# Types, judgements and lexical meaning

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# Outline

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# A classical (model-theoretic) view of lexical meaning

- natural languages are like formal languages
- fixed interpretation
- truth is central to the notion of meaning

# Judgement-based lexical meaning – in flux

- natural languages are toolboxes for constructing (formal) languages (Cooper and Ranta, 2008)
- interpretation in flux (Larsson and Cooper, 2009; Cooper, 2012)
- type theoretical judgement (leading to truth) is central to the notion of meaning – rich type theory

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- dog hairs rise (upstairs, as an argument that dogs should be allowed upstairs, Breitholtz and Cooper, 2011)

# Acquisition of *gloves*

Naomi: mittens
Father: **gloves**
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- Her meaning of *mittens* must be revised

# Conceptual Pacts

- Garrod and Anderson (1987) on the maze game
- Brennan and Clark (1996) on conceptual pacts
- Healey (1997) on task oriented sub-languages

# Quotation

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- A not quite quotation version: *These so-called experts . . .*

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- I might want to say that *three o'clock* can have more or less precise meanings

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- Large literature addressing in large part the first two questions (including Björnsson and Almér (2011); Crespo and Fernández (2011); Stojanovic (2007))

# Are *A* and *B* disagreeing?

- They don't seem to be agreeing:
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  - B: #No, I agree, it's disgusting
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  - A: This soup is delicious
    B: ?You're wrong, it's disgusting
- "Faultless disagreement" – in contrast to:

  A: The temperature of this soup is exactly 40°C
  B: No, you're wrong, it's exactly 43°C

# So what are people disagreeing about?

- At least on one understanding of this dialogue, *A* and *B* are not disagreeing about the meaning of the word *delicious* but about the *soup*
- A dialogue about the meaning of *delicious*:
  A: This soup is delicious
  B: Yes, it's very good. I wouldn't say it's delicious.
  A: Yeah, "very good", "delicious" – same thing
- If the original dialogue is a disagreement about the soup and not about the meaning then *A* and *B* must have (something like) the same meaning for *delicious*, or at least think they have

Propositions

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# Truth at the centre of semantics?

- traditional notions of proposition are based on truth
- e.g. truth in possible worlds, propositions as sets of worlds where the proposition is true
- in general, the approach to dealing with taste has been to refine this truth-theoretic approach by adding additional parameters (making truth relative or contextually determined)
- but ultimately there is some fact of the matter (*true*, *false* or perhaps undefined, e.g. a truth-value gap)

# Judgements at the centre of type theory

- type theory gives us a slightly different spin on this
- a central notion is that of a *judgement* that an object $a$ is of a type $T$, $a : T$
- I have been trying to push the idea that this can be seen as an abstract theory of perception and cognition (Cooper, 2012)

Pictures

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- Types have existence independent of their extensions
- We may know a type but be unsure of its extension
- We may *disagree* about whether something belongs to a type or not
  A: It's a tree
  B: No, it's a bush

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- a Montagovian strategy: make the apparently more complex case basic and add to it for what you think of as being the ordinary case (*cf.* intensional verbs)
- we only think of taste predicates as being difficult because we are starting from truth-based semantics rather than judgement-based semantics
- truth, or knowing the conditions under which something is of a type, is still very important

# *delicious* types

- What type might *soup-is-delicious* be?
- Ignoring problems with demonstratives, *this soup is delicious* might correspond to

$$\left[\begin{array}{lcl} x{=}\text{soup}_1 & : & \mathit{Ind} \\ c_{\text{soup}} & : & \text{soup}(x) \\ e & : & \text{delicious}(x) \end{array}\right]$$

or, assuming some kind of backgrounding or presupposition

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$$\lambda r : [x{:}\mathit{Ind}]\left(\left[\begin{array}{lcl} e & : & \text{delicious}(r.x) \end{array}\right]\right)$$
- So what might it mean for $A$ and $B$ to have the same meaning for *delicious*?

# Relating lexical content to types

- Suppose the word *delicious* is associated in a lexicon with the content $\lambda r : [\mathrm{x}{:}\mathit{Ind}]([\ \mathrm{e}\ :\ \mathrm{delicious}(r.\mathrm{x})\ ])$
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- $T$ is a fixed point type for a dependent type $\mathcal{T}$ iff for any $a$, $a : T \rightarrow a : \mathcal{T}(a)$
- This allows us to talk about sameness of meaning in terms of type judgements.
- $w \rightsquigarrow_A T$ "word $w$ is associated with type $T$ in agent $A$'s lexicon"

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# Judgements

## standard type theory

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- $:_A T$ "agent $A$ judges that there is some object of type $T$"

# Type act theory

- articulating and extending the notion of judgement in type theory
- cf speech act theory
- "Doing things with types"

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$:_A T?$ "agent $A$ wonders whether there is some object of type $T$"

creations $:_A T!$ "agent $A$ creates something of type $T$" (useful if $T$ is a type of situation)

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| same extension | $w \rightsquigarrow_A T_1$, $w \rightsquigarrow_B T_2$ and for any $o$, $o :_A T_1$ iff $o :_B T_2$ |

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| same extension, different words | $w_1 \rightsquigarrow_A T_1$, $w_2 \rightsquigarrow_B T_2$ and for any $o$, $o :_A T_1$ iff $o :_B T_2$ |

# Sameness of meaning for personal taste predicates

- A: This soup is delicious
  B: No, it's disgusting
- only "same type" allows *A* and *B* to have the same meaning for *delicious* but have different judgements
- Suppose that everything *A* judges to be delicious *B* judges to be disgusting and *vice versa*. "same extension, different words" would predict that they have the same meaning for *delicious*/*disgusting*

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- it seems that "same type" (possibly different judgements) plays an important role a lot of the time
- this means we should think carefully about how we individuate types

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- similarly you may have two different classifiers (e.g. pleasant vs unpleasant taste) which are excited by the same objects (everything I think is delicious, you think is disgusting and *vice versa*)

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- where to draw the line between individual ideas/experiences/perception/encyclopaedic knowledge and (shared) lexical meaning?
- towards a view where there is enough similarity (but not necessarily identity) in meanings/ideas for given words to allow us to communicate

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- we need both

# Bibliography I

Artstein, Ron, Mark Core, David DeVault, Kallirroi Georgila, Elsi Kaiser and Amanda Stent, eds. (2011) SemDial 2011 (Los Angelogue): Proceedings of the 15th Workshop on the Semantics and Pragmatics of Dialogue.

Barwise, Jon and John Perry (1983) *Situations and Attitudes*, Bradford Books, MIT Press, Cambridge, Mass.

Björnsson, Gunnar and Alexander Almér (2011) The Pragmatics of Insensitive Assessments, *The Baltic International Yearbook of Cognition, Logic and Communication*, Vol. 6, pp. 1–45.

Breitholtz, Ellen and Robin Cooper (2011) Enthymemes as Rhetorical Resources, in Artstein *et al.* (2011).

# Bibliography II

Brennan, Susan E. and Herbert H. Clark (1996) Conceptual pacts and lexical choice in conversation, *Journal of Experimental Psychology: Learning, Memory and Cognition*, Vol. 22, pp. 482–493.

Clark, Eve V. (2007) Young children's uptake of new words in conversation, *Language in Society*, Vol. 36, pp. 157–82.

Cooper, Robin (2012) Type Theory and Semantics in Flux, in R. Kempson, N. Asher and T. Fernando (eds.), *Handbook of the Philosophy of Science*, Vol. 14: Philosophy of Linguistics, pp. 271–323, Elsevier BV. General editors: Dov M. Gabbay, Paul Thagard and John Woods.

# Bibliography III

Cooper, Robin and Jonathan Ginzburg (2012) Negative inquistiveness and alternatives-based negation, in M. Aloni, V. Kimmelman, F. Roelofsen, G. W. Sassoon, K. Schulz and M. Westera (eds.), *Logic, Language and Meaning: 18th Amsterdam Colloquium, Amsterdam, The Netherlands, December 19–21, 2011, Revised Selected Papers*, Lecture Notes in Computer Science *7218*, pp. 32–41, Springer.

Cooper, Robin and Staffan Larsson (2009) Compositional and ontological semantics in learning from corrective feedback and explicit definition, in J. Edlund, J. Gustafson, A. Hjalmarsson and G. Skantze (eds.), *Proceedings of DiaHolmia: 2009 Workshop on the Semantics and Pragmatics of Dialogue*, pp. 59–66.

# Bibliography IV

Cooper, Robin and Aarne Ranta (2008) Natural Languages as Collections of Resources, in R. Cooper and R. Kempson (eds.), *Language in Flux: Dialogue Coordination, Language Variation, Change and Evolution* ( *Communication, Mind and Language* 1), pp. 109–120, College Publications, London.

Crespo, Inés and Raquel Fernández (2011) Expressing Taste in Dialogue, in Artstein *et al.* (2011), pp. 84–93.

Dobnik, Simon, Staffan Larsson and Robin Cooper (2011) Toward perceptually grounded formal semantics, in *Workshop on Integrating Language and Vision on 16 December 2011 at NIPS 2011 (Neural Information Processing Systems)*.

# Bibliography V

Garrod, Simon C. and Anthony Anderson (1987) Saying what you mean in dialogue: a study in conceptual and semantic co-ordination, *Cognition*, Vol. 27, pp. 181–218.

Gibson, James J. (1986) *The Ecological Approach to Visual Perception*, Lawrence Erlbaum Associates.

Ginzburg, Jonathan (2012) *The Interactive Stance: Meaning for Conversation*, Oxford University Press, Oxford.

Healey, P.G.T. (1997) Expertise or expertese?: The emergence of task-oriented sub-languages, in M. Shafto and P. Langley (eds.), *Proceedings of the 19th Annual Conference of the Cognitive Science Society*, pp. 301–306.

Larsson, Staffan (2011) The TTR perceptron: Dynamic perceptual meanings and semantic coordination., in Artstein *et al.* (2011).

# Bibliography VI

Larsson, Staffan and Robin Cooper (2009) Towards a formal view of corrective feedback, in A. Alishahi, T. Poibeau and A. Villavicencio (eds.), *Proceedings of the Workshop on Cognitive Aspects of Computational Language Acquisition*, pp. 1–9.

Lasersohn, Peter (1999) Pragmatic Halos, *Language*, Vol. 75, No. 3, pp. 522–551.

Lewis, David (1979) Attitudes de dicto and de se, *Philophical Review*, Vol. 88, pp. 513–543. Reprinted in Lewis (1983).

Lewis, David (1983) *Philosophical Papers, Volume 1*, Oxford University Press.

Ninan, Dilip (2010) *De Se* Attitudes: Ascription and Communication, *Philosophy Compass*, Vol. 5, No. 7, pp. 551–567.

# Bibliography VII

Ott, Walter (2006) Hume on Meaning, *Hume Studies*, Vol. 32, No. 2, pp. 233–252.

Perry, John (1977) The Problem of the Essential Indexical, *Noûs*, Vol. 13, No. 1, pp. 3–21. Reprinted in Perry (1993).

Perry, John (1993) *The Problem of the Essential Indexical and Other Essays*, Oxford University Press.

Schlenker, Philippe (2011) Indexicality and *De Se* Reports, in C. Maienborn, K. v. Heusinger and P. Portner (eds.), *Semantics: an international handbook of natural language meaning*, pp. 1561–1604, de Gruyter.

Stojanovic, Isidora (2007) Talking about taste: disagreement, implicit arguments, and relative truth, *Linguistics and Philosophy*, Vol. 30, No. 6, pp. 691–706.

# Bibliography VIII

Teller, Paul (2011) Robots, Action, and the "Essential Indexical", *Philosophy and Phenomenological Research*, Vol. LXXXII, No. 3, pp. 763–771.

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A: I like this soup
B: #No, I don't /
No, you don't (you're just saying that) / *I* don't

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- A notion of perspective, similar to *left* and *right*
- yet different in that, given a perspective, there is an objectively observable fact of the matter whether an object is to the left or right of another – and there is no neutral "fact" independent of perspective in the case of taste

# Seeing a tree (a simulation view)

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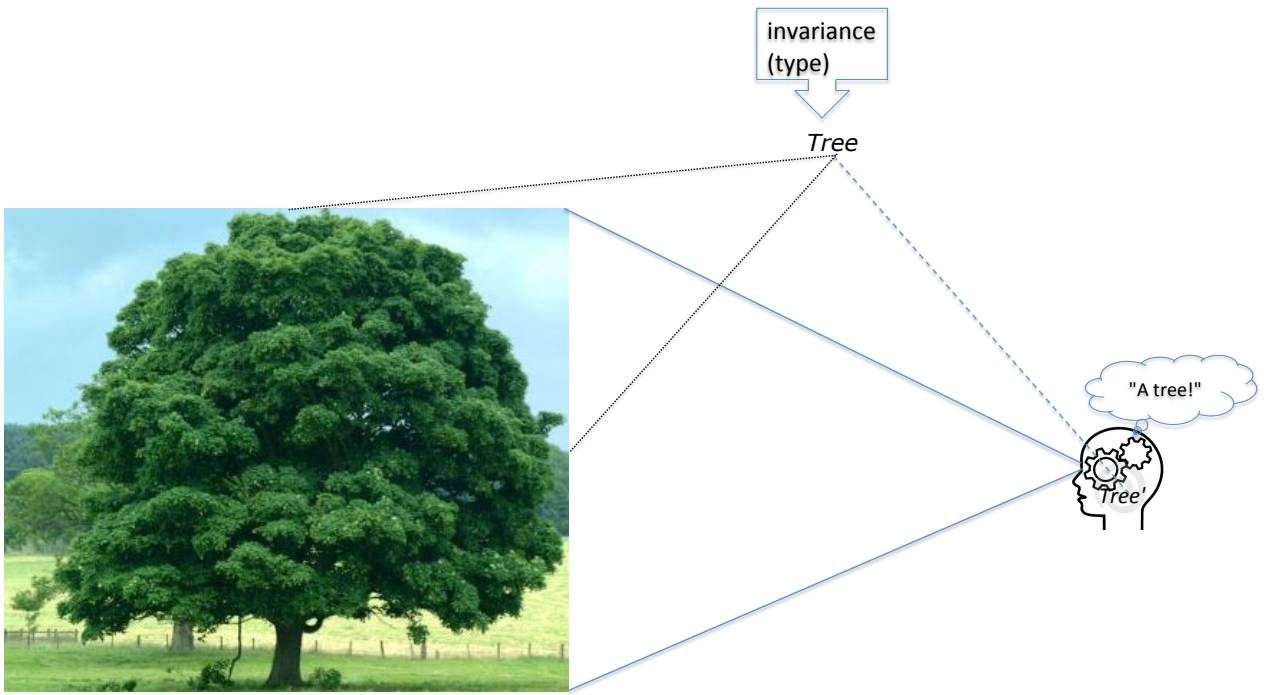

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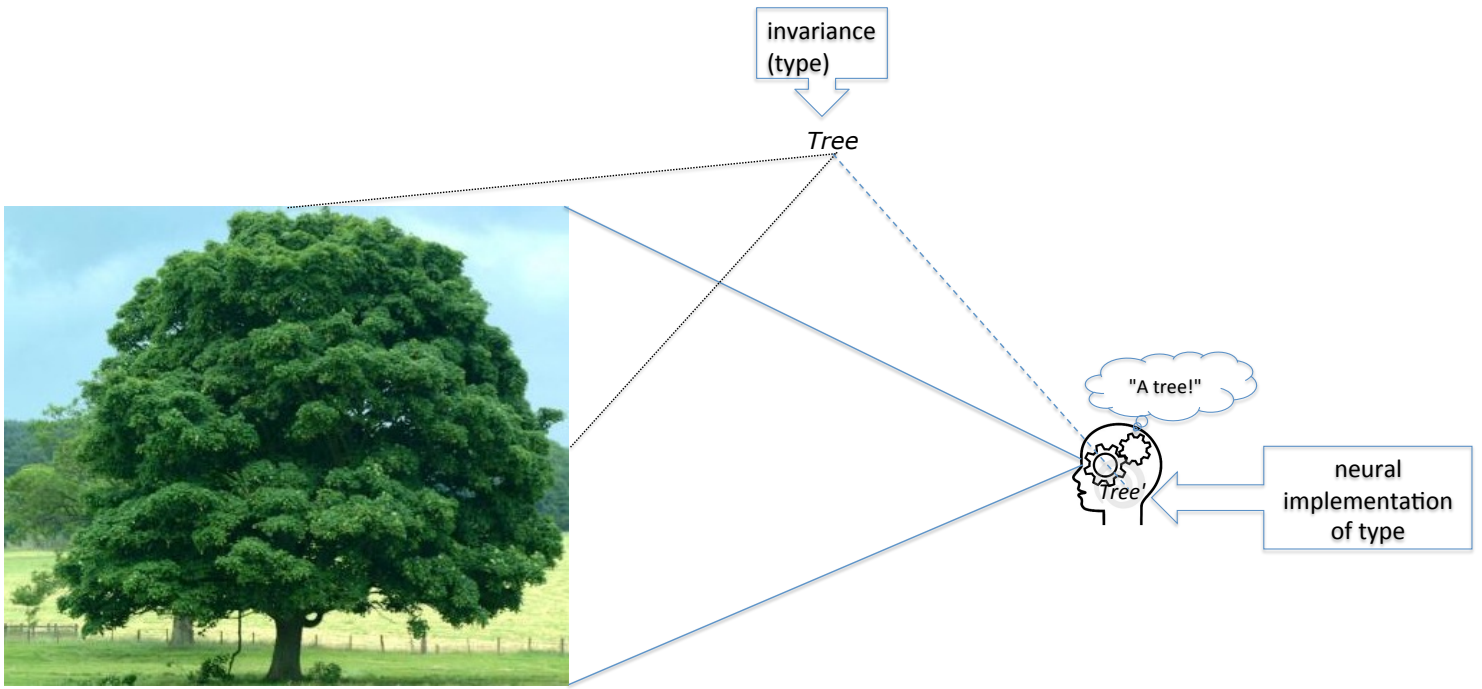

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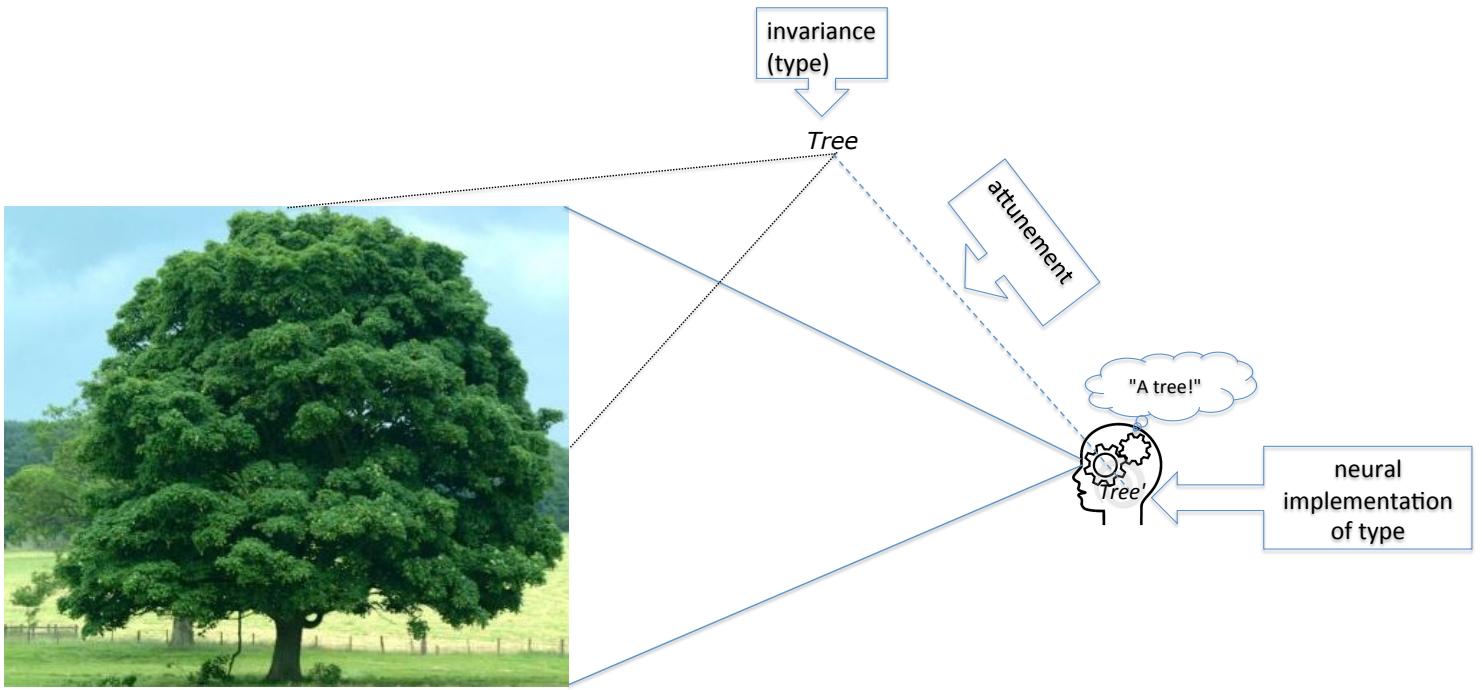

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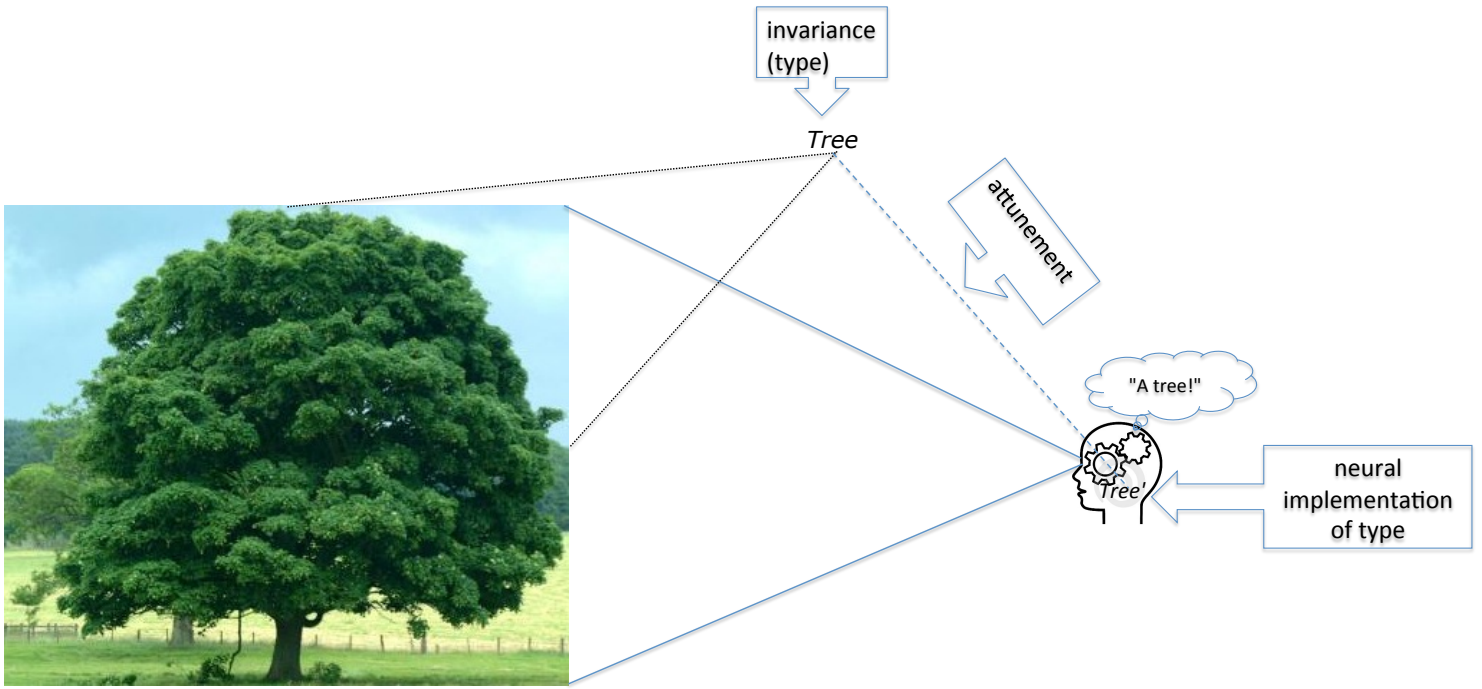
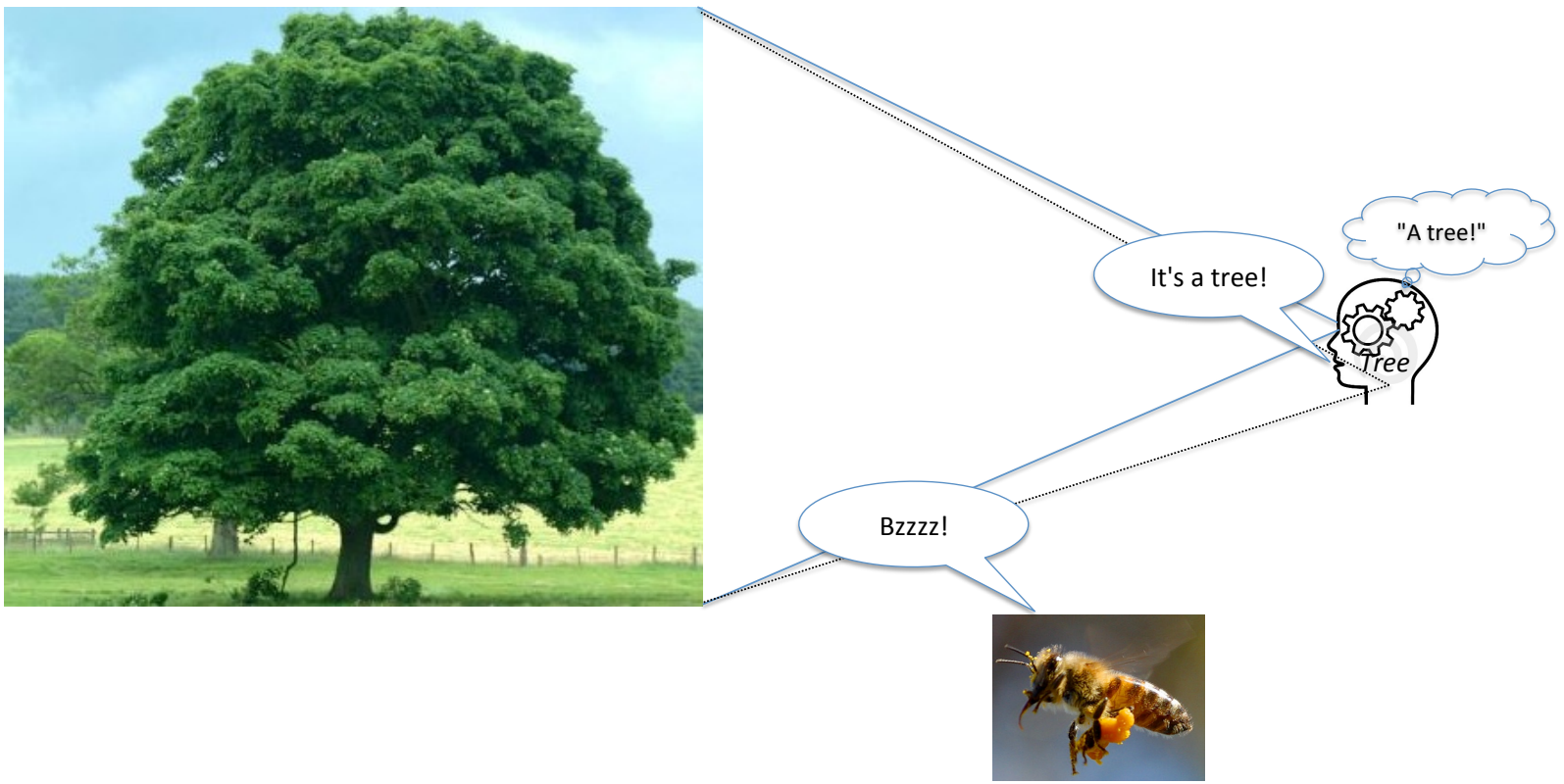



Gibson (1986); Barwise and Perry (1983)

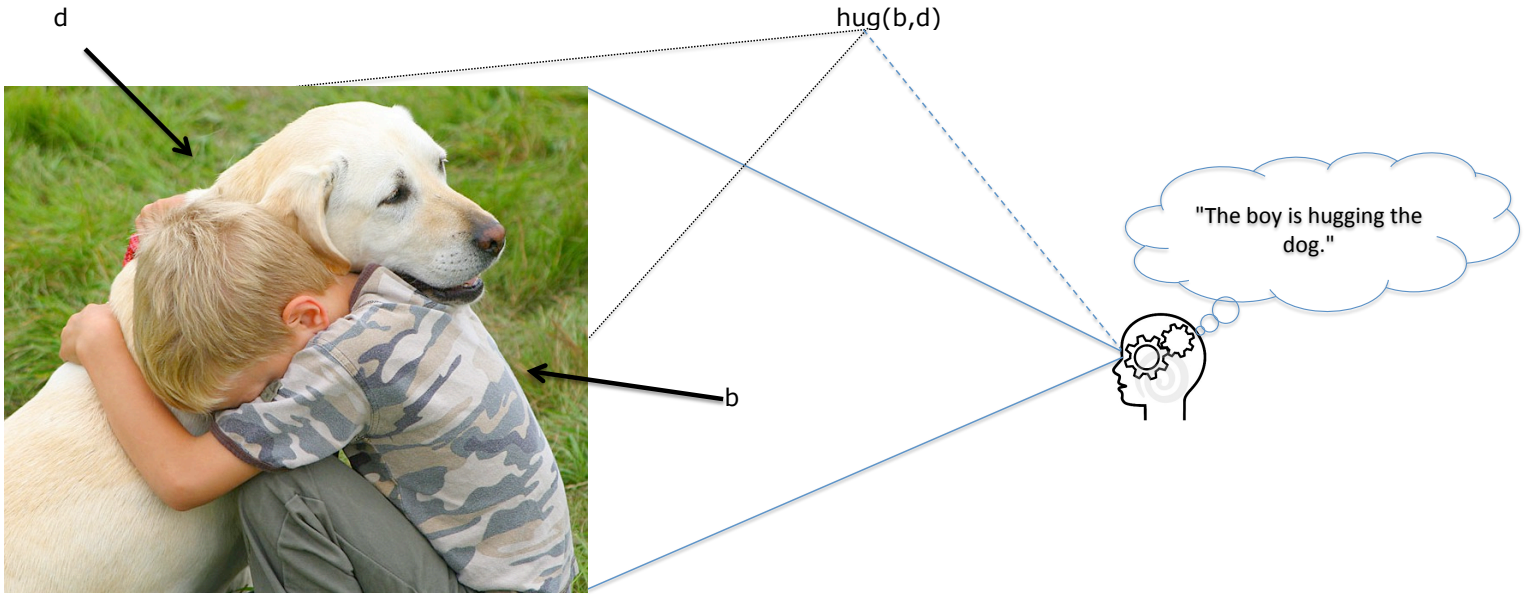
# Judgement

- (An agent judges that) object $a$ is of type $T$.
- $a : T$

# Perception by different species



# Seeing a hugging event




Judgements at the centre

# Subjective judgements and Austinian propositions

- agent $A$ judges object $a$ to be of type $T$, $a :_A T$
- subjective Austinian proposition : $\begin{bmatrix} \text{situation} & = & s \\ \text{type} & = & T \\ \text{agent} & = & A \end{bmatrix}$

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- Ultimately, we would probably also want to include at least the time at which the agent makes the judgement

# Types of Austinian propositions

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  Includes both objective (without agent) and subjective propositions (with agent)

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  a partially specified type of subjective propositions

# Types as objects of dialogical negotiation

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  and claims you can instantiate it with a true proposition
- answering *yes* (agreeing) means you can also instantiate it with a true proposition
- answering *no* (disagreeing) means you can instantiate a type with an incompatible type-field (e.g. *soup-is-disgusting*) (*cf.* Cooper and Ginzburg, 2012, on negation)

# *de se* type acts

- Let $\mathcal{T}$ be a function of type $(Ind \rightarrow Type)$
- a kind of *dependent type*
- *cf.* Perry (1977); Lewis (1979); Ninan (2010); Schlenker (2011)

judgements $o :_A \mathcal{T}(A)$ "agent $A$ judges object $o$ to be of type $\mathcal{T}(A)$"
$:_A \mathcal{T}(A)$ "agent $A$ judges that there is some object of type $\mathcal{T}(A)$"

queries $o :_A \mathcal{T}(A)?$ "agent $A$ wonders whether object $o$ is of type $\mathcal{T}(A)$"
$:_A \mathcal{T}(A)?$ "agent $A$ wonders whether there is some object of type $\mathcal{T}(A)$"

creations $:_A \mathcal{T}(A)!$ "agent $A$ creates something of type $\mathcal{T}(A)$" (useful if $\mathcal{T}(A)$ is a type of situation)

# Type acts are prelinguistic

- type acts (including *de se* type acts, Teller, 2011) do not supervene on language
- speech acts are supervenient on type acts
- a dog taking part in a game of fetch realizes that it, itself, must act in order to realize the type of the game
- cf SELF in object oriented programming

Type acts