SPEAKER REFERENCE, UTTERANCE DESIGN, AND COGNITIVE ARCHITECTURE

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SHARED GRICEAN ASSUMPTIONS

- Communication is applied mindreading.
- The speaker's task is to intentionally trigger and guide the addressee's intention-recognition capacity.
- Semantics is the study of a highly structured kind of evidence that speakers provide to hearers about their intentions.

SHARED GRICEAN ASSUMPTIONS

- The only kinds of reference that make any sense are intention-based, speaker-based notions.

- There's no problem about referring to something without using an expression that refers to that thing, or without an expression with which one refers to it.

- This just requires m-intending to produce a singular thought.

TWO CONCEPTS OF REFERRING

1. Speaker Reference

(SR) In φ-ing, *S* referred to *o* iff what *S* meant by φ-ing is an *o*–dependent proposition (a singular proposition that has *o* as a constituent).

TWO CONCEPTS OF REFERRING

2. Referring With an Expression

(RW) In uttering *x*, *S* referred to *o* with *e*, relative to its i^{th} occurrence in *x*, iff for some audience *A* and relation *R*, *S* intended *A* to recognize that *R(e, x, i, o)* and, at least partly on the basis of this, that *S* referred to o in uttering *x*.

PSYCHOLOGICAL PLAUSIBILITY?

"Notice that if **RW** is correct, referring to something with an expression requires having propositional attitudes about it relative to a position it occupies. Is that psychologically plausible? I think so."

—Neale, p.284

THE APHONIC INTENTION PROBLEM

It's raining **LOC**.

The book **DOM** is on the table **DOM**.

Dunja is tall**DEG,DOM**.

You must**f,g** be there by now.

THE APHONIC INTENTION PROBLEM

Elmar says 'It's raining' to Nate, thereby saying that it's raining in Dubrovnik.

Therefore:

In uttering 'It's raining', Elmar referred to Dubrovnik with **DOC** (relative to its 1st occurrence).

iff:

(∃**R**) Elmar intended Nate to recognize that

R(**LOC**, 'It's raining', 1, Dubrovnik)

and, at least partly on the basis of this, that Elmar referred to Dubrovnik in uttering 'It's raining'.

MOST (ALL?) APHONICS ARE VARIABLES

Everyone$_i$ wants **PRO$_i$** to be taken seriously.

Wherever$_i$ I go, it's raining **LOC$_i$**.

In [every room]$_i$, the book **DOM$_i$** is on the table **DOM$_i$**.

MOST (ALL?) INDEXICALS ARE VARIABLES

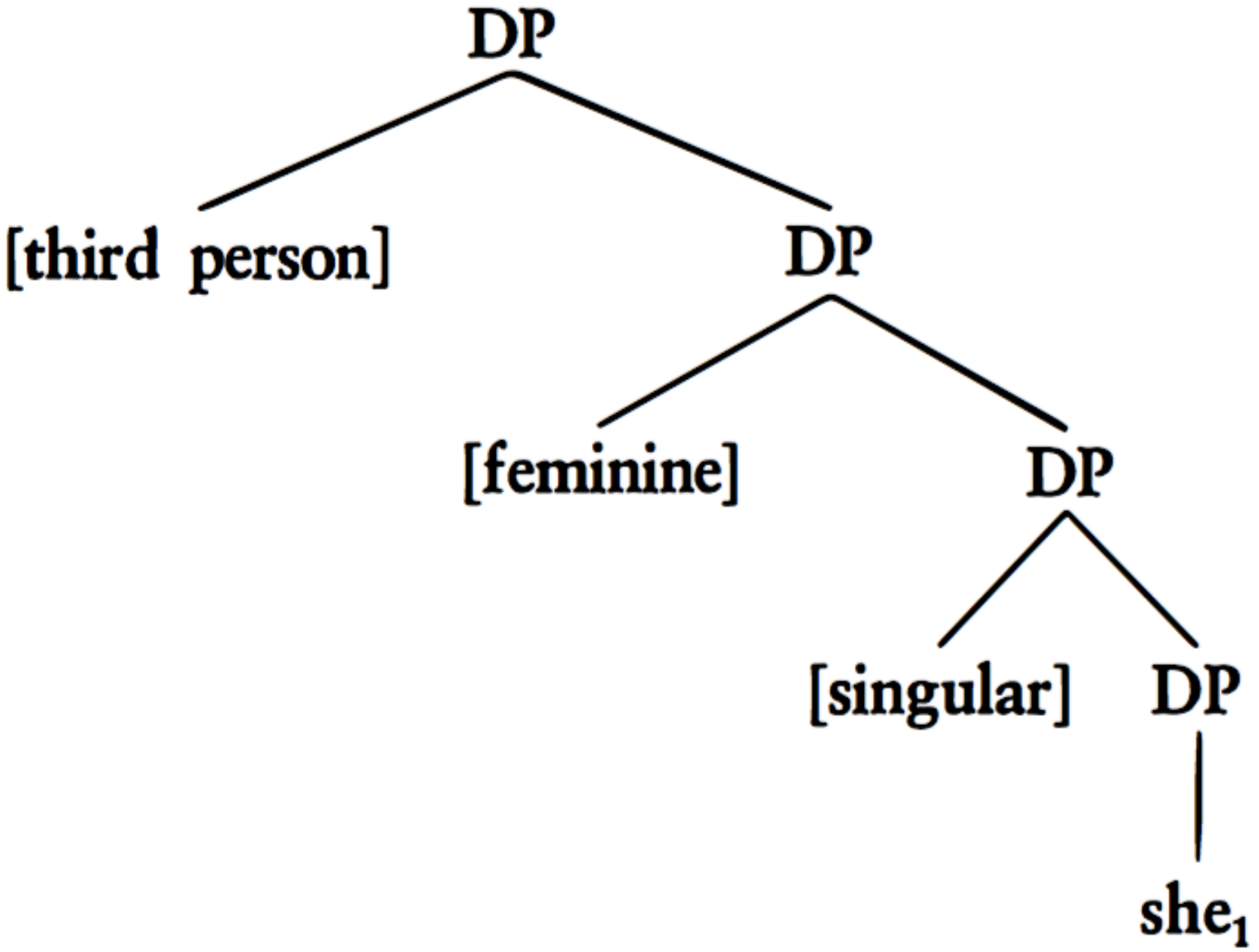
[Every girl]$_i$ wishes she$_i$ could have an adventure.

[Each of you]$_i$ should clean your$_i$ room.

Only I$_i$ got a question that I$_i$ understood.

Whenever [a pianist]$_i$ visits, we$_i$ play a fugue.

At [every kennel]$_i$, Lassie$_i$ is a collie.



Heim & Kratzer (1998: 244)

VARIABLES

SEMANTICS FOR VARIABLES

For any variable *v* and index i, $[\![v_i]\!]_g = g(i)$.

APPROPRIATENESS CONDITION

A context c is appropriate for an LF φ only if c determines a variable assignment g_c whose domain includes every index which has a free occurrence in φ.

Heim & Kratzer (1998: 243)

VARIABLES

SEMANTICS OF VARIABLE BINDING

…"variable binding" is any semantic operation which removes (or reduces) assignment dependency. By combining an expression whose denotation varies across assignments with one or more variable binders, we can create a larger expression whose denotation is assignment-invariant.

Heim & Kratzer (1998: 116)

VARIABLES

"For free pronouns, the relevant assignment is given by the utterance context and represents the speaker's referential intentions."

—Heim (2008: 36)

VARIABLES

"In a simplified example (omitting person and number), we compute the following result.

(4) For any g: $[\![\text{masc-he}_7 \text{ is married}]\!]_g$ is defined if $7 \in$ dom(g) and g(7) is male.

Where defined, $[\![\text{masc-he}_7 \text{ is married}]\!]_g = 1$ if g(7) is married, and = 0 otherwise.

If we are dealing with an unembedded occurrence of this sentence, uttered by a speaker who intends the 7^{th} variable to refer to John, this means that the speaker is presupposing John to be male and asserting him to be married."

—Irene Heim (2008, 36)

THE VARIABLE-INTENTION PROBLEM

Referring with variables appears to require having intentions about variables' numerical indices, or about assignment functions, or both.

Again: this *seems* like a problem.

14.12 The Tacit States Reply

"(a) ... S is not "consciously aware" that she [has intentions about aphonics]

(b) ... S meant such a proposition nonetheless because she tacitly had the requisite beliefs and intentions.

A solution of this sort will likely occur to anyone already sympathetic to ... Chomsky's (1980) talk of tacit knowledge of language, which suggests a similar solution to the aphonic-intention problem."

—Neale, p.324

14.12 The Tacit States Reply

(a) ... S is not "consciously aware" that she [has intentions about aphonics]

(b) ... S meant such a proposition nonetheless because she tacitly had the requisite beliefs and intentions.

A popular weasel word.

—Michael Devitt, yesterday

A solution of this sort will likely occur to anyone already sympathetic to ... Chomsky's (1980) talk of **tacit** knowledge of language, which suggests a similar solution to the aphonic-intention problem.

—Neale, p.324

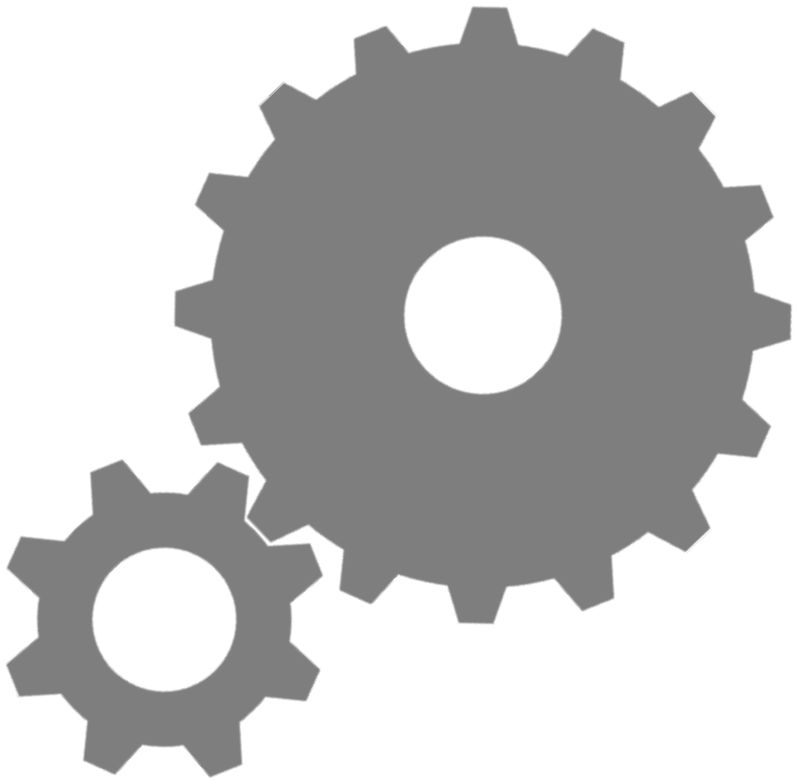
Personal-Level

Subpersonal-Level

Central States/Processes

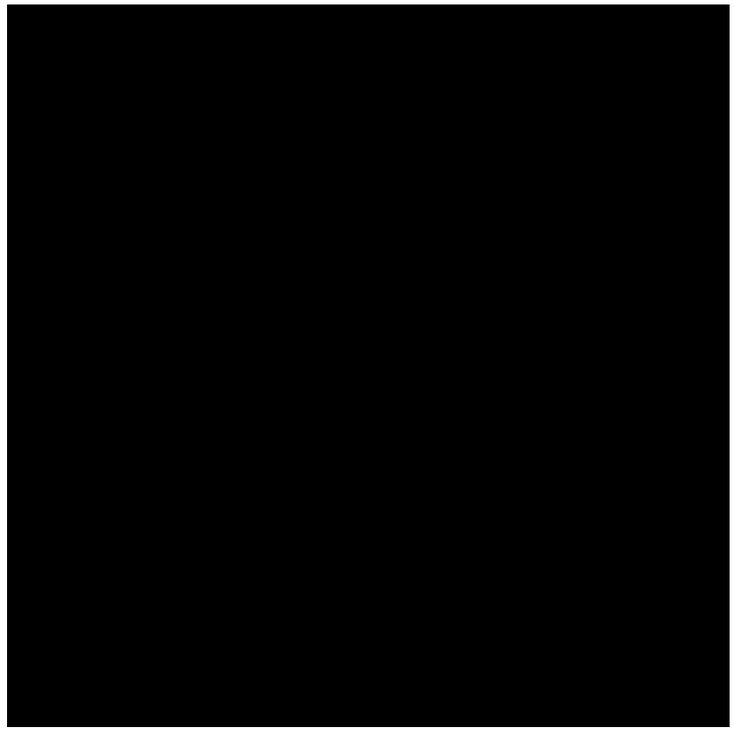
Modular States/Processes

MODULAR PROCESSES



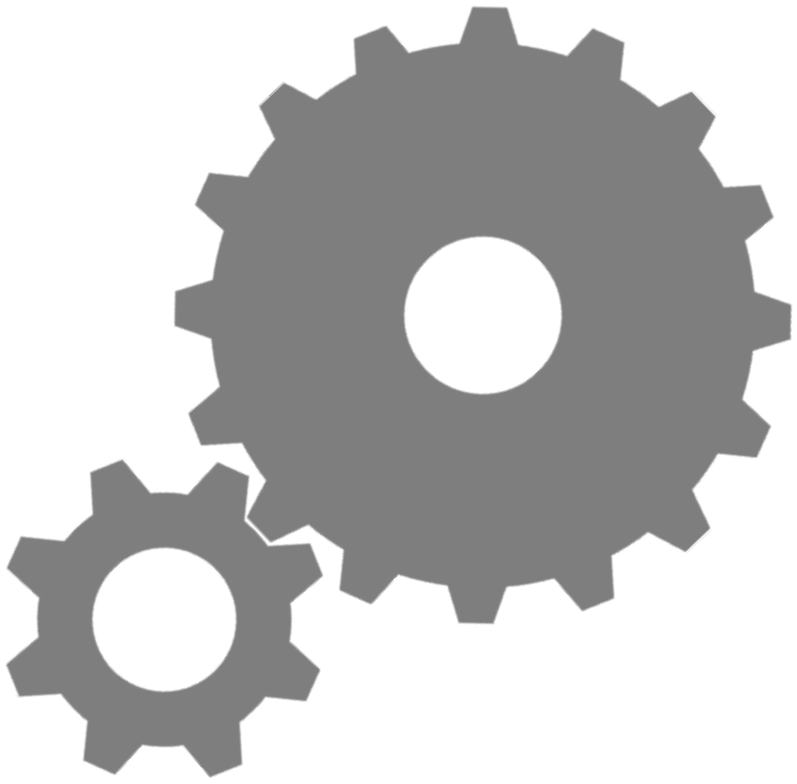
- encapsulated
- domain-specific
- fast, automatic
- algorithmic

CENTRAL PROCESSES



- isotropic
- general-purpose
- effortful (sometimes)
- abductive

SEMANTIC COMPOSITION



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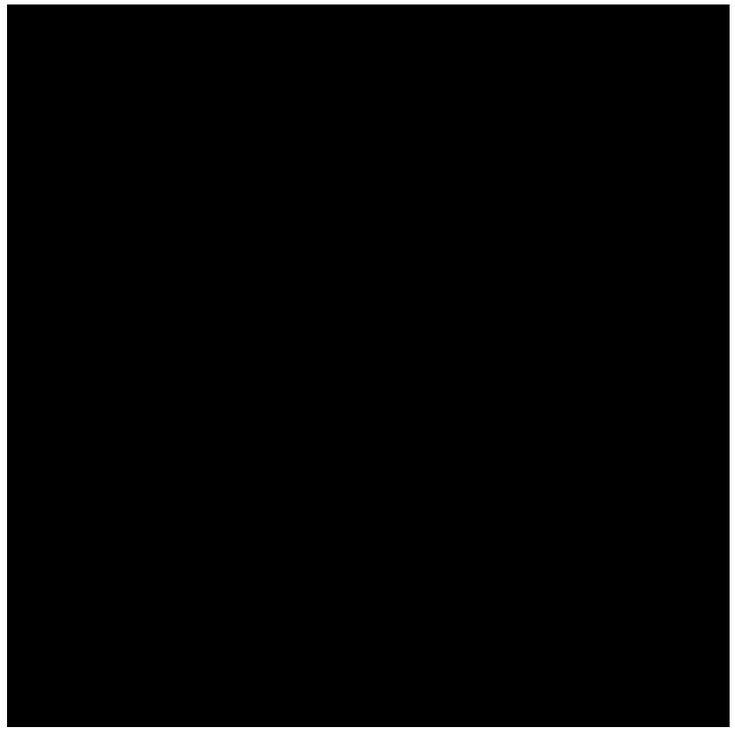
PRAGMATIC INFERENCE



- isotropic
- general-purpose
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LIMITED CENTRAL ACCESSIBILITY

"...the computations that input systems perform typically proceed via the assignment of a number of intermediate analyses of the proximal stimulation. Sentence comprehension, for example, involves not only acoustic encoding but also the recovery of phonetic and lexical content and syntactic form . Apparently an analogous picture applies in the case of vision..."

—Fodor (1983: 56)

LIMITED CENTRAL ACCESSIBILITY

"...the subject doesn't have equal access to all of these ascending levels of representation...

A plausible first approximation might be that only such representations as constitute the *final* consequences of input processing are fully and freely available to the cognitive processes that eventuate in the voluntary determination of overt behavior."

—Fodor (1983: 56)

LIMITED CENTRAL ACCESSIBILITY

Some things we don't have central access to:

- Syntactic principles and phrase structures
- Semantic composition rules
- Representations of sub-sentential expressions' semantic values. E.g.:

$$[\![\text{every}]\!]^w = \lambda\Phi_{et} . \lambda\Psi_{et} . (\forall x_e)\, \Phi(x) \Rightarrow \Psi(x)$$

- Representations of aphonic expressions

ARCHITECTURAL ARGUMENT 1

1. M-intentions (and other representations of intentional states) are central states.

2. Representations of aphonics, indices (and nearly all referring expressions) are intermediate modular states.

3. Modules don't have access to central states, and central systems don't have access to intermediate modular states.

∴ Therefore, we don't have intentions to refer (of the form RW) with (most) referring expressions.

2. Referring With an Expression

(RW) In uttering *x*, *S* referred to *o* with *e*, relative to its i^{th} occurrence in *x*, iff for some audience *A* and relation *R*, *S* intended *A* to recognize that *R(e, x, i, o)* and, at least partly on the basis of this, that *S* referred to o in uttering *x*.

Can we manage with speaker reference alone?

1. Speaker Reference
(SR) In φ-ing, *S* referred to *o* iff what *S* meant by φ-ing is an *o*–dependent proposition (a singular proposition that has *o* as a constituent).

YES!

Q

What was the concept of referring with an expression (RW) supposed to do for us?

A

It was supposed to determine the contents of “context-sensitive” lexical items, so that their contents could compose.

POSITIVE PROPOSAL:
SEMANTIC VALUES AS CONSTRAINTS

- The question of what determines the content of a referring expression is a category mistake.
- Referring expressions' semantic values are not their referents, but constraints on what speakers can refer to when uttering them.
- A sentence's semantic value is a property possessed by any proposition that can be said when uttering it literally.

Sperber & Wilson (1986/94); Bach (1987); Carston (2002); Schiffer (2003); Neale (2004)

"...the semantics of an expression gives the information that a competent speaker can glean from it independently of any context of utterance. ...

That this information is independent of contexts is a consequence of the fact that grammar, semantics in particular, is concerned with linguistic types, not tokens. ..."

—Kent Bach, *Thought and Reference*, p.5

I propose that we represent the character* of a sentence by an ordered pair ⟨A, P⟩, where A is the kind of speech act that must be performed in a literal utterance of the sentence, and P is the kind of propositional content that speech act must have. ...the character* of a complex expression [is] determined by its syntax and the characters* of its component expressions.

—Schiffer, *The Things We Mean*, p.112

...a semantic theory for a language *L* will provide, for each sentence *X* of *L*, a *blueprint* for ... what someone will be taken to be saying when using *X* to say something. The blueprint associated with X is its *semantics*, and the set of such blueprints, one for every sentence of a language *L*, is the *semantics* for *L*. (The study of the these blueprints is also called *semantics*. ...)

—Stephen Neale, 'Pragmatism and Binding', p.189

ARCHITECTURAL ARGUMENT 2

1. The part of utterance comprehension modeled by compositional semantics is modular (in Fodor's sense).
2. Reference-resolution is a central process.
3. Modular processes output to central processes (not the other way around).

∴ Reference resolution happens after compositional semantics, not before.

COMMUNICATION & COGNITION

m-intention for
A to believe p

encodes a
rough-grained
property φ of p
in a sentence σ

σ

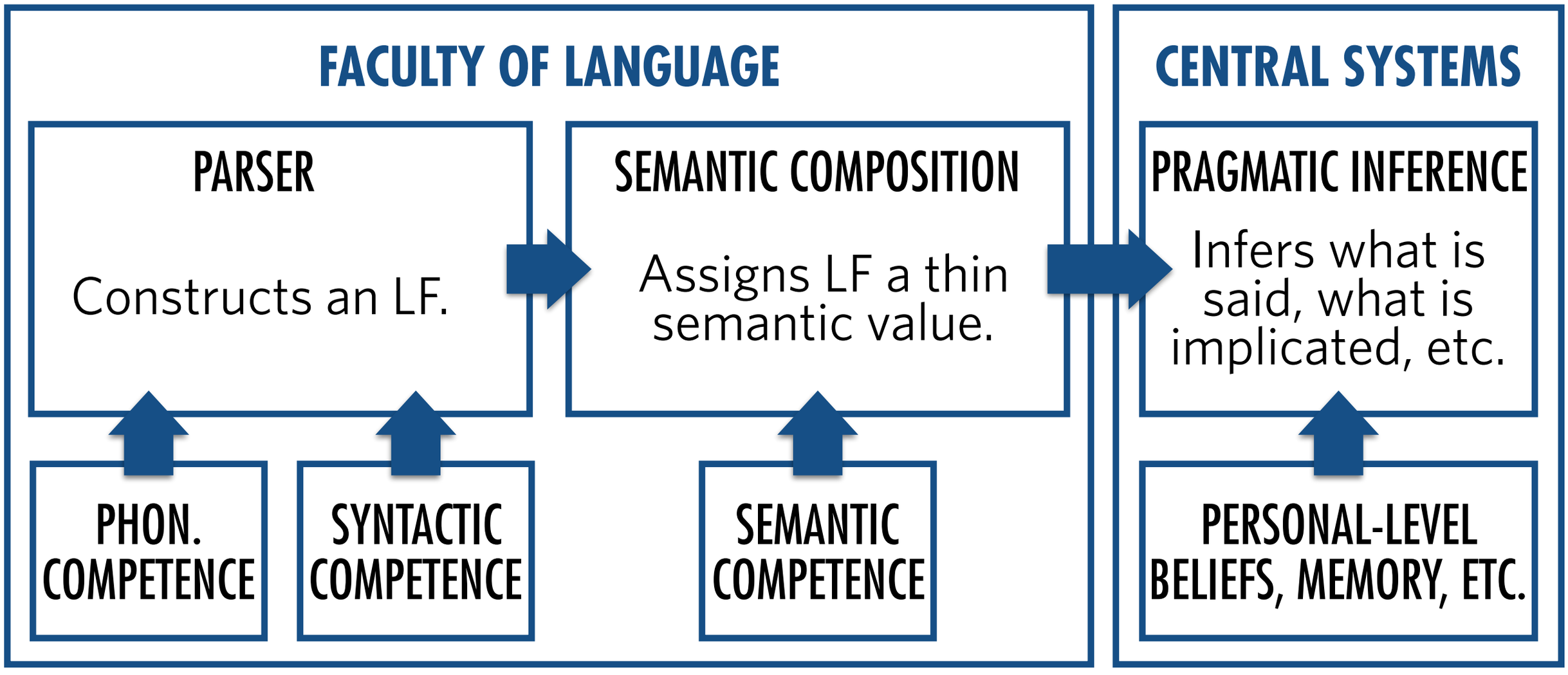
infers that
S meant p

decodes a
rough-grained
property φ of p

S

A

SPEECH COMPREHENSION



SPEECH PRODUCTION (UTTERANCE DESIGN)

FACULTY OF LANGUAGE

PARSER

Constructs an LF that encodes φ.

SEMANTIC ENCODING

Constructs a semantic representation of a property φ of p.

PHON. COMPETENCE

SYNTACTIC COMPETENCE

SEMANTIC COMPETENCE

CENTRAL SYSTEMS

INTENTION FORMATION

Forms m-intention for A to believe p.

PERSONAL-LEVEL BELIEFS, MEMORY, ETC.

SEMANTIC COMPETENCE

COMPOSITIONAL SEMANTICS

THE PLAN

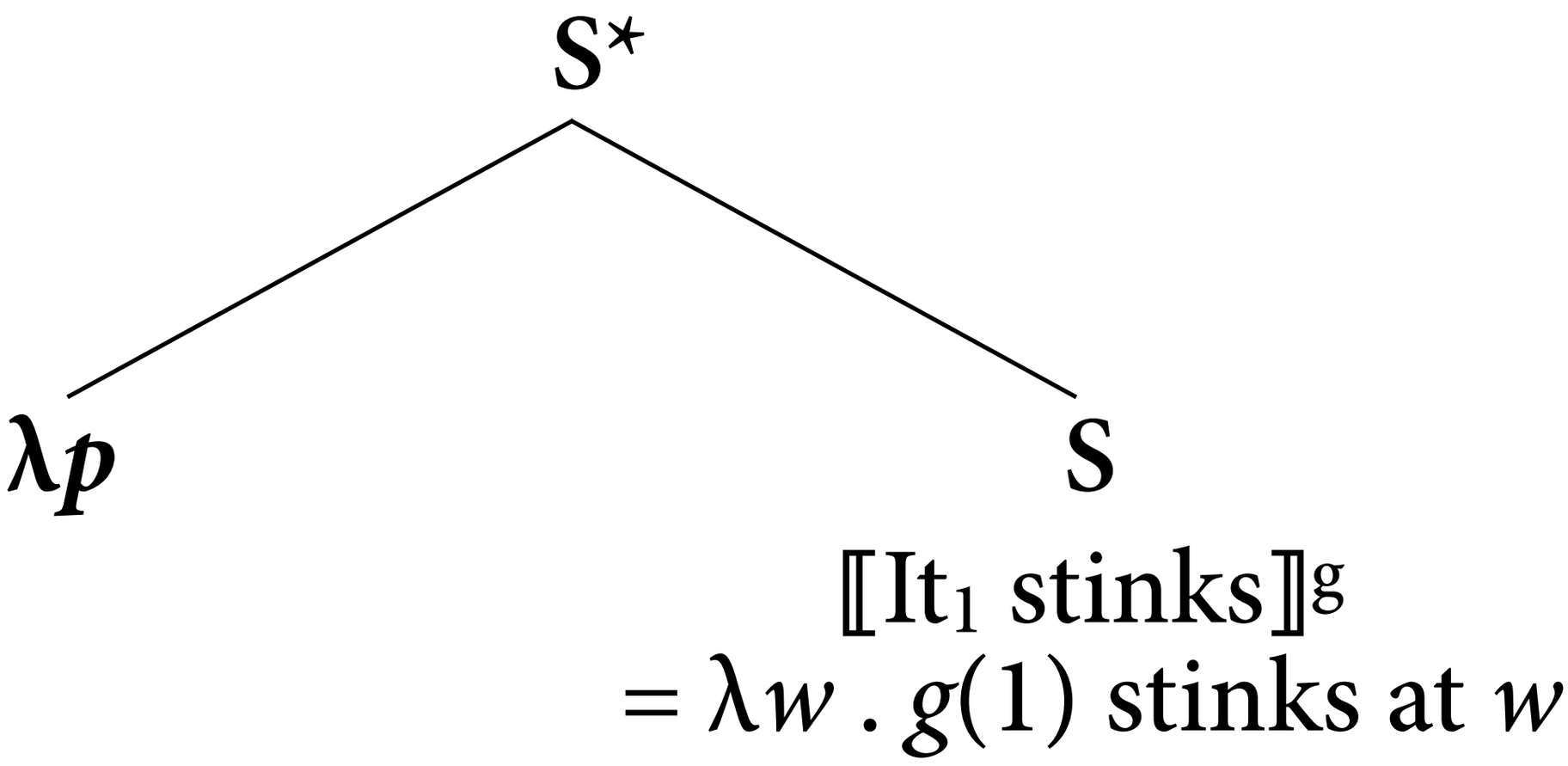
- Implement the idea of semantic values as constraints rather than contents.
- Stick as close to orthodoxy as possible.
- For now, “orthodoxy” means “textbook static semantics”.

Semantics of ‘It stinks.’

$$[\![\text{It}_1 \text{ stinks}]\!]^g = \lambda w \,.\, g(1) \text{ stinks at } w$$

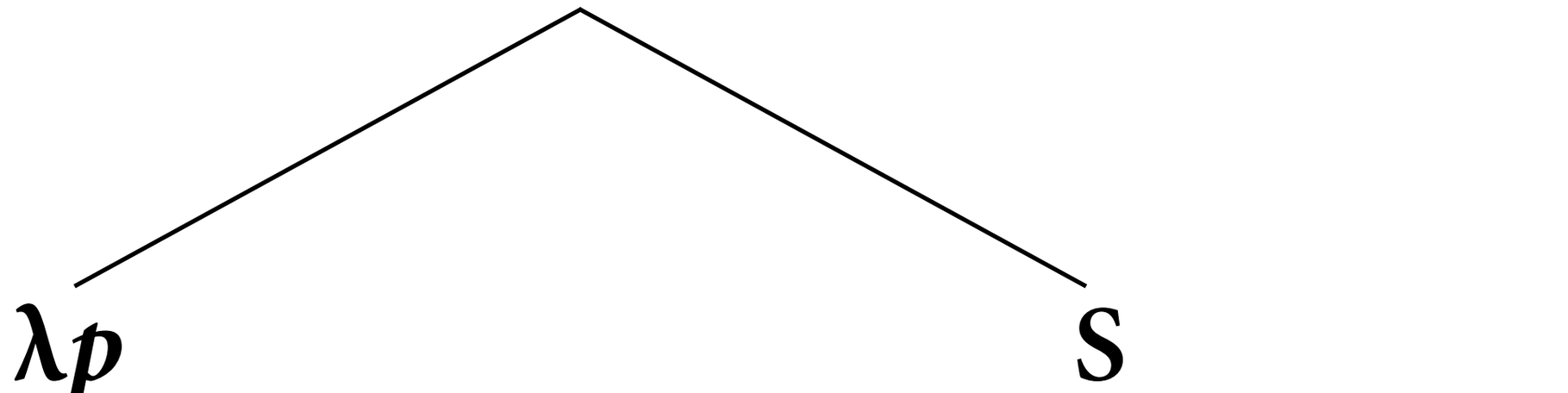
Heim & Kratzer (1998);
von Fintel & Heim (2011)

Semantics of ‘It stinks.’



Semantics of ‘It stinks.’

$$[\![\mathrm{S}^{\star}]\!] = \lambda p_{st} \,.\, (\exists x)\; p = [\lambda w \,.\, x \text{ stinks at } w]$$



Semantics of ‘It stinks.’

$$= \underbrace{\lambda p_{st} \,.\, (\exists x)\; p =}_{\text{prenex}} \overset{[\![S^*]\!]}{[\lambda w \,.\, x \text{ stinks at } w]}$$

Semantics of ‘It stinks.’

$$[\![\text{S}^{\star}]\!]$$

$$= \lambda p_{st} \,.\, (\exists x)\; p = [\lambda w \,.\, x \text{ stinks at } w]$$

A function that maps each proposition p to truth iff, for some x, p is the proposition that x stinks.

Semantics of ‘It stinks.’

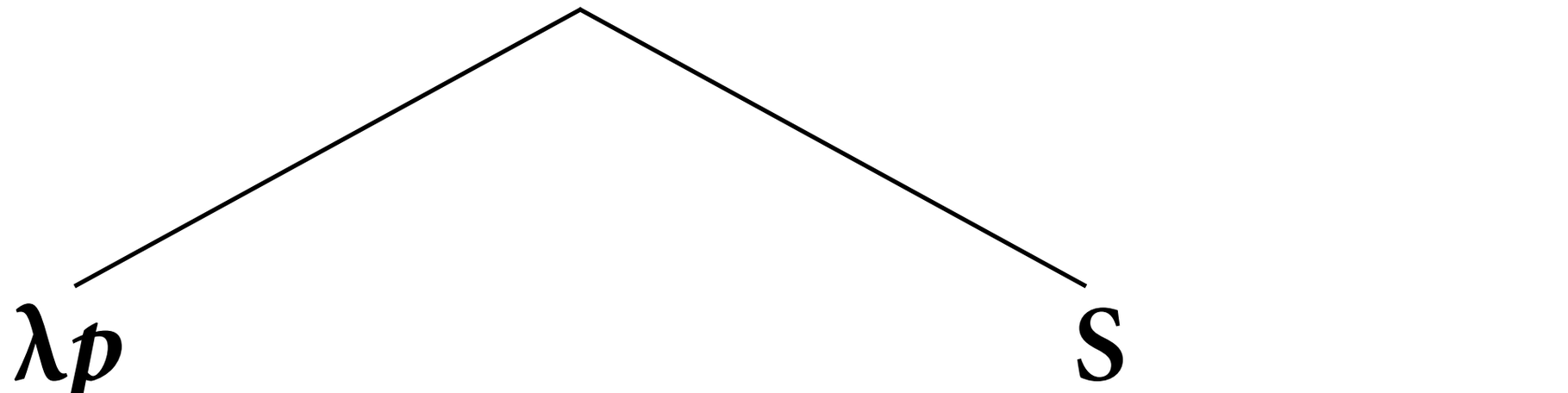
$$[\![\text{S}^{\star}]\!]$$

$$= \lambda p_{st} \,.\, (\exists x)\; p = [\lambda w \,.\, x \text{ stinks at } w]$$

The property that a proposition p has iff, for some x, p is the proposition that x stinks.

Semantics of ‘It stinks.’

$$[\![\mathrm{S}^{\star}]\!] = \lambda p_{st} \,.\, (\exists x)\; p = [\lambda w \,.\, x \text{ stinks at } w]$$



(PTA) Proposition-Type Abstraction

Let α be a branching node with daughters β and γ, such that:

(a) β dominates only λ*p*, and

(b) γ contains unbound variables $v_i \ldots v_n$.

Then:

$$[\![\alpha]\!] = \lambda p_{st} \,.\, (\exists x_i) \ldots (\exists x_n)\; p = [\![\gamma]\!]^{g[x_i/i \ldots x_n/n]}$$

ENTAILMENT

The g-closure of SR

Let $[\![\mathrm{SR}]\!]$ be $\lambda p_{st} \,.\, (\exists x_i) \ldots (\exists x_n)(p = \varphi)$

Then $\mathrm{g}(\mathrm{SR}) = [\![\varphi]\!]^{\mathrm{g}}$

Sentence-Radical Entailment

$\{\mathrm{SR}_i \ldots \mathrm{SR}_m\} \vdash \mathrm{SRn}$

iff

$(\forall \mathrm{g})\{\mathrm{g}(\mathrm{SR}_i) \ldots \mathrm{g}(\mathrm{SR}_m)\} \vdash \mathrm{g}(\mathrm{SR}_n)$

QUESTIONS

- What's the semantic difference between 'he' and 'she'?
- What about other "context-sensitive" expressions: 'that', 'I', 'here', 'you', etc?
- What about "context-sensitive" expressions that aren't type *e*?

A PROPOSAL

$$[\![\text{He smokes}]\!]$$
$$= \lambda p_{st} \,.\, (\exists x_{e} : \boldsymbol{x \text{ is male}})\; p = [\lambda w \,.\, x \text{ smokes at } w]$$

A function that maps a proposition p to the true iff, for some male x, p is the proposition that x smokes.

A PROPOSAL

- Each variable v is assigned two kinds of semantic value:
  - $[\![v_i]\!]^g = g(i)$
  - **$\mu(v)$** is a constraint property. E.g.:

$$\mu(he) = \lambda x_e \,.\, x \text{ is male}$$

SOME EXAMPLES

$$\mu(\text{he}) = \lambda x_e \,.\, x \text{ is male}$$

$$\mu(\text{she}) = \lambda x_e \,.\, x \text{ is female}$$

$$\mu(\textbf{LOC}) = \lambda x_e \,.\, x \text{ is a place}$$

$$\mu(\textbf{DOM}) = \lambda f_{et} \,.\, f$$

INDEXICALS

$\mu(\mathrm{I}) = \lambda x_e$. x is the speaker whose utterance is being interpreted

Proposition-Type Abstraction (Pedantic Version)

Let α be a branching node with daughters β and $\gamma_{i...n}$, such that:

(a) β dominates only λp, and

(b) γ contains unbound variables $v_i \ldots v_n$.

Then:

$$[\![\alpha]\!] = \lambda p_{st} \,.\, (\exists x^i : \mu(v_i)(x^i)) \ldots (\exists x^n : \mu(v_n)(x^n))\ p = [\![\gamma]\!]^{g^{[x^i/i \ldots x^n/n]}}$$

EXAMPLES

$$[\![\text{He smokes}]\!]$$
$$= \lambda p_{\langle s,t\rangle} \,.\, (\exists x_{\mathrm{e}} : x \text{ is male})\ p = [\lambda w_{\mathrm{s}} \,.\, x \text{ smokes at } w]$$

$$[\![\text{I smoke}]\!]$$
$$= \lambda p_{st} \,.\, (\exists x_{\mathrm{e}} : x \text{ is the speaker}\ldots)$$
$$p = [\lambda w_{\mathrm{s}} \,.\, x \text{ smokes at } w]$$

$$[\![\text{The dog barks}]\!]$$
$$= \lambda p_{st} \,.\, (\exists \varphi_{\mathrm{e}t})\ p = [\lambda w_{\mathrm{s}} \,.\, \textit{The}\ \varphi\ \textit{dog}\ \text{barks at } w]$$

SOME NICE FEATURES

- No such thing as semantic content.
- Thin, compositionally derived semantic values.
- No more context parameters needed.
- Minimal role for assignment functions.
- Conservative: just a minimal addition to textbook semantics.

MORE NICE FEATURES

- No need to assign referents to individual expressions before semantic composition.
- No need for intentions about aphonics.
- No need for intentions about phonics either!
- Only (relatively) simple, proposition-directed m-intentions needed.

THANKS