Robert Stainton. *Linguistic Interpretation and Cognitive Science.* Carleton University Cognitive Science Technical Report 2001-05 (www.carleton.ca/iis/TechReports). November, 2001.

Linguistic Interpretation and Cognitive Science

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[Presented as the Opening Address at the Philosophy in Cognitive Science Conference (PHICS), September 28th, 2001.]

I have three simple aims tonight. My first aim is to introduce a debate that is currently raging in philosophy of language. In particular, I want to contrast three ways of thinking about linguistic interpretation, within linguistics and philosophy of language. Aim two is more important still, given the theme of the conference: I want to highlight several relatively unfamiliar ways in which cognitive science can impact on that debate about linguistic interpretation. In particular, I will present evidence coming from the broader cognitive disciplines, about which of these three views might be best. That's the stuff about how cognitive science and philosophy intersect. Let me be clear: my hope is not to settle the issue about which of the three views is correct, not least because what follows simplifies issues quite a bit. On the one hand, the views presented are to some extent caricatures, rather than positions that anyone explicitly adopts; on the other hand, the data offered for and against the views are much more complex than what can accurately be described in a single talk, and to a general audience at that. Worse, even if I had all night, the pool of data remains very much incomplete. So, this talk should be taken as (at best) a rough-and-ready introduction to a debate, intended to encourage further empirical work bearing on the philosophical question. I said I had three aims. One is missing. Aim three is rather less serious, but rather more fun: I aim to show you some pictures from my Summer vacation. Why? Because I can!

The Code Model

According to a familiar way of thinking about language, a language is a system of shared rules -- a complex algorithm or code -- which, in advance of occasions of interpretation, completely determines the meaning of utterances. True, the code needs to take as inputs not just the form of the thing uttered, but also a (quite limited) set of contextual parameters. For instance, a hearer of 'I was born here 35 years ago' won't know what

was said, in the sense of knowing what would make the saying true or false, unless he knows who spoke (“Who is 'I'?”), about what place (“Where is ‘here’?”), and when (“35 years before when?”). But once speaker, addressee, time, place and a few other factors are specified, employing a language, on this old-fangled view, is simply applying the algorithm in question. Because the algorithm assigns meanings compositionally (i.e., the meaning of the whole is exhaustively determined by what the parts mean, and how those parts are put together), and because the composition is recursive (i.e., the algorithm can take as inputs things which it itself created), knowing the “code” explains the ability of the hearer to interpret an (in principle) unlimited number of novel utterances in a systematic way.

Many philosophers of language now doubt that any such algorithm can output the *complete* meaning of utterances in context. They have thus given up on the Unrestricted Code Model. That’s because the “code” would need to handle irony, sarcasm, implicature, metaphor, jokes, ill-formed utterances, and so forth. And handling that kind of speech would require a "code" that encompassed nearly everything the agent knows. For instance, consider understanding the following jokes:

> “*Question*: What is yellow, and looks like a pale? *Answer*: A yellow pale.”
>
> “*Question*: How many surrealists does it take to screw in a light bulb? *Answer*: Fish.”

Understanding this would require not just contextual factors like speaker, hearer, time, place, etc., but also "inputs" about the cultural context of the speaker, specific linguistic practices (e.g., the “What is...” and “How many...” forms of joke), information about 20th movements in art, etc. Moreover, how well this purported "code" works seems to depend upon how smart the user is. But that's no kind of "code" at all. To take another example, suppose Christopher says, “Would you like some cake?”, and Ben replies, “It’s Passover”. We all know that Ben has just refused the offer of cake. But imagine filling in everything required to algorithmically generate the complete understanding of Ben’s utterance! It's just not plausible that humans know any such algorithm.

Still, one could retain the hope that the Code Model would at least account for the interpretation of *literal* speech. Paul Grice, who played a large part in getting people to give up the Unrestricted Code Model, nevertheless seems to have been inclined to think

that this code-based approached worked fine for literal talk. For instance, he felt that it could account for what is literally said – though not for what is *conversationally* implicated and so forth. And this brings us to the first "view" that I will discuss: the Restricted Code Model.

> *The Restricted Code Model*: To arrive at what is literally asserted (or asked, or commanded) by an utterance, it is sufficient to take the disambiguated meaning assigned to the expression type by the code, and fill in the reference of any context-sensitive elements found in the syntax of the expression uttered.

The thesis has been explicitly endorsed by Jason Stanley, who argues in his paper "Context and Logical Form" that all effects of extra-linguistic context on the truth-conditionals of genuine speech acts – assertions or otherwise -- are traceable to logical form, i.e., elements in the actual syntactic structure of the sentence uttered. (2000, 391-2.) He is joined in this by Emma Borg, Ernie Lepore, Zoltan Szabo, and numerous others.

Now, there seem to be lots of cases of perfectly literal talk in which masses of general purpose knowledge, and lots of general purpose intelligence, are required to arrive at utterance meaning. Nor is this knowledge and intelligence brought to bear solely to assign referents to context-sensitive elements of syntactic structure. Hence even the Restricted Code Model might be in trouble. Thus, as Charles Travis notes, if Samir makes clear that he's thirsty, and Kirit replies 'There's some coke in the fridge', Kirit seems to have literally asserted that there is a *drinkable quantity* of coke in the fridge. (E.g., his claim would be false if the only coke in the fridge were a cola stain on one of the walls.) And, according to John Perry, when Silvita utters the sentence 'It's raining' while watching rain drops fall out her window in Paris, she asserts that it is raining *there*, in Paris. Crucially, however, there appears to be no indexical in (1) that denotes the quantity of coke; nor is there an indexical for place in (2).

1. There's some coke in the fridge
2. It's raining

Similar examples can be found in the writings of Kent Bach, Robyn Carston, Francois Récanati, John Searle, Dan Sperber & Deirdre Wilson. To give one final example, dear to my heart in more ways than one, if I show you a picture of me standing there with a big fish, and say 'From the St. Lawrence River. About 35 pounds. Caught on 20 pound line.',

I *assert* that the demonstrated fish came from the St. Lawrence, weighed about 35 pounds, and was caught on 20 pound line'. To see this, note that if I had actually bought the fish down in the ByTown Market, and then had my picture taken with it, later uttering (3) intending to deceive, I would have lied.

3. From the St. Lawrence River. About 35 pounds. Caught on 20 pound line.

And yet, say I, the expressions in (3) are all predicative, not propositional. Let's focus on the first. Syntactically, it is a projection from the preposition 'from', not a projection from an inflectional element. Hence it isn't syntactically a sentence. It is syntactically a prepositional phrase. Semantically, it applies to individual objects: in particular, and put crudely, it applies to things come from the St. Lawrence River. The expression is not the sort of thing which can be true or false. In the jargon of Montague grammar, (3) is of semantic type <e, t>, not of semantic type <t>. It isn't even the kind of thing which, once disambiguated, and with the context-sensitive slots filled in, is true or false. Nouns and Noun Phrases can't be true or false, and neither can Prepositional Phrases. And yet, or so I have argued, such things can be used to make literal assertions. If that's right, then there is yet another reason for rejecting the Restricted Code Model.

These sorts of apparent counterexamples have occasioned two quite different reactions. On the one hand, certain theorists have tried to rescue the Restricted Code Model. This first reaction can be pursued in at least two ways. First, a theorist can reject the claims about what is asserted in these cases. She can say, for instance, that *nothing* is literally asserted in using (3). In which case, there can be no worry about "what is asserted" going beyond what the structure determines. As for the other examples, she could insist that what is literally asserted in using (1) is that there is some quantity of coke, however minimal, in the fridge; similarly, in uttering (2), what the speaker can be held to have asserted is just that *it is raining*, not that it is raining at any particular place. Here again, there would then be nothing "extra" in what is asserted, beyond what structure provides. Emma Borg has been pressing this kind of line. The second alternative for saving the Restricted Code model is to accept the claims about the content of what is asserted, but deny that this actually violates the Sufficiency Thesis *because there are more context-sensitive elements in the structure produced than what meets the eye*. This is Jason Stanley's strategy. He argues that there are unpronounced elements of structure

in (1) through (3). This makes /**from the St. Lawrence River**/, for instance, structurally ambiguous: the sound pattern sometimes corresponds to a plain-old predicate, of type <e, t> -- e.g., when it occurs embedded in a larger structure; but sometimes the same sound corresponds to something of type <t>, specifically it has this different structure when it occurs unembedded. I will return to these attempts to save the Code Model at the end.

Alternatively, one can react to these counterexamples by *abandoning* the Code Model altogether, restricted or otherwise. The question then is: What should we substitute in its place? I turn to that now.

View #2: The Inference Model

On the Code Model, a language is a system of shared rules -- a complex algorithm or "code" -- which, in advance of occasions of interpretation, and given a quite limited set of contextual parameters, either *completely* determines the meaning of utterances (unrestricted version), or *mostly* determines the meaning of utterances (restricted version).

Employing a language, on this view, emphatically is not a process of "guesstimating" what a specific utterance literally means. True enough, interpretation is creative on the Code model, in the sense of being compositional and recursive. But it is *not* creative in the sense of requiring cleverness and imagination – except possibly when it comes to disambiguating and assigning referents to context-sensitive elements.

The first alternative to the code model takes precisely the opposite line: linguistic interpretation is no more the blind application of a deterministic code than coming up with a scientific theory, or a work of art, is. On the Inference conception, interpreting a person's speech is just one more way of pragmatically "finding one's way around in the world". And linguistic interpretation is one more example of being smart.

What tends to go along with this, is a refusal distinguish "knowledge of language" from other sorts of knowledge: there are just inferential abilities to deal with things. Despairing of finding a tractable code, or set of codes, that suffice even for linguistic interpretation, the Inference model abandons the search for codes altogether, and posits instead a cluster of general purpose abilities, plus random bits of learned information, that allow us to find our way around in the world. True, some of this learned information is

pre-theoretically called “knowledge of language”: e.g., we say that the tourist *knows what ‘juego de naranja’ means* because he produces these sounds at bars in Spain when he wants orange juice. But, on this view, there is no genuine line between knowing what this sound means, and knowing about orange juice. (When you know that podiatrists treat ailments of the foot, is that knowledge about podiatrists, or knowledge about the meaning of the word ‘podiatrist’? On this view, that is a bad question, since no such robust distinction exists.)

Second Response: The Hybrid Conception

A second response to the failings of the code model, one that I personally find much more plausible, goes like this. A language is indeed a specialized system of shared rules, a complex algorithm. Moreover, the algorithm is compositional and recursive. But the algorithm, though it is necessary, is not anything like sufficient for utterance interpretation: the algorithm does not, in advance of occasions of interpretation, determine the meaning (of even of literal utterances) *all on its own*. Specifically, the algorithm often does not -- even given the aforementioned contextual parameters like speaker, time, etc. – inevitably assign something propositional to the utterance. Rather, it (often) assigns something which must be "completed" or "enriched" to arrive at something truth-evaluable. Thus, though knowing English (and yes, there is such a thing on this view) is required for understanding English speech, it isn' t enough- not even when supplemented by knowledge of the highly constrained contextual factors like addressee, time of utterance, etc. Call this the Hybrid conception.

Linguistic interpretation, so conceived, involves not only the process of applying the special-purpose algorithm, but some other process as well. It is the second process which does the completing/enriching. Of particular interest recently is the idea that the additional process is one of drawing general purpose inferences, to arrive at all-things-considered judgments about what the utterance meant. (Where this means not that all things *have been* considered, which is impossible given the time constraints, but that anything which the person knows is relevant in principle.) Employing a language would thus involve two quite distinct processes, neither of which is individually sufficient for discovering the meaning of the utterance. The first process is algorithmic. But the second

is not: it is non-deterministic inference. (*Both* processes are "creative", but in quite different senses: the former is creative in the sense of involving a generative procedure; the second is creative in the sense in which an artistic creation is.)

Let me sum up the contestants before I go on. I have presented three approaches to linguistic interpretation. Well, four actually.

- The first, the Unrestricted Code Model, was put aside as pretty much a non-starter. It said that the *complete* content of an utterance – including implicatures, metaphorical content, etc. – could be computed by applying a language-specific algorithm. I'm hesitant to pin this view on anyone in particular. As I noted at the outset, the views I'm canvassing here are to a certain extent caricatures, and this is especially true here. What I can tell those of you who want to learn more, is that people who have been accused of holding this first view include rabid generative semanticists, Systemic Functional linguists, and "semioticians". The remaining three views were more promising.
- The Restricted Code Model said that the *literal* content of the utterance, e.g., what was literally asserted, could be determined by taking what the code assigned to the disambiguated expression type, and filling in all context-sensitive slots provided by syntax. That is, taking as input only the sound produced and a (quite limited) set of contextual parameters, it was supposed that the literal content of the utterance could be determined. As noted, numerous certain recent philosophers have explicitly endorsed this view: Jason Stanley and Zoltan Szabo, for instance, have argued for it in recent journal articles. And both Emma Borg and Ernie Lepore have flirted with the idea in draft manuscripts. Other philosophers who you might read, to learn more about this orientation, include the early Davidson and Paul Grice.
- The Inference Model denied that a code was sufficient even for arriving at literal content, and basically gave up on the search for any kind of language-specific code. Charles Travis has been explicitly pushing this line recently. One also thinks here of the later Wittgenstein, Davidson post-"Derangement", and maybe Derrida. Certainly someone attracted to the Inference Model would do well to read these philosophers.

- The Hybrid Model also denied that decoding, disambiguation and reference assignment to indexicals were sufficient for getting literal content; but, in contrast with the Inference Model, proponents of the Hybrid Model still saw a need for a discrete language-specific code to carry the interpreter part of the way. Explicit proponents of the Hybrid Model include Carston, Récanati, and Sperber & Wilson. Oh yes, and me.

What remains is to choose between the three promising models. But I haven't the time, or the evidence, to help you make that decision. What will emerge, however, is that evidence from cognitive science can bear pretty directly upon whether the Code Model should be given up -- in part, or altogether; and also on what should replace it.

Choosing Between the Conceptions

Is there *anything* to decide between these three ways of looking at linguistic interpretation, other than philosophical intuition? In fact I think there is, once we accept an important methodological point about the philosophy of language. Everyone agrees that it would be foolhardy to pursue philosophy of biology in total abstraction from the empirical biological sciences. Surely, say I, philosophy of language owes empirical debts too. In particular, and this certainly part of the point of tonight's paper, philosophy of language owes empirical debts to the various cognitive sciences. Given this, I think there is mounting empirical evidence in favor of the Hybrid approach.

Consider the psychological concomitants of the three models. The Code Model and the Hybrid Model are both modular, in something like Jerry Fodor's sense. Both posit a language-specific device for interpretation, the place where the code is stored. On the Code Model, the input to this device is the sound produced, and the few contextual factors. The output is the literal content of the speech act. The psychological concomitant of the Hybrid Model, in contrast, goes more like this: here too, there is a language-specific sub-faculty, what Chomsky calls the Language Faculty, in which the algorithm is stored; and there is another component of the mind-brain, call it the "Central System", where inferences get drawn; and *both* of these sub-faculties play an essential role in the comprehension of speech, literal or otherwise. (The second sub-faculty plays a role in much else besides, of course. It is, I repeat, not language-specific.) In contrast, the

psychological commitment of the Inference conception would have to be that there are not mental sub-faculties at all, but just one giant “mush” that allows us to get around in the world. This would be the way of cashing out the idea that there is only one process at play, in "the mind as a whole". Put in Chomsky’s competence-performance talk, the three conceptions would see things this way: for the Code Model, the competence yields the literal content, but nothing more; for the Hybrid view, more than one mental competence always plays a causal role in yielding observed performance, where “performance” here is arriving at the interpretation, *literal and otherwise*, of the utterance in context; for the Inference conception, there is no line around distinct “competences” at all.

Against the Inference view, we should note the existing evidence for an autonomous linguistic competence. First, our knowledge of language develops along a highly specific path, in discrete stages that are shared across the world. This development is extremely rapid: by the age of three, the average child knows more subtleties of grammar than what have been stated in all the world’s linguistics journals put together -- yet it would be impossible to teach them almost anything else of complexity (e.g., a bit of theoretical physics, or the central facts about internal combustion engines). Why should such radical distinctions in cognitive development exist, if there is no genuine line between knowledge of language and other kinds of knowledge? More telling still, this grammatical development can take place in infants whose overall cognitive capacity is extremely low: children with William’s Syndrome, for example, have near-normal mastery of grammar and vocabulary, but IQ’s near 50. Unlike non-human animals, which actually do seem to pick up language behaviors by using their “general intelligence”, these children must be relying on the language-specific part of their brain to acquire grammar and vocabulary. On a related note, linguists are beginning to find genes that are specific not just to language, but to particular features of language: e.g., there is a heritable deficit which, put very roughly, affects the ability to inflect verbs, but leaves essentially everything else basically intact. Language-specific knowledge also decays without impacting on general cognitive capacity in striking ways. For instance, there are clinical cases in which a bilingual loses one language (typically the native tongue), but retains higher cognitive functioning. How can this be described, let alone explained, on the second view? There is also emerging evidence of the neurological basis of language

which suggests that, though connected with other parts of the brain, the language-centers are neurologically discrete. (Note too that these same parts of the brain are used by native users of American Sign Language -- so it won't do to suppose that they are just centers of sound reception and production. They are specific, rather, to language. Equally interesting, ASL users exhibit the same developmental stages in language acquisition, and the same breakdown patterns after strokes and such.)

Despite all this, I don't think we can say that the Inference Model has been ruled out. Many folks reject modularity, and nativism too. Some of them are with us tonight. And, as those of us working in cognitive science know, the cognitive holists have their favourite data too: neural plasticity, the successes of connectionist models, the complex and equivocal nature of each and every aphasia, etc. True, my bets are firmly placed with those who see a cognitive line between language and other things. Being aware of the highly informed views to the contrary, however, I think our conclusion tonight should be as much methodological as substantive: that the way forward, in terms of deciding between appealing to a specialized code or not, requires doing a lot more empirical work.

Putting the Inference Model aside for now, can cognitive science provide data to decide between the Restricted Code Model and the Hybrid Model? Actually, I think it can. Let me just hint at some of the evidence I have been looking at.

Emma Borg wants to rescue the Restricted Code Model by arguing that what appears to be asserted really isn't asserted. How can we tell if she's right? One promising bit of data comes from a series of experiments by Ray Gibbs and his colleagues, where they tested native speaker's judgments of what was literally said. Gibbs et al. found that in cases like (1) and (2), native users of the language described what was asserted as not *there is some non-zero quantity of coke in the fridge* but as *there is a drinkable quantity of coke in the fridge*; in the same vein, they would identify what was asserted by Silvita as not *it is raining somewhere or other*, but as *it is raining here in Paris*. I quote their conclusion:

> "The data from our four experiments demonstrate that people do not equate a minimal meaning [i.e., disambiguated type meaning, plus reference assignment] with what a speaker says, but assume that enriched pragmatics plays a significant role in determining what is said... These data lend support to theories of utterance

> interpretation in cognitive science that [maintain that] pragmatics strongly influences people's understanding of what speakers both [literally] say and [non-literally] communicate" (Gibbs & Moise 1997, 51).

I would like to see these experiments replicated with sub-sentential speech. I expect that there too, ordinary speakers will find that I asserted that I had caught the fish in question, on the St. Lawrence. I expect they won't say: "Oh, he didn't make any sort of real statement at all".

Jason Stanley, I noted, would rescue the Restricted Code Model by positing unpronounced elements of structure in (1)-(3).

1. There's some coke in the fridge
2. It's raining

Thus unpronounced in (1) is an index for quantity; unpronounced in (2) is an index for place. Now, it would take me too far a field to address the postulation of empty elements in these cases. Instead, I will focus here on one way of handling (3).

3. From the St. Lawrence River

Stanley's proposal about this case is that there is an unpronounced subject in (3), that refers to the object indicated (here, that giant carp); and an unpronounced verb + inflection, that does the job of the copula. One interesting bit of evidence against this line comes from language deficits. On the one hand, there is an aphasia that attacks the ability to produce and understanding sentential structures, but leaves the ability to understand bare phrases intact. (See Chatterjee 1995.) Presumably these aphasics can't be turning a phrase into an (only partially pronounced) sentence in order to understand, since they can't comprehend sentences. And this, in turn, points towards *normal* processing as not involving the reconstruction of anything sentential either. If so, then the postulation of hidden elements in (3) is not warranted. (Similarly, earlier I mentioned a family which exhibited a genetically-based inability to deal with inflectional elements. What I want to know about such people is whether they can understand sub-sentences, which don't have to carry inflection, much better than they can complete sentences. If so, this would be further evidence for the Hybrid Model.)

In sum, there are three quite different ways of responding to the apparent failures of the Restricted Code Model. First, one can try to save the phenomenon, by finding *less*

asserted, or by positing *more* structure. Second, one can agree that no code is sufficient even for interpretation, and reject specialized linguistic codes altogether, calling on general purpose intelligence, together with undifferentiated knowledge about the world, to do essentially everything. That is the direct the Inference Model takes. The Hybrid model, the one I favor, supposes that the code model did have something right: specialized and autonomous codes are indeed involved in linguistic interpretation. The mistake is to expect the linguistic competence taken alone to yield complete interpretations: on the Hybrid Model, inference and general purpose knowledge are also required, *even in literal interpretation*.

As I said at the outset, my first aim was to introduce the debate about which of these approaches is best. I guess I achieved that. I also wanted to illustrate how results from cognitive science might bear on this debate, thereby highlighting the intersection between philosophy and cognitive science. I'm not sure if I achieved that second aim. On the other hand, my third aim was a slam dunk: I'm absolutely certain that I showed some pictures from my Summer vacation.

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