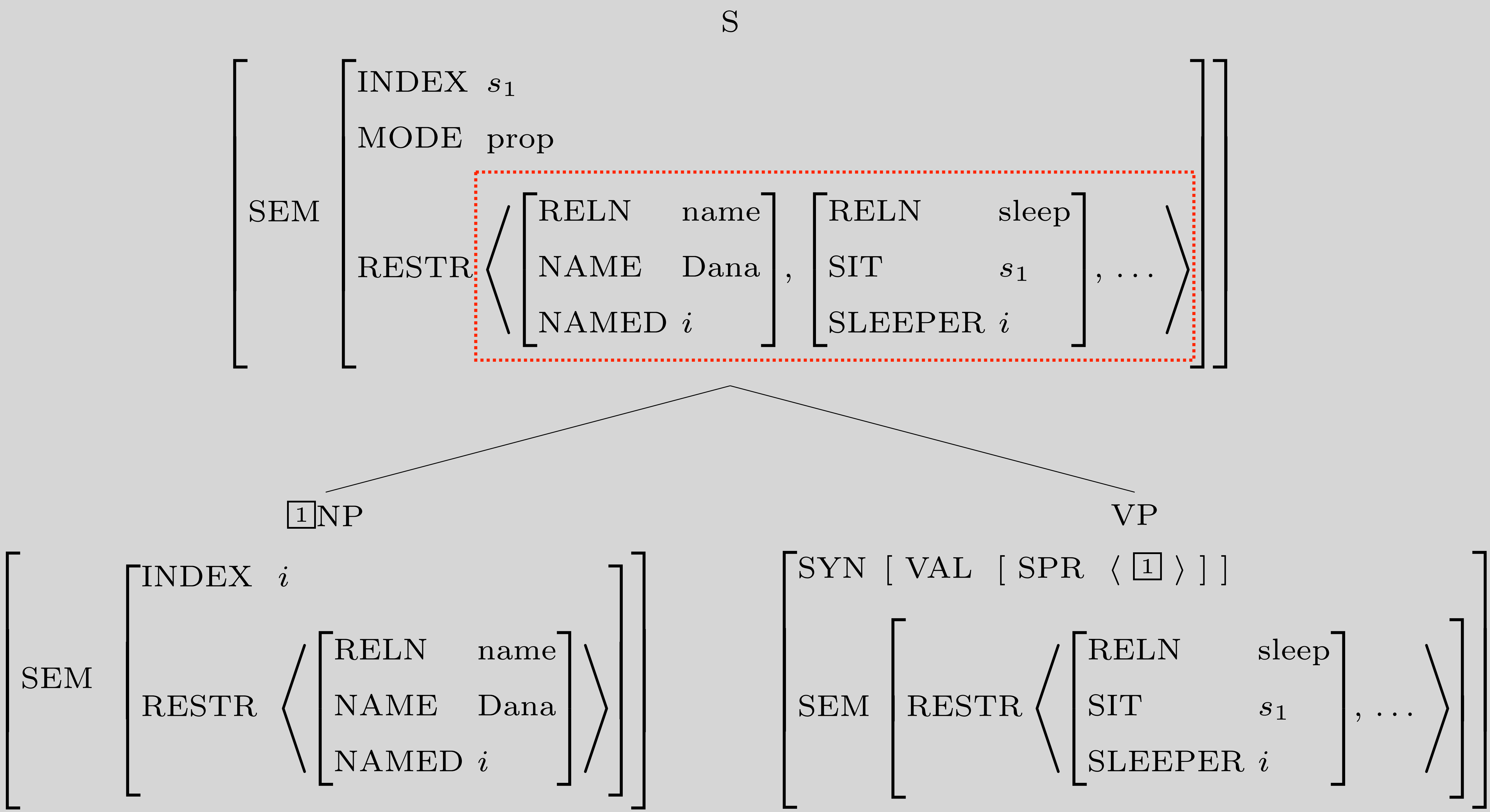
- The Semantic Inheritance Principle:

  In any headed phrase, the mother's MODE and INDEX are identical to those of the head daughter.

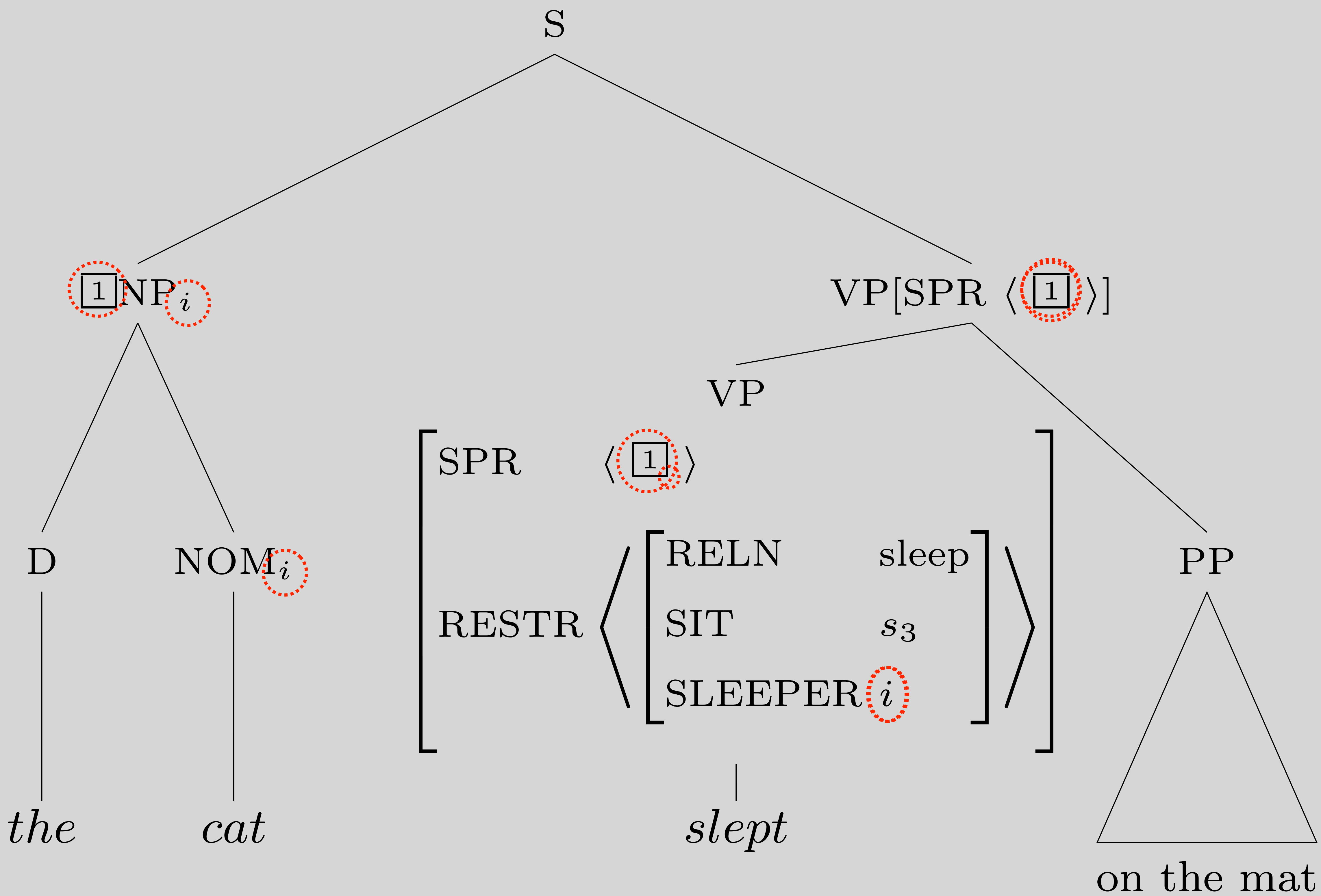
- The Semantic Compositionality Principle:

  In any well-formed phrase structure, the mother's RESTR value is the sum of the RESTR values of the daughters.

Semantic Compositionality Illustrated



What Identifies Indices?



Summary: Words ...

- contribute predications
- 'expose' one index in those predications, for use by words or phrases
- relate syntactic arguments to semantic arguments

$$\left\langle \text{slept}, \begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{HEAD} & \textit{verb} \\ \text{VAL} & \begin{bmatrix} \text{SPR} & \langle \text{NP}_j \rangle \\ \text{COMPS} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & s_1 \\ \text{MODE} & \text{prop} \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{RELN} & \text{sleep} \\ \text{SIT} & s_1 \\ \text{SLEEPER} & j \end{bmatrix}, \ldots \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

Summary: Grammar Rules ...

- identify feature structures (including the INDEX value) across daughters

Head Specifier Rule

$$\begin{bmatrix} \textit{phrase} \\ \text{SYN} \begin{bmatrix} \text{VAL} \begin{bmatrix} \text{SPR} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \end{bmatrix} \rightarrow \boxed{1} \quad \textbf{H} \begin{bmatrix} \text{SYN} \begin{bmatrix} \text{VAL} \begin{bmatrix} \text{SPR} & \langle \boxed{1} \rangle \\ \text{COMPS} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Head Complement Rule

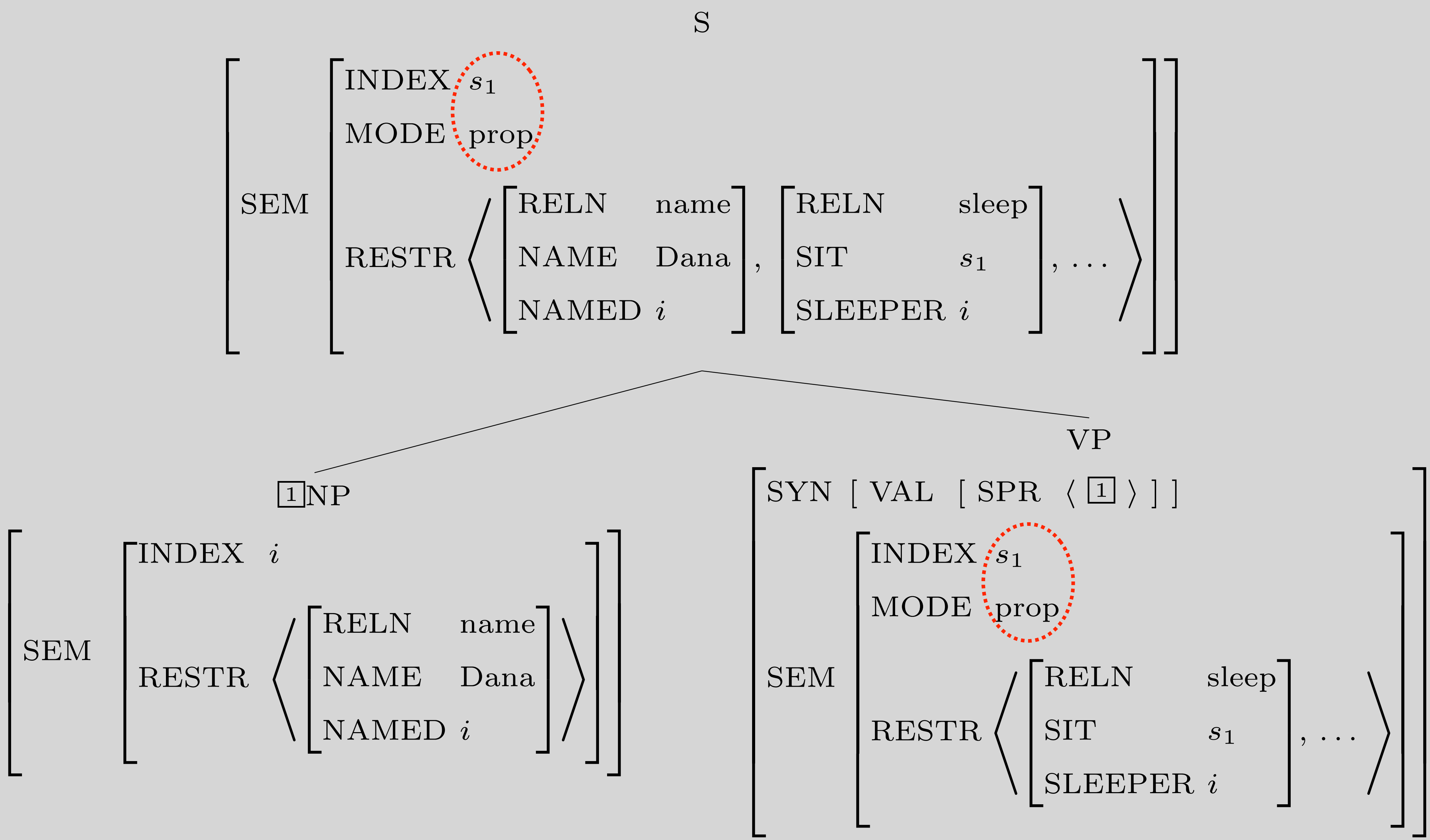
$$\begin{bmatrix} \textit{phrase} \\ \text{SYN} \begin{bmatrix} \text{VAL} \begin{bmatrix} \text{COMPS} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \end{bmatrix} \rightarrow \textbf{H} \begin{bmatrix} \textit{word} \\ \text{SYN} \begin{bmatrix} \text{VAL} \begin{bmatrix} \text{COMPS} & \langle \boxed{1}, \ldots, \boxed{n} \rangle \end{bmatrix} \end{bmatrix} \end{bmatrix} \quad \boxed{1} \ldots \boxed{n}$$

Head Modifier Rule

$$[\textit{phrase}] \rightarrow \textbf{H}\ \boxed{1} \begin{bmatrix} \text{SYN} \begin{bmatrix} \text{COMPS} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \begin{bmatrix} \text{SYN} \begin{bmatrix} \text{VAL} \begin{bmatrix} \text{COMPS} & \langle\ \rangle \\ \text{MOD} & \langle \boxed{1} \rangle \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

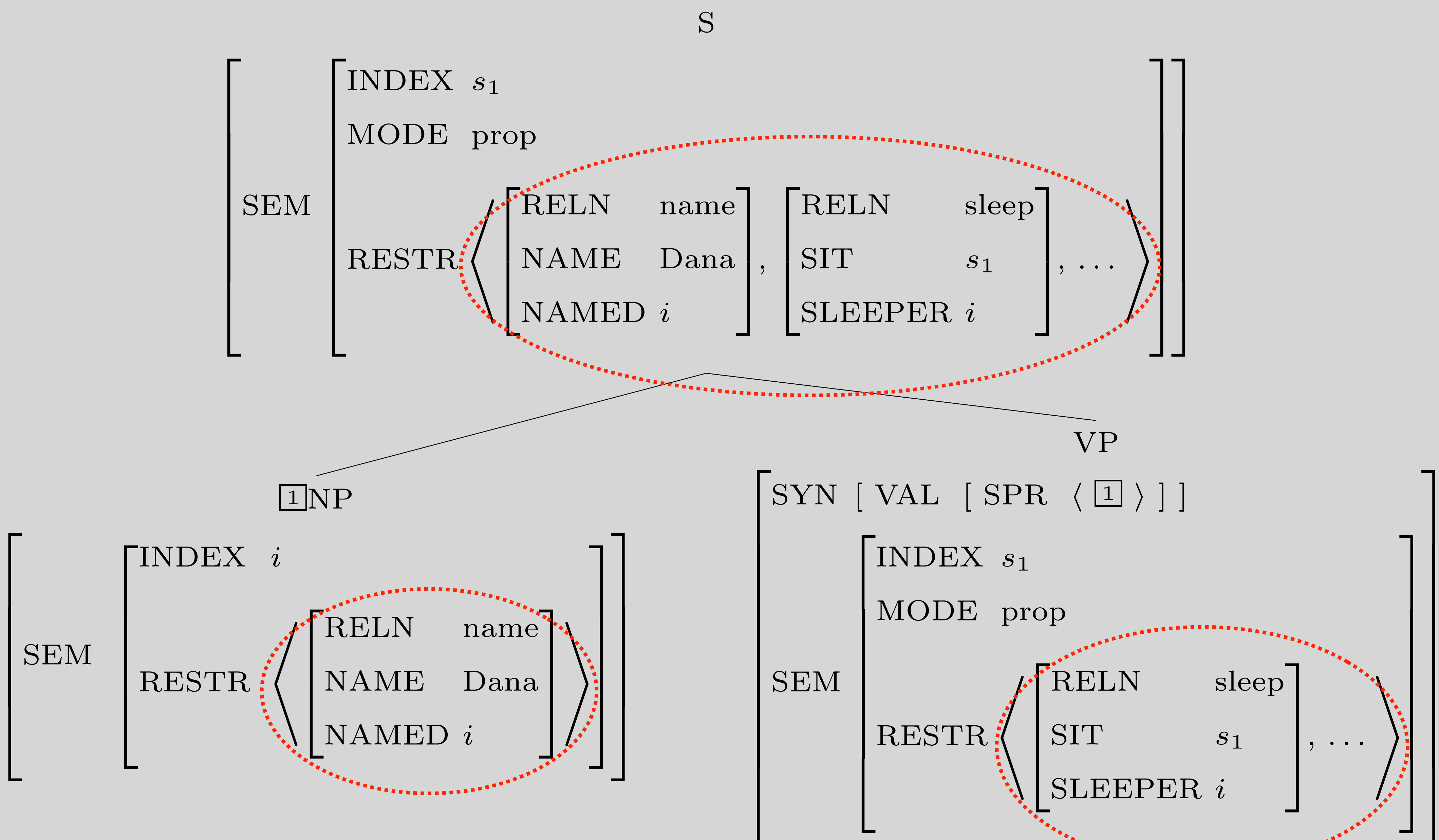
Summary: Grammar Rules ...

- identify feature structures (including the INDEX value) across daughters
- license trees which are subject to the semantic principles
  - SIP 'passes up' MODE and INDEX from head daughter



Summary: Grammar Rules ...

- identify feature structures (including the INDEX value) across daughters
- license trees which are subject to the semantic principles
  - SIP 'passes up' MODE and INDEX from head daughter
  - SCP: 'gathers up' predications (RESTR list) from all daughters



Other Aspects of Semantics

- Tense, Quantification (only touched on here)
- Modification
- Coordination
- Structural Ambiguity

Evolution of a Phrase Structure Rule

Ch. 2: NOM --> NOM PP
VP --> VP PP

Ch. 3:
$$\begin{bmatrix} \textit{phrase} & \\ \text{VAL} & \begin{bmatrix} \text{COMPS} & \text{itr} \\ \text{SPR} & - \end{bmatrix} \end{bmatrix} \rightarrow \mathbf{H}\begin{bmatrix} \textit{phrase} & \\ \text{VAL} & \begin{bmatrix} \text{SPR} & - \end{bmatrix} \end{bmatrix} \text{PP}$$

Ch. 4:
$$[\textit{phrase}] \rightarrow \mathbf{H}\begin{bmatrix} \text{VAL} & \begin{bmatrix} \text{COMPS} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \text{PP}$$

Ch. 5:
$$[\textit{phrase}] \rightarrow \mathbf{H}\boxed{1}\begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{VAL} & \begin{bmatrix} \text{COMPS} & \langle\ \rangle \end{bmatrix} \end{bmatrix} \end{bmatrix} \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{VAL} & \begin{bmatrix} \text{COMPS} & \langle\ \rangle \\ \text{MOD} & \langle \boxed{1} \rangle \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Ch. 5 (abbreviated):
$$[\textit{phrase}] \rightarrow \mathbf{H}\boxed{1}\begin{bmatrix} \text{COMPS} & \langle\ \rangle \end{bmatrix} \begin{bmatrix} \text{COMPS} & \langle\ \rangle \\ \text{MOD} & \langle \boxed{1} \rangle \end{bmatrix}$$

Evolution of Another Phrase Structure Rule

Ch. 2: X --> X^{+} CONJ X

Ch. 3: $$\boxed{1} \rightarrow \boxed{1}^{+} \begin{bmatrix} \textit{word} & \\ \text{HEAD} & \textit{conj} \end{bmatrix} \boxed{1}$$

Ch. 4: $$\begin{bmatrix} \text{VAL} \ \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \text{VAL} \ \boxed{1} \end{bmatrix}^{+} \begin{bmatrix} \textit{word} & \\ \text{HEAD} & \textit{conj} \end{bmatrix} \begin{bmatrix} \text{VAL} \ \boxed{1} \end{bmatrix}$$

Ch. 5: $$\begin{bmatrix} \text{SYN} & [\text{VAL} \ \boxed{0}] \\ \text{SEM} & [\text{IND} \ \ s_0] \end{bmatrix} \rightarrow$$

$$\begin{bmatrix} \text{SYN} & [\text{VAL} \ \boxed{0}] \\ \text{SEM} & [\text{IND} \ \ s_1] \end{bmatrix} \ldots \begin{bmatrix} \text{SYN} & [\text{VAL} \ \boxed{0}] \\ \text{SEM} & [\text{IND} \ \ s_{n-1}] \end{bmatrix} \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{HEAD} & \textit{conj} \end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{IND} & s_0 \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{ARGS} \ \langle s_1 \ldots s_n \rangle \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \begin{bmatrix} \text{SYN} & [\text{VAL} \ \boxed{0}] \\ \text{SEM} & [\text{IND} \ \ s_n] \end{bmatrix}$$

Ch. 5 (abbreviated):

$$\begin{bmatrix} \text{VAL} & \boxed{0} \\ \text{IND} & s_0 \end{bmatrix} \rightarrow \begin{bmatrix} \text{VAL} & \boxed{0} \\ \text{IND} & s_1 \end{bmatrix} \ldots \begin{bmatrix} \text{VAL} & \boxed{0} \\ \text{IND} & s_{n-1} \end{bmatrix} \begin{bmatrix} \text{HEAD} & \textit{conj} \\ \text{IND} & s_0 \\ \text{RESTR} & \left\langle \begin{bmatrix} \text{ARGS} \ \langle s_1 \ldots s_n \rangle \end{bmatrix} \right\rangle \end{bmatrix} \begin{bmatrix} \text{VAL} & \boxed{0} \\ \text{IND} & s_n \end{bmatrix}$$

Combining Constraints and Coordination

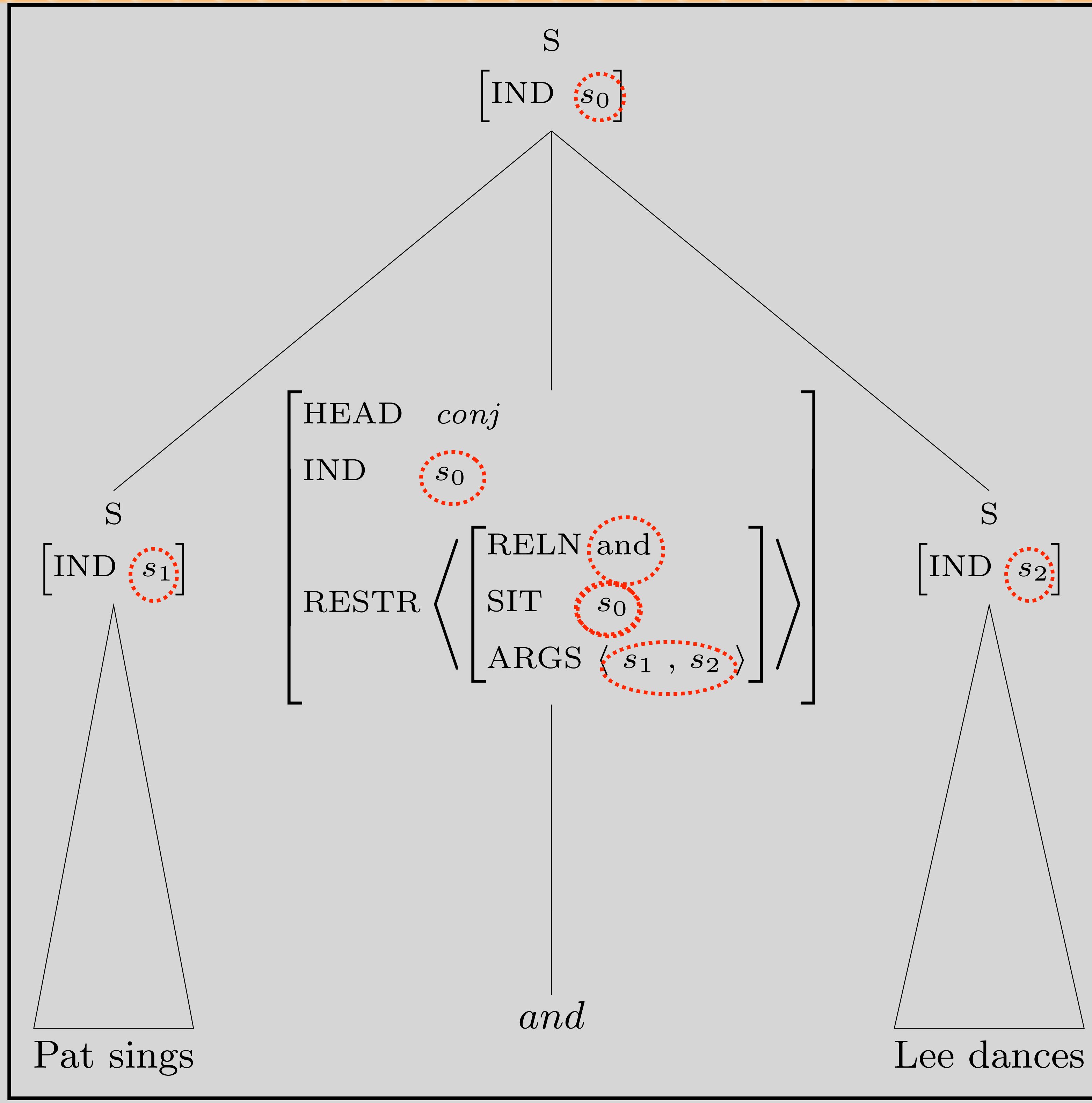
Coordination Rule

$$\begin{bmatrix}\text{VAL} & \boxed{0}\\ \text{IND} & s_0\end{bmatrix} \rightarrow \begin{bmatrix}\text{VAL} & \boxed{0}\\ \text{IND} & s_1\end{bmatrix} \ldots \begin{bmatrix}\text{VAL} & \boxed{0}\\ \text{IND} & s_{n-1}\end{bmatrix} \begin{bmatrix}\text{HEAD} & \textit{conj}\\ \text{IND} & s_0\\ \text{RESTR} & \left\langle\begin{bmatrix}\text{ARGS}\ \langle s_1 \ldots s_n\rangle\end{bmatrix}\right\rangle\end{bmatrix} \begin{bmatrix}\text{VAL} & \boxed{0}\\ \text{IND} & s_n\end{bmatrix}$$

Lexical Entry for a Conjunction

$$\left\langle \text{and}\ ,\ \begin{bmatrix}\text{SYN} & \begin{bmatrix}\text{HEAD} & \textit{conj}\end{bmatrix}\\ \text{SEM} & \begin{bmatrix}\text{INDEX} & s\\ \text{MODE} & \text{none}\\ \text{RESTR} & \left\langle\begin{bmatrix}\text{RELN} & \text{and}\\ \text{SIT} & s\end{bmatrix}\right\rangle\end{bmatrix}\end{bmatrix}\right\rangle$$

Combining Constraints and Coordination



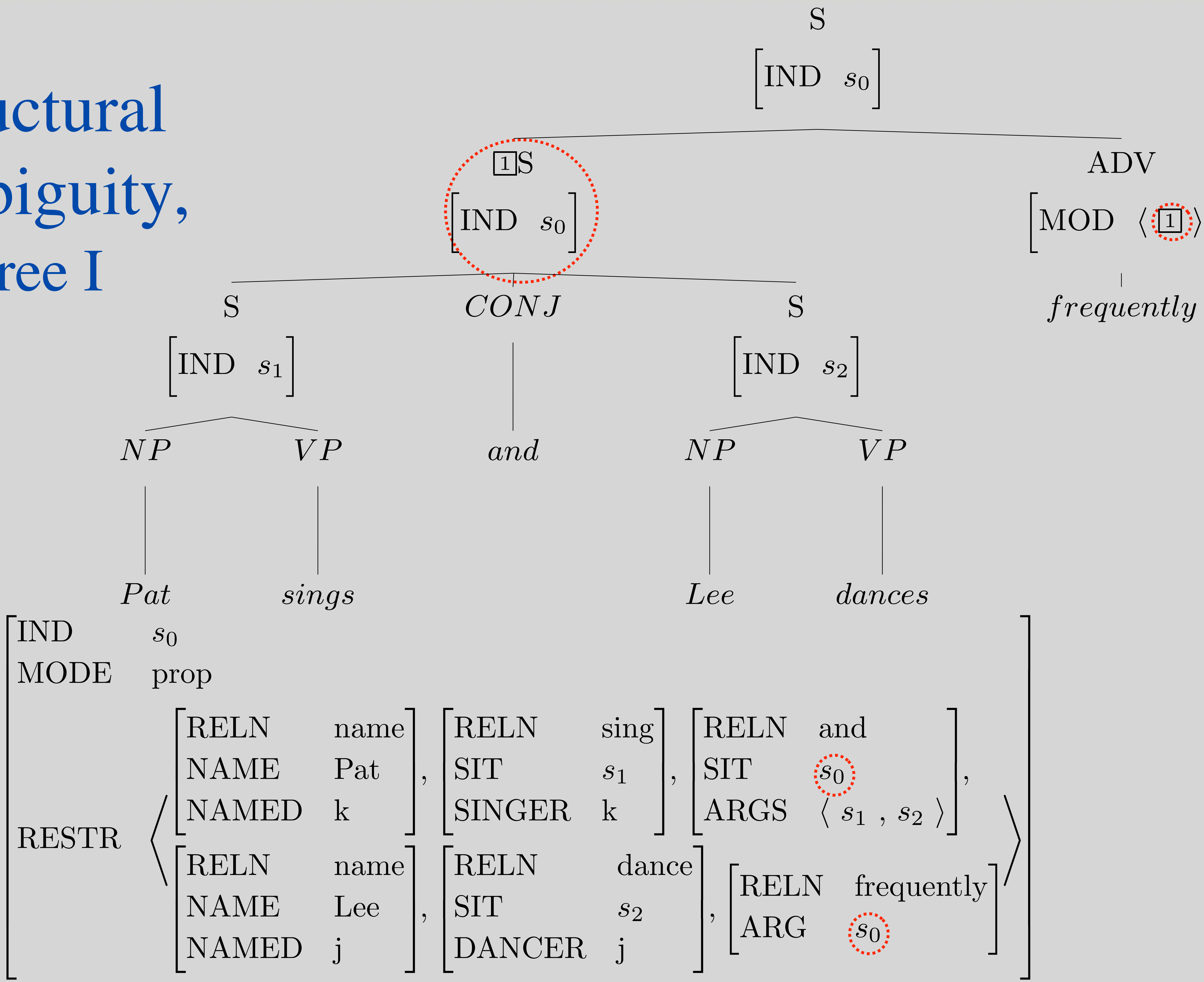
Lexical Entry for *and*

$$\left\langle \text{and} , \begin{bmatrix} \text{SYN} & \begin{bmatrix}\text{HEAD} & \textit{conj}\end{bmatrix} \\ \text{SEM} & \begin{bmatrix} \text{INDEX} & s \\ \text{MODE} & \text{none} \\ \text{RESTR} & \left\langle \begin{bmatrix}\text{RELN} & \text{and} \\ \text{SIT} & s\end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \right\rangle$$

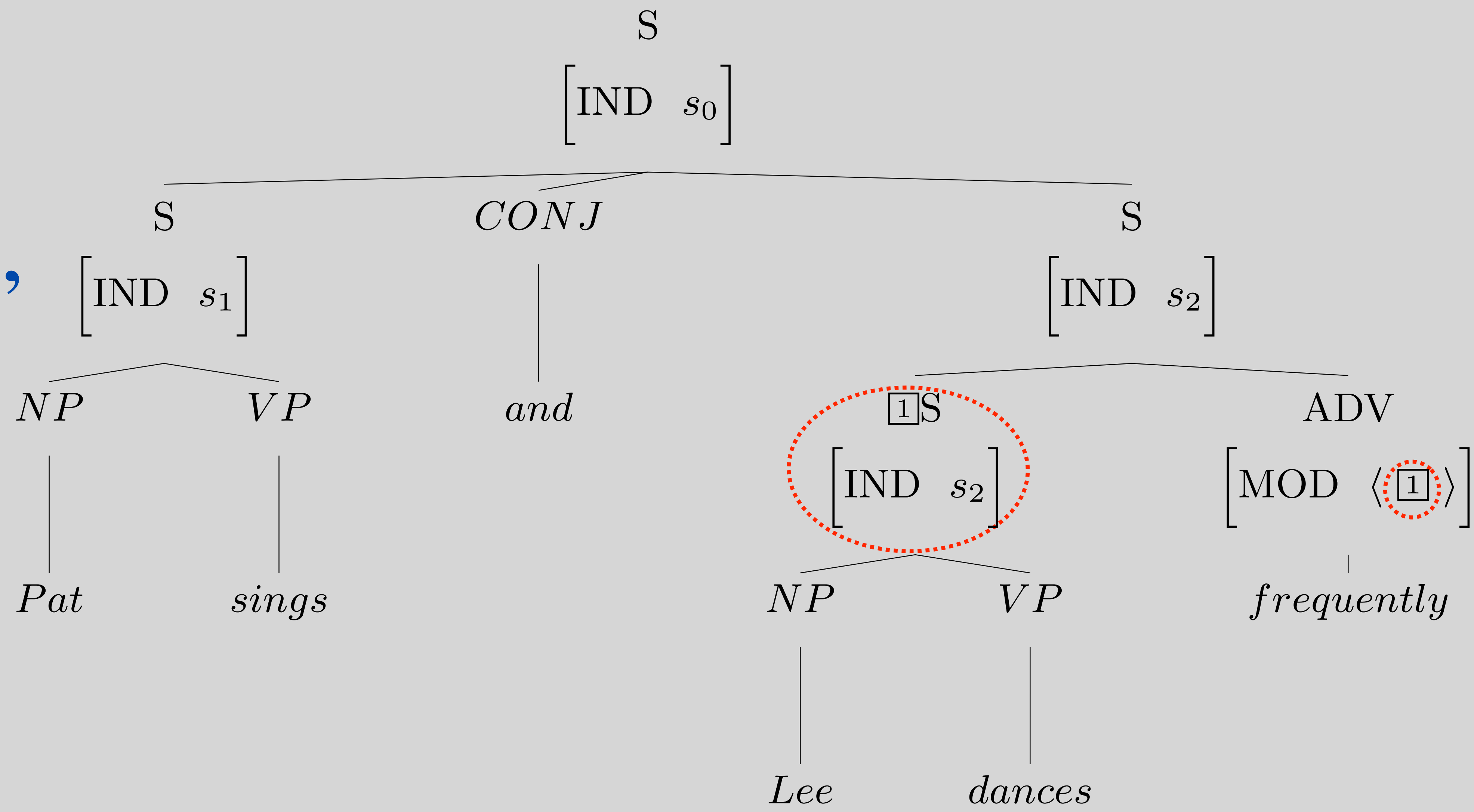
Coordination Rule

$$\begin{bmatrix}\text{VAL} & \boxed{0} \\ \text{IND} & s_0\end{bmatrix} \rightarrow \begin{bmatrix}\text{VAL} & \boxed{0} \\ \text{IND} & s_1\end{bmatrix} \dots \begin{bmatrix}\text{VAL} & \boxed{0} \\ \text{IND} & s_{n-1}\end{bmatrix} \begin{bmatrix}\text{HEAD} & \textit{conj} \\ \text{IND} & s_0 \\ \text{RESTR} & \left\langle\begin{bmatrix}\text{ARGS} & \langle s_1 \dots s_n\rangle\end{bmatrix}\right\rangle\end{bmatrix} \begin{bmatrix}\text{VAL} & \boxed{0} \\ \text{IND} & s_n\end{bmatrix}$$

Structural Ambiguity, Tree I



Structural Ambiguity, Tree II



$$\begin{bmatrix} \text{IND} & s_0 \\ \text{MODE} & \text{prop} \\ \text{RESTR} & \left\langle \begin{matrix} \begin{bmatrix}\text{RELN} & \text{name}\\ \text{NAME} & \text{Pat} \\ \text{NAMED} & \text{k}\end{bmatrix}, \begin{bmatrix}\text{RELN} & \text{sing}\\ \text{SIT} & s_1 \\ \text{SINGER} & \text{k}\end{bmatrix}, \begin{bmatrix}\text{RELN} & \text{and}\\ \text{SIT} & s_0 \\ \text{ARGS} & \langle s_1 , s_2 \rangle\end{bmatrix}, \\ \begin{bmatrix}\text{RELN} & \text{name}\\ \text{NAME} & \text{Lee} \\ \text{NAMED} & \text{j}\end{bmatrix}, \begin{bmatrix}\text{RELN} & \text{dance}\\ \text{SIT} & s_2 \\ \text{DANCER} & \text{j}\end{bmatrix}, \begin{bmatrix}\text{RELN} & \text{frequently}\\ \text{ARG} & s_2\end{bmatrix} \end{matrix} \right\rangle \end{bmatrix}$$

Question About Structural Ambiguity

Why isn't this a possible semantic representation for the string *Pat sings and Lee dances frequently*?

$$
\begin{bmatrix}
\text{IND} & s_0 \\
\text{MODE} & \text{prop} \\
\text{RESTR} & \left\langle
\begin{array}{l}
\begin{bmatrix} \text{RELN} & \text{name} \\ \text{NAME} & \text{Pat} \\ \text{NAMED} & \text{k} \end{bmatrix},
\begin{bmatrix} \text{RELN} & \text{sing} \\ \text{SIT} & s_1 \\ \text{SINGER} & \text{k} \end{bmatrix},
\begin{bmatrix} \text{RELN} & \text{and} \\ \text{SIT} & s_0 \\ \text{ARGS} & \langle s_1 , s_2 \rangle \end{bmatrix}, \\
\begin{bmatrix} \text{RELN} & \text{name} \\ \text{NAME} & \text{Lee} \\ \text{NAMED} & \text{j} \end{bmatrix},
\begin{bmatrix} \text{RELN} & \text{dance} \\ \text{SIT} & s_2 \\ \text{DANCER} & \text{j} \end{bmatrix},
\begin{bmatrix} \text{RELN} & \text{frequently} \\ \text{ARG} & s_1 \end{bmatrix}
\end{array}
\right\rangle
\end{bmatrix}
$$

Semantic Compositionality

$$
\begin{bmatrix}
\text{IND} & s_0 \\
\text{MODE} & \text{prop} \\
\text{RESTR} & \left\langle
\begin{array}{l}
\begin{bmatrix} \text{RELN} & \text{name} \\ \text{NAME} & \text{Pat} \\ \text{NAMED} & \text{k} \end{bmatrix},
\begin{bmatrix} \text{RELN} & \text{sing} \\ \text{SIT} & s_1 \\ \text{SINGER} & \text{k} \end{bmatrix},
\begin{bmatrix} \text{RELN} & \text{and} \\ \text{SIT} & s_0 \\ \text{ARGS} & \langle\ s_1\ ,\ s_2\ \rangle \end{bmatrix}, \\
\begin{bmatrix} \text{RELN} & \text{name} \\ \text{NAME} & \text{Lee} \\ \text{NAMED} & \text{j} \end{bmatrix},
\begin{bmatrix} \text{RELN} & \text{dance} \\ \text{SIT} & s_2 \\ \text{DANCER} & \text{j} \end{bmatrix},
\begin{bmatrix} \text{RELN} & \text{frequently} \\ \text{ARG} & s_0 \end{bmatrix}
\end{array}
\right\rangle
\end{bmatrix}
$$

$$
\begin{bmatrix}
\text{IND} & s_0 \\
\text{MODE} & \text{prop} \\
\text{RESTR} & \left\langle
\begin{array}{l}
\begin{bmatrix} \text{RELN} & \text{name} \\ \text{NAME} & \text{Pat} \\ \text{NAMED} & \text{k} \end{bmatrix},
\begin{bmatrix} \text{RELN} & \text{sing} \\ \text{SIT} & s_1 \\ \text{SINGER} & \text{k} \end{bmatrix},
\begin{bmatrix} \text{RELN} & \text{and} \\ \text{SIT} & s_0 \\ \text{ARGS} & \langle\ s_1\ ,\ s_2\ \rangle \end{bmatrix}, \\
\begin{bmatrix} \text{RELN} & \text{name} \\ \text{NAME} & \text{Lee} \\ \text{NAMED} & \text{j} \end{bmatrix},
\begin{bmatrix} \text{RELN} & \text{dance} \\ \text{SIT} & s_2 \\ \text{DANCER} & \text{j} \end{bmatrix},
\begin{bmatrix} \text{RELN} & \text{frequently} \\ \text{ARG} & s_2 \end{bmatrix}
\end{array}
\right\rangle
\end{bmatrix}
$$

Overview

- Some notes on the linguist’s stance
- Which aspects of semantics we’ll tackle
- Our formalization; Semantics Principles
- Building semantics of phrases
- Modification, coordination
- Structural ambiguity
- Next time: How the grammar works

Reading Questions

- Why is the truth value of a proposition matter to syntacticians? Or rather what about RESTR is actually syntactically interesting?
- What are some of the major advantages of choosing a theory of syntax that gives a prominent role to semantics over other models and theories that touch on meaning much more infrequently?

Reading Questions

- What's up with the relation-specific role names (LOVER, LOVED, etc)?
- In section 5.7, how is argument / ARGS defined? Is it a feature structure or a value? Will this term only be used with coordination or come up in different situations later?
- How do we come up with RELN for lexical entries? Are there any restrictions?

Reading Questions

- I can understand the predication for directives when conditions are explicitly stated in the utterance (*Go to the store*. is like saying “you_i move towards the store_j”) but what about single word utterances (*Go*.). Are there different styles of predications for directives or do they all have essentially the same conditions if the verbs share the same transitivity? In other words does the utterance *Go*. in our semantic framework mean “you_i move to a place_j not here”?

Reading Questions

- For an expression with RESTR value being a predication identical to (14a) (for the word love), does that mean there must be a lover i and a loved j for the expression to be semantically significant? Can't someone just feel loved not by a specific person, but just in general?

Reading Questions

- What is the difference between SIT(UATION) and INDEX, and INST; all seem to function as "primary keys", right?
- How often might we wish to define semantic descriptions that encapsulate "multiple situations in the semantics of a single proposition" in creating a fully-defined HPSG generally?
- The situations in the book seem to be mostly tied to VPs. Can situations occur without a VP, such as in languages where valid sentences don't require a VP?

Reading Questions

- References to a 'situation' – formally denoted as [INDEX s] – seem to be made across a vast array of lexical items in this chapter. Is this parameter an overgeneralization, and will it eventually be broken down into more distinguishable parts? In particular, the conjunction and is assigned an [INDEX s] on page 150. Intuitively, its VP arguments such as walk, eat broccoli, and play squash are real-world events, but why is the conjunction itself a 'situation'?

Reading Questions

- What has a MODE value of none?
- In the text, “A proposition is the kind of thing you can assert, deny or believe. It is also the only thing that can be true or false.” Does it mean that proposition can only be declarative sentence?

Reading Questions

- Can you give us some examples of situations where quantifier scope under specification would be desirable?
- Regarding the comment at the end of page 153, can you provide more details around what kinds of trade-offs we're making when we use "simplified" semantic representations for quantifiers in our grammar?
- The *a dog saved every family* example on page 151: what do universal quantifier and existential quantifier mean? Do they mean "all" and "exist" only, or do they have a more abstract meaning? Moreover, is there any other quantifier besides these two?

Reading Questions

- In a practical application, how do semantic and syntactic ambiguity get resolved? We can draw feature structures for the different interpretations, but how do we pick one? Associated high distribution in corpora + surrounding context?
- In addition for semantic ambiguity, how would a machine attempt to resolve it if a human may not be able to resolve it themselves (essentially it's left unresolved but we are expecting the machine to give us some output/answer)?

Reading Questions

- Suppose we have the utterance *There's an avocado and a fork on the table*. *I'll eat it*. It's most probable that *it* refers to the avocado, instead of the fork. I think the most straightforward way to resolve this anaphora would be to index *avocado* and *eat* accordingly, but is there a more semantically-driven way (specific to what *eat* means), so that some nouns are more edible than others (and this is reflected in the semantic feature structure), and the probability of *avocado* is greater in this context, but not necessarily so if we replaced *fork* with *apple*? (My sense is that this approach may be useful when we want to deliberately model this sort of ambiguity, but perhaps it's not so useful in other cases.) Or would we rely on another system for anaphora resolution?

Reading Questions

- For synonyms, or words that are closely related semantically, is there a way to map the relation in terms of syntax? Is the relation between syntax and semantics being used in computational applications explicitly today?

Next time

- Chapter 6: Pause and enjoy the vista midway up HPSG mountain
- Section 6.3 is *optional*