This essay adresses topics in linguistics and the philosophy of language, though (by conventional measures of expertise) I am more of a Phenomenologist and a Computer Programmer than a linguist. I confess this not as biography, but to introduce my metatheoretical anchor points, from which derive intuitions that others might find unconventional. I am, in particular, sensitive to the experiential nuances of human cognition and skeptical that mechanical systems can emulate human minds except for narrowly defined tasks. At the same time, I think computational systems have interesting aspects that can enrich our understanding of cognition, evn if we do not philosophically buy a "cognition is computation" metaphor.

To be precise, I am skeptical about "AI"; and I am also skeptical about a kind of logical reductionism that I believe exerts a definitive influenc on several interrelated filds, including philosophy, linguistics, and computer science. As the paradigm seemingly goes, if we accept some form of "mind as computer" analogy, then we intrinsically accept *first* the idea that "mind" encompasses as some important part a logically articulated subsystem, which can be scientifically studied via formal logic; and *second* that as a consequence of this scientifically tractable logicality, AI is a good model or proxy for the study of mind. The unconscious deduction here seems to be that *mind as computer* has as a consequence that mind is (to some salient degree) a logical system, following a premise that computers are logical systms. But this premise is more false than it is true; so for me the whole paradigm is on shaky grounds. I will explain later why computers are not as logical as non-programmers seemingly believe. For now I'll just say this: there are rigorous accounts of computation that, I contend, are not grounded on formal logic in any techical or reductive sense. As a result, someone's non-logical-reductive views on language and consciousness do not *a priori* preclude computational models having some intuitive, explanatory, or structural-analogy place in their analyses of cognition.

Meanwhile, as a Phenomenologist I am a committed "realist". What I mean is that, in a nutshell, we should renew our commitment not to read Husserl too psychologically; for instance, not to read *intentionality* as a psychological phenomenon. If I see a red sofa, we should go ahead and accept that what I see is a red sofa — that very object. I do not see a mental image of a red sofa or a phenomenal appearance of a red sofa or a token of red-sofa-appearance-ness. We should not be led stray by the sofa being a few feet away from me, so it is not "in my brain" — my brain is over here, not over there. If I am suddenly distracted by something, look away, and forget about the sofa, my sofa-impression (but not the sofa) goes away, which seems to suggest that there my sofa-impression is not the same kind of thing as a sofa — which in turn invites us to qustion whther what I am really seeing is that sofa-impression, not that sofa. But, without disputing that in *some* sense the impression is not ontologically identical to the thing itself, I still maintain that the best gloss on the situation still starts from the givenness that I do see the sofa (and not the sofa-impression or any other psychologistic posit). I will have mor about to say about this realism, also. For now I'll say this: the case for "impressions" over "things themselves" seems stronger when talking about vision (which works at a distance) rather than touch — if I actually sit down on the sofa and physically contact it, we may feel more comfortable saying that my experience is directly encountering that physical object (though someone could still say that tactile sense-impressions are still not identical to objects; for one thing, the contact point between my hands/torso and the sofa — the locus of those haptic nerve cells — is not in my brain either, ergo a spatial gap still exists between brain and the sensed object). If we accept that our nervous system is in some sense a functionally organized complex, then an encounter between some external body and *part* of that system, with suitably holistic functional response, can plausibly be treated as "my brain" (or nervous system or mind) contacting the sofa — we don't need to rule out this gloss because my *central* nervous system remains physically isolated, any more than we would dispute that a knife has punctured a sealed carton when in fact only the knife-tip did so. In short, sense-causing physical contact as part of my embodied propensity to register tactile contact experientially, through the medium of functionally-organized processing that eventually includes the brain, is — I would say — a sensate manifestation of my contact with the sofa (not with a tactile-sense-impression or haptic-phenomenon of the sofa). And if we accept this line of reasoning for touch, we should do so for vision also — partly because an intrinsic feature of *seing* something is that we *could* with proper movement touch it, and apprehension of visual from includes anticipation of how surfaces will respond when we kinaesthetically interact with them (we might presume, for instance, that we can run our hand over the wall to the right but not to the left, if there's another wall there: this visual disclosure is also in a sense proto-kinetic).

So, before making claims about language, I have hereby asserted two main intuitive feints guiding my subsequent discussion: computer programs as useful but not logically reductive analogs for cognitive processes, and the virtues of a "realist" Phenomenology which accepts language to the effect that we experience "things themselves": that touching and seeing (etc.) are expriential encounters with real, external, non-psychological entities. This does not have to be a blunt realism — I don't dispute that we experience appearances in some sense — but we need to articulate the thing/apearance

distinction in a way that does not disallow common-sense intuitions like "seeing the sofa" meaning that I do see some real, external sofa-thing. That would make for an analysis in pure Phenomenology if I just framed my arguments with reference to, say, Husserl's own treatment of the noemata/phenomena distinction. Here, howevere, I am going in a different direction and package a loose theory of "realism" about intended "expernal" objects within a treatmnt of "externalism" (and *internalism*) in the philosophy of language.

I'm not ignoring that "external" in the sense of "wide scope" mind-world relations as a Semantics hypothesis is only tangentially related to "external" in a phenomenological sense of experienced external objects (as opposed to experienced internal, e.g. somatic, states). But I *will* present a theory that connects these two senses of "external" (and likewise two senses of "internal").

All told, my goal here is to sketch a theory of cognitive linguistics which can resonate soundly with Phenomenology (while not being especially phenomenological on its own). This theory will be incomplete — deliberately, strategically incomplete. Indeed, every theory should be incomplete: an essential quality of modern science is our recognition that scientific explanation covers a vast breath of scales and kinds of phenomena, and "science" as a singular human institution only exists insofar as there are many sciences, each with some measure of theoretical autonomy but also areas of overlap, so scientific explanations can brisge across scales. Bioligists take it for granted that the basic intellectual structures of their disciplines can be justified by appeal to chemistry (as a causative or emergent base of bioloigical phenomena); and the presence of *parts* of biology where this connection is explicit (like organic chemistry) is important for our overall sense of biology as something grounded in a general scientific method. But these "reductive" links are not typically operationalized in biology as a whole — a biologist is not "doing" chemistry , biological properties are not necessarily chemical properties, biological laws are not necessarily chemical laws, and biological terms are not semantically (or even arguably referentially) reducible to chemical terms. We can consider whether biological concepts are "in some sense" reducible to (or extensionally equivalent to or "the same stuff as") chemical concepts, but framing this discussion as a nuanced debate implies that biology is not *trivially* reducible to chemistry, and we may accept such a reduction as a plausible optional only insofar as some if us may hold philosophical commitments, which "we" collectively do not want to dismiss out of hand, that higher-scale sciences are necssarily reducible to lower-scale ones that are their causal or physical-constitutive base. But even if there is a sense of "reduction" and of "biology" and "chmistry" that makes biology reducible to chemistry, this dos not make biological *science* reducible to chemical "science" — that is, a well-constructed and discursively evaluable biological thory should not be expected to consider in any details its own reductive interprtations, or express its concepts in chemical (rather than physical) terms, or attempt to *explain* rather than just *presuppose* chemical laws (preservation of quantities in chemical reactions, acid/base qualities, solvents and solubility, molecular interactions, etc.). Ditto for chemistry in relation to molecular physics, molecular physics in relation to quantum physics, nurology in relation to biology, and so forth. In short, whatever our philosophical intuitions about emergent phenomena and the ontological duality (or monism) between emergent and base scales, these philosophical points are only tangentially related to the equally important philosophical question about what makes a good theory in a science. 'p'

This bears riterating: when considering a science (I'll include social sciences and humanities here) philosophically, there are two different sorts of questions that can arise: on the one hand, what is the ontological status of the entities, laws, and quantitative models postulated by the science and its currently influential theories? Should we understand terms to be proposed natural kinds (like "protons"), structural features that don't necessarily align with straightforward patterns of reference (like "dark matter"), referring expressions into complex systems whose parts have somehow fuzzy or underdetermined boundaries or criteria of individuation (like "climate"), or quasei-refrences which have the form of concrete designations but are really just shorthand for elaborate paradigms (like "natural selection")? These are various options in the semantics of scientific jargon, which are clues to the proper ontological status of scinces' theoretical posits (so much applies to linguistics also, with its theortical vocabulary of concepts, lexemes, syntax rules, gnerative semantic rules, and so forth — are these mental subsystms? Innate cognitive faculties? Clusters of nerve cells? Neural pathways reinforced during language acquisition?). But, on the other hand, there is a different order of question philosophers can ask with regard to a particular science: what qualifies as a well-constructed theory for that science? What sorts of formal models hold explanatory merit as, seemingly, capturing the casuative factors determining the behavior of the systems that science investigates: continuum-based numerical models? Models in discrete mathematics? Systems of logic? State machines? And interconnected with that question is the proper scope of the science: a well-constructed theory needs to honor bounaries between and autonomy of different sciences. Having a clear picture of what beliefs in *other* sciences to take as explanatory primitives in *this* science is an essential criteria of theoretical soundness — no less than the urge to pursue explanatory closure within the proper bounds of each science.

One of my objections to "logical reductive" paradigms in linguistics (and computer science) is their failure to distinguish these two aspects of a philosophy of science, by my lights. When discussing chemistry or biology, we can make a clear distinction between metaphysical commitments according to which higher-scale systems reduce (via physical composition and the propagation of causality across levels of organization) to lower ones — biology to chemistry to physical — as a genr of reduction obviously diffrent from reducing sciences as collective intellectual exercise. We do not reduce the community of biologists to the community of chemists, or the kinds of expertise and fluency in certain mental gymanastics, or the criteria of what makes good biological theories, to the concordant community, conceptualizations, gymnastics, and theory-criteria of chemists. This is for me part ofv what makes biology a successful science — it is incomplete in an ontologically necessary, intellectual fertile way. But if this is a reasonable criterion, what can we say about linguistics as a science? Is it incompleye in an ontologically necessary and intellectual fertile way? In fact, I intend to argue here that some popular linguistic theories are *not incomplete enough*. They are (or would be, if successful) too complete — while also, I will claim, incomplete in the wrong ways, leaving too many *relevant* phenomena, issues that *are* in the scientific wheelhouse, incompletely explained.

I will make these arguments as a prelude to describing the (incomplete) linguistic theory I *am* prepared to defend. Specifically, the first two sections here will weigh in on Conceptual Role Semantics and Truth-Theoretic Semantics and explain why I believe some popular paradigms in the philosophy of language are problemmatic. While the details will vary, the main thurst of my points will be that philosophers of language fail to appreciate the importance of sciences internalizing a map of the division of labor between science — a science is constituted in part by how it touches but remains autonomouus from other (both higher- and lowe-scale) sciences. So biology is constituted in part by its status as a potential reductive base for neuroscience, medicine, genetics, and paleontology, while having its own reductive base in chemistry and physics. Part of what it means to be biology is to be the explanatory bridge between, say, medicine and physics. Analogously, I believe, part of what it means to be linguistics is to be the explanatory bridge between, say, sociology, anthropology, and ethnolinguistics, with cognitive science (or Cognitive Phenomenology). Language can be intrinsically characterized as the cognitive bridge between our everyday world — of social situations and kinaesthetic/pragmatic enaction and anticipation, planning and memory — with the neurophysical substratum (whatver it is) of our mntal faculties. Language, that is, is an important tool for our negotiating the duality of our higher-scale social/situational world with our lower-scale neurophysical existence. Analogously, a phenomenon in language — say, a sentence — should be analyzed as a kind of transition-system between a social/situational layer of reality and a cognitive/neurological layer. Linguistics is accordingly suspended between these layers — or, better, I claim that linguistics should be the *theory of being suspended* between social/situational and cognitive/neurological strata. A linguistic analysis starts with entities shooting in from the first stratum (sentences we hear uttered, canonicaly), and it ends with some restructured representation or consummation of that sentence (parsed, lexified, etc.) understood as inputs to some neurophysical process belonging (ontologically, and as a matter of scientific jurisdiction) to the second stratum. Such an analysis is *correctly* incomplete because it recognizes that a basic criterion of well-formdness for linguistic theories is that they *refrain from* direct analysis of either societal/interpersonal or cognitive/neurophysical processes. Linguistic analysis is incomplete because a theortical machinery fine-tuned for analyzing processes of linguistic understanding at the intermediate level between social/situational and neurological strata cannot be the same as a theortical machinery for analyzing sociological or nurophysical laws in turn — by analogy, the exprimental (and theortical) mchinery for detecting Earthlike exoplanets cannot be the machinery for detecting Higgs bosons (and vice-versa).

Here I find an analogy to computer software useful: programs don't run themselves, so application developers have to realize that they do not control, or have access to much information about, when applications are launched (or when users will perform actions that require response from the software, like clicking a mouse button or pressing a key). Nor do programmers control input/output commands like emitting colors to the screen: they only influence electronic devices (like displays and networking capabilities) indirectly, via preimplemented system calls. In other words, the essential structure of a computer application is to be poised to react to various events (a mouse click, a key click, plus of course program startup initially) by eventually requesting certain operations (like changing the state of the screen) whose exact functioning remains outside the programmer's theoretical arsenal. Application developers have only a vague idea of how values and types in code are marshalled to an from electrical signals physically affecting (or reporting state from) devices like monitors, mouses, and keyboards. This is by design: if you're too closely attuned to low-level cyberphysical details, like how source code function calls map to digital signals, you're no longer doing computer programming (maybe you're doing chip design). To the degree that programming has a theory, it's a theory of how to *bridge* users' desired interactions with the software you are building *to* the digital structures encoded at the level of microprocessors and machine language. It is not a theory of microprocessors themselves. Theory well-formedness in the realm of programming — the field sonetimes calld

Software Language Enginering — reflects the transforms bridging "Human Computer Interaction" with machine language; it is not a theory of HCI or of machine languagebthemselves. Indeed, HCI methodology is subjective and statistical; and the methods of physically realizing machine language in microprocessors depend on physical and nanochemical properties. Well-formed Software Language Enginering theories *have* to leave both HCI and microprocessors out of the frame, since software programming languages are not statistical or subjective, nor physical or nanochemical.

The hierarchical natur of computer architecture complicates any "mind as computer" metaphor: computers have many subsystems, with significantly different structures and properties. Using computers as case-studies of artifacts ghat are in some sense "intelligent" can take us in different directions for different answers as to what scale of computers' organization we propose to inform, say, cognitive-linguistic research: microprocessors? Machine Language? Programming languages? Software systems? The internet? Of course, many instances of "mind as computer" analogic reasoning are not explicit research paradigms bing proposed forth but are more like reports of intuitions: a community of linguists feeling that there's something going on in how computers work that usefully models or resembles how human rasoning or language-processing works. But cashing these intuitions into systematic models can prove challenging: even insofar as a computer may exhibit intelligent behavior, it does so only in an emergent manner, the whole "intelligence" being possible only through specific kinds of interaction between subsystems, in particular a tightly determined transition between high-level systems (like applocation source code) and low-level systems (like machine code).

Of course, many researchers probably believe that this emergent dimension is precisely why computers are a plausible cognitive analogy: they suggest that intelligence can be realized in structural systems whose lowest-level operations are not particularly complex. No-one would argue that in and of itslf a simple Van Numann machine is particularly "intelligent"; but software evincing intllignt bhavior can be implemented as emergent phenomena for which Van Numann machines are their reductive base. This may sem like a useful analogy to consciousness, realized in neurons and synapses even though neurons and synapses are not themselves conscious. That's an acceptable intuition, but it also leads to a kind of philosophical bait-and-switch: what starts as a "mind as computer" intuition ends up as a different kind of analogy, something more like comparing minds to functional systems *implemented* on a computer. There is a difference between being a system realized on a computer and actually being a computer.

In the case of language comprehension, someone may find a useful analogy in database-like constraint-solving applications, like Prolog: language usrs maintain an internal store of beliefs — about both language and the world — and a record of prior steps in the current conversation. This "database" gets updated as we hear new sentences, and we are equipped to make or reject inferences based on inference rules and constraints, respectively: from "John is my younger step-brother" we can conclude both that the speaker's parents are divorced and that John is not female. Of course, real-world complications sometimes intrude on the kinds of tidy frames linguists build around words: a brother can actually be a transgender woman, and divorces can remarry each other. We can debate whether these are semantic or pragmatic issus (I think they're the former, but let's say they ar the latter for sake of argument). So let's say language has enough logical order that conversations can be modeled rather like Prolog programs. These leads to a maybe-interesting mind-as-Prolog analogy, but — here's the crux — mind-as-Prolog analogies are *not* mind-as-computer analogies. Computers *run* Prolog programs; it's not that they *are* Prolog sessions.

Indeed, I think many "mind-as-computer" analogies are actually more like "mind-as-Prolog" analogies, or substitute some other technology for Prolog. For instance, mind-as-artifical-neural-network analogies are not mind-as-computer analogies, because computers are not ANNs (though thy may implement them). Indeed, ANNs are designed to make computers more humanlike: to transcend the mechanistic limitations of Van Neumann architecture by realizing, at some virtual level, a more connectionist manifestation of computation. A mind-as-ANN analogy is therefore really mind picrured as a computer programmed to operate like a mind (so, the analogy is basically circular). Mind-as-symbol-processing analogies have similar issues: computers are not symbol-processors, though they can implement symbol processing systems. As I'll defend below, I think computers are basically stack machines, and stack machines do not "process" symbols — what they do is process stacks, and jump around to different subroutines. When people think about "computers" in mind-as-computer analogies — or write in ways suggestive of such an analogy — I often get the impression that what people are really thinking about is not "computrs" but some sort of mathematically formalizable, functionally specified system that can be *realized* on a computer.

These other analogies are not *a priori* bad — it's reassuring if we have accounts of intelligence that traffic through functional organizations that can be realistically embodied in mundane physical artifacts, rather than needing some magical mind-gunk. But if our "mind-as-computer" analogies are nothing more than a desire to find logico-functional systems

that can credibly undergird cognitive behavior, computers are basically irrelevant: the computational realizability of such logico-functional systems is a nice reminder that we're not asking non-philosophers to believe in magic, but the structure of these systems are sufficiently remote from how computers internally operate that computer realizability should have no *theoretical* role. In other words, mind-as-computer analogies are usually basically mind-as-logico-functional-system analogies.

We're entitled to find these latter analogies intuitive. My problem is only with mind-as-logico-functional-system analogies that get defended *by appeal to* mind-as-logico-functional-systemies. There seems to be a kind of metatheoretical pattern that goes something like this: mind is metaphorically a logico-functional system *because* mind is metaphorically a computer, and logico-functional systems (when not just abstract mathematical territories) are realized via implementation in computer architecture. But mind-as-computer is not logically related to mind-as-logico-functional-system — any apparent link between these analogies is a biproduct of intellectually bakgrounding the distinction between *being* and *implementing*. We may or may not like a mind-as-computer analogy, but even if we *do* accept such a perspective, even if provisionally, this does not then legitimize or entail that we are accepting a mind-as-logico-functional-system analogy. Of course, we can judge the latter analogy on its own merits, but the former analogy in no way retroactively justifies the latter.

So, my strategy for the rmaining sections of this paper is as follows: I will review some language-philosophy contoveries and argue that disentangling mind-as-logico-functional-system from mind-as-computer analogies should change our estimation of theoretical claims apparently motivated by mind-as-logico-functional-system paradigms. I will then present a different basic account of language processing which, I believe, does not work in any logico-functional-system orientation, though I will recognize some fashion of functional orientation. I will in places appeal to computer architecture, though the framework I propose will only absorb "mind as computer" analogies to a limited, targeted extent. A central theme will be that *logic* is not terribly relevant for either language or computers: functionally-organized systems do not have to be *logico-functional* systems. The ambient philosophy guiding these arguments is that "logic" in any formal, symbolic sense is not the proper vehicle for understanding the structured transitions and causative propagation endemic to multiscale, emergent systems.

Biology, for example, is not a *logical* intermediary between medicine and physics. We can consider how best to describe its "intermediariness": as a theory-construction maxim (in the sense that intermediariness is expressed in which laws/obervables are thematized and which are deferred to other sciences), as a causal network grounded in cross-scale physical constitutions and mereologies (e.g., tissues are both phsyically composed of cells and are wholes where cells are parts), as an emeregnt system which both *is* (vis-à-vis other sciences) and *has* a reductive base. Sciences are like computer programs in that they have *inputs* (observables from other sciences) and "outputs" (laws from other sciences). I use thse terms because they track analytic trajectories: medical *observables* (e.g. that many people who are exposed to a toxin develop neurological damage) are linked *via biological analysis* to causal/material explanations (how the toxin chemically damages nerve cells). Biology neither statistically models the medical observations nor physically explains the causative mechanism, but it provides a theoretical machinery for rigorously modeling and analyzing the transition between them. It write the second act of the explanatory play, so to speak. Pictured computationaly, the analysis is like a computer program whose inputs are higher-scale observables (saay, medical data) and whose "outputs" are numerical models whose formulae or justifications are solved by other sciences — by analogy to programmers calling system-kernel functions. In this analogy, medicine is like the end-user, biology is the application developer, and physics is the system kernel.

These are analogies informed by computers, of course, but I am trying to focus in on the "intermediariness" they evoke. How computer software bridges users and bare-metal is a useful metaphor for how scientific theories bridge observations and causal/mathematical microphysical models. And, correlatively, how sciences bridge between other sciences — higher sciences yielding obsevrations that are "inputs" to intermediary explanations, lower sciences defining formats for "outputs". Biology, for example, can defer to chemical or physical explanation if it can provide data in structures adequate to chemical or physical formulae: the reference frames, quantitative measures, dimensional systems. Biology does not need to solve such ewuations, just marshal data into their form. So a good biological analysis will take observation data (e.g. from physics) and transform it to equational data in some sense, wherein chemistry and physics take over. By analogy, correct computer software takes obsevrations (data in computer files and user actions) and translates these observations to the proper system-kernal calls, whrein the Operating System takes over.

Sometimes logical constraints come to bear on these transitions, but the importance of logic per se is overshadowed by the overarching phenomenon of "intermediariness": how the technical and ontological status of computer applications is

defined by their intermdiary position between input data/user actions and low-level system calls. Analogously, sciences are characterized by their posits' ontological status as — and their theories' structural criteria regulated by — intermediariness between observational data from one per science and causal/mathematical formula from another. As a philosophical gestalt, such "intermediariness", I believe, should take the place of "logic" in our intuitions.

In the specific contexts of Conceptual-Role and Truth-Thoretic Semantics, I will now show what for me this means in practice.

Part I Conceptual Role Semantics and Externalism

Conceptual Role Semantics is often discussed together with a particular internalism/externalism debate which it tends to engender. Here I want to defend a kind of Conceptual Role Semantics (hereafter CRS) but I will first outline an account of compromise between externalism and internalism. I will suggest a compromise different, I believe, than Ned Block's "two factor" model that seems considered the leading example of an externalist/internalist hybrid.

The basic CRS picture is that linguistic meanings should be associatd with conceptual rols in pur understanding situations more than in terms of their reference to external objects. Given sentences like

- (1) He opened the wine bottle with an ornate corkscrew.
- (2) He opened the beer bottle with a butterfly corkscrew.
- (3) He collects antique corkscrews and just bid on one online.
- (4) I thought this was a screw-top but it turns out I need a corkscrew.
- (5) This X3D file shows a very realistic corkscrew created with NURBS surfaces.
- (6) Could you send me the corkscrew (the X3D file you just mentioned)?

we should interpret "corkscrew", first, as a concept in a kind of functional organization. In some of these sentences there is also a specific corkscrew (qua phsyical object) on hand as a referent, but its actual physical properties — or even identity — is not decisive for the meaning of the sentence. After all, in (4) the speaker is not thinking of any corkscrew in particular (probably — more on that later) and in (5) and (6) the corkscrew is not real (at least not real qua corkscrew). But the conceptualization associated with "corkscrew" does not seem markedly different in (1) or (2) versus (4), at least (more on the other three later).

Not only physical details but even lexical identity seems tangential to the important conceptual meanings. Suppose I am hosting two guests, one has a magnum of ale and one a bottle of Malbec. They ask, respectively:

- (7) Do you have a bottle opener?
- (8) Could you get me a corkscrew?

and I give the first guest a butterfly corkscrew and the second a folding multi-knife. What I gave them is different from their request, but they should think nothing of it insofar as the winged corkscrew has a gap on its handle suitable for beer bottles and the multi-knife has a fold-out corkscrew spiral. I have not violated any conversational maxims, because I reasonably assume that the instruments I gave them are suitable for the desired goals, of opening their bottles. Semantically "corkscrew" really means "something that can be used to open a wine bottle", and in that sense the lexeme gets it principle content from this operational role, not some list of attributes (like spiraly and graspable) or prototypes.

Granted, a suitably designed winged corscrew can be construed as a kind of bottle opener, and a multi-knife a kind of corkscrew respectively. We are prepared to accept these tools as examples ofvthe respctive concpts if they are functionally designed to support those tasks, even if they are not the primary function. But our inclination allowing concepts to dilate modulo functional criteria suggest that our grasp of concepts is first and foremost functional-pragmatic:

we tend to internalize concepts in reference to (extralinguistic) functional roles and expand concpts to accommodate varigated implementers of those roles.

We can indeed accept sentences like:

- (9) He opened the bottle of beer with a hammer.
- (10) He pounded the nail with a lever corkscrew.

Of course here we are inserting objects into a conceptual nexus where they are not usually found. Winged corkscrews are often *designed* to double as bottle-openers, but lever corkscrews are not designed to double as hammers. Nevertheless we have no trouble imagining the scenarios being described, where someone uses the thick part of a corsckrew to pound a nail, or a hammer's handle-claw gap to pry off a bottle cap. We have schemata for "a tool to open a capped bottle" and "a tool to pound a nail", and the concepts of bottle-opener and hammer occupy that conceptual niche insofar as they are artifacts designed for those purposes. But the conceptual "slot" for, say, "a tool to open a capped bottle" is more general than the specific tools designed for those purposes.

We nonetheless *would* be presumably violating conversational maxims if we handed our friend who wanted to open a beer bottle a hammer. Even if there's a way to make the hammer work for that purpose, it's further outside the norm that, referring back to (), proposing to use a winged corkscrew. So the implicature in () is satisfied, let's say, by bringing my guest a winged corkscrew, but not a hammer. But we can entertain the *thought* of using a hammer as a bottle-opener, and even this possibility presents problems for simplistic thories of language acquistion as essentially learning a static set of word correspondances, like "a hammer is used to pound nails" or "a corkscrew is used to open wine" — after all, you cannot conclude from

- (11) A hammer is somthing used to pound nails.
- (12) A lever corkscrew is something used to open wine.
- (13) A lever corkscrew can be used to pound nails.

that a hammer is a kind of lever corkscrew and can therefore open wine. What we *do* have are conceptual slots available encapsulating ideas like "that which can open bottles" or "that which can pound nails", and we "fill" these conceptual slots with different lexical content in different situations. The "that which can open capped bottles" slot can be filled descriptively — i.e., in declarative speech, like in () — by a hammar, but not in other kinds of speech acts (we cannot read the concept "bottle opener" as satisfied by "hammer" in the contxt of a request for a bottle opner). Note that the scope of conceptual roles can change merely by switching between locutionary modalities.

The takeaway from this discussion in the internalism/externalism setting is that conceptual roles have a linguistic priority over and against both lexical and physical realizers, and the scope for things inside and outside of language to play (or not play) such roles varies with context. I have introduced these issues via tool artifacts (like corkscrews) but would be closer to the spirit of the CRS internalism/externalism debate by discussing natural-kind concepts. Suppose I am building a sand castle on a beach and ask someone one of:

- (14) Can you bring me a bucket of water?
- (15) Can you bring me a glass of water?

For (), a reasonable reaction would be a bucket filld with ocean water; but for () my addressee would probably infer that I was thirsty, and — since salt ater is non-potable — was requesting water I could drink. But "*glass of* water" probably figures here just to establish my intention to drink it: you are entitled to bring me bottle of water instead. In other words, my request has implied content which in some aspets loosens and in some aspects restricts th conceptual scope of semantic entries in my utterance. Thus oceans are composed of water, and near a beach I can say:

- (16) The ocean is over there.
- (17) The water is over there.
- (18) You can see the ocean from here.
- (19) You can see the water from here.

Each pair is almost identical. But ocean-water ceases to fall under the conceptual role of "water" when we are in the context of drinking things instead of the context of geography. This suggests that water does not "mean" H_2O or eother saline or non-saline water: the meaning is not fixed to any particular chmical composition but adapts to the situational context, including what the water is used for — e.g. as a drink or as a binder for a sand castle.

The most talked about "water" analysis in th literatur is less earthly than this: Putnam's "twin earth" argumnt that there could be a planet whose substance (with chemical makeup) XYZ could be functionally indisinguishable from our (H_2O) water. Externalists and internalists thereby express their differences as disagreements over whther twin-earthers' XYZ concept is the same as our H_2O concept. For the latter, as the basic account goes, XYZ plays the same conceptual role in their lifeworld as H_2O poays in ours, so it is the same concept; for the former, the concepts designate different material substances (even if twin-earthers don't know this) so they can't mean the same thing, even if there is some sort of analogy or resemblance between them (concepts can be analogous or similar while still being different concepts).

Before making a case for one alternative here over the other, let me note the following: it is unfortunate that the case-study is formulated in terms of XYZ vs. H_2O, because at the level of molecular composition it is hard for us to conceive that XYZ is *really* indistinguishable from water. After all, our concptual understanding of water includes things like electrolysis — if XYZ does not emit hydrogn and oxygen when electricallly charged under certain controlled conditions, it is not behaving like water and can not be (even internalistically) construed as conforming to our concpt of water. Of course, we are free to expand our water-concept, just as we contract it when switching from geology/geography to drinking. But here we expand it with full recognition that finer-grained concptual distinctions are possible, just that there are many contexts where they are unnecessary.

We do not need to contemplate far-fetched twin-earth scenarios to see this in practice: here on earth we have deuterium water which is chemically different from normal water (but both have the H_2O signature, although heavy water is also described as D_2O). We are free to let "X" mean normal hydrogen, "Y" mean deuterium ions, and "Z" mean oxygn, so XYZ becomes what chemists call HDO — semi-heavy water. Most people would probably say that HDO is just a kind of water, and so can be subsumed under the concept "water", but this is not conclusive. In reality, I don't think the English community has needed to establish whether "water" should mean ordinary H_2O or should include variations containing different hydrogen isotopes — whether heavy and semi-heavy and other variants of water should be considered "water" or some other concepts.

In practice, a fraction of ocean water has deuterium, which might argue for "water" subsuming heavy water — we don't point to the ocean and say

▾ (20) The water and the Deuterium Dioxide is over there.

But this can alternatively be explained by the principle that referring to an impure sample of a substance is still a valid use of the concept:

▾ (21) Here's a glass of water (even though tap water is mixed with flouride).

▾ (22) Bing cherries are dark red (even though the stem is brown).

In the second case, we can validly call something red even if something less than its whole surface shows a red color. Applying a similar rule, we can call a solution "water" if there are only "sufficintly small" amounts of solutes. Clearly we use "water" to dsignate many substances other than pure H_2O. I can think of two options for explaining that semantically: (1) Salt water, tap water, distilled water, (semi) heavy water, etc., are all different kinds of water, but our coarsr "waterr" concept subsumes them all (in most contexts). (2) There is only one water concept, pure H_2O, but impure samples of liquid that are mostly water can be called "water" by the same principle that a mostly red-colored object can be called just "red".

The second option has a common-sensical appeal because it fits a succinct "concepts as natural kinds" paradigm but does not venture too far from normal language use — that "red" actually means "mostly red" is a pattern common with many nouns and adjectives (someone can be *bald* with a bit of hair; I can point to a turkey burger made with bread crumbs and spices and say "that's turkey"; I can tell someone listening to Keny Arkana's song "Indignados" that it's in French, although some of the lyrics are Spanish). However, the "mostly water" reading has a couple of problems: first, what about cases like a "glass of water" where "mostly water" is not "mostly" enough to drink? And, second, why can't we refer to

plasma, say — which is 92% water — as water? This is not just a matter of numbers: the dead sea water is much less pure than plasma in the hospital (in terms of percentage H_2O in solution) yet we are authorized to call the former "water" but not the latter. This certainly seems to be a matter of conceptual roles — plasma occupies a certain place in our conceptual systems about blood and medicine (largely because it plays a specific role in biology and medicine) which does not fit the profike of "water", while the stuff in lakes *does* fit that profile, even if the lakes are hypersaline. Blood fits a conceptual ecosystem where we are not tempted to subsume it uner the concept *water*, whereas our conceptualization of lakes pulls in the opposite direction — even though by purity the water in Gaet'ale Pond in Ethiopia is apparently not much more watery than blood. Our disposition to either contract or dilate the sense "water" seems to be determined by context — by the conceptual role water plays in different context — rather than by actual hydrological properties.

What about the hypothetical twin-earth XYZ that Putnam imagines is indistinguishable from our H_2O? Well, for this hypoyhsis to even make sense we have to assume that XYZ is scientifically indistinguishable from water, which is a matter not just of pure H_2O but of all solutions and deuterium- or triterium-related variants of water, and so forth. As a thought experiment, where we are free to conceive almost anything, this is not impossible. Let's imagine that there is an undiscovered subatomic particle that on some planets clings to atomic nuclei without affecting them in almost any way. We can call nuclei harboring these particles "twin nuclei", so hydrogen becomes "twin hydrogen", oxygen becomes "twin oxygn", and presumably water becomes "twin water". This twin water would essentilly retrace the the compositional structure of water — since it would have to form (and unform, under electrolysis) just like "our" water. If we plug this "twin water" into Putnam's scnario, I can't see why we don't just call this a variant kind of water, water with some extra (but observationally negligible) particles, just like heavy water is water with extra neutrons.

This does not do perfect justice to "twin earth" discussions, because I am describing "twin" water as something whose composition is almost identical to "our" water. In the original story, "twater" is XYZ, which as written suggests something whose physical constituents are much different than water, even if all propensities that influence our "water" conceptualizations are exactly the same as our water. But something compositionally different than water *can't* be functionally identical to water, at least if any of the actions we can take that reveal water's composition come out different. In short, whatever XYZ are, they must have a capability to *become* hydrogen and oxygen, because XYZ's emulating water means it emits hydrogen and oxygen under electrolysis. Meanwhile there is no action that could "release" the "X" (or whatever) because that would also behaviorally differ from water. So XYZ would differ from water only insofar as in its "unobserved" states it can float around as something without hydrogen or oxygen but, whenever subject to actions that cause water proper to emit these gasses, it would somehow conjure them up in exactly the same patterns as water (which actually *is* composed of hydrogen and oxygen) does.

By dictum, then, XYZ is not actually composed of hydrogen and oxygen, but whatever it *is* composed of can act as *as if* it *does* contain these gasses so as to emit them. In that case I'd question the argumentative force of claiming that XYZ does not contain hydrogen and oxygen to begin with. We are asked to believe that XYZ is made up of some ethereal non-hydrogen and non-oxygen that can nevertheless become hydrogen and oxygen whenever it is in the physical states wherein water that *is* made of hydrogen and oxygen will release them. I am inclined to say that this is just another way of being made of hydrogen and oxygen. After all, atoms are not little ping-pong balls: what we picture as a water molecule is actually apparently muchbmore ethereal, suspended in quantum indeterminacy. I take it there is some Shrodinger equation for a water molecule, and only when the "wave function" collapses — say, by our observing the water subject to electrolysis — do we actually get hydrogen or oxygen atoms. So "our" water isn't really "composed" of hydrogen or oxygen in its pure quantum state. Maybe XYZ "collapses" to hydrogen or oxygen in different ways than earthly water (but with no way to measure the difference), but this is still not divergent enough that for me to feel compelled to call XYZ anything other than some variant form of water.

Of course, I am assuming that twin earthers have *the same* water-concept that we do, *in all respects*. Maybe a more faithful review would consider that twin earthers might have a related but more primitive water-concept tha ours — maybe some subset of our concept in terms of the scientific knowledge embedded in our concept. Before we earthers knew abput hydrogen, oxygen, or electrolysis, the behavior of water under electrolysis was not a factor in our concept of water. So imagine if twin earther's level of scientific knowledge was akin to that on earth centuries ago — their XYZ is measurably different from our water, but they have no experimental our scientific apparatus to notice the difference. But this is *contingent*: the twin earthers *could* some day discover hydrogen and oxygen. Then, if XYZ really is not composed of hydrogen and oxygen (or acts as if composd of them when not in a nonobservable ethereal state) their scientific theory of water, and accordingly their conceptualization, would diverge from ours.

We can imagine a non-water XYZ that is water-like enough to play an identical rooe to (our) water, but this story can go in two directions: either XYZ is *absolutely* identical to water, its differences from water so obscure as to be observationally and causally maningless; or it has legitimate differences from water that *could* be conceptually significant but in some context are not (at last not yet). These are two different thought experiments. If some substance is in alll respects and under any conceivable science identical to water, yet somehow compositionally different from it, I think the plausible respone among normal language communities would be to extend the concept of water — subsuming XYZ under the concept, analogous to heavy water when it was discovered. We are generally prepared to expand the reach of concepts when there is no compelling reason not to do so. Whether a potential expansion takes hold probably varies by context. We are — a point that generally fits on the externalist side of the ledger — more willing to accept expansion when the revised conceptualization would not deviate too far from a basic alignment of natural kind concepts to scientifically reasonable classifications. We can readily extend "water" to D_2O because the two substances are compositionally very similar. We are less likely to accept conceptual mergers when they seem to violate our natural-kind pictures, even if they are functionally plausible: we do not accept "agave" as a subconcept of "honey", even though the two are physically rather similar and functionally very similar. Nor does physical form alone drive conceptual boundaries: we know full well that water vapor an ice are the same stuff as liquid water, but we recognize a conceptual distinction between them. But these are not hard and fast rules: we may be inclined in many contexts to treat frozen-concntate juice as conceptually subsumed under"juice" (as in "juice on sale"), and we will often accept almond milk oecashew milk as "milk", despite physical differences which we certainly acknowledge. In short, concptual boundaries tend to be drawn to honor, albeit without excess granularity, both physical and functional factors — neither physical/compositional similitude alone, in the absent of functionalv resemblance (see water/ice) tends to earn concept dilation, nor vice-versa, but a mixture of functional and physical similarity even with *some* differences in both aspects tend to be likelier drivers of concept-expansion (see water vs. chlorinated water, or red wine vs. white wine). By these rules, expanding "water" to include XYZ — if XYZ is functionaly identical to *but* compositionally different from water — would be abnormal, like seamlesly expanding "milk" to include almond milk. But these rules are approximate, and on the idiosyncratic case where XYZ is *completely* functionally like water but (stipulated to be) physically different (though by functional identity we could not detect as much), I think the normal "conceptual dilation" rules would side with the functional identity and ignore the physical differences.

On the other hand, if XYZ has real discoverable differences from water, then the potential exists for twin earthers' concept of water to divrge from our own, even if at any point in time the concepts are identical. The time "points" don't need to be simultaneous: we can compare one country's concpt of water in the year 1800 with a diferent county's in the 16th vcntury. It is plausible that different people at different times have effectively the same conceptual attitudes toward concepts that, with the benefit of hindsight and more science, we know have potential for diffrentiation. I think the mere potential for differentiation warrants our identifying conceptual differences even if the parties involved are not aware of this potential. I am prepared, for example, to accept that a child's water-concept in our time can be different from a medieval child's water-concept merely by virtue of the modern child potentially learning about deuterium, hypersalinity, and other scientific nuances that complicate the modern conception of water relative to our forebearers.

We certainly accept that people may have different understandings of a concept and, on that basis, may judge that what two people ar entertain are two different concepts — though we may also feel that they entertain two variations of *the same* concepts. There's room for most concepts to "diversify", subsuming subconcepts and variations; hence there's roon for a concept to expand (see water to heavy water) without fragmenting. But sometims we *do* insist on splitting concepts — or, eqivalently, refuse to accept a concept-enlargement — and *the reasons for this refusal may be external to some peoples' use of the concepts*. Current political discourse in the United Stats, for example, is driven by turns of phrase that are rather haphazardly defined: "Climate Change", "Border Wall", "Free Tuition", etc. Suppose a health policy expert observes that Bernie Sanders's use of the term "Medicare for All" is different from Kamala Harris's. She may conclude that Sanders's concept "Medicare for All" is different from Harris's concept — and the rationale for this conclusion ned not take into account whether the two candidates are aware of the differences. Suppose, as an expert, she has to mentally track the differences — she has a well-informed judgment that each of the "Medicare for All" plans have different ramifications because of heir specific policy differences; as a result when discussing "Medicare for All" she needs to note in her own mind which version of that idea is under discussion at any moment in a discourse. That is to say, she needs to subsume them under different concepts. Moreover, we endorse that she *should* do so, even if she thereby makes a distinction that the politicans or thir supporters themselves do not realize. In this kind of case we may defer to expert opinion when adjudicating a potential conceptual divorce, even if there is only minimal differences in the role of the concepts vis-à-vis the conceptual systems of many relevant parties.

The possibility that "Medicare for All" may play the same *role* in a Sanders supporter's and a Harris supporter's conceptualizations does not preclude our judging that they are nonetheless different concepts — if by virtue of more information and more access to expert counsel we can understand that there are potential differences in their conceptualizations that *could* drive the conceptual roles to diverge. I think this is analogous to a "twin earth XYZ" scenario in that the thought experiment is set up as if we have access to expert confirmation that twin earth's XYZ is not physically the same substance as water. Projecting from earthly practice, we accordingly accept that "externalist" considerations may need to come to bear, and "XYZ" may need to be classifid as a different concept that water *notwithstanding* the lack of any concptual role diffrence between XYZ for twin earthers as compared to water for us. This is consistent with our tolerance for including factors beyond just concptual roles in more mundane circumstances: we accept that sufficiently divergent notions of "Medicare for All" *could* be most appropriately classified as two different concepts. This is not mandates — we could certainly describe the Sanders and Harris platform as "two different Medicare for All plans", subsuming them under one concept but acknowldging their differences — as token differences, like the conceptual difference between this apple and that apple, rather than concept-differencs like apple vs. cherry. Analogous, we *could* subsume XYZ under the concept *water* — XYZ being a kind of water insofar as samples of XYZ (tokens of the XYZ-concept) bear some physical differences to tokens of ordinary water (like havy-water samples do), but we can handles this variation on a token-token lecel (analogous to comparing two apples). But we can *also* split rather than expand the conceps — *divorce* rather than *dilate* — making XYZ a different concept than water, just as we can make Sanders supporters' Medicare for All a different concept that Harris supporters. The key point is that our choice of "divorce or dilate" may be driven by factors wholly external to some concept-bearers' internal concept-uses. Two different concepts — recognized by us as different — may play identical conceptual roles for some people.

This stance is at least minimally Externalist in that I don't insist on internal conceptual-role similitud being an immovable criteria selecting "dilate" over "divorce". We as a language community can and sometimes should override the tendency for concepts to expand under role considerations. As I pointed out earlier, a corkscrew and even a hammer can sometimes satisfy the role "bottle opener" in specific contexts. Usually we distinguish context-specific concptual role-playing from general concept dilation — I think this is the gist of Zhaohui Luo's analysis of "situations" and "Manifest entries". We can adopt a temporary frame of reference wherein, say, hammers are bottle openers — or in Luo's example (in a single zoo exhibit) all animals are snakes — without mutating the concepts so wildly that "hammers" become expanded to including anything that may open a capped bottle, or "snakes" become all animals. Yet such situational dilations can recur and eventually spill beyond their situational guard rails. In a vegan cafe I can imagine the staff converging on a usage that soy, almond, and cashew mils are collectively called just "milk". If veganism becomes ntrenched in some English-speaking community I can similarly imagine that in their dialect "milk" will mean anything that can be used like milk in a culinary context. The warrants for such expansions sem to be drivn by concptual roles — situations present "slots", like *that which opens this bottle* or *that which I pour on cereal*, and existing concpts tend to expand to fit these slots.

These considerations tend to follow the *internalist* line: we take attitudes based on conceptual role more than eternal na4tural-kinds when adjudicating conceptual boundaries. Thus situationaly we may present almond milk and agave to satisfy a request for milk and honey. But superimposed on "centrigual" tendency for concepts to expand into "under-lexified" concptual niches we have a counter tendency to question conceptual uses where functional resemblance strays *too far* from common sense. Someone may accept agave in lieu of honey, or a hammer as a bottle opener, in the context of how one situarion plays out, but they ar eless likly to accept these uses becoming entrenched, compared to, say, refiguring "milk" to include almond and cashew milk. And our hesitation to accept concept-expansion in these latter kinds of cases seems to implicitly look beyond concptual roles — we may insist on limiting concept dilations even if there are many people for whom there will never be situations where the differences between concept referents, over and above functional resemblance, would be important. In short, even if a community could do just fine with some dialect idiosyncracy that ignores a conceptual distinction we would ordinarily make, we don't tend to take this as evidnce that our multiple concepts can be merged into one more diverse concept.

Of course we *can* merge concepts, and the fact that many people can live their lives without a conceptual coarsening may render such merger likelier, but it seems we evaluate potential mergers more by reference to entire speech-communities, not isolated parts. Note that I am speifically talking here about merging or splitting concpts, not word-senses or lexemes or any purely linguistic artifacts. Certainly we have variegated "water" concepts — salt, tap, distilled, havy — but we have an overarching water concept that includs these as subconcepts. We can make a conscious dcision to modify concept/subconcept relations — which is different from changing how concepts are mappped to lexemes. So I take it

that Conceptual Role Semantics prioritizes role factors in drawing concept/subconcept relations and boundaries, and the consequence is a mostly Internalist intuitive model: we should accept concept maps where concepts are mostly drawn togther when there is a functional resemblance between their roles: our concept/subconcept renderings should witness and help us exploit functional analogies.

At the same time, however, I think we instinctively project notions of conceptual role outward from individual perople or subcommunities to the social totality. Even if technically distinct Medicare for All plans play similar conceptual roles in different voters' conceptions, we understand that such similarity may braak down as we pand the community outward. Sanders and Haris supporters don't live on thier own islands. Ther are factors outside their own minds that weigh on whether their functionally similar Medicare for All concepts are indeed *the same concept* from the larger communiy's point of view. But these external factors are not necessarily *extramental*: we can zoom outside the concptual patterns of one subcommunity and argue that concptual differences appear in the overall speech community that supercede functional resemblance in some subcommunity. Concptual roles ar not solisistic: the role of the concept Medicare for All for a Sandrs supporter is not just a role in *his* mind, but it bcomes a role in *our* minds if we dialogically interact with him. Insofar as people can make inferences about other peoples' conceptual role "system" — we can figure out the role which a concept plays in somone else's mind, to some approximation, even if analogous concpts play a different role in our own minds — conceptual roles are not private affairs; the have some public manifestation and there is a need for collective reconciliation of role differences, just as we need to identify when different people are using the same words in different ways and use lexical conventions to diminish the chance of confusion. Conceptual roles are not *internal* insofar as they have this public dimension. But "externalism" in this sense is waranted because we want to look philosophically at entire speech or cognitive communities. Conceptual differences that could *potentially* become publicly obsevrable from th vantage point of the *entire* cognitive community warrant consideration for conceptual divorce over dilation — overriding similar roles in some *part* of the community.

In the case of XYZ, insofar as the twin earth cognitive community and our own could *potentially* become part of a single overarching cognitive community, we have potential grounds for drawing comparisons between water and XYZ. Merely by contemplating their planet here on earth we are performatively drawing twin earthers into our cognitive community. By postulating that twin arthers think about XYZ the same way we think about water — and that we know this — we implicitly assume that thir conceptual role patterns are public observables in the context of our own community. If conceptual roles are observable, then there is a concept of a conceptual role: pundits can conceptually analyze how "Medicare for All" plays identical conceptual roles for Sanders and Harris supporters even if the candidates' plans are consequentially different. But this merely says that there are latent differences in two people's conceptual roles that they themselves may not actually experience. The public facet of conceptual roles complicates th notion of conceptual role similarity — two person's patterns of conceptual rols may be observably different as public phenoemena even if the people lack resources to realize the difference. Conceptual roles are therefore external to individual minds — but this is by scoping outside individual minds to holistic cognitive communities who can publicly observe our cognitive tendencies. We are still reasoning "internalistically" in the sense of considering cognitive patterns at the scale of an overall cognitive community.

In short, I will take the mantra of an "Externalist" when passing from individual minds and subcommunities to the public nature of conceptual roles and overaching cognitive communities. Once we get to the maximal possible community, however, I am inclined to revert to Internalism: if there is no broadening of communal scope that could make putative external diffrences meaningful to *anyone's* concptual roles, I see no reason to account for *these* erstwhile externalities in a theory of conceots. If XYZ has *some* not-water-like qualities that a sufficiently large cognitive community could confront — even if XYZ-conceptual-role and earthly-water-concptual-role is identical for the two isolated communities — I am happy to accept that twin earthers' XYZ-concept is a different concpt than arthers' water-concept. Similarly, I accept that Sanders supporters' Medicare for All concept may bea different concept than Harris supporters'. But in both cases I accept conceptvsplitting to ovrride role-similarity because I believe in an overarching cognitive community which has an interest in detecting differences or potential differences in conceptual roles qua public obsrvables, which transcendes our own internal awareness of what our conceptual roles entail. The fact that earthers and twin-earthers might never "discover" a water/XYZ difference is a contingent fact, not an essential structure in policing conceptual maps. When establishing how we should consider redrawing thse maps, we should work from the picture of an overarching comunity that can subsume isolated communities as an abstract posit; the parts of the twin earth story that imply earthers and twin earthers could never actually discover their differences are not, I think, compelling as intrinsic features of the analysis. In short, if water and XYZ have some potentially observable differences, then we need to proceed as the community which is

aware that these differences exist and that therefore, for us, water and XYZ need different conceptual slots. The only analysis then is how to reconcile the fact that we have multiple oncptual slots whereas twin earthers (and earthers who have not read Hillary Putnam) have just one. But if we take a *maximal* cognitive community — the sum total of earthers and twin earthers and philosophers — this community *does* distinguish XYZ from water (surrely XYZ plays a different role in Putnam's mind than water). And we should scope to the maximal community when determining whther smaller communities' concptual roles are truly identical, because concptual roles are, in part, potential public obervables for any possible supercommunity.

On th other hand, if XYZ is so much like water that *no* community would *ever* have reason to contrast twin-earthers's XYZ-conceptual-role with our water-concptual-role, then I think these roles are not just *internally* identical for each (twin-) earther, but *publicly* identical for any conceivable cognitive community for whom public observations of (twin-) earthers' conceptualizations are consequential givens. And in *that* case I think XYZ is the same concept as water notwithstanding putative compositional differences.

The whole idea that conceptual roles can be *public* complicates the Internalist/Externalist distinction, because each persons conceptual patterns can be evaluated from a vantage point external to *their* mind but still within the proclivities of a "m"aximal cognitive community. Concptual roles are not private to each person, but are private inclinations that get reshaped, corrected, influenced, or reinterpreted by a larger community. If we understand conceptual roles to include the totality not just of each person's conceptual role attitudes but the totality of how these attituds are observed by others, then we should consider that concepts are not "eternal" to the *maximal* cognitive comunity. Externalism about *individual* minds can be wrapped inside Internalism at the *maximal* inter-cognitive level.

But, complicating matters further, the maximal community's observations of concptual-role attituds is often driven by at least our *belifs* about xternal (i.e., extramental, natural-kind) criteria. For example, some companies want to rechristen "corn syrup" as "corn sugar", to make it seem more like a sugar-subconcept. Meanwhil, some dairy companis want laws restricting the use of "milk" for vegan products. In both cases our larger community has a chanc to weight the proper conventions for how our conceptual maps should be drawn. As I argued earlier, both functional and naturalistic criteria play a role in such deliberations. We are poised to distinguish transient situation-specific roles — that one time someone usd a hammer as a bottle opener — from functional parallels that stretch across many contexts. Within the parameters of that contrast, we are receptive to redrawing maps on role criteria — allowing milk to subsume vegan milk-substitutes, for instance. But this tendency is balanced by a respect for some notion of coherent natural kinds — the distinct biological properties of vegan milks work against a *maximal* community subsuming them under "milk" outside of spcial contexts.

Both the Externalist and Internalist points of view have some traffic in the considerations that cognitive communities bring to bear on which concptual maps should be enorsed by convention. Because ad-hoc conceptual roles can be established for particular situations, we can be conservative about *conventionalizing* concpt maps driven by functional correspondancs too far removed from (what we think to be) scintifically endorsed, natural-kind boundaries. In other words, I think we *do* and *should* allow "naturalistic" considerations to be a factor in what concept maps we endorse. But this is not a claim about Externalism as a philosophical paradigm shaping how we should construe the triangulation between mind, world, and language, as a matter of metaphysical ideology. Rather I believe that "externalist" factors should and do come to bear on the deliberations *internal* to cognitive communities' (sometimes but not always explicit) evaluations of how to draw concept and subconcept boundaries and relations — when to split concepts and when to dilate them. Dilate-or-divorce options are are pulled by both externalist and internalist considerations, sometimes in competing ways.

If we consider language — and communally-endorsed conceptualizations — evolve in practice, then by light of my claims until here there is material for both Externalist and Internalist readungs. This perhaps leavs room for a theory which accepts that both are partially true — each being logically founded under consideration of two different aspects of how concepts evolve. I will explore this possibility further, but first I want to shore up my account of concptual roles themselves. One complication I have glossed so far is that *functional* roles in an enactive and "pragmatic" (in the everyday-world sense) spheres are not *ipso facto* the same as either conceptualizations (conceptual-role-attitudes) or lexicosemantic conventions. Thse three are interrelated, but we need social and cognitive practices to get situational understandings entrenched in language and in communal concept-maps. Without a theory of this process, to speak of functional roles like *hammer* for *bottle opener* is not a substitute for speaking of conceptual roles *per se*. How to properly link "functionality" in an enactive quotidian sense — the data that various narural and man-made artifacts are used by people for cocrete tasks, and we often talk about this — to the cognitive realm of concepts (and their boundaries and subconcept relations)? This is the main theme of my next section.

Part II Truth-Theoretic Semantics and Enaction

Corrolary to the idea that roles often determine concepts, is the recognition that we tend to logically evaluate situations in functional terms, through the lens of what we (or any of our peers) are *doing*. Suppose my friend says this, before and after:

- (23) Can you put some almond milk in my coffee?
- (24) Is there milk in this coffee?

Between ()and () I do put almond milk in his coffee and affirm "yes" to (). I feel it proper to read ()'s "milk" as really meaning "almond milk", in light of (). Actually I should be *less* inclined to say "yes" if (maybe as a prank) someone had instead put real (cow) in the coffee. In responding to his question I mentally substitute what he almost certainly *meant* for how (taken out of context) () would usually be interprted. In this current dialog, the *milk* concept not only includd vegan milks, apparently, but *excludes* actual milk.

It seems as uf when we are dealing with illocutionary force we are obliqued to subject what we hear to extra interprtation, rather than resting only within "literal" meanings of sentences, conventionally understood. This point is worth emphasizing because it complicates are attempts to link illocution with propositional content. Suppose grandma asks me to close the kitchen window. Each of these are plausible and basically polite responses:

- (25) It's not open, but there's still some cold air coming through the cracks.
- (26) It's not open, but I closed the window in the bedroom.
- (27) I can't — it's stuck.

In each case I have not fulfilled her request vis-à-vis its literal meaning, but I *have* acted benevolently in terms of conversational maxims. Many linguists seem to analyze hedges like "could you please" as merely dressing over crude commands: we don't want to come across as giving people orders, but sometimes we do intend to ask pople to do specific things. As a result, we feel obliged to couch the request in conversational gestures that signal our awareness of how bald commands may lie outside the conversational norms. These ritualistic "could you please"-like gestures may have metalinguistic content, but — so the theory goes — they do not *smantically* alter the speech-act's directive nature.

The problem with this analysis is that sometimes directive and "inquisitive" dimensions can overlap:

- (28) Do you have almond milk?
- (29) Can you get MsNBC on your TV?

These *can* be read as bare directives, and would be interprted as such if the hearer believed the speaker already knew that yes, he has almond milk, and yes, he gets MsNBC. They can also be read as bare questions with no implicature: maybe fans of almond milk and MsNBC endorsing those selections. They can *also* be read as a mixture of the two, as if people expressed themselves like this:

- (30) I think the window is open, can you close it?
- (31) I see you have almond milk, can I have some?
- (32) If you get MsNBC, can you turn on Rachl Maddow?

I think the mixed case is the most prototypical and pure directives or inquiries should be treated as degenerate structures whre either directive or inquisitive content has dropped out. After all, even a dictatorial command includs the implicit assumption that the order both makes sense and is not impossible. On the other hand, we don't ask questions for no reason: "do you hav almond milk" may be a suggestion rather than a request, but it still carries an implicature (e.g., that the addressee *should* get almond milk).

Ordinary requests carry the assumption that addressees can follow through without undue inconvenience, which includs a package of assumptions about borh what is currently the case and what is possible. "Close the window" only has literal force if the window is open. So when making a request speakers have to signal that they recognize the request involves certain assumptions and are rational enough to accept modifications of these assumptions in lieu of literal compliance. This is why interrogative forms liie "can you" or "could you" are both semantically nontrivial and metadiscursively polite: they leave open the possibility of subsequent discourse framing the original request just as a belief-assertion. Developments like "can you open the window" — "no, it's closed" are not ruled out. At the same time, interrogative forms connote that the speaker assumes the addressees can fulfill the request without great effort: an implicit assumption is that they *can* and also *are willing to* satisfy the directive. This is an assumption, not a prsumption: the speaker would seem like a bully if he acted as if he gave no thought to hid demands being too much of and imposition. This is another rason why requests should be framed as question.

Sometimes the link between directives and belief assertions is made explicit. A common pattern is to use "I believe that" as anb implicature analogous to interrogatives:

- (33) I believe you have a reservation for Jones?
- (34) I believe this is the customer service desk?
- (35) I believe we ordered a second basket of garlic bread?
- (36) I believe you can help me find a find computer acessories in this section?

These speakers are indirectly signaling what they want someone to do by openly stating the requisite assumptions — *I believe you can* in place of *can you?*. The implication is that such assumptions translate clearly to a subsequent course of action — the guest who *does* have that rservation should be checked in; the cashier who *can* help a customer find accessories should do so. But underlying these performances is recognition that illocutionary force is tied to background assumptions, and conversants are reacting to the propositional content of thos assumptions as well as the force itself. If I *do* close the window I am not only fulfilling the request but also confirming that the window *could* be closed (a piece of information that may become relevant in the future).

In sum, when we engage pragmatically with other language-users, we tend to do so coopratively, sensitive to what they wish to achieve with language as well as to the propositional details of their discourse. But this often means that I have to interpret propositional content in light of contexts and implicatures. Note that both of these are possible:

- (37) Do you have any milk?
- (38) Yes, we have almond milk.
- (39) No, we have almond milk.
- (40) Yes — actually, we have almond milk.
- (41) No, we only have almond milk.

A request for milk in a vegan restaurant could plausibly be interpreted as a request for a vegan milk-substitute. So the concept "milk" in that context may actually be interpreted as the concept "vegan milk". As Luo points out in [], particular concept-maps are admissible as in force in specific situations even if they deviate noticably from typical usage (Luo does not talk about concept "maps" but about subtyping and various inter-type relations, yielding a type-theory of situations I think is relevant Conceptual Role theories of situations). In any case, responding to the force of speech-acts compels me to treat them as not *wholly* illourionary — as in part statements of belief (like ordinary assertions). One reason I need to adopt an epistemic (and not just obligatory) attitude to illocutionary acts is that I need to clarify what meanings the speaker intends, which depends on what roles she is assigning to constituent concepts.

If a diner asks for milk in a vegan restaurant, a waiter may plausbily infer that the customer believes the restaurant *only has* vegan milk, so there is no ned to make that explicit; and/or she assumes that everyone in the restaurant will hear "milk" as "vegan milk". In other words, the waiter infers that "vegan milk" for her plays the same role as "milk" for a non-vegan. This inference is not produced by any speech-act subtleties: a related inference would be involved in

- (42) Is there milk in this coffee?

▾ (43) Yes, almond milk.

Part of reading propositional content is syncing our conceptual schemas with our fellow conversants. But the illocutionary dimension of a request like "can I have some milk?" makes this interpretation especially important, because the addressee wants to make a good-faoth effort to cooperate with the pragmatic intent of the spech-act. But cooperation requires the cooperating parties' conceptual schemas to be properly aligned. I therefore have to suspend the illocutionary force of a directive temporarily and treat it as locutionary statement of belief, interpret its apparent conceptual undrpinnings in that mode, and then add the illocutionary force back in: if I brought *real* milk to a vegan customer who asked for "milk" I would be *un*-cooprative.

The upshot is that conversational implicatures help us contextualize the conceptual negotiations that guarantee our grasping the correct propositional contents, and vice-versa. This means that propositionality is woven throughout both assretive and all other mods of language, but it also means that propositional content can be indecipherable without a detailed picture of the current context (including illocutionary content). The proposional content of, say, "there is milk in this coffee" has to be judged sensitive to contexts like "milk" meaning "vegan milk" — and this propagates from a direct propositional to any propositional attitudes which may be directed towards it, including requsts like "plase put milk in this coffee".

Suppose the grandkids close grandma's bedroom window when she asks them to close the kitchen window. The propositional content at the core of grandma's request is that the kitchen window be closed; the content attached to it is an unstated belief that this window is open. Thus, the truth-conditions satisfying her implicit understanding would be that the kitchen window went from being open to being closed. As it happens, that window is already closed. So the truth-conditions that would satisfy grandma's initial belief-state do not obtain — her beliefs are false — but the truth conditions satisfying her desired result *do* obtain. The window *is* closed. Yet the grand kids should not thereby assume that her request has been properly responded to; it is more polite to guess at the motivation behind the request, e.g., thay she felt a draft of cold air. In short, they should look outside the truth conditions of her original request taken literally, and *interpret* her requesting, finding different content with different truth-conditions that are both consistent with fact and address whatever pragmatic goals grandma had when making her request. They might infer her goal is to prevent an uncomfortable draft, and so a reasonable "substitute content" is the proposition that *some* window is open, and they should close *that* one.

So the grandkids should reason as if translating between these two implied meanings:

▾ (44) I believe the kitchen window is open — please close it!

▾ (45) I believe some window is open — please close it!

They have to revise the simplest reading of the implicit propositional content of grandma's *actual* request, because the actual request is inconsistent with facts. In short they feel obliged to explore propositional alternatives so as to find an alternative, implicit request whose propositional content *is* consistent with fact and also meets the original request's illocutionary force cooperatively.

In essence, we need to express a requester's desire as itslf, in its totality, a specific propositional content, thinking to purselves (or even saying to others) things like

▾ (46) Grandma wants us to close the window.

▾ (47) He wants a bottle opener.

But to respond politely we need to modify the parse of their requests to capture the "essential" content:

▾ (48) Grandma wants us to eliminate the cold draft.

▾ (49) He wants something to open that bottle.

We have to read outside the literal unterpretation of what they ar saying. This re-reading is something that may be appropriate to do with respect to other forms of speech also: sometimes the true gist of what someone wants to communicate is not stated directly:

▾ (50) I think you could do excellent work in this class, and I think you are doing pretty well.

- (51) I am not going to talk about the refs because I don't want to get fined.
- (52) If she wants to win the nomination she needs to be as charismatic on the campaign trail as she was during the debate.

But our conversational responsibilty to infer some unstated content is especially pronounced when we are rsponding to an explicit request for something.

Certainly, in any case, meanings are not literal. But how then do we understand what people are saying? Trying to formulate a not-entirely-haphazard account of this process, we can spculate that interpreting what someone is "really" saying involves systematically mapping their eapparent concepts and references to some superimposed inventory designed to mitigate false beliefs or conceptual misalignments among language users in some context. That means, we are looking for mappings like *milk* to *almond milk* in () from a vegan restaurant, or *kitchen window* to *bedroom window* in () if it is the latter that is open:

- (53) Can I have some milk?
- (54) Can you close the kitchen window?

The point of thse "mappings" is that they preserve the possibility of modeling the *original* propositional content by identifying truth conditions for that content to be satisfied.

A *literal* truth-condition model doesn't work in cases like () and (): th diner's request is *not* satisfied if it is the case that there is now (real) milk in her coffee, and grandma's request is not necessarily satisfied if it is the case that the kitchen window is closed. The proposition "the kitchen window is closed" only bears on grandma's utterance insofar as she believes that this window is open and causing a draft. So if we want to interpret the underlying locutionary content of () and () truth-theoreticaly we need to map the literal concepts appearing in thse sentences to an appropriate translation, a kind of "coordinate transformation" that can map concepts onto others, like milk/almond milk and kitchen window/bedroom window.

Simultaneous with propositional content, of course, are attitudes: the difference between asserting and wanting that the window is closed. It is hard to deny that *some* propositional content is involved with each linguistic epxression, because simply by being a structured mental activity the effort to formulate sentencs must be extended with some purpose. We say (and write) things to help make something or other the case. But there are several challenges to disentangle the role that propositional content actually plays in meaning. One problem I just considered is that the right propositional content does not always come from *literal* meaning: the vegan *doesn't* want real milk in her coffee. The idea of "mapping" is one away to address this: in place of "literal" meaning we can substitute meanings undr "coordinate" transforms, where concepts transition from their literal designation to their roles: the vegan wants the product that plays the *conceptual role* of "milk" in her own frame of reference (at least in the context of, say, dining, as opposed to a context like checking whether a pit bull is lactating). But there are two other concerns we should have about propositional content, which I will discuss to close out this section.

2.1 *The Problem of Opaque Truth Conditions*

My analysis related to conceptual "transforms" assumed that we can find, substituting for *literal* propositional content, some *other* (reprsentation of a) proposition that fulfills a speaker's unstated "ral" meaning. Sometimes this makes sense: the proposition that the *bedroom* window is closed can neatly, if the facts warrant, play the role of the proposition that the kitchen window is closed. But we can run the example differently: there may be *no* window open, but instead a draft caused by non-airtight windows (grandma might ask us to put towels by the cracks). Maybe there is no draft at all (if grandma is cold, we can fetch her a sweater). Instead of a single transform, we need a a system of potential transforms that can adapt to the facts as we discover them Pragmatically, the underlying problem is that grandma is cold. We can address this — if we want to faithfully respond to her request, playing the role of cooperative conversation partners (and grandkids) — via a matrix of logical possibilities:

- (55) If the kitchen window is closed, we can see if other windows are open.
- (56) If no windows are open, we can see if there is a draft through the window-cracks.

▾ (57) If there is no draft, we can ask if she wants a sweater.

This is still a logical process: starting from an acknowledged proposition (grandma is cold) we entertain various other propositional possibilities, trying to rationally determine that pragmas we should enact to alter that case (viz., to instead make true the proposition that grandma is warm). Here we are not just testing possibilities against fact, but strategically acting to modify some facts in our environment.

The kind of reasoning involved here is not logical reasoning per se: abstract logic does not tell us to check th bdroom window if the kitchen window is closed, or to check for gaps and cracks if all windows are closed. That is practical, domain-specific knowledge about windows, air, weather, and houses. But we are still deploying our practical knowledge in logical ways. There is a logical structure underpinning grandma's request and our response to it. In sum: we (the grandkids) are equipped with some practical knowldge about houses and a faculty to logically utilize this knowledge to solve the stated problem, reading beyond the *explicit* form of grandma's discourse. We use a combination of logic and background knowledge to reinterpret the discourse as needed. By making a request, grandma is not expressing one attitude to one proposition, so much as *initiating a process*. This is why it would be impolite to simply do no more if the kitchen window is closed: our conversational responsibility is to enact a process trying to redress grandma's discomfort, not to entertain the truth of any one proposition.

For all that, there is still an overarching logical structure here that languages clearly marshals. But once we converge on the "language initiates a process" model, we can find examples where the logical scaffolding gets more tenuous. Consider:

▾ (58) My colleague Ms. O'Shea would like to interview Mr. Jones, who's an old friend of mine. Can he take this call?

▾ (59) I'm sorry, this is his secretary. Mr. Jones is not available at the moment.

It sounds like Ms. O'Shea is trying to use personal connections to score an interview with Mr. Jones. Hence her colleague initiates a process intended to culminate in Ms. O'Shea getting on the telephone with Mr. Jones. But his secretary demurs with a familiar phrase, deliberately formulated to foment ambiguity: () could mean that Mr. Jones is not in the office, or in a meeting, or unwilling to talk, or even missing (like the ex-governer consummating an affair in Argentina while his aides thought he was hiking in Virginia). Or:

▾ (60) Mr. Jones, were you present at a meeting where the governer promised your employer a contract in exchange for campaign contributions?

▾ (61) After consulting with my lawyerrs, I decilne to answer that question on the grounds that it may incriminate me.

Here Mr. Jones neither confirms nor denies his presence at a corrupt meeting.

As these examples intimate, the processes language initiates do not always result in a meaningful logical structure. But this is not necessarily a complete breakdown of language:

▾ (62) Is Jones there?

▾ (63) He is not available.

The speaker of () does not provide any logical content: it neither affirms nor denies Jones's presence. Nonetheless that speaker is a cooperative conversational partner even if they are not being cooperative in real life): () responds to the implicature in () that what the first speaker really wants is (for instance) to interview Jones. So the second speaker conducts what I called a "transform" and maps "Jones is here" to "Jones is willing to be interviewed". Responding to this "transformed" question allows () to be (at least) linguistically cooperative while nonetheless avoiding a response at the *logical* level to (). () obeys conversational maxims but is still rather obtuse.

This pattern of logical evasiveness might seem to be endemic only to slippery human languag, but analogous exsamples can be found even in the strict milieu of computer programming. Suppose I am writing a function which counts the number of non-blank, non-comment lines in a file. My implementation might start like this (in pseudo-code):

▾ (64) File f = File.open(path, File.READ_ONLY);

▾ (65) if f.isEmpty() return 0;

So the first line tries to open a file with the specified path, and the second line checks if the file is indeed open and non-empty. If not, it returns the number zero, meaning there are no non-blank non-comment lines in the file.

In a typical application framework a file will be opened if it exists and if the current user has permission to read and/or write to/from the file (here the necessary permission is read-only). For sake of presentation I assume that a file is considered non-empty only if it is open and has some content (i.e., you can read something from the file). So if the file *is* empty, that can mean several things: either it does not exist; or it cannot be opened because of inadequate permissions; or it *can* be opened but has no content. My function is noncommital and returns zero in each of these cases. In particular, I gloss over someinformation: the zero return value is analogous to Mr. Jones being "unavailable" for an interview.

In the formal computer setting, we are not allowed to logicaly infer what expressions "really" mean: we should not, for instance, if some file does not exist, instead try to opn a different file with a similar name. Therefore the "meaning" of code expressions should be tied explicitly to individual logical conditions. For cample, the "meaning" of line () should be tied to the proposition that the file (whose location is specified by *path*) is open. However, the code never actually enagages with that proposition. I do not necessarily determine whether the file is open, can be opened, or even whether it exists.

On this basis, it seems as if the "meaning" of my call to open the function is not a matter of ascertaining or bringing about certain truth conditions. It is true that my instruction may bring about certain truths (specifically, make it true that the file is open). But we should not conclude that this potential state of affairs is what the instruction *means*. As the programmer, I do not "want" the file to be opened; I have no vested interest (this is not like my wanting milk for coffee or to open a beer bottle). Instead, I am an intermediary between application-users and the system kernel: my role is translate what *users* want into system instructions. Granted, presumably the *user* wants the file she's interested in to be opened (as an intermediate step toward getting information from that file). But what I contribite as code are *instructions*, and instructions have an effect on the state of the overall computational environment where my application is hosted. In the general case I am not aware of eactly what new state obtains. Attempting to open a file may cause it to be opened, but it may also cause the software reprsentation of that file — a so-called "handle" — to acquire a flag indicating that the referenced file does not exist (i.e., its path descrribes a nonexistent location), or that it does exist but cannot be opened due to insufficient permission, or that the permissions are satisfactory but there is a temporary lock from another application writing to the file. If needed I could attempt to ascertain the file's state at this level of detail, but it turns out to be irrelevant to my own algorithm. In short, insofar as the "meaning" of computer code are the instructions it emits, these meanings correspond to state-changes only in coarse-grained ways. There may be propositional content associated to each possible state — there are propositions that the file is open, or nonxistent, or inaccessible, or temporarily locked — but the code does not engage the question of *which* proposition is (or becomes) true.

Underlying both these formal and natural language examples is the idea that the meanings of expressions are associated with changes of something's state: computer statements are instructions to change state and a large class of linguistic expressions are requests to do so. Whenever there is a state-change there is a corresponding proposition to the effect that the "thing" is now in state S_2 whereas it was before in S_1. Even if the instruction/request cannot be fulfilled there is the concordant proposition that the thing is still in S_1 can can *not* be brought into S_2. So it is trivial to read logical structures onto linguistic evetualities, by leveraging the idea that for any conceivable state of any conceivable state-bearer there exists a proposition that such bearer is in such state.

The problem for truth-theoretic semantics, as I see it, is that these trivial state-to-proposition conversions are just that — theoretically trivial. We should not care about a *trivial* truth-semantic theory. If we have a semantic theory wherein, let's say, "meanings" are really *initiators of state-change processes*, then we can trivially convert this into a truth-theoretic theory. But that is not an intersting truth-theoretic semantics; it is a trivial truth-theoretic theory grafted onto an interesting "state change" theory.

So much is not to call truth-theoretic semantics uninteresting. But for us to take truth-theoretic semantics seriously we need to accept the idea that this paradigm can *motivate* analysis qhich leads to interesting results, taking us somewhere we may not arrive otherwise. The fact that a given semantic theory has some formulaic translation into truth-thoretic terms does not guarantee that truth-theoretic intuitions actually play an important role in that other theory.

For truth-theoretic intuitions to be legitimately consequential toward a semantic theory, we need to ascertain to what degree logical structures actually play a cognitive role in how we use language to accomplish things in the world. Obviously, as rational beings our thought processes will be informed by logic and to some degree can be retroactively

modeled via logical complexes. But "logic" appears to play a role in these cognitive operations only inidrectly. There seems to be some medium — perhaps conceptual roles, or state-changes — that "carries" logic into the cognitive realm. We should reject truth-theoretic semantics if it seems to proceed as if that "medium" can be sidetracked — that we can analyze a logical form in language directly, without analyzing the vehicle by which logical considerations can enter language processing.

2.2 *Truth Conditions are not Polar*

My second quibble with truth-theoretic semantics is that it relies on a certain *faon á parler*. We (in the contxt of analysis, not at her house) might say something like:

- (66) Grandma wants the proposition "the kitchen window is closed" to be true.
- (67) Grandma wants the proposition "I am cold" to be false.

My prior analysis focusd on the fact that the more relevant proposition is that in (), and we have to read () from (). But it should also be obvious that grandma does not care about *propositions*. She only cares about "I am cold" as a *proposition* because she does not want to be cold.

By contrast, sometimes people care about propositions *as proposition*. A mathematician who has staked her reputatuon on a conjecture may want the conjuecture to be true. But this desirre is not like the desire of a Sanders or a Toronto Maple Leafs supporter to want propositions like "Sanders has won" or "Toronto has won" to b true. The mathematician's conjectur may be in an obscure field where there are no apparent real-world consequences with benefits that can proceed from truth rather than falsehoodb (it's not like, say, the conjecture will allow her to prove the validity of an encryption sheme she can monetize).

One way to put this is that the mathematician desires a *proposition* to be true, whereas the Leafs or Sanders supporters want certin *propostional content* to be true. But if wechave to bring in propositional content, our analysis — so it sems — becomes circular. If the propositional content of "the Leafs win the cup" is that th Leafs win th cup, then a fans who wants the Leafs to win the cup obviously wants the propositional content of "the Leafs win the cup" to be true — but that's becaus the idea of the Leafs winning the cup *is* the propositional content of "the Leafs win the cup".

Let's say that there are two inverse operators: one maps an idea onto a proposition, and one maps the proposition back onto the idea, which is its "content". A semantic analysis would be circular if it just immediatly reversed one operator with the other. Having said that, the reversal may be *separated* by several steps, making it non-trivial. Suppose the Leafs ar playing the Jets:

- (68) Are you rooting for the Jets?
- (69) Well, I want the Leafs to win.

The second speaker indirecly answers the first in the negative. This is conversationally reasonable — it does not violate any Naxim of Relevance — because the first speaker has available a chain of inference like:

- (70) There is a proposition (call it P_1) whose propositional content is that the Jets win and a proposition (P_2) whose content is that the Leafs win.
- (71) P_2 entails the negation of P_1.
- (72) He wants the content of P_2 to be true.
- (73) His wishes are only consistent with P_1 being false.
- (74) He wants the content of P_1 to be false.

The key step here is at () and (): in these steps of reasoning the predicate relation between propositions is expressly thematized. In the course of understanding language, there may be occasions when we need to identify logical connectives as implicit to the conceptual framework which a speaker is obviously assuming. In that case we are working with propositions rather than propositional content: there is nothing in the idea of a Leafs victory *apriori* that contains the idea

of a Jets defeat. The negative entailment relation only arises in particular situations — when the two teams play each other (and implicitly further restrictions, like there are no draws or suspended games).

It is, in short, a *feature* of a specific situation that the idea "Leafs win" entails the negation of "Jets win"; ergo, logical connectives are one facet of situational models *sometimes* relevant to linguistic processes. Similarly, speaker sentiment is *sometimes* relevant. But there is a structural isolation between these "systems": those "processing units" that can bear speaker sentiment (polarity) are different from those that can bear logical connectives (except in unusual cases, like the mathematician and the conjecture).

When we analyze a fan's sentiment *wanting* the Leafs to win, we are analyzing polarity vis-à-vis propositional *content*. When we observe negative entailment, we are analyzing relations among *propositions*. The proposition "encapsulates" the content so it can be part of logistic structures, where connectives like entailment and disjunction make sense. In computer science, the technical pattern of such "encapsulation" is often called a "monad", and monadic analysis has been adopted in linguistics as well, following Chung-Chieh Shan. We can say that logical propositions *per se* are monadic packages that "wrap" propositional content, subject it to some logical manipulation, and at some later point in processing "retrieve" the content from the proposition. This is not circular because the content is not *immediately* extracted from th "monad". In (), the content wrapped in P_1 is held through several processing steps before yielding the final interpretation (he wants the Jets to lose). The final extraction corresponds to transforming "He wants the proposition that the Jets lose to be false" to "He wants the Jets to lose". Stated side-by-side, this transform is redunant. The difference is that here the original proposition P_2 is not directly asserted as a linguistic meaning; it rather falls out of a logical process.

On this analysis, there is a *part*, or *substructure*, of linguistic processing that involves wrapping propositional content into propositions. But these wrappings are only meaningful when there is some "delay" between procssing steps — essentially, when there is some explicit sense that a given idea stands in some well-defined logical reoation to some other idea. Computer programers can crate "trivial" monads whose behaviors do not deviate at all from an imperative style of programming, but any code written with "trivial" monads can be refactored such that the monads disappear. This is analogous to the circularity between propositional content and propositions: the *meaning* of a proposition *is* its content, so the proposition "monad" has processing significance only when the meaning itself needs to be "held" awaiting the resolution of some logical nexus. If there is no processing structure that demands the content to be "held", then the proposition just "decays" to its content, and essentially disappears.

These points suggest that while modeling linguistic meanings in terms of propositions is *sometimes* appropriate, in the egneral case it is merely circular or tautological. We certainly should not put forth a theory that the "meaning" of an idea is its proposition — the turth is more the opposite. The meaning of a proposition is its propositional content. So, if we want a truth-theoretic semantics that is applicable for general cases — not just especially logically ordered situations, like a winner-take-all sporting match — we need a truth-conditional theory of propositional *content* separate and apart from a theory of propositions.

I am discinclined to believe that such a theory is possible, since I think we can give a theory of propositional content but I don't think logic would figure strongly in it. Having said that, I should now explain what such a theory of propositional content *should* look like, and I'll lave it as a (mostly) rhetorical question whether this theory does or does not leverage logic or something else.

Part III Cognituve and Environmental State-Change

Last section I hinted that I consider meanings somehow bound up with state-changes. This point seems obvious when we open express state-change desires, like for the window to be closed, but of course a lot of discourse is more about establishing facts or syncing concepts. Compare between:

- (75) Remember that wine we tasted on the Niagara Peninsula last summer? Can you find it in our local liquor store?
- (76) Remember that wine we tasted on the Niagara Peninsula last summer? What varietal was that again?

The first sentence in each pair attempts to establish a common frame of reference between addresser and addressee — it does not, in and of itself, request and practical (extramental) action. The second sentence in () *can* be read as requesting the addressee buy a bottle, though an alternate interpretation is to learn for *future reference* whether someone *could* buy that bottle. The second sentence in () carries no directive implicature at all, at least with any directness; it asks for more information.

Despite thse variations, it seems rasonable to say that language is always performed in an overarching setting where concrete (extralinguistic) activity will *evetually* take place. If in () I intend to recommend that grape variety to a friend, I am proposing an eventual action that he might take. If in () I am not making a request, I am however establishing the fact that such a request is reasonable. As a result, some extralinguistic state change seems to be lurking behind the linguistic content: I want my friend to go from having never tasted that varietal to having tasted it. Or I want to go from not having a bottle of that wine to having one. We seem to use language to set up the interpersonal understandings needed to *eventually* engage in (usually collective) practical activity.

Having said that, most expressions are not direct requests or suggestions of the "close the window" or "let's get some wine" varity. We may have a *holistic* sense that meanings orbit around extralinguistic and extramental state-change, but at the level of particular sentences most changes that occur, or ar eproposed, tend to be changes in our conceptualization of situations. Nevertheless, we can pursue a semantic thory based on state-change if we stipulate that many changed which occur in th course of linguistic activity do not have immediate, apparent physical effects. There are still multiple kinds of changes that can occur. Dialogs themselves change: the first sentences in () and () modify the discursive frame so that, for example, a particular wine becoms available as the anaphoric target for "that" and "that wine" — and also, mtonymically, "that varietal", "that grape", "that winery". Conceptual frames can change: if we are discussing a visit to Ontario and I mention one specific winery, one effect is to (insofar as the conversation follows my lead) refigure our joint framing to something narrower and more granular that the prior frame (but still contained in it; I am not changing the subject entirly). We can pull a frame out as well as in — e.g., switch from talking about one winery visit to the whole trip, or one Leafs game to the entire season. Moreover, our beliefs can change/evolve: if you tell me the wine was Cabernet Franc, I have that piece of info in my arsenal that I did not have before.

We are now in position to dvelop a theory that linguistuc manings are grounded in state-changes, assuming that the "register" where the changes occur can vary over several cognitive and extramental options: actual change in our environment (the window closed, milk in the coffee, the bottle opened); changes to the dialog structure (for anaphoric references, pronoun resolution, metalinguistic cues like "can you say that again", etc.), changes to conceptual framings (zoom in, zoom out, add detail), changes to beliefs. Each of these kinds of changes deserve their own analysis, but we can imagine the totality of such analyses forming a robust semantic theory.

At this point I will focus in on one point of analysis which, I believe, is canonical relative to others: changes to our respective framing of situations by adding new conceptual dtails. If I were to choose one primordial account of linguistic meaning, this genre of morphism is probably what I would nominate.

During the course of a conversation — and indeed of any structured cognitive activity — we maintain conceptual frames representing relevant information, what other people know or believe, what are our goals and plans (individually and collectively), and so forth. We update these frames periodically, and use language to compel others to modify their frams in ways that we can (to some approximation) anticipate and encode in linguistic structure.

In the simplest case, we can effectuate changes in others' frames by making assertions they are likely to believe to be true (assuming they deem us reliable). In general, it is impossible to extricate the explicit content of the relevant speech-acts from the relevant cognitive, linguistic, and real-world situational contexts:

- (77) That wine was a Cabernet Franc.
- (78) Those dogs are my neighbor's. They are very sweet.

Although there is a determinate propositional content being asserted and although there is no propositional attitude othr than bald assertion to complicate the pragmatics, still the actual words depend on addresses drawing from the dialogic conext in accord with how I expect them to (as manifest in open-ended expressions like "that wine", "those dogs", "they"). Moreover, the open-ended components can refer outward in different "registers": in "that wine" I may be referencing a concept previously established in the conversation, while "those dogs" may refer to pets we saw or heard but had not

previously talked about. Of course, the scenarios could be reversed: I could i troduce "that win" into the conversation by gesturing to a bottle you had not noticed before, and refer via "those dogs" to animals you have never seen or heard but had talked about, or heard talk about, in the recent past.

Surface-level language is not always clear as to whether referring expressions are to work "deictically" (drawing content from the ambient context, signified by gestures, rather than from any linguistic meaning proper), "discursively" (referring withing chains of dialog, e.g. anaphora), or "descriptively" (using purely semantic means to establish a designation, like "my next-door neighbor's dogs" or "Inniskillin Cabernet Franc Icewine 2015".

Let's agree to call the set of entities sufficiently relevant to a discourse or conversation context the "ledger". By "sufficiently relevant" I mean whatever is already established in a discourse so it can be referenced with something less that full definite description (and without the aid of extralinguistic gastures). I assume that gestures and/or descriptions are communicative acts which "add" to the ledger. The purely linguistic case — let's say, "dscrriptive additions" — can themselves be distinguished by their level of grounding in the current context. A description can be "definitive" in a specific situation without being a "definite description" in Russell's sense (see "that wine we tasted last summer").

So, descriptive additions to the ledger are one kind of semantic side-effect: we can change the ledger via language acts. I will similarly dub another facet of cognitive-linguistic frames as a "lens": the idea that in conversation we can "zoom" attention in and out and move it around in time. "That wine we tasted last summer in Ontario" both modifies the ledger (adding a new referent for convenient designation) and potentially can compel subsequent conversation to focus on that time and/or place. Finally, I will identify a class of frame-modifications which are the *details* ...

I will also assume that the machinery of frames is ognitive, not just linguistic. We have analogous faculties for "refocusing " attentions and adding conceptual details via intraction with our nvironmnt, both alon and with othrs, and both via language and other means. Some aspects of *linguistic* cognitive framing — like the "ledger" of referents prviously established in a conversation — may be of a purely linguistic character, but these are the exception rather than the rule. In the typical case we haveva latent ability to direct attention and form beliefs by direct observation or by accepting others' reports as proxies for direct obsevration.

When we are told that two dogs are male, for instance, we may not perceptually encounter the dogs but we undertand what sorts of preceptual disclosures could serve as motivation for someone believing that idea. We therefore assume that such belief was initially warraned by obsevration and subsequently got passed through a chain of language-acts whose warrants are based in the perceived credibility of the speakr. But internal to this process is our prior knowledge of the parameters for judging statements like "this dog is male" observationally. True, sometimes such observational warrants are less on display. If I had never heard of Staffordshires, I would be fuzzier about observational warrants and could end up in convrsations like:

- (79) Those dogs are Staffordshires.
- (80) What's a Staffordshire?
- (81) It's a breed of dog.

Here I still don't really have a picture of what it is like to tell observationally that a dog is a Staffordshire. There may not be any visual cues — at least none I know of — which announce to the world that a dog is a Staffordshire (compared to those announcing its gender, say). But insofar as I am acquaihted wuth the concept *dog breed*, I also understand the general pattern of these observations. For instance I may know breeds like poodles or huskies and be able to idenitfy *these* by distinctive visual cues. I alos understand that dogs' parentage is often documented, allowing informed parties to know their breeds via those of their forebearers. That is, I am familiar with how claims beliefs about breeds are formed based on observation rather than just accepting others' reports, so I know the extralinguistic epistemology anchoring chains of linguistic reports in this area to originating observations — even if I cannot in this case initiate such a chain myself.

My overall point is that language enables us to formulate beliefs based on the beliefs of othrs, but this is possible because we also realize what itis like to formulate *our own* beliefs, and envision that sort of practice at the origin of reports that later get circulated via language. If we can't sufficiently picture the originating observations, we don't feel like we are grasping the linguistic simulacrum of those reports with enough substancs. If I never learn what Stafforshire is, an assertion that some dogs are Staffordshires has no real meaning for me — even if I trust the asserter and do indeed thereby

believe that the dogs are Staffordshires. Notice that merely knowing Staffordshire is a breed of dog does not expand my conceptual repertiore very much — it does not tell me how to recognize a Staffordshire or what I can do with the knowledge that a dog is one (it cannot, for instance, help me anticipate his behavior). Nevertheless even knowing that Staffordshire is a breed of dog seems to fundamentally change the status of sentences like "those dogs are Staffordshires" for me: I do not *have* the conceptual machinery to exploit that knowledge, but I undersatnd what *sort* of machinery is involved.

In short, the *linguistic* meaning of concepts is tightly bound to how concepts factor in perceptual observations anterior to linguistic articulation. As a result, during any episode wherein conversants use language to compel others' beliefs, an intrinsic dimension of the unfolding conversation is that people will form their own (extralinguistic) beliefs — and can also imagine themselves in the role of originating the reports they hear via language, whether or not they can actually test out the reports by their own observations.

This extralinguistic epistemic capacity is clearly exploited by the form of language itself. If a tasting organizer hands me a glass and says "This is Syrah", she clearly expects me to infer that I should take the glass from her and taste the wine (and know that the glase contains wine, etc.). These conventions may be *mediated* by language — we are more likely to understand "unspoken" norms by asking questions. But many situational assumptions ar extralinguistic because they are (by convention) not explicitly stated, even if they accompany content that *is* explicitly stated. "This is Syrah" acccompanid by the gesture of handing me glass is an indirect invitation for me to drink it (compare to "Please hold this for a second?" or "Please hand this toe th man behind you").

I bring to every linguistic situation a capcity to make extralinguistc observations, and to understand every utterance in the context of hypothetical extralinguistc observations from which is originates. My conversation peers can use language to trigger these extralinguistic observations. Sometimes the "gap" — the conceptual slot which extralinguistic reasoning is xpected to fill — is direcly expressed, like in "See the dog over there?". But elsewhere the "extralinguistic implicature" is more indirect, as in "This is Syrah" and my expected beliefe that I should take and taste from the glass. But in any case the phenomenon of triggering these extralinguistic observation is one form of linguistic "side effect", initiating a change in my overall conceptualization of a situation by compeling me to augment beliefs with new observations.

All told, then, the language which is presented to me has the effect of initiating changes in what I believe — partly via signifyimg propositional content that I could take on faith, but partly also via directing my attention and my interpretive dispositions to guide me towards extralinguistic observations.