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Abstract: A speaker's understanding of a language and beliefs can be represented as a function mapping sentence types, times, places, contemporaneously valued sentences and other parameters to numeric valuations. Functions of this kind permit comparing one speaker's understanding and beliefs with another's, though not a speaker's beliefs directly with the world. A simple model of a linguistic community is developed here containing sentence- and speaker-analogues, each of the latter having her own such function, but no world to speak of. Imposing reasonable constraints on it, it is shown that concepts directly corresponding to the familiar concepts of semantics, including those of truth and reference, are apt to describe it. The suggested semantic theory shows that for the purposes of semantics, no relation need be assumed to exist between words and non-linguistic objects.

Keywords: semantics, truth, proposition, coherentism, Davidson, Wittgenstein

Semantics without Information

Neuroscience tells us –what is subjectively evident anyway– that language-speakers experience apparently true sentences differently than apparently false ones (Harris et. al. 2008). Having sound eyesight and being confronted in good lighting with a dog sitting squarely on a rug, an English speaker will be affected differently by 'The dog is on the rug' than by 'The dog is not on the rug'. It is natural to think that semantic theory should play a role in explaining such differences. On hearing a sentence, the natural thought goes, a speaker's cognitive apparatus assigns it a semantic interpretation, and it is the juxtaposition of this with what the sensory component of that apparatus delivers to her about the scene which occasions in her a feeling of harmony or rightness, or of discord or wrongness, as the case may be. You have to know what an utterance means before you can determine how you feel about it, we are inclined to think[1].

My aim is to make a part of the case that this thought gets the explanatory relation approximately upside down. Our immediate experiences upon hearing sentences, properly conceived, afford us a basis for understanding semantics, not vice versa. If such experiences are taken for the purposes of semantics as given, and if it is allowed that a kind of linguistic correlate of the hedonic calculus can be operated on them, then what emerges is a novel account of the familiar battery of semantic concepts including those of truth, reference and proposition. Of particular interest is the consequence that on this understanding semantic concepts are non-informational, inasmuch as no reference need be made in explicating them to a world of language-independent objects to which linguistic items systematically correspond. The informational aspect of language resides at the causal level according to this picture, relieving philosophy of the burden of fitting it into the semantic frame[2].

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[1]The sort of view pioneered in Dretske (1983) is an example of what I have in mind, here.

[2]The aptness of semantic concepts to figure in psychological explanations, as such concepts are formalized in at

A simple model of a speech community, one containing only speaker- and sentence- analogs and within which semantics is let off the hook for explaining its speakers' valuations of sentences, will be constructed. The interest of the model is that despite its simplicity, it is naturally characterisable in terms of concepts directly corresponding to the familiar concepts of semantics. Although it is a further undertaking to demonstrate that these correlate concepts fully explicate the concepts of semantics, I shall try to make this plausible. Names of the model's concepts will be distinguished by a prepended '_'.

_Value and _Belief

The basic elements of the model are a large set of speakers or _*agents*, a large set of sentence-like strings of sounds, _*sentences*, and a set of functions V_i –one for each _agent– which map _sentences *s* onto _*values v* for their associated _agents,

V_i: $s \rightarrow v$ *(version 1)*

_Values are numbers between 0 and 1 measuring an aesthetic quality intrinsic to token _sentences for _agents, with a value of 1 representing maximum harmony, 0 maximum discord, and 0.5 indifference. The model is constrained so that _agents' _value functions typically closely agree as to the _values of _sentences, but not always[3]. It will be assumed that composing novel, _valuable _sentences is non-trivial and provisionally, that upon encountering them, _agents experience in addition a special form of

least some theories of them, is open to question (c.f. Schiffer 2015). If these theories are seen solely as conceptual analyses of the terms of semantics, without pretense of relevance to science, then the present account can be understood as one among them. If, furthermore, considerations such as Jaegwon Kim's causal exclusion argument as it applies to semantic properties are decisive, then the natural thought is in any case false (Kim 1998: 37-47).

[3]I will use 'typical' throughout to signify this characteristic situation that something is mostly but not always the case.

pleasure or ‘_pleasure’. Until the last refinements of the model are made, the sole purpose of conversation will be to maximize this provisional _pleasure. For any _sentence *s*, an _agent a_i for whom $V_i(s) > 0.5$ will be said to *_believe s*.

The thought that _beliefs can be measured in this way is effectively just Ramsey's as regards beliefs, with one notable difference. In preparing the ground for his treatment of the measurement of degree of belief, Ramsey says of the view that it is perceptible by its owner as a ‘feeling of conviction’,

> [t]his view ... seems to me observably false, for the beliefs we hold most strongly are often accompanied by no feeling at all; no one feels strongly about things he takes for granted. (Ramsey 1990: 65)

Ramsey's mistake, I submit, is to confuse the feeling in question with a feeling about something like the significance or surprisingness of a sentence if true –here, _pleasure– resulting in a failure to find anything of interest for banal observations. The relevant comparisons however are between the likes of ‘The cat is on the mat’ and ‘The cat is not on the mat’ spoken in front of a cat plainly on a mat. The equanimity with which the first sentence is met is not matched for the second, even if the cat's whereabouts are not a matter of pressing interest. The difference is clearly subjectively available. The feeling would normally have the same value for an obvious, banal observation sentence as for an unshakeable but theoretical and important one such as 'Water is H_2O'.

To model sentence types whose truth varies from token to token, the _value function needs at a minimum to be augmented with parameters for time and three-dimensional spatial position, *t* and **x**:

V_i: *s*, *t*, **x** → *v*. *(version 2)*

A _sentence –e.g. 'The sun is up'– now may be _valuable at one time and place but _disvaluable at another. The composite of a _sentence, time and place is naturally conceived to be a _sentence token,

the string of sounds by itself, a _sentence type. It will be assumed that for a given _sentence type argument, _value varies in time and space from _agent to _agent typically in unison[4].

Time and position are a good start but are insufficient. For the model adequately to represent a speaker's responses to observation sentences there needs to be a further parameter representing her focus of attention, **φ.** This compound parameter reflects the fact that we can focus our sensory organs more or less acutely on a point in our surroundings, and so, like the position parameter, is just a set of three values specifying a point in space. For taste and smell, focus collapses to the point representing the _agent's position but for vision, touch and in some measure hearing, with their different constraints, it is typically distinct. The function then becomes,

V_i: *s*, *t*, **x**, **φ** → *v*. *(version 3)*

Taking a token _sentence now to be a complex of the form <*s*, *t*, **x**, **φ**>, it becomes possible to model a variant of Quine's distinction between occasion and standing sentences (Quine 1960: 35-6):

> *Def:* a _sentence type *s* is an *_occasion* _sentence for an _agent *a* over a dated time interval *i iff* the _values of tokens of *s* differ for *a* over *i*. Otherwise, *s* is a *_standing* _sentence for *a* over *i*.

Keeping to the model's constraints, there is no reference to extra-linguistic factors such as stimulus meanings or ocular irradiations.

Inclusion of the position and focus parameters in what is being counted as a token of a _sentence implies that a single utterance may correspond to multiple tokens, whose _values may be influenced by

[4]To be clear, the _value function is merely notional, in that there is not assumed to be any manageable algorithm which would compute it. The actual, contingently arrayed four-dimensional world would have to be built into it. Its interest is solely to schematise the determinants of *_semantic* properties.

the speaker's and hearers' locations and focuses of attention. What it will be simplest to continue calling a 'token' is really then a *token-for-a*. It can be assumed, however, that in typical exchanges the differences in **x** and **φ** between _agents do not result in differences in _valuation.

Introducing within the model an observation/theory distinction requires adding a fifth parameter to the function, the set *B* of token _sentences _believed by the _agent under consideration, excluding the _sentence *s* whose _value is immediately in question. The _value function hence changes to,

V_i: *s*, *t*, **x**, **φ**, $B \rightarrow v$. *(version 4)*

This change suggests,

> *Def: a token _sentence s* is a (pure) *_observation* _sentence for an agent *a iff* the _value of *s* for *a* is independent of *B*. Otherwise, *s* is a *_theory* _sentence.

Like observation and theory sentences, _observation and _theory _sentences exist on a spectrum, here according to the degree of their dependence on the elements of *B*. Even if it is ultimately allowed that, owing to the holistic character of the activity of _value-maximization, no _observation _sentence is wholly independent of *B*, the distinction remains crucial as a relative measure –some _sentences are much more dependent on elements of *B* than others for their _value[5].

[5]The picture of semantics being proposed in some ways resembles a coherence theory. Compare, however, Davidson's rejection of the current distinction: 'I now suggest also giving up the distinction between observation sentences and the rest. For the distinction between sentences belief in whose truth is justified by sensations and sentences belief in whose truth is justified only by appeal to other sentences held true is as anathema to the coherentist as the distinction between beliefs justified by sensations and beliefs justified only by appeal to further beliefs.' (Davidson 2001: 145-6). As I hope will emerge, the bathwater here is the conception of the means of justifying sentences of these types; the baby, the distinction between them.

The definition allows that one token of a _sentence type may be an _observation _sentence but another at a different time or place, a _theory _sentence. This would be the case, for example, for 'The sun is up' spoken out of doors, then briefly later indoors in a windowless room.

Upon coming to _value some new _sentence, the *B* argument to an _agent's _value function will change, and so potentially as a consequence also his _valuations of other elements of *B*. There could, indeed, be a recurring cascade of changes issuing from a single new _belief, or, assuming _valuation relies on fallible heuristics, from careful re-examination of an existing one. Let the model be constrained, though, so that typically, for most _sentences *s* the number of elements of *B* whose removal would result in a change to the _value of *s* is small relative to the size of *B.* Concerning the subset whose elements' being removed from *B* would result in a particular _valued _sentence's becoming newly indifferent for or _disvalued by *a*, I will say provisionally that its elements singly or in combinations *_support* the _sentence *s* for *a*[6].

The upshot is that _beliefs are at once in some measure both malleable and obdurate. An _agent's set of _beliefs can be thought of as existing in a kind of evolving equilibrium –mostly stable, but subject to adjustment under perturbation, with the whole edifice becoming increasingly static as it grows.

_Truth

The propensity of an _agent's set of _beliefs to evolve under the pressures of newly encountered _sentences and reconsideration of existing _beliefs implies that what she _believes at a given moment typically will not optimize _value for her –will not be a subset of any set of _sentences which would afford her maximum _value. Individual maximization of _pleasure being the only goal within the

[6]The impredicativity of the _value function occasioned by the parameter *B* is plausibly a feature, not a bug, in that it enhances the accuracy of the model as a representation of linguistic reality.

model and the best strategy for maximizing _pleasure being to maximize _value, it will be useful to be able to track the distinction between what an _agent actually _believes and what, were she to _believe it, would maximize _value for her. The natural thought is that what is required is an analogue of truth:

> *Def:* For an _agent *a*, a token _sentence *s* is *_true-for-a iff s* is an element of a set all of whose elements are _valuable for *a* and which, if its elements were exactly the _sentences _believed by *a*, would maximize _value for *a*.

A _sentence whose being added to this set would decrease total _value for *a* is *_false-for-a*. At any time, typically, much of what an _agent _believes will be _true for her, but not all, and she will _believe only a small fraction of the totality of what for her are _true token _sentences.

Should the model treat what is _true for one _agent to be _true for all? If _truth is just _truth-for-*a*, then for every disagreement between two _agents about a token _sentence either there is a genuine divergence between them as to what is _true in their respective _idiolects, or their _idiolects properly agree and one or other of them is simply mistaken about what is _true for him. It becomes apparent that the best strategy for _agents individually to maximize _value is to treat all differences as signalling a mistake for one or other _agent –that is, to treat _truth as objective– provided enough _agents opt-in to this strategy and assuming, as we have, both that _agents mostly coincide in their appraisals of _value and that appraisals of _value are at least in part malleable.

To see this, suppose that an _agent disagrees with the majority about some token _sentence broadly taken to be _true. She then forfeits the _pleasure potentially of all _sentences whose _support depends on it, which may be considerable in number. If she disagrees with the majority about even a small fraction of all _sentences, she loses not just the _pleasure of the _sentences hierarchically supported by them but also the confidence that _theory _sentences offered by others will rest on foundations which

she would _value, and hence, in many cases, the possibility of _valuing _sentences on the strength of others' ‘_testimony’. Admittedly, this _agent will get some compensation in the form of hierarchically dependent _sentences she contrives herself on the basis of her _idiolectic _sentences. As even the most prolific of solitary _sentence producers will fall far short of what her community collectively can contrive, however, and since she will be deprived of the *prima facie* error-check afforded by communal acceptance, she will on balance be considerably less well-off. The extra _value to be gained by an individual by participating in a community of _agents in which effectively everyone commits to and contributes to the construction of a single shared edifice of _truths will easily offset the cost of sacrificing the _pleasure of any genuinely _idiolectic _sentential affinities.

Just as an _agent's _value function determines for any given set of _sentences a total _value, all _agents' functions jointly determine a combined aggregate for the linguistic community. Abstracting from _agents' mental limitations corresponding to their finite memories and cerebral computational powers and treating their _value functions as unconstrained, the implied definition of _truth is,

> *Def*: A token _sentence *s* is _true *iff s* is an element of a set which would maximize the combined aggregate _value of all _agents, and the removal of any of whose elements would result in a set of lower aggregate _value.

The objectivity of _truth is naturally built into the implicit contract governing _sentential exchange. In uttering a _sentence an _agent is communicating not merely, 'Here's one I find _valuable, perhaps you will too', but rather something like, 'If we all find the _value in this one, we'll all be better off on balance'. It is, to be clear, merely a formal property of the model, provable in principle by comparing the total _value got by _agents equal in all respects but following the two strategies as to how to cope with disagreements.

To be able to reap the substantial benefits of communal _truth-acquiring efforts, an _agent who finds herself at odds with the balance of other _agents will be motivated to try to reconcile her and the prevailing _beliefs. Evidently, this will often involve her reviewing her own hierarchy of _beliefs for a failure which may have led to the difference[7]. Sometimes, though, it will involve a vigorous campaign to try to bring the community round to seeing that what she _believes is optimal for the shared hierarchy of _sentences. Widespread communal agreement is an indicator of _truth, but not a determinant.

The mechanics of _linguistic negotiation are nothing mysterious. Suppose _agent a_1 _values *s* on an occasion and utters it in the presence of a_2, who, as it turns out, _disvalues it. For the reasons just considered, a_1 will be motivated to try to change a_2's _valuation. The best means to this end will be for her to utter other _sentences with the goal of changing the value of *B* for a_2, or of restoring to prominence in a_2's heuristics _sentences already in his *B*-set but lost sight of, and as a result his _valuation of *s*. This activity –which could recur– can reasonably be called '_justification'.

To summarize, _truth has the following characteristics:

- It is a property of token _sentences (also of *_propositions*, discussed below).
- It is objective, in that the _truth-value of a token _sentence is the same for all _agents.
- It is normative, insofar as one ought to _believe what is _true and only what is _true if one's goal is to maximize _pleasure, and getting _pleasure is the only motivation to bother with _sentences.
- It is tracked by communal agreement, but transcends it. Complete communal consensus as to

[7]For a community of any size substantially greater than two, disagreement with the communal consensus is, as a statistical matter, prima facie an indicator for most people of a mistake of their own. The matter generally is not so straight-forward, but not in ways which affect the point here (c.f. Pettit 2006).

the _truth-value of a _sentence is not a guarantee that the _sentence maximizes _value –there may be a community-wide mistake.

An Objection

The commitments of the model become clearer in considering the objection that it appears to maintain that _truth, and so truth, is contingent on human psychology. It may seem to be suggesting that one could determine what is true simply by conducting a sort of psychological census of the population of speakers of a language.

This challenge makes plain what is assumed in opting for the explanatory inversion on which the model is premised. Understanding _value as a natural phenomenon, agents' experiences of _sentences would clearly be the province of psychology and, by extension, so would _truth. The model is of interest only if we reject what McDowell calls 'bald-naturalism' (McDowell 1994: 73-3) and take _value to be a surd phenomenon. So conceived it is akin to a sensation, immediately available subjectively, and exclusively so, and hence not the sort of thing susceptible to the scrutiny of objective, natural science. It is, in Wittgenstein's phrase, where our 'spade is turned' (Wittgenstein 1958: sec. 217)[8].

These considerations abut questions about the relation of our understanding to the world. The picture the model affords can be compared to the relation John McDowell has proposed (McDowell 1994). The surd character of _value correlates to what he calls the 'spontaneity' of judgement. Appraisals of _value must in a sense be unconstrained or free – _value has no scrutable fount. But they cannot be merely arbitrary (c.f. McDowell 1994: pp.71-76). The reliability of agreement in the majority of cases among speakers about sentences' _values is what makes _language possible. McDowell describes language as

[8]The model can be understood as a thought experiment evolving from this point, and the present objection and response a correlate of Wittgenstein's thought in *ibid.,* sec. 241.

‘a store of historically accumulated wisdom about what is a reason for what’, and that store as ‘subject to reflective modification by each generation that inherits it.’ (*ibid.*, p.126). This I take to be consistent with the idea of language presented here, as an edifice of _valued _sentences whose constitution is a matter of negotiation among community members for their shared benefit. This being said, McDowell is, in the details of his thinking, primarily preoccupied with matters such as how a perceptual judgement, conceived without reference to language or community, can be justified. By his own admission he makes scant mention of language (*ibid.*, p.124). The model, by contrast, conceives _justification as wholly secondary to the workings of _language, and so obviates the need for a special treatment of the justification of _observation _sentences.[9]

None of this of course is to say that science cannot inform our understanding of our measurable responses to sentences. The point is rather that such a scientific understanding (which would itself be experienced as nothing more than sentences valued) could not displace our immediate subjective responses to sentences from their foundational place in reasoning. This answer, then, does not allay the objection's concern that a widespread change in the constitution of human brains might alter what we mostly say to be true –no account of truth should. What it does is to swap the ultimately not-so-concerning precariousness of people's neurophysiological connections to the world for the admittedly greater precariousness of our dependence on one-another to continue judging in the same way. That is to say, this objection, although not sound, corresponds to one which is so, but which issues from a

[9]A notable appeal of the model is its potential to provide an account of the role of experience in judgement which circumnavigates the familiar dilemma as to whether what is perceived is on the one hand, as it may be, the pig itself –which threatens the possibility of a unified account of false and true justified judgements– or, on the other, some experiential intermediary –whose relation to the pig and capacity to justify are no less in need of explanation. For a discussion of these options and a defence of a solution which seeks to avoid the second horn, see Byrne 2015.

familiar, fundamental sceptical worry which it is not obvious any account of truth should be able to allay.

The set of all _sentences and hence _beliefs is evidently closed under the 'is _supported by' relation. In this the model conforms to the position expressed by Davidson, that in seeking something which would justify a belief the prospect is hopeless of finding anything not itself a belief (Davidson 2001: 141), or again with Travis's conclusion that the senses are 'silent', meaning that they are just not up to delivering anything commensurable, in the picture in this paper's introduction, with a semantic interpretation of a sentence (Travis 2004). In prescinding from all justificatory relations to the non-linguistic there is a danger of falling into wholesale relativism and losing grip on anything worthy of the name 'truth'. The proposed solution is to locate objectivity directly in _sentences themselves, and if _agents should aspire to more than the kind of stunted, _idiolectic _language briefly considered above, then this means not just in their own _sentences but others' also[10]. The consequent picture places the model squarely with Wittgenstein and in opposition to Davidson on the matter of interpretation. Whether one _agent in uttering a given _sentence is reliably agreeing with what another would say in uttering the same words is emphatically not a foundational problem to be solved only by _agents' engaging in a correlate of radical interpretation. Their taking this to be the case is, on the contrary, an indispensable assumption of the model's conception of _language[11].

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[10]There is clearly a question, parallel to Wittgenstein's about private language, as to whether the apparent '_epistemic' inaccessibility of what is _true (_true-for-a) in a purely _idiolectic _language -about the apparent indistinguishability of _sentences' seeming and being _true- would render it sufficiently unlike a public _language and useless as to make calling it a '_language' inapt. C.f. Wittgenstein 1958, sec. 258.

[11]Compare, 'Speakers of the same language can go on the assumption that for them the same expressions are to be interpreted in the same way, but this does not indicate what justifies the assumption. All understanding of the speech of another involves radical interpretation.' (Davidson 1985: 125), and, '[A]ny interpretation still hangs in

_Logic

So far, _sentences have been treated as mere strings of sounds. The natural next refinement to the model is to posit a vocabulary of shorter sound strings, *_words*, just like the words of (say) English, and to require that _valuable _sentences typically be resolvable into sequences of them. As with _sentences, _words are assumed to be arbitrary and *prima facie* semantically inert. To be suitably general, the claims here are about sequences of _words, or *_phrases*, of which solitary _words are the limiting case.

Having added _words, a priority for the model is to furnish it with the means to distinguish correlates of grammatical subjects and predicates. This is accomplished by adding the constraint that the space-time points at which _true _observation _sentences containing certain _phrases (*singular _terms*) occur describe a smooth, continuous spatio-temporal line. I will return to the details later, and simply assume the distinction for now.

The terms needed for *_deductive _logic* can be introduced in the way one would expect. *_Negation* is added by augmenting the model with a _word, *_NOT*, with the property that typically,

$$V_i(\text{\_NOT} + s, t, \mathbf{x}, \boldsymbol{\varphi}, B) \approx 1 - V_i(s, t, \mathbf{x}, \boldsymbol{\varphi}, B),$$

where '_NOT + *s*' designates the _sentence got by concatenating _NOT and the _words of *s*.

For a pair s_1 and s_2 of _sentences, correlates of conjunction and disjunction, _AND and _OR, can be added similarly:

$$V_i(s_1 + \text{\_AND} + s_2, t, \mathbf{x}, \boldsymbol{\varphi}, B) \approx V_i(s_1, t, \mathbf{x}, \boldsymbol{\varphi}, B) * V_i(s_2, t, \mathbf{x}, \boldsymbol{\varphi}, B \cup \{s_1\}),$$

and

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the air along with what it interprets, and cannot give it any support. Interpretations by themselves do not determine meaning.' (Wittgenstein 1958: sec. 198).

$V_i(s_1 + \text{\_OR} + s_2, t, \mathbf{x}, \boldsymbol{\varphi}, B) \approx 1 - (V_i(\text{\_NOT} + s_1 + \text{\_AND} + \text{\_NOT} + s_2, t, \mathbf{x}, \boldsymbol{\varphi}, B))$,

where it is assumed B itself contains neither s_1 nor s_2.

The _words _EVERYTHING and _SOMETHING can also be added, with the constraints that typically, for a _predicate *_phrase p*,

$V_i(\text{\_EVERYTHING} + p, t, \mathbf{x}, \boldsymbol{\varphi}, B) \approx$

$$\prod_{j=1}^{n} V_i\left(r_j + p, t, \boldsymbol{x}, \boldsymbol{\varphi}, B \cup \{r_1 + p, .., r_{j-1} + p\}\right),$$

and

$V_i(\text{\_SOMETHING} + p, t, \mathbf{x}, \boldsymbol{\varphi}, B) \approx 1 - V_i(\text{\_EVERYTHING} + \text{\_NOT} + p, t, \mathbf{x}, \boldsymbol{\varphi}, B)$,

where $\prod_{j=1}^{n} V_i(...)$ is the product ranging over all singular _term _phrases r_j which _agent a_i might encounter and '_NOT + *p*' expands to '_NOT + *r* + *p*'. Following the established pattern, then, the _value attributed to _sentences is understood to be given, and to explain the norms governing talk – here, logicality– and not vice-versa[12].

With these constraints added, the concept of _support can finally be cashed-out. Let the model be further constrained so that typically, sets of _supporting and _supported _sentences for an _agent instantiate some one of a limited set of *_inference _schemas*, where an _inference _schema is a set of _sentence patterns related one to another by the appearance in them of one or more common

[12] The expression for conjunction mimics the rule for conditional probabilities, P(*a* and *b*) = P(*a*) * P(*b*|*a*). For universal generalisation, it is the chain rule for probability. '$V_i(b, t, \mathbf{x}, \boldsymbol{\varphi}, B \cup \{a\})$' correlates to the probability of *b* given *a*.

substitution variables, and a pattern is instantiated by substituting _phrases for its variable(s). Within a substitution instance of an _inference _schema, naturally, the _supported _sentence will be the *_conclusion* and the _supporting _sentences the *_premises*, with the former *_implying* the latter. We can say, then:

> *Def:* An _inference _schema *i-s* is *_deductively _valid iff* for every '_inference' got by substitution of the variable(s) of *i-s* with _phrases, if the resulting _premises all are _true, the resulting _conclusion is _true.

The model's correlate of logicality, then, ultimately reduces to counterfactual _valuation relations between _sentences.

<MORE HERE>

These definitions may seem to challenge the model's inversion of explanatory priority. Given that people often are not ideally rational in their assignments of probabilities to logical combinations of propositions whose probabilities they have independently assigned, the tail may seem to be wagging the dog where _logic and _agents' _valuations are concerned[13]. The response again is that the model requires considering what would be judged in the ideal limit of arbitrarily many _agents each with arbitrarily extensive experience. So long as such _agents would in aggregate _value _logically compound _sentences as required, the relevant '_norms' can be arrived at and used by _agents as cudgels to try to change each other's _beliefs.

[13] The research and surrounding issues are summarised in Nickerson 2004: 262-8.

_Ambiguity

Ambiguity poses a challenge for the model. Suppose Amina believes only one of the several people she knows or knows of named 'Bill' to be a vegetarian. Amina's evaluations of potential utterances of 'Bill is a vegetarian' will differ, the natural thought being that she is able antecedently to fix, in virtue of the utterances' contexts, which person is the likely referent of 'Bill'. Introducing '_ambiguity' thus appears to have the fatal implication that assignment of _word _semantics must precede _sentence _valuation.

Sticking to the program, the way forward is to add to the _value function two further parameters. The first is a parameter for the _agent who uttered the _sentence in question, a_j :

V_i: *s*, *t*, **x**, **φ**, *B*, $a_j \rightarrow v$ *(version 5)*

Intuitively, disambiguation of the semantics of some expressions -proper names in particular- is often facilitated by, and in some cases requires, information as to the identity of the utterer of the expression. Available facts about relationships between a speaker and persons whose name the speaker uses on an occasion are understood to be exploited in narrowing the possible reference of the speaker's use of the name.

Including the utterer of *s* in the information provided to the _value function may seem problematic. It may seem to require the _valuing agent to stand in an intentional relationship to the utterer, and hence to make _valuing a _sentence at least in part an intentional act, considerably if not completely vitiating what interest the _value function may have.

This is not, however, the case. It … <The perhaps counter-intuitive point, to which I shall briefly return below, is that it will turn out -as it must- that no '_name' in the language '_refers' to any _agent – to hold otherwise would be a sort of category mistake. This separation makes possible conceiving the _value function in non-intentional, terms while holding that ...>

In normal speech, what resolves ambiguity is context. Let *C* be the recursive set of complexes of the form <*s'*, *t'*, **x**', **φ**', *B'*, a_j, *C'*> constituting a_i's recent language-relevant history, where *t'* < *t*.

and let this _*context-for-a* parameter be added to the _value function:

V_i: *s*, *t*, **x**, **φ**, *B*, a_j, *C* → *v* *(final version)*

Adding *C* to the complex constituting a token, it now becomes possible for the model to permit utterances of _standing _theory_sentences –'Bill is a vegetarian', say– to be _valued differently according to _context-for-*a*. Although there are _propositions expressed by tokens of 'Bill is a vegetarian' and, say, 'Bill eats meat' which a_i may simultaneously _believe (as discussed below), the model must require that a_i effectively never _values tokens of both _sentences in the same moment and _context.

One complication here is that, as with the position and focus parameters, speaker and hearer may come to _value an utterance of a _sentence differently solely due to differences in the *C* parameter to their respective functions. While this is as the model should be, it raises a question about what is properly a candidate for being _true. The answer is to recognize a correlate of the _context-for-*a* parameter independent of any _agent's _beliefs, namely, a complex of the form <*s'*, *t'*, **x'**, **φ'**, a_j, *C'*>, and to include this _*context* (*simpliciter*) parameter in what counts as a _truth-evaluable token. Even with this refinement, a single utterance evidently may, if there are differences between a _speaker's and _hearer's conversational histories, state, say, a token comprising the _context derived from the speaking _agent which is _true and one comprising the hearing _agent's _context which is _false, and this independently of how they respectively _value it.

_Reference and _Propositions

In taking _value as foundational and defining _truth directly in terms of it, the model's _semantics are not in the usual sense compositional. One benefit of this top-down approach is that whereas in familiar compositional theories, two singular terms' being substitutable *salve veritate* in all transparent contexts indicates that they share in common some substantial property requiring further explication –*viz*., their referring to some common thing– in the model, there is no further thing. The way is clear to take substitutability *salve '_veritate'* to be in effect all there is to _reference.

To begin to make this thought more precise, let a *singular _term _sentential function* be a construct derived from an atomic _sentence whose _grammatical _subject is a singular _term by replacing this _grammatical _subject with a placeholder variable. The singular _term _sentential function got from 'Bill is a vegetarian', then, would be '_ is a vegetarian'. Similarly, let a *_predicate _sentential _function* be a construct got by replacing the _predicate _phrase of an atomic _sentence with a placeholder variable. Furthermore, let a *_moment* be a complex consisting of values of the time, space, focus and _context arguments to the _value function. The last requirement is to note the existence of a class of _phrases which create '_opaque' contexts. For now it can just be stipulated that some _phrases –'believes that', 'desires that', etc.– create contexts which disqualify _phrases appearing within them from participating in the determination of _reference, and to call '_transparent' any _sentential function whose placeholder is not within any such context.

All of this permits,

> *Def*: A set *r* of singular _term _sentential functions is the *_moment set* at a _moment *m* of a singular _term _phrase *p iff r* is the set of all and only the singular _term _transparent _sentential functions which upon completion with *p* would be _true at *m* (and similarly for _predicates).

The _moment set of the name 'Bill' at *m* is thus the set of _singular term _sentential functions derived from the totality of _transparent _sentences _true at *m* with ‘Bill’ as their _subject, e.g. {‘_ is frowning’, ‘_ is middle-aged’, ‘_ is a vegetarian’,…}.

The guiding thought discussed above is that a _moment set of a singular _term should determine a distinct, suitable, space-time curve. Now, a _moment set containing singular _term _sentential functions yielding atomic _observation _sentences straight away determines one point on such a line, *viz*., the _moment's focal point. Where _moment sets *not* yielding _observation _sentences are concerned, the model can reasonably be constrained to require that such sets should yield _theory sentences which imply _observation _sentences _true elsewhere -e.g. ‘Bill is in his office down the hall’- assuming the _subject is at the time a going concern. Depending on the temporal career of who or what is being talked about, the proposal is that a _moment set should always yield past (future) tense _sentences _equivalent to present tense _observation _sentences _true at some past (future) _moment, and, crucially, that these past (future) _moments' focal points together with the present point (if relevant) should jointly constitute a smooth space-time line . The _truth at <*t*, **x**, **φ**, *C*> of the _observation _sentence 'Bill is frowning' puts the point <*t*, **φ**> on a 'Bill'-associated singular _term line; the _truth at the same _moment of 'Bill was at the cinema last night', 'Bill was born in Saskatoon', etc., yield points determining the rest of Bill's life's trajectory. If '_ is a vegetarian' is an element of this _moment set, '_ eats meat' will not be. All of this allows,

> *Def*: singular _term tokens p_1 and p_2 have the same *_referent iff* p_1 and p_2 have the same _moment set (and so determine the same space-time line).

This definition requires the model to preclude that two non-_coreferential singular _term tokens' lines can exactly intersect –a constraint which captures the fact that bodies occupy space-time regions uniquely. For convenience, let a set of _coreferential singular _term _phrases be called a ‘singular

_term _reference set’, or ‘STR set'.

STR sets make possible individuating the _referents of _predicates extensionally, so to speak. The set of _predicate _sentential functions which constitute a _moment set of a token _predicate straight-away determines a set of singular _terms, and hence STR sets. A _moment set of 'is a dog', for example, might include 'Rex _', 'Lassie _', 'Fifi _' and others, which directly yield singular _terms and hence their associated STR sets. Now, the model can reasonably be constrained so that the STR sets determined at a _moment by some present-tense _predicate _phrase '_ is *p*' exactly coincide with the STR sets of arbitrarily many future tokens of the _predicate phrase's past-tense equivalent, '_ was *p*', and likewise for the past and '_will be *p*'. This constraint allows constructing for any token _predicate a cross-temporal superset of STR sets, or what can be called a ‘predicate set’. We can then say,

> *Def*: token _predicate _phrases p_1 *and* p_2 have the same *_referent*, or express the same *_property, iff* the _predicate sets of p_1 *and* p_2 are identical.

Suppose a_1 says, 'Fifi is a dog'. If at a later _moment a_2 says, 'Rex is a dog', then a_2 has said of Rex what a_1 earlier said of Fifi just in case the _predicate sets of 'is a dog' at the two _moments are identical. At some _moments –while prepping a team for the Iditarod, say– perhaps 'Rex is a dog', where Rex is a Dachshund, would be counted _false. In this case, the token _predicate simply fails to have the same _predicate set as in the first case. 'is a dog' would have to be considered occasion sensitive, sometimes _referring to the natural kind, other times to being a candidate for running a gruelling race. In either case, the model provides that arbitrarily many tokens, past, present and future, can express exactly the same _property.

For _transparent _sentences, the natural definition of '_proposition' is,

> *Def*: Transparent token _sentences s_1 and s_2 express the same *_proposition iff* the constituent _phrases of s_1 and s_2 correlate one-to-one and the _phrases of each correlating pair have the same _referent.

If 'Fifi' at m_1 and 'Bill's pet' at m_2 are _coreferential and 'dog' and 'pooch' express the same _property at these respective _moments, then we have that tokens of 'Fifi is a dog' at m_1 and 'Bill's pet is a pooch' at m_2 express the same _proposition.

The model defines sameness of _reference but not _reference itself. To maintain the model's correspondence to linguistic reality, the _referent of 'Bill', say, must be Bill, and so not some abstract object such as a singular _term _reference set. In practice this is not a problem –_semantics can get by solely with sameness of _reference. I do not see that the corresponding thought about _propositions is similarly problematic, that what an agent might express in uttering a _sentence *s* might be an abstract object such as the set of token _sentences expressing the same _proposition as *s*, so I will take this to be the case. This is merely a convenience, in any case, without which the work of _semantics could still be done with the definitions provided.

As a model of propositions and reference, _propositions and _reference have a number of virtues. Most basically, although the matter of whether two _sentences express the same _proposition is substantive, _propositions themselves are metaphysically and epistemologically anodyne. There is no problem about what sorts of things they are, that an _agent might stand in the right relation to one when in the state of _believing it. There is no problem about the unity of the _proposition, just as there is none about what makes it the case that some singular _term _referent does or does not instantiate a given _property. A second result is that they provide a systematic account of ambiguity and synonymy. Although it has not been shown, the way to accommodating *_indexicals* as open-endedly _ambiguous singular _terms is, I think, mostly clear. Likewise, the model appears to be well-suited to giving a

satisfactory representation of the kind of open-ended occasion-sensitivity found in Travis cases[14]. Thirdly, they yield the desirable outcome that _truth itself can be conceived as holding not merely of token _sentences but of _propositions themselves, insofar as the _truth (_falsity) of one token _sentence expressing some given _proposition entails the _truth (_falsity) of all.

In order to extend the model to represent '_intentional' contexts, consider the set of all _sentences which when substituted for '*s*' in

b: 'Amina believes that *s*',

yield a _truth. If an Amina-relative cognate of the definition of '_moment _set' is specified in which 'would be assented to by Amina' is substituted for 'would be _true', and corresponding definitions of 'same _referent' and 'same _proposition' also specified, what results is, if you like, an Amina-relative _semantics. If Amina is a normal _person, its _sentences likely will not all be _true, and the relativised STR sets and predicate sets accordingly will diverge from its _phrases' proper STR sets and predicate sets. Suppose now however that 'r_{AMINA}' designates the STR set of 'Amina', 'r_{BELIEVES}' the predicate set of 'believes' and so on, and '<Amina-r_{S1}, .., Amina-r_{Sn}>' the Amina-relative _proposition expressed by *s*, where s_1,..,s_n are the _phrases of s. Provided that 'Amina believes that *s*' is _true, so too will be any other _sentence mapping to <r_{AMINA}, r_{BELIEVES}, r_{THAT}, Amina-r_{S1}, .., Amina-r_{Sn}>, so long as Amina is consistent in her beliefs. Extending this pattern to other intentional relations such as doubts and desires gives the outline of the representation of intentional contexts within the model. The _person-relative _semantic values of _terms described here are naturally conceived to be their *_senses* for the _people in question.

A proposed fourth result, then, is that the model is able to provide a coherent representation of intentional contexts. Since the _phrases within _intentional contexts can be taken either to have their

[14]See, e.g. Travis 1985.

_person-relative or objective _semantics, a _sentence embedding an intentional context will determine two _propositions, corresponding to the *de dicto* and *de re* understandings respectively of intentional sentences.

A last virtue of the model worth pointing out is that in situating the norms of language in a social contract, it sustains the conclusions of Burge's anti-individualism and Putnam's Twin Earth thought experiments (Burge 1979 and Putnam 1975). In the case of the model's equivalent of Burge's 'tharthritis' sufferer, the salient facts are that her _value functions in the actual and counterfactual cases would be the same (the correlate of Burge's hypothesis about her use), but the corresponding '_linguistic communities' with which she contracts to tell the _truth would differ as to the _truth of the relevant 'tharthritis' statements, and this, by the terms of the model, would affect the _reference of her _words, as the thought experiment requires. Parallel considerations would apply to correlates of Putnam's Oscar and Twin Oscar: even after displacement to '_Earth', the model's Twin Oscar intuitively is –at least initially– bound by his contract with his native _linguistic community, as it is to them that he owes the balance of his linguistic _pleasure. It is this which would determine the _truth-value of his uses of the _word 'water', as per the outcome of Putnam's experiment.

Two debts

There remain two debts –assumptions of the model inconsistent with linguistic reality– needing payment. The first is the assumption that _language is of value solely for the intrinsic _pleasure it conveys and is unrelated to any instrumental value in navigating the world. This assumption was made solely to simplify the exposition and can simply be dropped. In the model it can be allowed on the one hand that _agents' actions can change _sentences' _values, and on the other that given _sentences' being _valuable may coincide systematically with the occurrence of specific other mundane pleasures. So, suppose that an _agent has learned

i) that _sentences s_1 and s_2 jointly _imply s_3,

ii) that s_3's being _valuable systematically correlates to some mundane pleasure, and

iii) that by taking some certain action she can bring it about that s_1 is _valuable.

This provides that she could, upon finding s_2 to be _valuable, exploit her _linguistic knowledge to take appropriate action to get the mundane pleasure. All this being allowed, it is plausible that the instrumental value of _language could supplant _pleasure as the driver of individuals' quest for _truth. Novel _sentences need not be _intrinsically _pleasant for there to be a motivation to seek them and exchange them. All that is needed is for there to be a subjectively detectable quality for the _value function to measure.

The second unpaid debt is that the _value of a token _sentence is intrinsic to its sound pattern, rather than being learned on occasions of use. This too was merely provisional. If the semantic properties of expressions were understood to be compositional, then we would indeed be required to have learned, e.g. that 'Felix' refers to Felix prior to being able to evaluate 'Felix is frowning'. There is, however, no

need to conceive the learning feats in question in semantic terms. Although the brains of language learners may in fact require for the most part the establishing of informational correlations between things in the environment and particular words before the learners in question can evaluate sentences containing those words, it has been a basic assumption throughout that semantic properties need not have a role in this process.

Seeing that the relation between a name, say, and the thing in the world to which it informationally correlates is immaterial to semantics involves a shift of perspective. For an inhabitant of the model, the world can be treated effectively as a closed system composed solely of _sentences _valued and abstractions thereof. ‘Il n'y a pas’, one might say, ‘d'hors-_texte.’

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