Reference and Indexicality

Erich Rast *erich@snafu.de*

PhD Defense
14th December, 2006

Target versus Source Language

Philosophical/logical/semantic analysis involves the rule-governed mapping of expressions of the source language to expressions of the target language.

Target versus Source Language

Philosophical/logical/semantic analysis involves the rule-governed mapping of expressions of the source language to expressions of the target language.

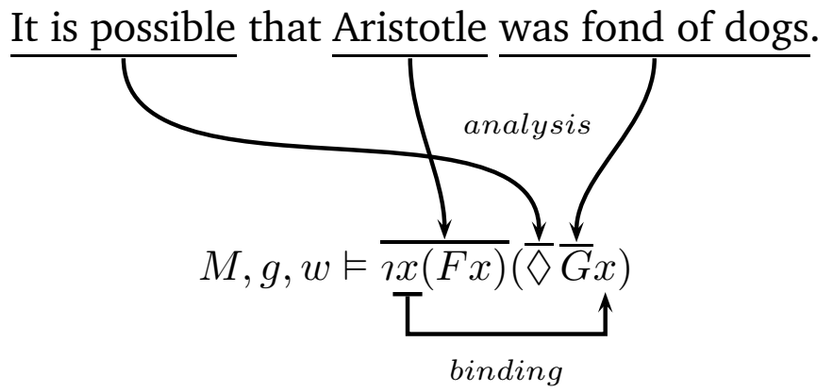


Figure 3.2: Wide scope analysis of an English sentence.

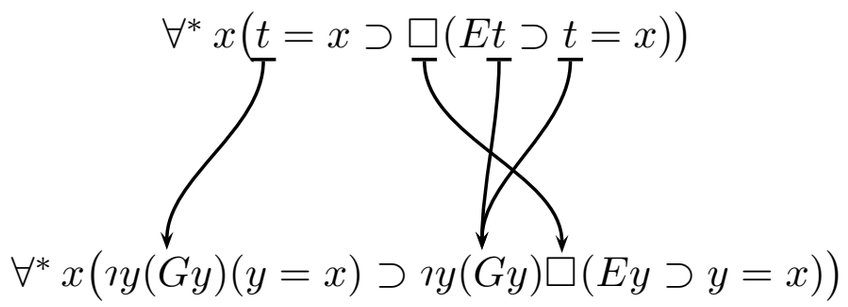


Figure 3.3: Wide scope translation of one expression into another expression of FOML.

Note: lingua universalis (characteristica universalis) vs. calculus ratiocinator

Reference

Reference is a technical notion that has been used in at least three ways in the literature:

(1) Semantic Reference
Semantic reference is minimally a dyadic relation between terms used and objects.

(2) Speaker Reference
Speaker reference is minimally a triadic relation between terms used, speakers, and objects.

(3) Extralinguistic Reference
Extralinguistic reference is minimally a dyadic relation between agents and objects.

Reference: Example

SHRDLU

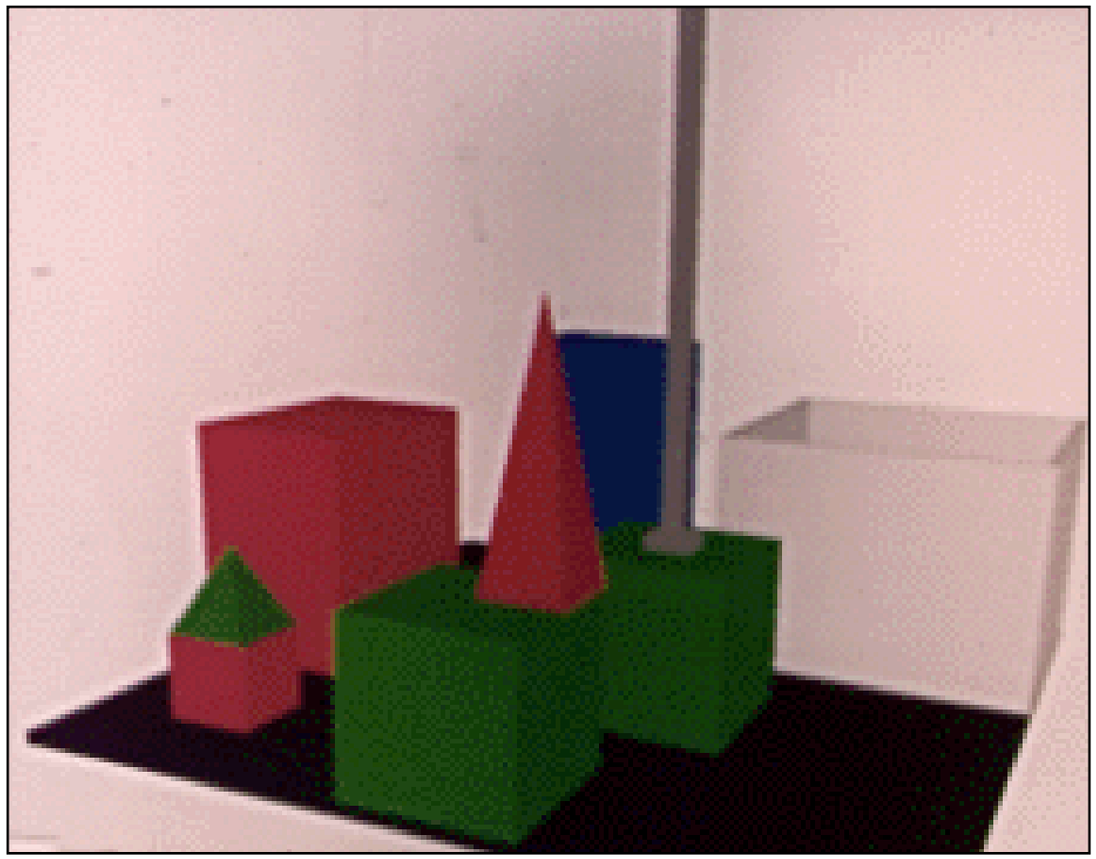
Request: *Take the blue block!*

⇨The robot takes the green block.

Semantic Referent: the blue block

Speaker Referent: the green block

Extralinguistic Referent: the green block



Having an extralinguistic referent can make sense even if no language is used at all.

Identifying Reference (1)

Originally used by Strawson (1964) in a different sense, the notion *Identifying Reference* is equivocally used for the following aspects of reference:

(1) <u>Ability to Identify the Semantic Referent</u>
A speaker's may have the *ability* to successfully identify the semantic referent of a singular term.

(2) <u>Successful Identification</u>
A speaker may *in fact* successfully identify the semantic referent.

(3) <u>Condition on Successful Speaker Reference</u>
A *condition* on speaker versus semantic reference has to be fulfilled in order for the speaker reference to be successful:

$$M, g, w_0 \vDash \imath x[@\, Ax]\imath y[\Box_1\, Ay \wedge I_1 y \wedge \cdots \wedge I_n y](x = y) \qquad (4.22)$$

doxastic modality
e.g. belief

Identifying Reference (2)

(1) Identifying Reference is not required by virtue of semantic competence.

(2) Identifying Reference is an epistemic success condition on speaker reference.

(3) Semantic reference is indispensable for the purpose of formulating such a condition, as it serves as *corrigens* to individual speaker references.

(4) Speaker reference is likewise indispensable for the purpose of formulating such a condition, as individual speaker references can be the *corrigenda*.

Direct versus Indirect Reference

(1) Indirect Reference View

"According to the indirect reference view reference must always be mediated by some sort of meaning." [18]

e.g. Frege, Russell (partly), Searle, Dummett, Sosa

Related:
Frege–Russell View, Description Theory, Sense vs. Reference

(2) Direct Reference View

"[...] direct reference theory assumes that it is at least under certain circumstances and by means of certain expressions possible to refer to objects without any mediation through meaning or Fregean senses." [42/44]

e.g. Kripke, Donnellan, Kaplan, Putnam, Burge, Soames, Recanati, Salmon

Related:
Millianism, New Theory of Reference, causal theory of names

Description Theory

- Description Theory is an implementation of the indirect reference view.
- Russell (1963): Ordinary proper names are definite descriptions in disguise.
- This is here regarded as the view that source language proper names are mapped to target language iota terms or corresponding uses of quantifiers [21]:

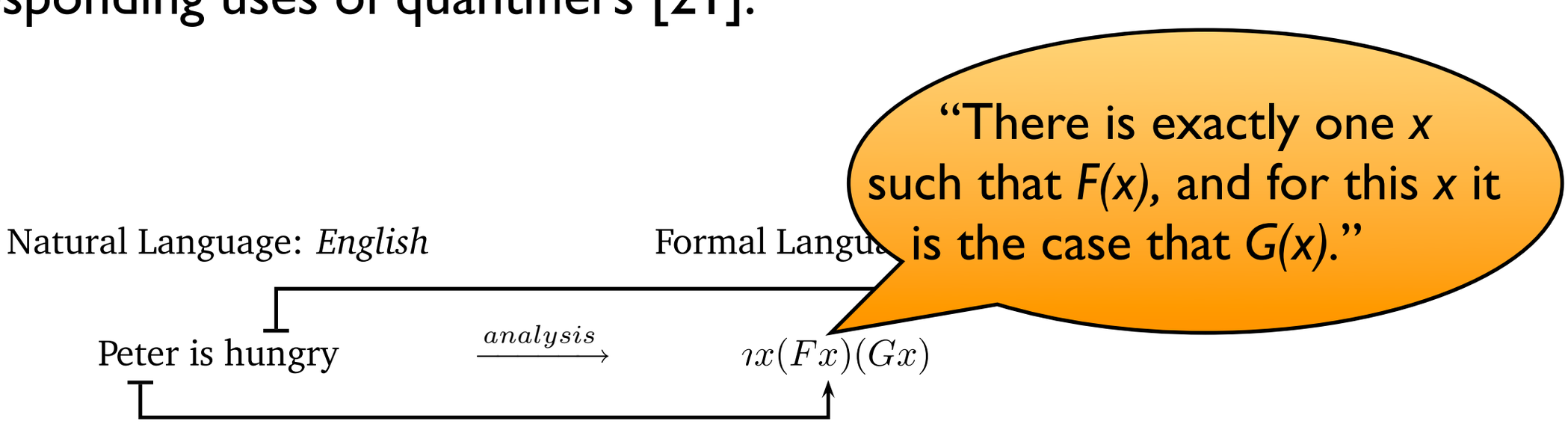


Figure 2.1: Analysis as a translation from natural language to formal language.

Nominal Description Theory

NDT is based on the property of being called by a name (see Bach 1987, 2005). My version of DT based on NDT works as follows [84]:

the unique object that is actually being called "Aristotle"

☆ **Ref 18** (NDT Scheme).

Semantic Reference: $\ldots \iota x \boxed{@\, Ax} \ldots$

Speaker Reference: $\boxed{\Box_1} \ldots \boxed{\iota x \circledcirc (Ax \wedge I_1 x \wedge \cdots \wedge I_n x)} \ldots$

Mention EDT here!

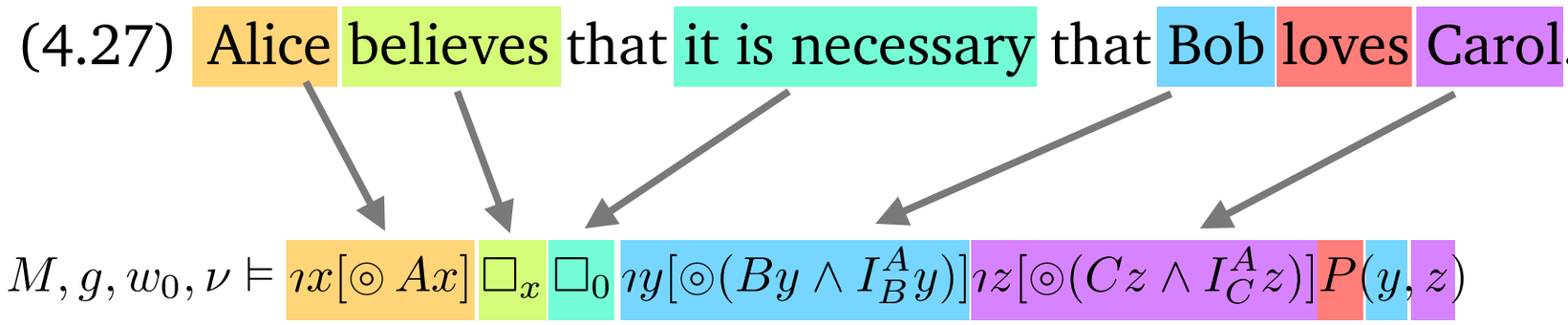
doxastic modality
e.g. *belief*

the unique object that is being called "Aristotle" according to the first doxastic de dicto modality (as long as there is one; otherwise in the actual world) and also fulfills subjective identification criteria of the attitude holder

Relativized Rigidity

Example: NDT

(4.27) Alice believes that it is necessary that Bob loves Carol. [88/91]



$M, g, w_0, \nu \vDash \imath x[\circledcirc Ax]\ \Box_x\ \Box_0\ \imath y[\circledcirc(By \wedge I_B^A y)]\imath z[\circledcirc(Cz \wedge I_C^A z)]P(y, z)$ (4.49) [90/93]

The interpretation of the proper names under a de dicto reading of the belief ascription depends on Alice in two ways:

(1) Alice's subjective identification criteria are added, but aren't required by virtue of Alice's linguistic competence in using the proper names.

(2) The definite descriptions corresponding to "Bob" and "Carol" are evaluated with respect to what Alice believes / are non-rigid with respect to belief, but rigid with respect to the embedded alethic modal operator.

Relativized Rigidity

Why Description Theory?

(1) Description theory is *not* needed for semantic reference. Direct reference / Millianism works fine, as long as referential opacity is ignored. There is also nothing wrong with the Causal Chain Theory of proper names as far as semantic reference is concerned.

(2) Recall: Semantic reference *and* speaker reference are needed for formulating an epistemic success condition:

$$M, g, w_0 \vDash \imath x[@\, Ax] \imath y[\Box_1\, Ay \wedge I_1 y \wedge \cdots \wedge I_n y](x = y) \qquad (4.22)$$

(3) Non-formulable modal description theory with relativized rigidity is a compelling view on speaker reference, because...

a. it seems reasonable to assume that a speaker attempts to identify an object by means of some of the properties he believes the object to have, and

b. properly contextualized it works well with indexicals.

Rigidity

Kripke (1972):

"Let's call something a *rigid designator* if in every possible world it designates the same object, a *non-rigid* or *accidental designator* if that is not the case. [...] A rigid designator of a necessary existent can be called *strongly rigid*." [43: Kripke 1981, 48]

Two of Kripke's theses (among many others) are:

(1) Rigidity Thesis for Proper Names
Names are rigid designators. [43: Kripke 1981, 48-9]

(2) Refutation of Description Theory
A description or cluster theory of proper names is incompatible with the fact that names are rigid designators. [43: Kripke 1981, 10-2; 57]

Challenges for Description Theory

(1) Modal Arguments

Proper names are rigid designators, definite descriptions usually are non-rigid and only *may* be rigid.

(2) Epistemic Arguments

According to description view, certain statements would be knowable apriori that in reality are only knowable a posteriori.

(3) Semantic Arguments

a. There is no evidence that a competent speaker has to associate a description with the use of a proper name.
b. If a description turns out to pick another object *b* instead of *a*, we usually would say that the corresponding proper name still denotes *a* (Gödel/Schmidt Cases).

Answers given by NDT

(1) Modal Arguments

Semantic reference:

a. The description is rigidified.

b. Some of Kripke's/Soames' intuitions about evaluating simple sentences in counterfactual circumstances aren't shared.

(2) Epistemic Arguments

a. It can be known a priori that the unique object that is actually called "Aristotle" is actually called "Aristotle" in our speaker community.

b. Statements involving the identification criteria of a speaker are *believed* to hold a priori, but that doesn't suffice to justify a priori knowledge.

(3) Semantic Arguments

a. The property of being called by a certain name doesn't presume identifying reference; the account is not circular.

b. Formulable description view is rejected: We are interested in an epistemic condition for successful identification of the semantic referent, not in a cognitive model of a speaker's performance when she tries to identify it.

c. Identification criteria are not required by virtue of linguistic competence; they are required for epistemic reasons.

Note: 3c only if trying to identify an object means trying to identify it by means of properties it is supposed to have

Indexicals

The description theory of reference can easily be contextualized. There are two sorts of context:

(1) Context of Utterance: The concrete situation in which utterances are made. It has a definite speaker, addressees, and other discourse participants, a time, a location, and takes place in the actual world in non-narrative contexts.

(2) Conversational Context: Complex comprising many factors like the mutually shared beliefs of discourse participants (common ground), social norms, epistemic norms or conventions, discourse topic, etc.

Almost all uses of indexicals and demonstratives depend on the context of utterance (egocentricity), and many uses of indexicals depend on the conversational context, since they are systematically vague. Proper names depend on the conversational context, definite descriptions can depend on both.

Proper names are relatively rigid, definite descriptions sometimes rigid, sometimes non-rigid, demonstratives and indexicals are absolutely rigid with only few possible exceptions.

Examples

Mention token-reflexivity

(1) I'm hungry.

'I' in (1) refers to the speaker of (1).

$M, g, c, k \models$ (**iota** X (Speaker X))(hungry X)

(2) Alice works hard, but not now.

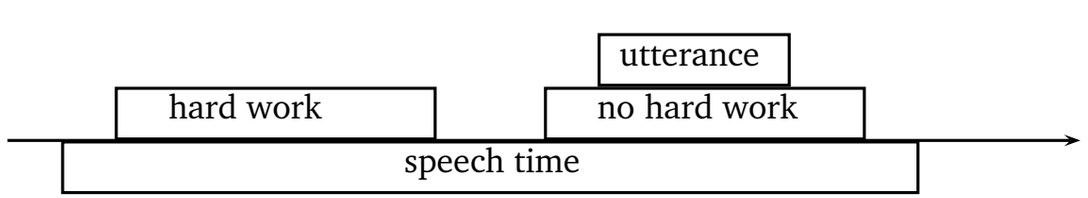


Figure 7.1: Egocentricity of «now» versus bare present tense in example 7.56.

(3) *Alice to Bob, facing a building:* The left entrance was locked.

(7.97) $M, g, c, k \models$

```
(Past C1)
(iota C1 . SUBJ
   (iota X (Speaker X))
   (and (entrance C1 . SUBJ)(leftOf SUBJ X)))
(locked C1 . SUBJ)
```

Some Differences To Other Approaches

(1) Reference rules are expressed in the object language.

(2) Both contexts are parameterized.

(3) Many expressions depend on the conversational context, but only egocentric expressions depend on the context of utterance.

(4) A version of first-order predicate logic is used.

(5) Non-traditional predication theory is assumed [Sinowjew/Wessel].

(6) Description theory doesn't work for essential indexicals [Perry et al.].

However: If description theory is used for cases that in the traditional view would be de re, e.g. using a demonstrative to refer to oneself from a 3rd person perspective [Kaplan's burning pants], then de se attitudes can be described as de re attitude attributions.

Samesaying / Semantic Content Issue

Pagin/Glüer-Pagin 2005: "The main problem with this suggestion [actualized DT] is that as long as we equate linguistic meaning with standard possible worlds intension, the synonymy, i.e. sameness of meaning, of 'Aristotle' and 'the actual teacher of Alexander' does not consist in anything more than their both having the constant function from worlds to Aristotle as intension. But then, 'the actual teacher of Alexander' is also synonymous with 'the actual most prominent pupil of Plato' as well as with 'the actual author of *De Interpretatione*'. As long as we take content to be standard intension, the descriptive contents of the original non-rigid descriptions are simply lost when they are rigidified: Rigidifying is collapsing contents. For saving the description theory, a more elaborate idea of linguistic meaning is needed." [Pagin/Glüer-Pagin 2005: 22]

Reply: Pagin/Glüer-Pagin are right. In the extensional view, two functions are identical if they yield identical results for any given input value, i.e. if they have the same Werteverlauf. In the present view it is not assumed that linguistic meaning is represented by intensions; otherwise we'd need a two-dimensional logic. Instead it is claimed that lexical meaning is represented by entries in the lexicon, i.e. target language schemes, under the assumption of later being interpreted in intended models after semantic composition. A much more elegant way is to map syntactic source language structures directly into expressions of an algebra [Montague, UG].

The Necessary A Posteriori

Examples of the necessary a posteriori:

(1) Alice = Bob
(2) Saul Kripke ≠ David Kaplan. [Soames 2005, 30]
(3) Water is H_20.

Kripke/Soames: Utterances like (1)-(3) are necessarily true, but only knowable a posteriori.

Standard Counter-Argument: If they are necessarily true, then there is no world in which they are false. Thus there is no empirical evidence that could falsify them. Hence, they cannot be a posteriori.

Possible fix: epistemic two-dimensionalism

The Necessary A Posteriori?

(1) Alice = Bob

(2)
$$M, g, w_0 \vDash \imath x \circledcirc Ax \imath y \circledcirc By(x = y)$$

$$\Updownarrow$$

$$M, g, w_0 \vDash \imath^* x[Ex \wedge \circledcirc Ax] \imath^* y[Ey \wedge \circledcirc By](x = y)$$

The Necessary A Posteriori?

(1) Alice = Bob

(2) $$M, g, w_0 \vDash \imath x \circledcirc Ax \imath y \circledcirc By(x = y)$$

$$\Updownarrow$$

$$M, g, w_0 \vDash \imath^* x[Ex \wedge \circledcirc Ax]\imath^* y[Ey \wedge \circledcirc By](x = y)$$

If (2) is true, it doesn't follow that (3) must hold:

(3) $$M, g, w_0 \vDash \Box\left[\imath x \circledcirc Ax \imath y \circledcirc By(x = y)\right]$$

$$\Updownarrow$$

$$M, g, w_0 \vDash \Box\left[\imath^* x[Ex \wedge \circledcirc Ax]\imath^* y[Ey \wedge \circledcirc By](x = y)\right]$$

So (1) is in this view contingent a posteriori, not necessary a posteriori. Still, the corresponding terms $\iota x \circledcirc Ax$ and $\iota x \circledcirc Bx$ are rigid designators as long as the referents actually exist as well.

However: This semi-actualism is perhaps not desirable.

The Necessary A Posteriori?

(1) If Alice and Bob exist, then Alice = Bob.

(2) $$M, g, w_0 \vDash \left[\left(\imath x[\circledcirc Ax]Ex\right) \wedge \left(\imath y[\circledcirc By]Ey\right)\right] \supset \imath x[\circledcirc Ax]\imath y[\circledcirc By](x = y)$$

$$\Updownarrow$$

$$M, g, w_0 \vDash \left[\left(\imath^* x[Ex \wedge \circledcirc Ax]Ex\right) \wedge \left(\imath^* y[Ey \wedge \circledcirc By]Ey\right)\right] \supset \imath^* x[Ex \wedge \circledcirc Ax]\imath^* y[Ey \wedge \circledcirc By](x = y)$$

If (2) is true, then (3) should hold, too:

(3) $$M, g, w_0 \vDash \Box\left(\left[\left(\imath x[\circledcirc Ax]Ex\right) \wedge \left(\imath y[\circledcirc By]Ey\right)\right] \supset \imath x[\circledcirc Ax]\imath y[\circledcirc By](x = y)\right)$$

$$\Updownarrow$$

$$M, g, w_0 \vDash \Box\left(\left[\left(\imath^* x[Ex \wedge \circledcirc Ax]Ex\right) \wedge \left(\imath^* y[Ey \wedge \circledcirc By]Ey\right)\right] \supset \imath^* x[Ex \wedge \circledcirc Ax]\imath^* y[Ey \wedge \circledcirc By](x = y)\right)$$

We must assume that $\iota^* x[Ex \wedge \circledcirc Ax]$ denotes the same object in all worlds *in which it denotes*.

Under this assumption, (1) is an example of a statement that is necessarily true but only knowable a posteriori.

Alternative 1: Modest Actualism

Existence stipulations part of subjective and objective meaning

We can distinguish several cases:

(1) Proper Names for Empirical Entities

e.g. "Alice" $\quad \iota^* x \circledcirc [Ex \wedge Ax]$

the unique object that actually exists and is actually called "Alice"

(2) Proper Names for Fictional Entities

e.g. "Superman" $\iota^* x [\circledcirc(\neg Ex \wedge Sx) \wedge \Diamond Ex]$

the unique object that actually doesn't exist, is actually called "Superman", and might exist

(3) Proper Names for Mathematical Entities

e.g. "π" $\quad \iota^* x [\circledcirc(Ex \wedge Px) \wedge \Box Ex]$

cannot be confirmed a posteriori

the unique object that exists necessarily and is actually called "π"

Many open problems: proper names for historical entities might need to comprise the statement that the referent has existed but no longer exists. Questions like that heavily depend on possibilism versus actualism.

If (1) is chosen, then there will be necessary identity statements that are only knowable a posteriori.

Alternative 2: Modest Possibilism

We can distinguish several cases:

(1) Proper Names for Empirical Entities

e.g. "Alice" $\quad \iota^* x \circledcirc Ax$ — the unique object that is actually called "Alice"

(2) Proper Names for Fictional Entities

e.g. "Superman" $\quad \iota^* x \circledcirc Sx$ — the unique object that is actually called "Superman"

(3) Proper Names for Mathematical Entities

e.g. "π" $\quad \iota^* x[\circledcirc Px \wedge \Box Ex]$ — the unique object that exists necessarily and is actually called "π"

In this view, the existence presupposition isn't part of the meaning of a name, except in case of strongly rigid proper names for mathematical entities.
N.B. We need to assume a possibilist definition of rigid designation if this position is taken.

The Contingent A Priori

Example of the contingent a priori: [Kripke 1981, 54-6; 63 fn. 26]

(1) Stick *S* is one metre long at t_0.
(2) Water boils at 100 °C at sea level.
(3) If there's a unique F, then the x: actually Fx = the x: Fx [Soames 2005, 39]

Kripke: If *S* was used to fix the scale at t_0, (1) is knowable a priori *for the agent that has fixed it that way*, cf. [Stojanovic 2004] . Yet, given that "one metre" is a rigid designator, *S* could have had another length at that time.

Reply: This a form of linguistic a priori, but notice the clause in italics above. See [Stojanovic 2002, 2004] for a detailed analysis and critique of Kripke's and Kaplan's claims about the contingent a priori. Soames 2005 is also sceptical and preferably discusses examples like (3).

Twin Earth [Putnam 1975]

Language 1: English

(1) "Water" denotes H_2O.

Earth

Alice

Language 2: Twenglish

(1') "Water" denotes XYZ.

Twin-Earth

Twalice

Alice and Twalice are in the same, qualitatively undistinguishable physical state.

(2) Alice: *Water is wet.* (about H_2O)
(2') Twalice: *Water is wet.* (about XYZ)

Conclusion drawn by Semantic Externalists: The physical state of the epistemic agents/speakers doesn't fully individuate the (a) meaning of the utterances (semantic externalism), (b) nor does it fully individuate Alice's and Twalice's corresponding thoughts (externalism of thought content).

Twin Earth [Putnam 1975]

Language 1: English

(1) "Water" denotes H_2O.

Earth

Alice

Language 2: Twenglish

(1') "Water" denotes XYZ.

Twin-Earth

Twalice

Alice and Twalice are in the same, qualitatively undistinguishable physical state.

(2) Alice: *Water is wet.* (about H_2O)
(2') Twalice: *Water is wet.* (about XYZ)

Conclusion drawn by Semantic Externalists: The physical state of the epistemic agents/speakers doesn't fully individuate the (a) meaning of the utterances (semantic externalism), (b) nor does it fully individuate Alice's and Twalice's corresponding thoughts (externalism of thought content).

Possible Replies: (i) The puzzle cannot be formulated from the perspective of semantic internalism, i.e. in 1750 before H20 and XYZ have been discovered.

Twin Earth [Putnam 1975]

Language 1: English

(1) "Water" denotes H_2O.

Earth

Alice

Language 2: Twenglish

(1') "Water" denotes XYZ.

Twin-Earth

Twalice

Alice and Twalice are in the same, qualitatively undistinguishable physical state.

(2) Alice: *Water is wet.* (about H_2O)
(2') Twalice: *Water is wet.* (about XYZ)

"Water is H20" globally underdetermined ? not in temporal version--it is supposed that experts now can decide H20 from XYZ

Conclusion drawn by Semantic Externalists: The physical
epistemic agents/speakers doesn't fully individuate the (a
utterances (semantic externalism), (b) nor does it fully ir
Twalice's corresponding thoughts (externalism of thought content).

Possible Replies: (i) The puzzle cannot be formulated from the perspective of semantic internalism, i.e. in 1750 before H20 and XYZ have been discovered.(ii) Alice: *Water might be XYZ.* utterance is true, hence "Water" is not rigid

Primary vs. Secondary Intension

$[\![e]\!] : W \times W \rightarrow Extensions$ [Pagin/Glüer-Pagin 2005, 22; N.B. the typo–brackets wrong]

$[\![e]\!]^1 := \lambda w.\langle [\![e]\!](w, w)\rangle$ primary intension (diagonalized content)

$[\![e]\!]^2_{w_i} := \lambda w.\langle [\![e]\!](w_i, w)\rangle$ secondary intension at w_i

Pagin/Glüer-Pagin 2005: the linguistic meaning of e is $\langle [\![e]\!]^1, [\![e]\!]^2_{w_0}\rangle$

For comparison, the primary intension of e would be in DIML:

$\lambda i.\langle [\![\Delta e]\!](c)(i)\rangle = \lambda i.\langle [\![e]\!](c \lhd world(i) \lhd time(i))(i)\rangle$ [151, 6.21; N.B. the typo–(i) is missing]

The secondary intension of e at i_n in DIML:

$\lambda i.\langle [\![e]\!](c \lhd world(i_n) \lhd time(i_n))(i)\rangle$

"the actual teacher of Alexander" differs from "the teacher of Alexander" in secondary intension

"the actual teacher of Alexander" differs from "the actual author of *De Interpretatione*" in the primary intension

Note: (a) not so simple in DIML, because contexts and indices are to be kept apart! (b) Doesn't work, since scenarios aren't contexts. [Chalmers 2006]

Epistemic Two-Dimensionalism

[e.g. Chalmers 2006; Jackson]

S: the set of scenarios (canonically describable epistemic alternatives)

W: the set of metaphysically possible world-states

$[\![e]\!]^1 : S \rightarrow Extensions$ primary intension

$[\![e]\!]^2 : W \rightarrow Extensions$ secondary intension

$[\![e]\!] : S \times W \rightarrow Extensions$ two-dimensional intension

e is metaphysically necessary iff. $\forall w \in W : [\![e]\!]^2(w) = 1$

e is a priori iff. $\forall s \in S : [\![e]\!]^1(s) = 1$

Epistemic Two-Dimensionalism: Example

[Chalmers 2006; Jackson]

(1) Water is H_20.

... is metaphysically necessary, because $\forall w \in W : [\![(1')]\!]^2(w) = 1$

... is a posteriori, because $\exists s \in S : [\![(1')]\!]^1 = 0$

(2) If there's a unique F, then the x: actually Fx = the x: Fx [Soames 2005, 39]

... is contingent, because $\exists w \in W : [\![(2')]\!]^2 = 0$

... is a priori, because $\forall s \in S : [\![(2')]\!]^1 = 1$

(3) There is a sentence token.

... is a posteriori, because $\exists s \in S : [\![(1')]\!]^1 = 0$

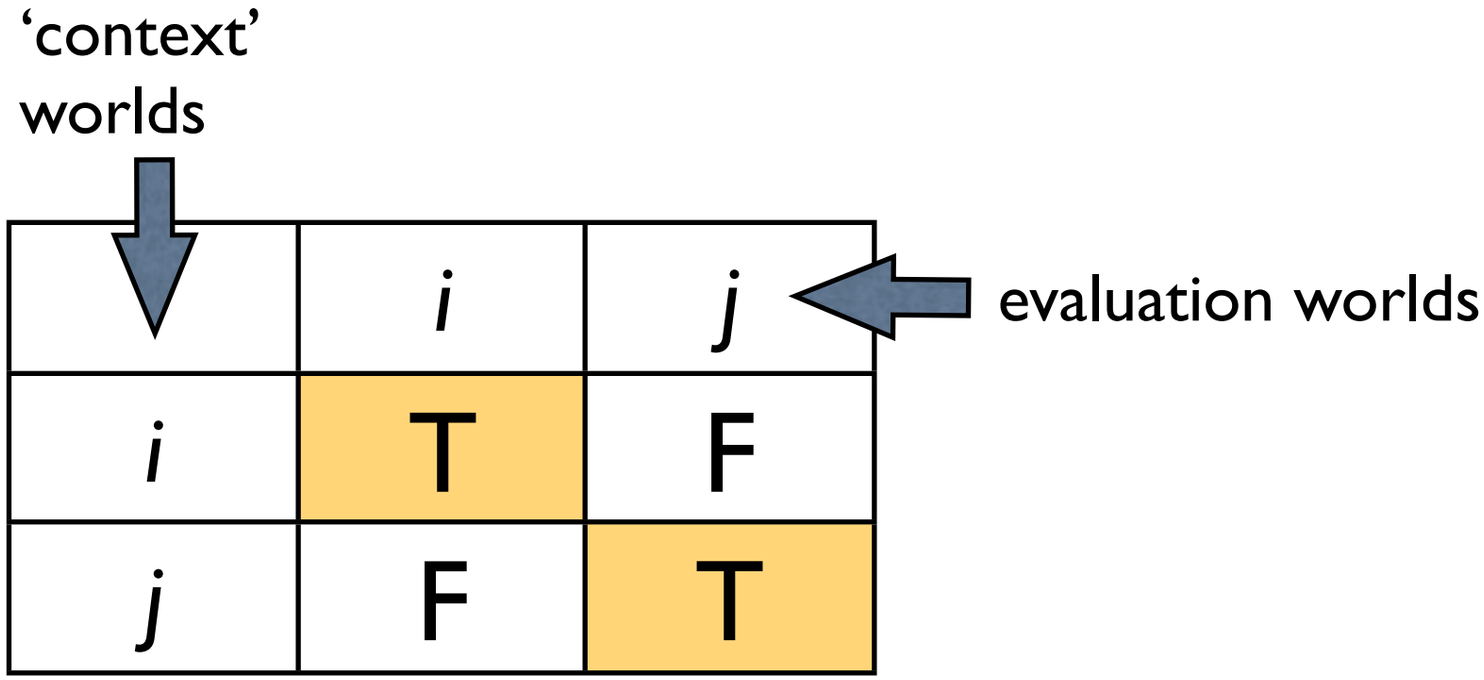
There is a scenario in which there is no language at all. This is a key difference between epistemic and semantic/contextual two-dimensionalism. A context of utterance comprises the use of a token for communicative purposes. Epistemic two-dimensionalism is orthogonal to semantic two-dimensionalism.

Why ‘Diagonalization’?

[Stalnaker 1978, 2006; cf. Carpintero 2006]

Propositional Concepts: functions from possible worlds to propositions

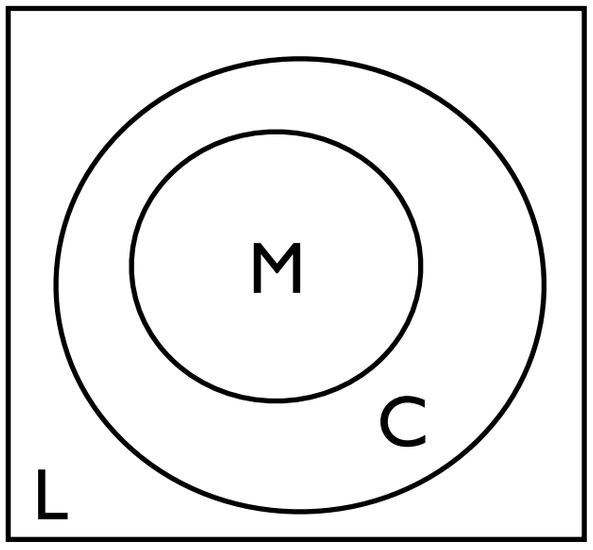
(1) Phosphorus is the bright star appearing to the east, if it exists.



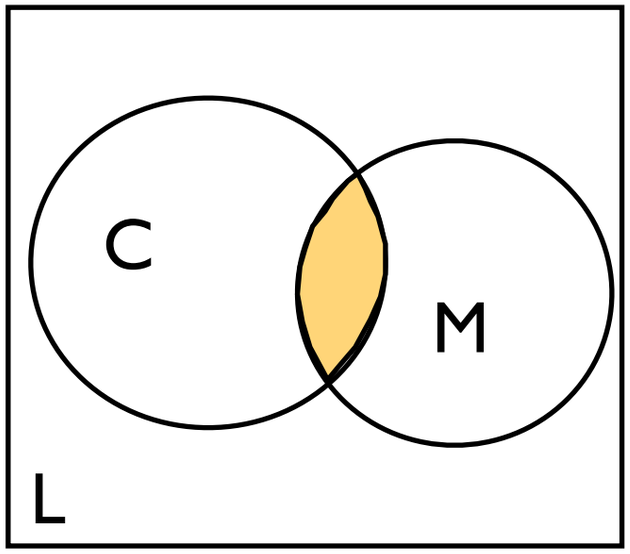
In *i* the bright star is the Venus, in *j* the bright star to the east is Mars.

Conceivability vs. Metaphysical Possibility

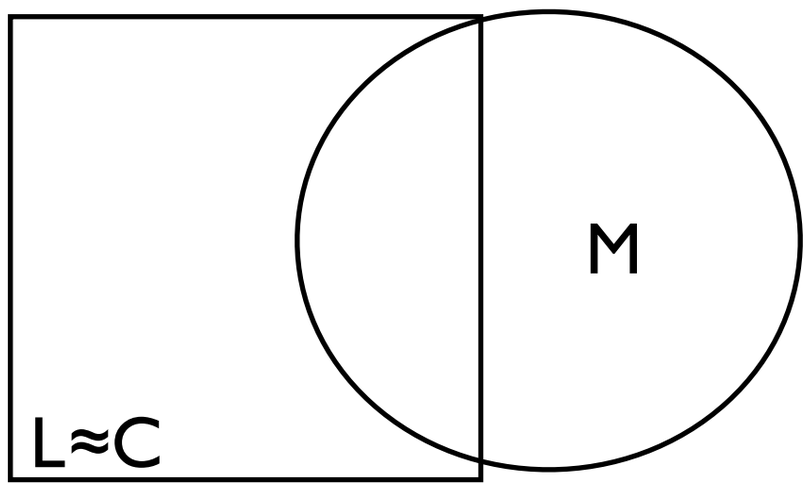
'standard' view



Chalmers?



Putnam??



Possible worlds metaphysics is full of dangers.

There are many futures for us to consider