Multi-theory, Multi-scale: Notions of Reduction in Phenomenology and Cogitive Science

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Abstract

I believe that a well-integrated theory of phenomenology and cognitive linguistics (and cognitive science more generally) demands an account of the different reductive projects and commitments which are relevant to these domains. There are multiple reductive trends sssociated with consciousness, cognition, and perception: reduction of epistemic states to their perceptual motivators; reduction of culture and societal situations to individual cognitive acts; reduction of physical objects to perceptual forms which disclose them; reduction of interpersonal reality to persons' collective, conscious experience of one another; reduction of conscious states and perceptual episodes to neurophysical substrata. These reductions differ in kind, in the degree of explanatory force or ontological autonomy they ascribe to different levels, in how semantic and theoretic structures are assigned to different levels, etc. In general, though, reductive explanation requires a well-developed conceptual semantics at two different scales of physical reality and of theoretical attention. In order to survey reduction in the cognitive/phenomenological context, I will explore what needs to be covered by a rigorous language of cognitive/perceptual mentality, arguing that similar theory-semantic precision is needed and presupposed by any reductive orientation related to mind, body, consciousness, and cognition. A well-constructed language can be both applied and motivated by several different, even paradigmatically incompatible, reductive visions. So, apart from the various and maybe competing commitments of reductive paradigms, we can consider how they collectively polish our theoretical language, formations, and internal concept-structures. The core of this theory "language", as I consider it here, draws from cognitive grammar and transcendental phenomenology. But I will also explore how a core such language can be extended, and in real life is intrinsically linked, to social, cultural, affective, and scientific reality.

Broadly defined, phenomnology is simply the study of the intrinsic structures of consciousness, or contents of experiences. [...] A "reduction" in Husserl's sense is a *methodological* device for "reducing", or narrowing down, the scope of one's inquiry. Importantly, then, Husserl's reductions are not *ontological* reductions, whereby entities of one category are defined or eliminated in terms of entities of some other category (as some have sought to reduce physical objects to sense-data, or minds to bodies, or values to facts, and so on). Rather, the purpose of Husserl's reductions is that of successively delimiting the subject matter of phenomenology. Accordingly, the purpose of the first reduction — sometimes called the "psychological", or "phenomenological-psychological", reduction — is to focus our attention on consciousness and experiences, rather than on the various external objects with which consciousness is more typically occupied. ... The purpose of the second step — called the "transcendental" reduction — is to eliminate from the study of consciousness all empirical or naturalistic assumptions. ... The purpose of the third step — an instance of what Husserl calls "eidectic" reduction — is to generalize results achieved through a transcendental phenomenology. The phenomenology finally achieved, Husserl believes, will then not merely be an account of the phenomenologist's own consciousness, or his own experiences, but will have the status of a general "science" of consciousness.

David Woodruff Smith and Ronald MacIntyre [2, p. 93, 95]

> Lakoff and Johnson (1999) postulate different "levels of embodiment" (cf. Section 2.4), while Rohrer (2007a; 2007b) explicitly argues that his "levels of investigation" framework in not reductionist: "research in embodied cognitive science should not seek to reduce such phenomena to another level but should instead bridge across these levels" (Rohrer 2007a: 346). Lakoff and Johnson (1999) describe their ontological position as being one of "noneliminative physicalism" (ibid: 109), where "each level is taken as real, as having a theoretical ontology necessary to explain phenomena. ... explanation and motivation flow in both directions." (ibid: 113). However, while this may qualify as an *epistemological* non-reductionism, ontologically Lakoff and Johnson are physicalists, accepting without any argument "the lack of any mind-body gap" (ibid: 96). Also, just considering that 4 of the 6 "levels of investigation" in Rohrer's "non-reductive" framework deal with increasingly high-grained analysis of the brain ("Neural systems", "Neuroanatomy", "Neurocellular systems" and "Subcellular systems"), while the two highest: "Communicative and cultural systems" and "Performance domain" are characterized as "Multiple central nervous systems" and "Central nervous systems" shows what is *really real* for this strand of cognitive linguistic thinking.
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> Jordan Zlatev [3, p. 6].

As someone interested in both phenomenology and mathematics, I find that there is an emerging literature which integrates phenomenology and cognitive science/linguistics, exploring in a visionary and nondogmatic way the intersection of nature and consciosness. However, while important writers in this vein — such as Ronald Langacker, Jordan Zlatev, Yves-Marie Visetti, and Jean Petitot — seem confident that phenomenology and cognitive science are compatible, other writers seen not so sure. How wide really is the paradigmatic gap between phenomenology and mainstream cognitive linguistics, not to mention cognitive science as a whole? Certainly these are distinct (sets of) theories, but we can debate whether they are complementary — two views on similar phenomena, phenomena like consciousness, or cognitive/perceptual unification — or rather divergent, so that research which professes to synthesize them is at best problemmatic or forced.

Arguably, the gap between phenomenology and cognitive science is symptomatic of a broader gap between human and natural sciences, where the former pair fall on either side of this latter border, however much in clear sight. But the contemporary world calls this very distinction into question: there are both theories and technologies which suggest a third domain, overlapping humanities and human sciences, and natural science and mathematics. Our desire for computer algorithms which classify natural language texts, for graphics which create the illusion of perceptually present virtual worlds, for analyzers which

scan social media for social trends — or even to flag instances of bullying, or interpret writers' emotions — these concerns are all interdisciplinary in a very broad sense.

Culture is an emergent system whose finer-grained constituents are individual cognitive acts. This does not present culture as "nothing but" the thoughts and experiences of individual people: the very notion of *emergence* implies the ontological autonomy of higher-scale phenomena. But culture, individual consciousness, and the science of mentality and cognition, can be part of a unified explanatory complex. The inter-theory semantics and intra-theory autonomy of these different layers can both be honored, by adopting perspectives of emergence and multi-scale analysis which are already articulated, and perhaps persuasive, in the philosophy of science.

This, in capsule, is the triangular relation I think we can develop between culture, consciousness, and physical science. These are distinct ontological regions, but they can be collectively embraced by a reductive-emergent multi-theoretic confederation. Integrating different ontological and theory-semantic domains is not easy; and theoretical concepts need to be carefully defined, tracked across domains, and their interrelationships formally modelled, perhaps with the aid of technology. But — if we can accept a multi-faceted system of reductive analyses which can ground subjective and social reality in the natural world — then these inter-domain complexities can become matters of theoretical architecture, not of institutional or ideological divisions. Integrating phenomenology and cognitive science can then be an important piece of a yet larger puzzle. To what degree is the stylistic gap between these disciplines a matter of distinct intellectual histories and academic milieu, which can themselves be "reduced" or "bracketed", revealing theoretical connections at a textual and argumentation level?

I think attending to how the domains of phenomenology and of cognitive science consider *reduction* and *reductive analysis* can shed light on these matters. Here I will consider first general notions of reduction in philosophy and science; then the kinds of reduction we may find in phenomenology and cognitive science; and finally, based on a comparison between these kinds, whether we can see new evidence for these domains as complementary and not divergent.

The central thread of my discussion will be that phenomenological research can develop a language specifically attuned to the nuances and details of cognitive and perceptual intentionality. Perhaps we can call this a "language of cognitive/perceptual morphology". I will argue that several different understandings of "reduction" can legitimately be associated with such a language. By focussing on the cognitive/perceptual morphology of intentional mental states, we can, at least for a while, bracket the Grand Philosophical Puzzles of intentionality as a speculative firmament (as in Husserl) or a controversial metaphysic

of mend/world connection (as in philosophy of mind). I want to emphasize however that I have only a provisional idea of what terms and relations should be part of this language, so to be more generic I will often call it just "$\mathcal{L}$".

The text which follows is organized to minimize repetition, while segmenting my arguments into separate pieces. To this end, the first part of this document is an extended but self-contained essay, followed by some appendices which explore some topics in greater depth, sometimes with a more formal or quasi-mathematical presentation. Most of the appendices are modelled on existing technical languages that have been used to model cognitive and perceptual processes, and which may be adapted into the "language" I just spoke of. I will try to explore several topics which can unify these partitioned analyses, including:

- The idea of "Unified Concept Theory". This language was used by Joseph Goguen to recommend a multi-disciplinary integration incluing sociology, mathematics, and cognitive science. In "What is a Concept", Goguen shows how different systems in cognitive linguistics — including Fauconnier "Mental Space", Gardenförs "Conceptual Spaces", and the "Conceptual Frames" of George Lakoff and Mark Johnson — can be unified, and suggests that this can be extended outward to social theories of concepts, as elements of communication or cultural paradigms.

- Reduction as unification: not only does a reductive theory connect two levels of description or analysis, it can potentially unify several higher-order theories insofar as they share a common reductive base theory.

- Phenomenological Epistemology. Specifically, I think there are several different epistemological analyses which are relevant to phenomenology. These can be described as follows. At the *microepistemological* level, the syntheses and belief-revisions which occur in a single perceptual episode, and which — as an epistemological argument — we can suggest will tend to disclose more (and more correct) information as more observed details are synthesized. At the *macroepistemological* level, we can consider the broader question of how the conscious mind can reasonably aspire to scientific knowledge, and how science in turn might physically explain consciousness. At the *metaepistemological* level, we consider proper phenomenological method, and how a theory which necessarily centers on individuals' mental states can acquire a shared, pulic forum of theory-semantics and argumentation. These three branches of phenomenological epistemology, respectively, we be considered in the first three appendices.

- Finally, most of the appendices will also be organized around a particular mathematical framework, although in a very nontechnical way. Mathematical formulations can have several roles in a cognitive context. There are scenarios, like computer graphics, where a single perceptual situation can simultaneously be given quantitative, cognitive, and aesthetic analyses, and it can be interesting to explore their correlations. More generally,

though, mathematical formulations come packaged with interrelationships which can carry over into less formal discourse. For example, *spatial regions*, and their contacts and partonomies, are given axiomatic treatment in Mereotopology. The conceptual interrelationships among these ideas, then, may carry over into less formal and precise models.

Sometimes one encounters the phrase "Analytic Phenomenology" to describe a kind of phenomology influenced by mathematics, natural science, and by Analytic Philosophy. A number of writers have also officially aligned themselves with a "Naturalizing Phenomenology" project, for example through a substantial volume with that name [1]. The topics and arguments of these writers overlap with some perspectives in cognitive linguistics, and here I will refer to them jointly with the phrase Cognitive Phenomenology. The "Naturalizing" project connects phenomenology to analytic philosophy and to cognitive science, but also uses certain mathematical models to (re)present cognitive structures which have experiential or intentional salience. So it is also helpful, I believe, to informally talk about "computational" phenomenology in this kind of context (as well as in connection for example with Virtual Reality). On the other hand, structures in cognitive grammar recur in larger-scale semiotic systems and cultural media, for example representations of spatial relations in art and film, which suggests talk of "Cultural" Phenomenology. So these computational and cultural lines of inquiry are different branches which, we can argue, can be rooted in Cognitive Phenomenology proper.

As Jordan Zlatev [3] argues, there are nontrivial differences between a more directly phenomenological cognitive linguistics (or Cognitive Grammar) associated, in particular, with Ronald Langacker, and then the kind of cognitive linguistics associated with figures like George Lakoff, Mark Johnson, and Gilles Fauconnier. When I want to emphasize this contrast, I will refer to the latter in terms of "Embodied Cognition". I think Cognitive Phenomenology and Embodied Cognition share many intuitions, and I will discuss the contrasts, and try to justify my choice of terms, toward the end of this paper.

Very briefly, it may be helpful to consider Embodied Cognition as more *operational* or *participatory*: cognition involves goal-directed reasoning within certain domains or structures, which may be more abstract (like "conceptual frames" or interpersonal situations), or more concrete (like one's physical environment).[1] Sometimes our mental familiarity with relevant domains depends on

[1]Similar language can be found in a cognitive theory sometimes called "enactive": in the words of Paul Donato, this approach "may be summarized as follows ... Concepts [are] participatory: concepts and categories are participatory parts of the mind/world whole; ... context influences the meaning of concepts and needs ... a place in [their] description; ... concept conjunctions exhibit emergent features that traditional theories [cannot] "predict"; [and] similarity judgments are context-dependent." ("Geospatial Semantics: beyond ontologies, toward

conscious experience (emotions and emotive response, for example, is fundamental to intersubjective reality). But the contrast between consciously experienced cognition, where direct, focussed awareness is a structuring principle, and preconsciously activated conceptual or practical operations, is less foregrounded. Many cognitive processes can be either conscious or preconscious.

By contrast, we can identify Cognitive Phenomenology as more *intentional* (if we want to highlight the contrast, a little simplistically, as object-directed compared to goal-directed).[2] The kinds of cognitive schema featured from this perspective involve attention focussed on a certain target; organizational patterns, which can be (for example) spatial, functional, or situational, are then centered on this target (as object and/or theme). It may be necessary to further distinguish the *attentional* and the *pragmatic* dimension of intentionality. For example, to eat an apple, I need several versions of an intending which spans different modes of comportment: I desire and plan to eat it, then look at it, then grasp it and recognize that it is the apple I feel and am holding (not necessarily in that order). Cognitive Lingustics in general recognizes many schema and metaphors which center on some focus in this sense. However, I can eat an apple, and engage these various intentionalities, even if my conscious attention is directed elsewhere. Given this evidence, we may be tempted to argue that schematic "centering" is an important part of cognitive operations, but does not necessarily involve vivid conscious awareness: so intentionality should no longer be reified as the foundation of consciousness, or consciousness as the paradigm of mentality. In other words, perhaps Embodied Cognition intuitions tend to assimilate intentionality as only one aspect of cognitive-schematic organization in general; not, and in contrast to phenomenology, as philosophically originary.

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an enactive approach", p. 17). We can identify echoes of an American Pragmatist or Peircean philosophy, which directly influenced some cognitive linguistics in this vein, notably Mark Turner; and perhaps also echoes of later Wittgenstein.

[2]By taking intentionality as the identifying feature of consciousness, some interpreters critically find Husserl as beginning from a metaphysic of subjective separation, which forecloses attempts to re-situated selves in (natural or social/cultural) environments, even when he started thinking about intersubjectivity and the Lifeworld. Says Don Zahavi: "one of the standard objections against Husserl appears warranted: because of his preoccupation with *intentionality*, Husserl took object-consciousness as the paradigm of every kind of awareness and therefore settles with a model of self-awareness based on the subject-object dichotony [and so] never discovered the existence of a prereflective self-awareness, but remained committed to the idea that self-awareness is a question of reflection or higher-order monitoring." But he presents textual evidence for a contrary reading; for example, "Husserl denied that sensations are a phenomenological naught. On the contrary, they are conscious, that is, experientially given, when they are lived through and, as he pointed out, this givenness does not come about as the result of an objectification or because the sensations are taken as objects by an (inner) perception. The sensations are given, not as objects, but precisely as subjective experiences." (pp. 39-40). Of course, sensual subjectivity also suggests a separation of the self, to some degree, because of the seeming that I (and no-one or nothing else) experience those particular sensations. Integrating sensation, intention, and subject/object relations is a very broad project in Phenomenology; I will sketch one approach to similar topics in §4.

Here I will argue (for example in §5 below) that preconscious intentional activity, even while conscious awareness is directed elsewhere, may still depend on cognitive (perhaps neurological) formations that rely on the overall reality of human mind as including consciouness (if we accept neuroscientific language at this point, the reality of the brain as *supporting* and *enabling* consciousness); and on cognitive or motor skills which at one point do indeed demand conscious attention. An adult has committed many practical sequences to memory, including ones whose schematic representation seems to involve intentional centerings. Because these tasks can be carried out preconsciously, we might suppose that conscious *attention* can be separated out from cognitive *intention*, so that intentionality becomes a separate phenomenon from consciousness. However, we can counter that a practical sequence may *initially* demand conscious attention to its intentional targets, and only once the associated conceptual or motor structures are suitably entrenched, can these episodes be "committed to memory" and run beneath vivid conscious awareness. I will discuss this potential reconciliation of Cognitive Phenomenology and Embodied Cognition in §4-5.

I intend the *operational/intentional* constrast as mostly suggestive; I think the differences between Cognitive Phenomenology and Embodied Cognition are subtle, and I will try to separate them only slightly here. As I will argue, I think the differences do have some relevance to how we situate cognition and consciousness in the natural, scientific world — including whether, from the scientific perspective, we find it important to pursue a "reduction" of mind and consciousness to physical entities or processes. There are scientific intuitions in both Embodied Cognition — which after all belongs to cognitive *science* — and in a cognitive thematics associated with the project of "Naturalizing Phenomenology". But although, in both contexts, we can reasonably consider the "reduction" of mentality to physical substrata, both of these viewpoints also understand cognition, at least in part, from the "first person point of view". So we can also consider how science, nature, and phyiscal phenomena in general are disclosed or manifest in our first-personal, subjective awareness. In effect, any responsible notion of "reduction" in this philosophical context has to explore reduction in multiple directions: mental reality to physical process, for example, but also as physical reality somehow reduded or "mapped" to configurations of mental awareness. My project here is to assume that reduction can be multifaceted, and even bi-directional.

Conventional wisdom in science and philosophy seems to be that (Husserl-inspired) phenomenology cannot accept a scientific form of reduction, because it paradigmatically considers consciousness and the "transcendental" cognizer as the foundation of philosophical certainty. Phenomenological Reduction proper may explore a Cartesian doubt about everything *except* this *cogito*, but consciousness, if anything, cannot be "reduced away". There is an objectivity of appearance, where the nature of empirical things and events is manifest in how they appear *to* consciousness; but consciousness itself cannot be reduced to just

another thing appearing, another thing with a nature, or another thing in the empirical world. Paradigmatically, by contrast, Embodied Cognition does not recognize as radical or metaphysical a separation between mind and world; I will suggest below that a better metaphor may be an adaptative or functional integration into the world as a multi-faceted "ecosystem".

The "Idealist" reading of phenomenology, which magnifies this ideological gap, may be something of a stereotype — but I claim that it is not compulsory. There are different ways to understand the relation between empirical order and the manner of things appearing to consciousness. Here I will suggest that the Phenomenological Reduction can be read as a strategic move to focus analysis on perceptual configurations and how they support intentional mental states. In this sense, the Reduction is more technical than metaphysical. I will also argue that phenomenology does indeed centralize individual consciousness, but in such a way that, within consciousness, we find intuitions about physical nature that are consistent with scientific explanation. These arguments, featured in §2-3 and §6, respectively, sketch a "co-reductive" account which, I believe, can potentially reconcile phenomenology and cognitive science.

However, I will start by considering theories of counterfactuals — first because this will provide a succinct case of reductions, and secondly because I will use counterfactuals as part of my subsequent discussion of phenomenology.

1 Counterfactuals and Possible Worlds

My intention here is to present two accounts of counterfactuals, and explore how one (or both) may be reductions of the other, for various notions of "reduction". The account I favor is inspired by Michael Jubien (mostly his 1993), though I will present my version using language influenced by Gilles Fauconnier and J. F. Sowa. I am not trying to adequately summarize any particular theory, just to sketch two models for the sake of camparing them through the lens of reductive analysis.

Personally, then, I find a property-based approach to counterfactuals persuasive. This approach has three key ideas: that (nonvacuous, meaningful, interesting) properties need not have instances; that properties bear associations with other properties regardless of their being instantiated; and that properties with the same extension (including no extension) are not necessarily the same. So there is a property *being Sherlock Holmes*, which is co-associated with properties like *being English* or *living in London*. I use "co-associated" to designate one specific kind of inter-property association, the kind which if restricted to *instantiated* properties would correspond to co-instantiation: in other words, the first

property is such that any instance is also an instance of the second property, as a matter of its internal "meaning" (note the co-association relation is not assumed to be transitive). These relations come in both necessary and contingent varieties: Holmes is only contingently co-associated with London, because there was nothing prohibiting Conan Doyle from writing a story where he moves somewhere else. One way to ground co-association is by connecting properties to concepts: *being Holmes* is co-associated with *living in London* because the *concept* of Sherlock Holmes includes the property of living in London.

Following Sowa — and then a tradition in both theory and technology which implements a Conceptual Graph Semantics (`CGS`) — domains of knowledge and reality can be modelled as networks of concepts (or concept-types) and their instances (aka concept-tokens), linked by relations. Some of these relations are intrinsic to their domains, such as concepts expanding or refining each other; other relations are asserted on the basis of particular tokens. Conceptual networks, sometimes represented as (labelled, directed) graphs, can assert particular facts, establish rules for what constitutes valid propositions (and potential facts) in some domain, or both. Such networks can be general classificatory systems, like bioinformatics, or concrete databases. Rules for how concepts may be related, and propositions formed, are sometimes called "domain ontologies" or "conceptual supports". This provides a more abstract level from which particular collections of predicates or assertions, or "Conceptual Graphs", can be formed. For example, it is abstractly true that a person can only be married to another person (this is a restriction on well-formedness of propositions concerning marriage, within the relevant domains of law and family); and it is concretely true that Barack Obama is married to Michelle. Graph-like concrete networks can be called "property frames", if we adopt a version of this theory based on Michael Jubien's work, where the "nodes" of hypothetical graphs would be properties like *being Barack Obama* or *being Sherlock Holmes*.

Jubien's property-oriented semantics and theory of reference elegantly addresses a variety of issues related to counterfactual, hypothetical, and fictional contexts. For example, the intuition that a particular sculpture could have been executed in wood, and not clay, is captured by asserting that the property *being this statue* could have been instantiated by a block of wood, not of clay (this avoids referential puzzles like: the statue is in fact a lump of clay; a lump of clay cannot be a block of wood; but the statue *could* be a block of wood...). Here, though, I want to focus on the theory's application to fictional realms, where properties like *being Holmes* are not instantiated; and yet it is possible to have true and false beliefs, knowledge, and epistemic warrants, about Holmes. These propositional attitudes are framed by the network of properties established by Conan Doyle's stories. The stories, then, create a conceptual network whose structural organization is no different in kind than networks modelling real people (an online encyclopedia, for example).

The fact that Holmes was *fictional* does have the consequence that the network is *fixed*: we can discover new facts about real-life people, but the "graph" of the Holmes property-frame can never expand (well, unless someone finds the text of a hitherto-undiscovered Holmes story). This is a nontrivial difference at the level of graph *adaptability*, but it is not a difference in structural organization per se. There are, indeed, expansions which are possible because they are not inconsistent: it is possible that Holmes was gay — viz., that the property of *being Holmes* can be co-associated with *being gay*. This means that there is a consistent extension of the "graph" with a linked Holmes-node and being-gay node. But this graph can never be either true or false relative to the stories; the extension (even if well-formed according to the domain-rules) does not model a proposition which is "evaluable" in their domain.

By similar reasoning, the Holmes stories are *plausible*; they are internally consistent, and their network of property-relations is well formed according to the relevant domains, which are largely borrowed from real life: Holmes and Dr. Watson are (fictional) people, living in (presumable real-life) London, etc., so the "domain rules" of people and cities are assumed as frames for the stories. As far as I know, the stories never violate those rules. So they present fictional people and events which are nevertheless entirely conceivable. This is why we can confidently assert things like "Holmes could have existed", or "it would have been possible for Holmes to exist", or, then, "there is a possible world where Holmes exists". We say that things (propositions, say) are possible, if there is a network or frame of properties or concepts where they can be modelled, and which conforms to rules of the relevant domains. So "possibility" means "conformity to domain-specific ontological and concept-relation rules", and counterfactuals are propositions or entities which are possible, but either not instantiated or not actually obtaining.

I also want to note that, at least leaving aside talk of "graphs", the underlying semantics here might sound like conventional first-order logic. In other words, someone might suspect that the theories I am contrasting are merely two different choices of terminology and exposition, for what is essentially one single theory. I will address this in a moment, but to some extent this is an artifact of my skipping some of the more interesting disussions in Jubien's presentation, which I am trying to use as the basis for an inter-theory comparison.

Jubien introduces a more robust but, I think, similar account as a replacement for the conventional theory of Possible Worlds (and particularly the notion of Kripke frames — cf. 93 p. xxx). He allows for possible world "talk" as a convenience, but a phrase like "there is a possible world where..." becomes just a maybe-intuitively-useful substitute for "it is possible that...". Grammatically, we have *possible* as an adjective, but not "possible worlds". This invites comparison to theories which do in fact argue that there are distinct ontological

entities called "possible worlds". Here I do not consider a strictly mathematical Modal Logic, where "possible world" just names whatever, in a model of the theory, happens to fit certain axioms. (By analogy, group theorists sometimes use the word "zero" to denote the neutral element of the group operation, in whatever model satisfies the group axioms. This "zero" need not have any relation to numeric zero.) This mathematical usage is not at issue. However, Possible World Semantics is introduced so as to provide a model *for* modal logic *in terms of* possible worlds. In other words, it is assumed that there is some independent notion of possible worlds and that, according to this notion, these things then model the axioms of modal logic. In terms of the last analogy, this is like ontologically recognizing a specific entity which is Zero (not just calling "zero" whatever heppens to be the neutral element) — or recognizing *the* (actual) world as one of the "possible worlds".

If that is true, then there are alot of them. Any collection of independent propositions leads to a combinatorial explosion of possible worlds. Moreover, each world has objects, and any object which takes on contingent predicates has counterparts in other worlds. Modal logic also introduces a technical relation of inter-world "accessibility", which can capture the intuition that propositions may be necessary in some worlds but not in others, and/or provide a model-theoretic interpretation of necessity, because we can quantify over the set of worlds accessible from some fixed world. Now, note that different kinds of structures can model modal logic. For example, let's say that adult humans weigh somewhere between 60 and 600 pounds, so for each person it is possible that they weigh somewhere in this range. We can represent this as a function from people to weights, and consider the set of possible valuations of this function as a model for modal logic (in particular, those valuations which all fall in the 60-600 range). Here "possible worlds" is just another way of saying "possible valuations". But possible world semantics does not employ these kinds of targeted, domain-specific frames of possibility and measurement, to provide mathematical modal models. The question is whether our metaphysical intuitions about possibility and necessity can be harnessed to provide modal-logic models, in which, in particular, *the* world, the actual world, is one of the possible worlds. This theory does not need to have some full-fledged account of what (or where) these worlds are — in terms of quantum fluctuations or parallel universes or whatever — but it does need to propose the ontological existence of *some* things to be referents of words like "world" or symbols like w.

So my interest here is to contrast this ontologically robust notion of possible worlds with my Jubien-borrowed and -glossed property-oriented approach. I will present this contrast as an example of (several forms of) *reduction*. Jubien argues that assertions made using possible worlds can be just as well made with properties: for example, necessaraily horses are mammals, not because this holds in every possible world, but because the property *horse* extends the property *mammal*. Because properties are not defined by their extension, refinement as an

inter-property relation is different from inclusion as a relation between extension sets. As a brief aside, one of the canonical analyses in Cognitive Linguistics is how George Lakoff and Mark Johnson describe theoretical reasoning in terms of spatial and physical metaphors. With this in mind, we can consider "reduction" in terms of spatial metaphors: reduction commonly means reduction in size, which can involve making some collection smaller, or the contrast between larger things and smaller things. Molecules are composed of (and therefore larger than) atoms, for example, so molecular biology, for example, can be reductively explained in terms of atomic physics. With respect the property-based and Possible-World Semantics theories of counterfactuals, then, we can similarly identify several kinds of reduction:

- Reduction in Ontological Commitments: the property approach arguably has a *smaller* set of ontological commitments. Sure, the set of properties seems large, but not subject to the combinatorial explosion of possible worlds and counterpart-objects. For example, each object has its own property (of being that particular object); but there are no "counterparts"; so there are maybe two things (the object and the property), but not a whole spectrum of counterparts. Also, an object may or may not instantiate a property, but there is not a different world for each such alternative. (Here I assume by intuition that "alternatives", which are say boolean-valued codomains of functions, are less ontologically heavy than "worlds", as are, say, numbers — having already excluded mathematized interpretations of modal logic within function-valuations from this discussion, since, I claim, such interpretations provide ontologically light-weight entities as interpretants of abstract possible worlds, which is different from building a metaphysic of possible worlds as actually these interpretants.)

- Reduction in Terminological (or theory-semantic) Commitments: The property-oriented theory removes some terms which are intrinsic to the other theory: possible worlds, counterparts, accessibility, etc. The former theory does, to be fair, add on some other terms; so it is not necessarily true that the total set of technical terms is smaller in one theory than the other. But there is a specific reduction in that certain terms are present in one theory and absent in the other.

- Reduction in topicalized analytic scale. The property-oriented theory also has a reductive account of semantic meaning, which I have only briefly covered. Without fully endorsing this account, Jubien does set up a framework in which linguistic meanings, or at least a large class of them, can be modelled as a form of Conceptual Graph whose nodes are properties and whose edges are inter-property relations like co-instantiation and co-association (these are my terms). Nouns, verbs, and proper names all become properties, and predication becomes an inter-property link (Jubien laments that "there is a tendency about in the land" to confuse "the 'is' of predication with the 'is' of identity" xxx). So this theory suggests an

explanation of how larger linguistic entities work, in terms of a property theory of, mostly, individual lexical units.

- Finally, there is a reduction in theory *explanatory scope*. As either/both linguistic or epistemic models, property frames apply equally to facts and to counterfacts; one can develop the theory such that no qualification distinguishes instantiated properties from not, and no way to capture Obama's "realness" from Holmes's ficticity. If desired, one can add on such considerations; but the theory is structured so that questions of whether properties are instantiated — so that "singulary" properties, in particular, like proper names, can model referring expressions and therefore either point or a real designant or fail to do so — these questions are "factored out" of the core theory. They become extensions which may or may not be recognized without the core being involved. So we can say that the explanatory scope of the theory is reduced in size, because there are questions it does not answer; but this is a strategic retreat, because it is therefore not affected by problems which arise within the possible extensions. Similarly we can say that these extensions and associated questions are "reduced": questions of how to distinguish real from fictonal, for example, are "bracketed", lying beyond the reduced theory's scope.

Someone more persuaded by Possible World Semantics might respond that this property-frame theory can also be reduced to possible worlds, running reduction the other way. It is well-established that `CGS`, at least in some formulations, is mathematically reducible to first-order logic: `CGS` graphs can be isomorphic to sets of first-order sentences. This merely formal isomorphism rather misses the point, because the first-order translations are cumbersome and ill-suited to computational representation, whereas the original `CGS` models provide elegant and efficient data structures. Nevertheless, it is formally possible to reduce property-instantiations to states of affairs, for example, and perhaps property-coassociations to internally consistent hypothetical states of affairs. This can be construed as reducing property-frames to possible worlds if we define a "possible world" as, say, a "maximally consistent state of affairs". My own intuitions are that this is not really a definition but another reduction: we reduce possible worlds (or possible-world-talk) *to* "maximally consistent states of affairs"; especially if one of the possible worlds is *the* world. I am not persuaded that *the* world is a "state of affairs" (I would say that the world is more "everything, full stop" than "everything that is the case"); which would imply that both property-frames and Possible World Semantics can perhaps be each reduced to first-order logic.

Inter-theory reduction is not usually a straightforward affair; one needs a detailed account of how the terms, concepts, relations, and domain-rules framing a theory $\mathcal{T}\_1$ translate to those of a $\mathcal{T}\_2$. Different kinds of reduction may be proposed between $\mathcal{T}\_1$ and $\mathcal{T}\_2$, and alternative accounts can reversely argue for a

reduction of $\mathcal{T}\_2$ to $\mathcal{T}\_1$. Given these interwoven or bidirectional reductions, we can either argue that two different theories are complementary — the reduction does not entail that one theory is subsumed by the other — or else that one is more elegant, more structurally economical, more ontologically restrained, and so forth. If it is easier to think about a theory, then it becomes easier to extend and apply it, which alone can make it preferable, even if some other theory is equivalent in a purely mechanical sense. In the case of co-reductions, however, we should not assume that one or another theory is superior along these lines; it may rather be that the theories both complement and also complete each other.

Suppose I want to know why my computer program crashes. Examining the source code, I realize that I had neglected to intialize a pointer. But if I want to explain *why* the crash occurs, in full detail, I need to reason at the level of machine code, because it is on this scale that computer instructions correspond to discrete physical processes, like logic gates. So my reasoning that the invalid pointer *causes* the crash, is only adequate becaue I take as a given the reduction of source code to machine code and then to physical events, as manifest in a compiler and microprocessor. On the other hand, a purely physical description of the electronic event corresponding to a program-crash is not a complete explanation either, because it neglects what triggerred this event; why it was initiated in the first place. For that I need to revert back to a higher scale and acknowledge that the operating system will halt programs which try to access invalid memory addresses. The full explanation requires parallel accounts on both scales.

Moreover, suppose some future civilization, which uses a very different kind of computer and code, discovers and tries to reverse-engineer one of our early-21st-century systems. For sake of argument, pretend they can reconstruct the I86 machine code from electronic signals, and mine this code for recurring patterns. By naming and identifying these patterns, they can develop symbols and descriptive terms for events like variable assignment, initialization, pointer dereference, and so forth, thereby reconstructing in an emergent, speculative way the high-scale structure of our source code. Eventually they develop a language for these emergent patterns, one which mimics our high-level computer languages. But their version of this high-level language has a different purpose than ours: it is designed as a simplifying framework for describing massive quantities of low-level data, akin to how thermodynamic equations simplify the physics of billions of molecules. From their perspective, the high-level language reflects a kind of reductive theory, one which enables reams of data to be concisely summarized and reasoned about. To put it succinctly, there is a reasonable sense in which *machine code reduces to source code*, even though in the more typical sense the opposite reduction occurs (in this case, it is mechanically performed, by a code compiler and linker).

This narrative illustrates a possible bi-directional reduction: reduction in scale serves the purpose of causal and physical explanation, but reduction in terminology, in theory-semantic economy and structural expressivity, promotes system-oriented, cognitively flexible explanation which is intuitive and observation-oriented. Reduction does not necessarily progress only from higher to lower scales. Explanatory formations which assign semantic or ontological autonomy to higher scales are often considered "emergent", but emergence accounts may be bidirectionally reductive: a lower scale provides causal determination, but a higher scale provides semantic economy. We should get in the habit of considering *scale* as often akin to a dimension, like space and time. The higher-scale is no less "real", compared to the smaller-scale, than is the future to the past, or up to down. There may be a causal dependency on patterns and observable structure of the higher scale, on the lower scale, but this does not entail the semantic vacuity of terms referring "in" to higher-scale semantic frames, as if their referents do not really exist, or are "nothing but" sets of finer-grained referents. There is a causal dependency of present and future on the past, but we hardly believe, say, that the US Constitution — whose existence can be explained by tracing American history through Revolution, the Articles of Confederation, etc. — is merely a "heuristic fiction".

At this point I will leave issues of Possible Worlds behind. My rationale here was to argue for different forms of reduction, and it was convenient to do so using a theory of counterfactuals which I can now employ in a different way. I think that counterfactuals are a good entry to phenomenological topics like intentionality, because the phenomenological tradition appears to hold that we entertain intentional relations even to hypothetical or fictional entities, like Sherlock Holmes. If we are committed to an account of intentionality which depends on an externally existing "target" for our intentional "grasping", then the non-existence of a Holmes would seem to launch us on a quest to find some ontology where Holmes "exists" — for example, in a possible world. On the other hand, if we reject intentionality as directed to something extra-mental, then we reduce intentional noemata to some sort of psychological entity (which may seem a reasonable compromise with respect to a Sherlock Holmes, but is less appealing with respect to a Barack Obama, because, well, I think I voted for an externally existing person). The phenomenological intuition (as I intuit it, anyhow), is that noemata are extra-mental but not necessarily existing (not even in something like an "alternative possible world") — at least not existing in the sense (let's call this "instantiative" existing) that Barack Obama exists (and Holmes not) because *being Obama* is instantiated (and *being Holmes* not). So one part of the phenomenological project is to develop a language where a third option, combining extramentality and instantiative nonexistence, can be reasonably articulated.

2 Intending Sherlock Holmes

So, my thoughts are directed to Sherlock Holmes. I do not believe that he exists just inside my head, because I think the Holmes I intend is the same Holmes as the Holmes Arthur Conan Doyle envisioned, and my head wasn't around back then. On the other hand, once the stories were put to paper, he was not just inside Conan Doyle's head either. So where is he?

Well, let me first note that I can *only* intend Sherlock Holmes because I know certain things about him — where this knowledge means knowing structures in a conceptual network created by Conan Doyle and generally accepted as an arbiter of truths for the specific "Sherlock-Holmes stories" domain. So this network has sufficient structure to support *propositional attitudes* viz-a-viz entities like Holmes and Dr. Watson, and moreover these structures also individuate some of these entities. So it is only by virtue of these structures that I can have intentional relations to something like a Sherlock Holmes: the intending occurs because some of the struture within the overall "Sherlock-Holmes story" domain can be assembled into a configuration which has a certain form. I will speak of an "intention-bearing configuration" when the concepts activated within a proper domain, unified in a proper fashion, can take on a proper form which matches a profile of an intentional act. Obviously that sentence was vague: in the sequel I will explore what the "poper" such domains, fashions, forms, and profiles may be.

Earlier I argued that a conceptual network (or, property-frame, since before I was presenting a property-oriented theory) can have a similar structure regardless of whether certain entities modelled within the network (as graph nodes or concept-tokens, for example) actually exist. So one criterion for intentionality is that the concepts activated in the course of cognitive acts viz-a-viz some entity, belong to that structural family which has a similar form for both existent and nonexistent concept-tokenizations. Sherlock Holmes, for example, is introduced as a man, and so a token of the concept-type *man* (and by extension *human*); he is friends with Watson, lived in London, occupied as a dectective, etc. So the kind of conceptual network we can build around Holmes is structurally resonant with the kind of network we build around real people. This kind of analysis depends on distinctions which may have more general ramifications: for example, we can distinguish concepts from properties, because Sherlock Holmes (I would argue) *tokenizes* the concept-type *human* (because if he is anything, he is a *particular* man), and is an *instance* of the *concept* human (in the sense of being an example of a man), but (I would argue) Holmes does not *instantiate* any properties (such as the property *being Holmes*), taking "instantiate" to mean roughly "create an instance in the real (physical, material, etc.) world". These are obviously metaphysical claims, and perhaps I am using words like "concept"

and "property" a little unexpectedly. You can fairly argue that just using words in idiosynchratic ways is not the same as having a good theory. Alot depends on different senses of words like "instance" and "instantiate".

I will try to respond to these hypothetical counter-claims, but first I want to go off on a tangent, and talk about World Government. No, really: I have in mind a story I read earlier this year about Garry Davis, who founded a "One World" movement by issuing himself a passport as a "citizen of the world". Now, obviously, a person cannot invent a government and issue a real passport, so (whatever its material realness) such a passport, *qua* passport, is as fantastical as Sherlock Holmes. The rub is however that others became interested in this "One World" idea and started to ask for passports of their own, to the point where, eventually, a few national governments actually began accepting them. I don't know if the original passport drawn up in Paris was still around, but it's plausible that there were some "fantasy" passports which did then become "real" passports of a sort, without them actually changing at all. A related case-study is "bitcoin" internet money: someone cannot invent a government and then issue currency for it, but there does exist an internet-based, non-governmental money, which can sometimes be used for real-life purchases.

So single individuals cannot conjure up (real life) money or passports in their imagination alone, but a sufficiently large and organized group of people can confer some validity to these erstwhile-phantoms. We can say that this collective recognition provides enough "structure" for a One World passport to be *real*, and so its realness is a product of the structure supporting it, not any intrinsic property of the passport itself. I think we can use this as a rough analogy for intentionality: intentional relations depend on a supporting structure of cognitive and/or perceptual details, configured during the course of a cognitive and/or perceptual episode, which "bears" the intentional criteria. Among mental states there are a class of intentional ones, and mental states fall in this class by virtue of intentionality-bearing configurations, which have similar structure both in cases where their intended target is "actually there" or not. Within the broader class of intentionality, there are numerous "subclasses": we can distinguish cognitive and perceptual (and perhaps also linguistic, etc.) intentional modes, and their combinations, and then we can distinguish mereological organizations of noemata. So far I have given examples of intending a single thing, but intention can also target things as collections, and the same thing can be sometimes single (consider "pack the deck of cards") and sometimes collection ("shuffle the deck of cards"). So there is a table of different intentional modes, and for each mode we can explore configurations which are common to the mode alone, or to intentionality in general. So this theory may recognize various parameters of analysis, but a parameter that can be "factored out" is one which would distinguish intentionality directed to real, or otherwise to nonexistent, targets. As I have laid it out, a theory can try to identify what is common, within different intentional modes, between intending existents and nonexistents. Some

more general analysis can then consider this difference — and how we distinguish what is real from what is not, perhaps by how we synthesize multiple perspectives and investigations. That is a different branch of phenomenological considerations. But the basic — or "reduced" — theory of intentionality wants to factor out topics of object (non) existence.

Consider, then: were the early "One World" passports instances of the concept *passport*; or what about the newer ones, which are at least in places accepted as valid? Now of course grade school children can create "pretend" passports as part of a learning exercise; but I am asking whether the One World passports tokenize the concept *passport*, not the concept *pretend passport*. However we answer this question, the passports' legitimacy is determined by whether they conform to conceptual rules of the relevant domain, such as whether the body which issues then has proper standing, and whether governments will recognize them. This is not a matter of the passports being "real" in the sense of materially existing: we can easily imagine a novel where a political movement or breakaway state starts issuing passports raising similar questions. So the notion of "instance" relative to these questions is not a matter of physical, material, or "real world" *instantiation*; it is a matter of whether a certain putative concept-token conforms sufficiently to the relevant domain-rules. Notice that a sample of a concept-type — even a prototypical example, like a sample cover letter — need not be a "real" instance of the concept; consider a demonstration cover-letter, with fictitious names. Arguably Holmes is a prototypical detective, but not a real one. Concept-tokens can "tokenize" their concept-type by being a specific example, without thereby materializing a real-world token, a token of physicality or of spatiotemporal locatedness. So notions like sample, example, token, prototype, and concept-instance, form a constellation which is partly independent from, and needs to be analyzed in relation to, notions of realness, physicality, or materiality. Real as in *valid* is different from real as in *existing*. The semantics of these words are too multifaceted to permit resolution of such metaphysical issues through disciplined language use alone.

Granted, someone might say: It sounds as if you are using slippery terminology again. "Property Frames", or "Concept Networks", before, read alot like "Possible Worlds"; and these "Configurations" sound alot like "Definite Descriptions". Inventing new names for contested notions does not make the contestations go away. Well, I agree that having a definite description of something is often necessary and sufficient for having an intention-bearing cognitive configuration. I believe I am acquainted with a definite description of Holmes — although the "definiteness" here is somewhat fiat, since we do not distinguish Holmes from all humans, just those in the story. But, granting that the limited scope of the stories is part of the definiteness, I do have an intention of Holmes because I have a definite description of him. However, I do not believe that this description is *the same* mental entity as that which configures my intending Holmes. A description is a mental or linguistic artifact, and Holmes is a person;

the description *describes Holmes*, and I do not think it *describes itself*. So while my acquainting with the description is sufficient for an intentional relation in the sense that I need no further *details*, this acquaintance is part of a larger mental configuration, and the description is not *itself*, per se, the defined. I make this distinction not only on philosophical grounds, but experientially: the description does not "feel" like a *target* of a mental act, with the same finality as Holmes; the description feels more like the organizational principle of the act, rather as the road I take to a destination is not the same as the destination.

If a friend describes his fiancee, and then I meet her, my acquaintance with her now takes on a definitiveness which is qualitatively different than it had before. It would seem that this is to large measure because I now have direct perceptual acquintance, and not just a description; but I think some of this situation carries over to a case like Sherlock Holmes. There is a targetedness in my thinking about Holmes which feels more consolidated than merely thinking about someone whom I know only by description. This specificity may not have the oomph of full-fledged perceptual impressions, like when I finally see the fiancee in person, but there is still some kind of cogintive oomph attached to a Holmes, an iconicity of mental attention, which is lacking if I think about a description on its own, apart from thinking about its descriptand.

To some degree, this "iconicity of attention" is a matter of context. If my friend tells me that he sufferred a near-fatal accident driving to see his fiancee, my attention will surely be directed to my friend's state, and any notion of his fiancee will be relegated to a secondary clause, analogous to the secondary locative in *while driving [to see my fiancee]*; the emphasis of the sentence (and of my concerns) is elsewhere. On the other hand, if my friend tell me that *his fiancee* sufferred a near-fatal accident, then she becomes topically central, and I need to orient my cognitive attention in her direction, even if I know her only through his descriptions. The phrase "my friend's fiancee" may serve as a definite description, but whether this phrase (or its corresponding idea) unfolds into a full intentional cofiguration in my mind depends on context. In a discursive setting, context frames a sentence and provides a trajectory which directs our attention to its central idea; in the current example, the central topic will almost always be the state of the person near-fatally injured. I use the word "trajectory" here consciouly inspired by Langacker's notion of "trajector", as in his example "the store across the street": *the store* is a trajector, and "across the street" sets up a cognitive and/or perceptual framework pointing toward the store (Langacker calls *the street* in this case a "landmark").

In the more abstract space of a conceptual network — modelled as a conceptual graph, perhaps — I think intentional configurations are similarly defined by trajectories along concept-nodes (assuming the hypothetical graph model). The effectiveness of this framing does not depend on the intentional "trajector"

being instantiated, as we can see by continuing a linguistic analogy: "the store across the street will be / would be / would have been great for business" can be said even if across the street right now is just a (maybe just proposed) construction site. Similarly, the conceptual network surrounding Holmes, created by the stories and recognized by their readers, contains trajectories which lead toward Holmes as a "concept-node". This graph picture is intuitively useful, because as so represented the trajectory is literally a graph-theoretic path, traversing nodes for Watson, London, and so forth. The configuration around Holmes is reasonable for a case where Holmes is a distinct person, a distinct token of the concept-types *detective*, *man*, *human being*, etc. The "finality" of Holmes as a "cognitive trajector" does not depend on his actual existence; it is instead determined by the configuration of the nodes along the path of this trajectory being adequate for the relevant concept-tokenization rules, within the scope of the current domain. So the "oomph" of Holmes's intentional finality is a kind of mental annotation I can attach to the Holmes-concept — a subscious attaching which I consciously register as an experience of Holmes as a cognitive icon — by warrant of the domain-rules. This finality is not based on Holmes first being there, perceptually before me, and thereby existing within a perceptual network which traces attentional trajectory simply by virtue of its structure as perceptual manifold. Instead, a cognitive/conceptual configuration can substitute *for* these perceptual strutures, legitimizing an experience of intentional finality even in cases where this intending act has no perceptual dimension at all.

Sometimes I may *falsely believe* that this iconifying annotation is warranted. Suppose I hear a loud noise upstairs, and assume there is a burgler. So I rush to confront the person who made the noise, only to discover instead an open window and a blustery wind. Here I have a putative intentional relation to *the intruder upstairs* but, on further inspection, this sense of intending simply dissolves. I no longer feel authorized to annotate the configuration through which I cognize a content like "the source of that loud noise" with a single, finalizing target, and the presumption of its iconicity or finality no longer seems useful as an aspect of my mental state. This is a cognitive reconfiguration, a revisal in my belief-states, but it triggers or correlates with a qualitative, experienced shift in my overall comportment (bodily as well as mental). This illustrates that the experience of intentional finality is driven by potential utility of comportments built around this finality, as well as by the actual states of affairs which obtain. If a customs agent asks me to show him my passport, I can clearly reach into my pocket, understanding *my passport* as an intentionally final, and, relative to that situation, singular unit which can be enmeshed in a specific set of ideas and actions. If the same agent asked for my *papers*, by contrast, my anticipation of what to reach for, of what aggregate fulfills his particular intention of "my papers", would be more hesitant. We annotate our sense of referents or descriptands with that oomph of intentional finality as a tactical device, when some direct cognitive feel of their singularity is useful for planning my subsequent mental or physical engagements with them.

So far I have discussed only conceptual networks, but similar analyses can be provided for perceptual content, both real or imagined. Suppose I try to imagine Sherlock Holmes. I am free to vary this — he does not have to look like one of the actors who played him on screen, for example — but there are some rules for my imaginings. He has to have two arms, since nothing in the stories suggest otherwise, and one of these arms must be to the left, the other to the right. He must be physically oriented somehow relative to directions up and down. I must see him in an ambient three-dimensional space, not as a figure in a purely two-dimensional frame, since I am imagining Sherlock Holmes in person, not a photograph of him. I must see him as a figure against some background. This foreground to background contrast, and also the necessary visualizing of left and right, front to back, and up and down, all establish a sense of directions within the imagined space, and therefore routes of perceptual attention, potential trajectories guiding an imaginary gaze onto Holmes, who serves as their trajector — now a perceptual trajector, rather than a purely cognitive one; a "finalizer" of trajectories in a perceptual (here imaginary) space, rather than along nodes in a conceptual graph. These structures of perceptual organization are independent of whether I am actually seeing someone real in person, imagining a real person, or imagining a fictional character. When we say that we *see* someone, then; that our vision is *directed at* someone; this does not necessarily mean a binary relation between myself and an object seen. It describes instead a structural pattern within the visual content which, as a whole, confers on this content the signature of visual attention to a perceptual target. My visualizations can conform to rules of visual intending, just as my cognitive appraisal of Holmes can conform to the rules of the relevant conceptual domains — and, for that matter, the One World passports arguably conform to the rules of international rights of entry. The conformity-to-rule within the relevant perceptual, cognitive, and/or socio-political structures, trumps the imaginary status of Holmes or of the One World Government, and confers on them a degree of (depending on context) practical or intentional legitimacy.

Let me offer another example of a perceptual case. I used to live near the Villa Maria metro stop in Montreal, and on winter nights I would sometimes ride the bus, rather than walk, the rest of the way. Riding up an escalator to street level, it happened on occasion that I saw a bus in the lane across a glass partition, only to realize that it was an optical illusion caused by lights reflected off, rather than behind, the glass. Perhaps my anticipating hurrying toward the bus predisposed me to see as a bus merely a bus-like configuration of lights. At some point I began to notice that this optical illusion had happened several times, and then I began to notice that it seemed to happen at a particular time of night and at one particular point on the escalator, a sitatuation which bore a very specific perceptual configuration consistent with there actually being a bus outside. Having realized this, I no longer tended to interpret this configuration as disclosing a bus, but I still had the experience of actually momentarily seeing a bus, or seeing something which could still possibly be a bus. I started to say

to myself things like "there's that wierd optical-illusion non-existent bus again".

What I find interesting in this case-study is that whatever intended entity is suggested by my mental state by that point, I find it hard to classify. I was not just intending an imaginary bus, like my aforementioned imaginary picture of Sherlock Holmes. Perhaps I was intending such an imaginary bus at first, but once I recognized the pattern of the optical illusion I no longer was inclined to believe there was a bus there. Nor, however, was I just intending the optical illusion of seeing the bus there, since, I can report, I did quite literally perceive something like a "could have been a bus if I did not know otherwise": it was not as if my recognizing this as an optical illusion meant that the perceptual sense of something there simply vanished. Whatever I was actually perceiving in those brief moments was some sort of entangled, self-qualifying, perceived-but-not-quite-posited hybrid entity.

The episodes of those perception were very brief; it took only one or two seconds for the shift in perspective to clarify that there was no bus there (or even that there was). It was only for an instant, from one very specific vantage point, that a certain perceptual configuration had an interpretation consistent with a bus being there, but could in fact actually be caused by reflected lights. We can see this as a failure of actual states of affairs to supervene on perceptual configurations, at least in a specific time-slice. But it was not as if I was just hallucinating buses any old place, like in front of me on the escalator or floating in air. Even though I was picturing a bus-phantom, it had a certain definitiveness; it was in a specific place, and the place itself, the location and volume of space which I perceived it as occupying, was entirely real. So the perceptual configuration was still grounded in an organization of a real spatial locale. There were a series of visual and operational pathways, up the escalator, across the partition, etc., which led toward a real bus (when real) as a trajector. So the trajectory was formed from real things, and the perceptual configuration, even in episodes of that optical illusion, activated a trajectory which imposed on its target, its *trajector*, a precision of place, of spatial situatedness, and of visual presentation. It is this specificity which, I think, caused me to continue to have some experience of seeing a bus, even after my identification of the optical-illusoriness meant that, cognitively, I no longer actually believed that those episodes were disclosing a real bus.

Any given perceptual configuration can be caused by different states of affairs, but most of this variation is fine-grained: my seeing of a (real) bus outside is consistent with the bus having clear windows or rain, snow, or smudges on its windows; that degree of detail is not available from a proper distance. The configuration which can be equally caused by a bus's lights outside, or other lights reflected from inside, and so can be reasonably interpreted both as suggesting a bus outside and not; this configuration is unusual in that the different

possible states of affairs are very different from one another. The configuration supports two different interpretations at a very coarse-grained scale. This co-possibility is also highly unstable; the more detail one perceives — the more that particualar configurations are contextualized in temporally extended cognitive/perceptual episods — the more that such various possible interpretations converge, in the sense that the differences between compatible states of affairs become increasingly fine-grained. It is reasonable to assume that, in most episodes, the synthsizing process of our mentality will enclose the spectrum of possibilities so tightly that any possible variation is so fine-grained as to be practiceably insignificant. Quantifying this process, which perhaps can use a form of modal logic, would help to lend formal structure to the phenomenological investigation of how we, in real-life cogitive perception, manage the imperfections of sense-data. The questions of how perceptual configurations relate to and disclose external states of affairs, and navigate through imprecisions in this process, belong to a phenomenological *epistemology*, and perhaps this branch of phenomenology is important to its place in the context of traditional philosophy, for example Husserl's confrontation with skeptical or Cartesian thought. Nevertheless, this branch of phenomenology is only one part of the larger enterprise.

In my interpretation, phenomenological analysis is succesful insofar as it separates its core perceptual analysis from this epistemological extension. This gives an account of what is "reductive" in phenomenological reduction: the epistemology-branch of the theory is "reduced" from the main theory, the scope of the latter theory reduced so that the epistemology becomes separate, the notional scope of the main theory (such as the notion of the bus being real or an optical illusion) shrunk, and language which depends on semantically distinguishing reals from inextents reduced to language which does not do so. The statement *I saw a bus* seems to depend on some real object to be referent of "a bus" (so, if we want to expand the semantics to more general discursive contexts, on some qua-object which we need a theory to ontologically define). A theory of intention-bearing configurations can then reduce this kind of statement to something like "I had a seeing-a-bus kind of visual episode", meaning that the episode had the configurational signature of seeing-a-bus, whether or not the seeing was "fulfilled". This signature is more detailed than just the false belief in seeing a bus, because the configuration has a well-structured profile relating the bus-appearance to a specific location, perspective orientation, spatial relation to trajectories, etc. It is this perspective / trajector specificity, not so much the belief-state it engenders, which grants to this configuration the profile of "seeing-a-bus".

Here we can adopt the intuition which David Woodruff Smith and Ronald MacIntyre captured with the idea of "adverbial" intentionality, that intentional relations are linguistically figured by modifying the verb which corresponds to the intentional modality. If my intentional attitude on an occasion is largely visual, this verb might be "seeing", so seeing an apple on the table is seeing

apple-on-the-table- "ly" (rather inelegantly capturing the adverbialization of apple-on-the-table). Seeing "a-bus-outside-ly" is even more inelegant. But this inelegance is part of the point: such adverbial translations are not comfotable formulations in language, because they are proposed as reductive interpretations of normal language. It is interesting, for example, that normal language may not distinguish real from imaginary or illusory perceiving. "I saw a bus" can mean both that I saw a real bus, and that I had a visual sense of a bus that was not actually there. The sentence is semantically noncommittal between these two interpretations, but the grammar places *a bus* in the object position, thereby suggesting that an "internal ontology" of the relevant semantics or semantic frame incorporates a referent for the bus, real or not. The clumsy adverbial reconstructions reduce away this syntactic illusion of ontological commitment, but it is worth noting that the reduced phraseology, which highlights the semantic noncommitment, is not a realistic use of surface-level language, whereas the nonreduced forms are semantically noncommittal and yet, in light of their grammar, fail to call attention to this noncommitment.

The "adverbial" reconstruction is simply a pedagogical device to call attention to how phenomenological analysis can frame perceptual episodes; the concern is not analysis of pragmatics for talking about perceptual episodes, at least not primarily. So we refigure an episode of seeing an apple on the table, for example, as analyzing the kinds of perceptual configurations which qualify as "seeing in an apple-on-the-table fashion". Seeing apple-on-the-table is not the same as vague hallucinations of apples; the configuraion must introduce specific relations of position, location, directions of perceptual survey, and so forth, which will be the same whether the apple is real or illusory. The frames and trajectories of spatial organization configure structures of intentional finality even if the intention is, viz-a-viz the actual world, unfulfilled. The position of the imagined Holmes against his background, the real-world landmarks which path toward an illusory trajector, the spatial morphology required of "on the table" whether or not the table is bare, all configure an indexicality of perceptual target even if the target is nonexistent. We can have configurational indexicality without the (real) indexed; concept tokenization without the (real) token; property networks without instantiated properties; and so forth.

Separating out the cognitive and perceptual structures which bear the signature of intentional relations, from epistemological considerations of how and whether intentions are fulfilled — and how we know the difference — this separation of concerns is a reasonable analytic strategy. It allows the language and the conceptual frameworks appropriate for the more morphological investigation, and the more epistemological, to be crafted separately. In particular, a detailed theory of perceptual focus and cognitive attention, in all its varieties, requires a dense collection of parameters for identifying precisely what preconditions apply for different kinds of comportmental states. There are "domain rules" for entertaining purely imaginary perceptions, for example, in imaginary

perceptual spaces, some of which I indicated in relation to imagining Sherlock Holmes. There are domain rules for configurations in our actual environments which may engender perceptually ambiguous situations, like the bus possibly real or ilusory, depending on whether the lights pattern comes from behind or reflected by the glass. There are domain rules for directing mental attention at individuated and conceptualized, but nonexistent, targets. The language for specifying the domain rules should not make any explicit mention of noematic existence or nonexistence, because the goal of this language is to express what structures in cognitive and/or perceptual configuration are common to intentionality both fulfilled and unfulfilled.

3 Phenomenological Reduction and Phenomenological Emergence

Conscious and perceptual states have a mereological articulation: perceived contents can be compound sums of simpler perceptions as parts, and the isolated sensory affect or quale provides a kind of base-level "parts" of consciousness. Clarifying this mereological form involves both clarifying the individuation of affective or qualitative tokens from the totality of conscious experience, and also clarifying the synthesizing processes by which compound percepts, and larger-scale cognitive structures, beliefs and propositional attitudes, situational and interpersonal reasoning, and so forth, build up from a promordial affective and qualitative layer of awareness. One ambition of $\mathcal{L}$ is to allow descriptions of this combinatory or mereological structure, and therefore to promote a "multiscale", first-personal, and affect-oriented account of consciousness. While I envision this as a phenomenological reductive analysis, of a sort, it is not an example of "phenomenological reduction" in the sense of a *descriptive* phenomenology where this kind of systematic model-building should be "suspended".

On the other hand, I think *phenomenological reduction* in the sense of the *epoche* can still be considered within the space of reductive analyses, as a kind of (what I am calling) discursive reduction, here a kind of *semantic* reduction in which the semantic domain of some theory or account is deliberately restricted. This is a "reduction" by analogy to a theory which interprets descriptions like "he is in pain" in terms of behavioral terms like "he is showing signs of discomfort", motivated by concerns about the ontological implications of semantically introducing reference to an entity like *his pain*. When a (kind of) entity is considered ontologically problemmatic, we can avoid making commitments to particular ontological accounts by paraphrasing talk which appears to refer to or semantically involve such entities, in terms of a different discursive model where such entities are not among the theorized concepts. Such paraphrasing is a kind of discursive reduction because it reduces the space of concept-types

directly incorporated into a theory's systematic semantic inventory. Of course, the analogy here is imperfect: instead of first-person reports (like pain) being bracketed, in favor of third-person observation, in descriptive *epoche* it is the first-person experience, which, alone, is *not* problematized. Having said that, the purpose of such analysis need not be to take "third-person" objective reality as ontologically problematic; but rather, as I have advocated here, we temporarily suspend questions of the objective correlates of intentional experience so as to focus on the configurational structure of this experience.

In the case of the *epoche*, assumptions related to the *external* reality or cause of experienced contents are considered problemmatic, because the goal of this reduction, in the context of Husserl's philosophy, is to develop a systematic philosophical method which addresses skeptical concerns as to our ability to learn truths about the external world. For a cognitive science whose interest in phenomenology rests more on its rigorous first-person investigations of experience, rather than on its philosophical architecture, such extensive confrontation with skeptical or empiricist attitudes may seem to be of at best merely historical interest, a substantial but (relative to modern concerns) tangential contribution to a previous era's controversies. Nevertheless, Husserl's implicit strategy for approaching these skeptic's concerns helps contribute to his first-personal descriptive acuity, and also situates his "reduction" within the terrain of reductive analysis in general. Insofar as such descriptions as "there is (external to my mind) a red apple there on the table", or "ambient light and the apple's surface properties cause its red appearance for me", are problemmatic within the dialectic of skeptical counter-arguments and metaphysical arguments, Husserl effectively develops a reductive account of the discourse employed by such descriptions. This discourse is reframed by considering not scientific assumptions or beliefs with respect to external things or causes, but rather the precise experiential details which seem to motivate these further assumptions. For example, assumptions such as the external existence of the apple are expressed instead in terms of the apple having a certain phenomenological *profile*, one expressed through the idea of "externality", involving properties like those I mentioned above: the fact that I cannot voluntarily control or apple's appearance, or that it systematically appears or fails to appear based on the position of my gaze.

I have proposed a $\mathcal{L}$ of "cognitive-perceptual morphology" to capture the "phenomenological profiles" of appearances, bracketing their epistemological interpretations. This "separation of concerns" represents a strategy for incorporating the philosophical spirit of "Phenomenological Reduction" in its original guise. However, I am also concerned with properly developing a rhetorical account of phenomenological analysis, which takes into consideration the ontological problems of first-personal or subjctive entities, like pains or personal apple-appearance, insofar as such entities are not directly accessible to collective discussion. Defending and refining "first-person ontology" requires confrontation with reduction in a different sense — the reductive analysis of mental states,

for example, in terms of neurophysical substrata. I fully reject the eliminative claim that the first-personal, as public intractible, is an ontological *reductio ad absurdum* for phenomenological method: in other words, that it renders phenomenology as such philosophically untenable. However, I do believe that the analytic methods of phenomenology need to clarify with some rigor how the ontological privation of first-personal entities is to be accommodated.

With this in mind, then, alongside "Phenomenological Reduction" proper we need to keep hold of several different genres of reductive analysis in a phenomenological context:

- A phenomenological consideration of reductive analysis in the context of science: in other words, of how the underlying rationale for reductive analysis as a predominant scientific method, is rooted in the cognitive structures and philosophical intuitions founding scientific reason;
- An account of conscious and perceptual contents in terms of their mereological articulation, by analogy to how complex or higher-scale physical entities are composed of simpler or lower-scale ones;
- A theory of certain formal systems (for example, or at least as I am emphasizing here, Mereotopology and Conceptual Graph Semantics), as modelling many cognitive and perceptual processes, so that phenomenological description can be supplemented with a kind of inter-theory reduction in which the cognitive mechanisms described introspectively can be given a partial, approximate formalization, in terms of frameworks which are subject to mathematical and computational simulation;
- An account of the minimal, base layer, or "low-scale" entities which can be considered part of subjective conscious and perceptual states, including their isolation from surroundings, the criteria of their individuation, and the ontological meaning of their taking on properties, such as qualitative properties like appearing red or feeling soft;
- And, as a kind of discursive precondition for each of these concerns, a theory of tbe proper rhetorical and disputational framework through which phenomenological investigation can be developed as a properly dialogic, conceptually rigorous endeavor within a "public sphere".

The notion of *emergence* provides a balance — sometimes compatible with, sometimes metaphysically opposed to — different accounts of reduction. Emergence reconstructs macroscale properties and objects which are causally or materially "destructured" or partitioned by reductive analysis. Here too, however, we need to contrast different forms of reductive explanation, then explore how emergence accounts complement (or critique) them. A more "discursive" reductive paradigm concerns reductions between *theories*, or reductive explanation:

the assertion that a theoretical or descriptive framework established on one scale or domain is causally or materially dependent on a related framework on a different scale or domain. For example, theories within *chemistry*, which take as foundations the structure of molecules and the forces binding atoms within molecules and those between molecules, is assumed to rest on the basis of quantum models of atoms, which explain properties such as the energy levels of electrons in different orbits. Parameters that are assumed in one theory are mathematically demonstrated, and causally accounted for, in another. In this case, the inter-theory relation is also a contrast between different scales, but this is not assumed as typical of all such inter-theory connections or dependencies.

On the other hand, a more *mereological* reductive paradigm refers to reductive analyses in which it is necessarily assumed that some class of entities is materially composed of, or higher or lower scale versions of, some other class. Here the point of reduction is to identify the dependence of higher-scale phenomena and patterns in terms of a more fine-grained representation. The example of chemistry and quantum mechanics applies here as well: electrons and atomic nuclei are (among) the basic entities of the quantum theory, whereas atoms and molecules are basic entities of chemistry.

Chemists acknowledge that atoms and molecules have smaller components, but in their case it is the more compound entities which are individual concept-tokens within the discursive universe of the higher-scale theory. Electrons are also fundamental entities in chemistry, so the same objects may appear within two different theories, even if they generally apply to different scales of reality. Properties like conductivity apply to larger-scale materials, but this property is defined in terms of movement of electrons, so in this case a system of concepts also has some referents at smaller scales; on the other hand, electrons in the higher-scale context tend to be referred to more in terms of electrical currents — involving very large numbers of electrons in similar patterns of movement — rather than in isolation. Here the contrast is scale is manifest not in excluding electrons from the larger-scale domain of concepts, but rather in the tendency to focus analytically on large collections of entities of a type T, or, conversely, to focus more on property of a single T-instance in isolation.

As this chemistry and quantum mechanics example suggests, the two types of reductive analyses I am identifying are not at all mutually exclusive: in many cases an inter-theoretic reduction of analyses concerning objects of type T (or a set of such types on a given scale), their properties or patterns described in terms of objects of type (or a set of types) T', assumes that T-objects are mereologically composed of T'-objects.

Although reductive analysis describes and/or explains higher-scale phenomena in terms of lower scales, reduction does not preclude a discursively or onto-

logically independent conceptual system applied to higher scales. Higher-scale, mereologically complex entities can instantiate concept types and tokens on their own; the fact that an object of type T is composed of T'-objects does not preclude the T-object from being, as singular referent, a distinct concept-token, or concept-types from quantifying over T-obejcts. Properly balancing a reductive account of mereology or causation, with a higher-scale of "emergent" account of higher-scale phenomena as subject to their own conceptual domains, is a crucial part of any reductive-explanatory process — whether applied to the regions of physical nature or of mind and consciousness.

So, in terms of theory and methodology, reduction and emergence are complimentary, not opposed. They are oftem mutually dependent and reinforcing steps toward theoretical completeness. However, there is a more philosophical sense in which reductive and emergent intuitions can enter into confrontation, engendering different instincts about the degree of theoretical and causal autonomy of phenomena at different scales of description. In contrasting reduction and emergence, we therefore need to distinguish reductive *explanation*, or emergent *accounts*, from *reductionism* or "emergentism". Consider:

- A weak form of emergence simply asserts that high-level semantics is theoretically useful: even though a reductive base theory may complete our causal-explanatory picture of some phenomena, in order to correlate *causation* with *observation* it is necessary to have a separate set of (semantic and/or ontological) terms profiling higher-scale entities or aggregates.

- A stronger emergent account would further claim that the high-level observation-language is equiprimordial with a low-level causation language, relative to explanatory thoroughness: the high-scale semantics and ontology completes the lower-scale equivalents, as much as vice-versa. My story about a future civilization who "reinvents" high-level programming languages so as to analyze our machine code, was intended to fictionally suggest emergent accounts at this paradigm.

- An even stronger form of emergence — one which does start to deviate from natural-scientific paradigms in general — suggests an actual "downward causation", where progression to certain higher-scale configurations, or other such norms only present on higher scales, can literally cause events at lower scales. This final paradigm proposes co-relation between scales not only in terms of theory-semantic completeness, but also in terms of causal explanation.

For philosophy, the issue at stake in the reduction / emergence debate is how to integrate our understanding of natural science with our world-view in general: with our perspectives on the human sciences and the human individual, and with our favored theories of ontology and epistemology. Both reduction

and emergence have strengths and weaknesses with respect to their intuitive resonance with these philosophical topics.

For reduction, explaining phenomena is easiest as, or perhaps is by definition, an explanation of the properties and behaviors of their smallest constituent pieces. This assumes, obviously, that a phenomenon under consideration is complex and has simpler constituent parts. These smaller parts may be composed of yet smaller parts. Explanation of complex phenomena proceeds to explain simpler, constituting phenomena, until we arrive at minimal constituents for which there is no explanatory value or meaning in dividing them further. Explanation proceeds through different levels of organization. Any complex phenomenon has different levels or organization, each of one which can be described on its own turns. The most important explanation, however, is the explanation of the "lowest level". When studying a phenomenon, then, a crucial task is to identify this lowest level of explanation or "reductive base". This progression of explanation down through levels of material and mereological composition has the merit of giving shape to the overall, multi-theoretic exercise: a group of theories work together, and achieve some degree of closure, as they link downward through compositional scales to some minimal physical basis.

On the other hand, the intuitive dilemna for this kind of reductive architecture is that the ultimate ground of causal explanation lies in domains of reality which are largely beyond natural human reasoning, and so our intuitive, macroscale lifeworld can seem ontologically adrift in a sea of counter-intuitive science. Emergent accounts have the merit of treating the categories and phenomena which we intuitively recognize in our environing world, as equally causally determinative within the world's empirical order. I will return to this "counter-intuitive" aspect of reductive analysis, and how phenomenological insights can counter this problem, in the fourth appendix. Here, I simply want to note the challenge of sustaining the ontological *reality* of higher-scale theory-semantic referents, even while their source of causal *order* is understood to reside solely in unfamiliar, counter-intuitive, high-resolution pictures of physical reality. This challenge remains relevant even for a "weak" (or non-eliminative) reductive paradigm, and perhaps for weak-emergent paradigms (which indeed can go hand in hand with weak-reduction) as well.

So, distinguishing reductive *explanation* as method, from *reductionism* as paradigm, the former need not attach conclusive ontological significance to a hierarchy of scales of appearance. The question at stake is why the reductive base is used or chosen as the lowest level of explanation. It may be so chosen because it yields simple or testable explanations. It may be so chosen because it is impractical to seek or to test explanations defined on a lower level. In these cases, there is no ontological commitment that the chosen reductive base "really" captures the lowest level of phenomena. On the other hand, reductionism as

a philosophical stance argues that reductive explanation is incomplete unless it gives compelling reasons to believe that a theory's reductive base really is the lowest possible level of explanation as a matter of empirical fact. In other words, the objects studied by the base theory should in fact be simple and indivisible. The hierarchy of levels proposed by the theory should match a hierarchy of composition in the physical world.[3] Physical sciences, such as physics and chemistry, need (according to reductionism) to identify the smallest possible units of physical matter and physical reality. This is an empirical matter: the world itself dictates what are the smallest physical phenomena.

For a canonical example of this particular problem, consider the question of whether the smallest units of physical matter [4] are point-particles or, as most physicists now argue, strings or "membranes", with spatial extension in one or more dimensions [Laughlin]. String theory might be useful as a mathematical tool even if physical particles are, in fact, point-particles (0-dimensional); however, string theorists view themselves as making definitive claims about the nature of matter, rather than simply pursuing useful models. Particles either really are point-particles or really are strings. The success of a theory depends on more than explanatory success or effective model-building.

In general, then, a theory has different components, including:

- A collection of entities posited by the theory;
- A set of behaviors, dispositions, and properties evidenced by these entities;
- A model of how collections of these entities act and interact.

For reductionism, there must be a correlation between theory and world on each of these aspects. The entities posited by the theory must map onto and adequately describe entities in the world. It is not enough for there to be theory-to-world fit with respect to models and behavior. Even if physical particles behave as string theory predicts, and even if string theory can model collections of these particles (such as atomic nuclei), the test of string theory is whether

[3] Assuming the theory concerns physical things. If it is a theory in some other domain, there should be parallel arguments defending the particular hierarchy chosen. For example, a psychologist explaining human perception should try to discover the minimal units of perception. Experiments can test how brief a stimulus can be and still be noticed. The theory should identify the minimal units of explanation not for convenience, but as a scientific discovery in its own right. For another example, linguistics needs to identify the smallest meaningful units of spoken or written language—letters? Syllables? This is not arbitrary; one can imagine psycholinguistic research that could test the matter empirically. Study of a given phenomenon should identify the smallest possible units which exemplify the phenomenon: the smallest units of language, of perception, of matter, etc. Or, at least, this is an assumption of the reductionism paradigm; as we will see, it is now subject to controversy.

[4] Modern physics does not recognize a fundamental distinction between matter and energy; therefore, when I refer to "matter" I will usually mean "matter and energy". Using the word "matter" for both is more succinct.

particles "really are" strings. Particles could be wildly different and still evince the same behavior and collective tendencies. Reductive explanation alone could rest on the success of its models and predictions, and remain agnostic as to whether it has discovered the "true nature" of the phenomena in question; but reductionism, as a scientific attitude, aspires to descriptive completeness.

This aspiration has philosophical as well as purely scientific ramifications. The success or failure of natural science affects our metaphysical positions, including whether or not a complete theory of physical nature is necessarily a complete theory of the universe as a whole. Incompleteness in natural science — failure to explain the origin of time and space, for example, or the origins of life and of consciousness — lends credence to the possibility that scientific theory needs to be supplemented by some other mode of investigation, whether it be theological, psychological, or even rooted in antireductive emergence theory. I suspect that many scientists, asked to describe the importance of science in human endeavors generally, would respond that science makes it possible to understand the world through the lens of empirical observation and publicly verifiable theories and hypotheses. Science frees society and governments from religious or speculative ideas which are beyond the reach of public debate and evaluation. Science evolved toward the reductive ideal on the heels of the modern scientific method.

Reductionism, in effect, is a metaphysical as well as scientific paradigm. To demonstrate this, consider how it contrasts with emergence theory or emergentism. Once again, I will not offer a formal definition of emergence at this point, only identify some tendencies.[5] In general, emergence theories assume

[5]References to example of emergent theory can also reflect philosophical differences amongst emergence theorists, which includes different opinions as to how far emergentism differs as a paradigm from reductionism. So we have John Searle, for example, who employs the notion of emergent properties as properties of sets of objects of type T which are not realized in individual objects of type T; consciousness, for example, is an emergent property of sets of neurons but not individual neurons; but this is no more reason to consider consciousness non-physical than to consider liquidity, and emergent property of physical substances, nonphysical (Cf. Searle 1997, p. 18). Here, the concept of emergence is used to defend the supposition that an emergent phenomenon is physical, and so obeys (low-level) physical laws. The role of emergence here supplements a reductive theory: emergence theory must explain how properties of T-objects translate to properties of sets of T-objects. Presumably, this translation is governed by T laws. Slightly further removed from reductionism is the work of Stuart Kauffman, who studies the origin of life. He engages the controversy over whether life, a pattern of complex behaviors, could have emerged from within simpler, pre-living systems (e.g., strings of proteins). Kauffman studies the likelihood of complex patterns of organization actually occurring given the properties of low-level phenomena which are to be constituents. This requires analysis of these phenomena (for example, of the kind of protein molecules which are possible), of possible organizational patterns amongst them (between two different proteins, for example), and of empirical considerations such as the length of time available for a system to develop complexity. Kauffman shows that often complexity is likely to occur — not because of some teleological force in nature guiding phenomena to greater complexity, but by simple probability (See Kauffman 1993, Chapter III). This kind of emergence theory is more developed than Searle s, because it formulates techniques specific to the analysis of high-level

that explaining the lowest level of phenomena is less important than explaining organizational patterns and higher-level configurations. Both reductive and emergent paradigms tend to see complex phenomena in levels of organization, with higher, more complex levels composed of less complex parts. Reduction tends to explain downward through this hierarchy: to explain the higher levels, it is necessary to explain the lower levels. Emergence explains upward: after we have explained the lower levels, it can still be difficult to explain where higher-level behaviors and organization come from, or to find the correct parameters with which to model the emergent patterns or translations. Special methods and models are often required to translate our knowledge of lower levels to successful theories of higher levels.

Emergence and reduction have important philosophical ramifications, however, because high-level organizational patterns do not necessarily supervene on the nature of low-level phenomena. Emergence studies the organizational patterns found amongst sets of entities of a given type; it does not necessarily arrive at (or aspire to) a complete description of these entities. For example, an atomic nucleus is an organized collection of fundamental particles (quarks, in this case). It is possible to analyze nuclear structure without deciding whether quarks are point-particles or strings. The string/point-particle distinction is irrelevant to how quarks are organized into atomic nuclei. It appears that no information will be gleaned by deciding whether quarks are one or the other, that will affect our models of nuclear structure. In an emergent paradigm, then, the underlying question loses its importance. The failure of physics to decide between the two theories may be frustrating, but it is loses the urgency which

patterns, such as computer simulations, and measurements of complexity (cf. op. cit. 118-130 and 235-243). This is a theory of emergence because it introduces new terms and concepts intended to bridge the explanatory gap between low levels and high levels — a gap which we may not believe is metaphysically real, but still poses explanatory challenges. Nonetheless, it seems a fair reading of Kauffman's text to suggest that these parts of a theory of high-level emergence supplement, but do not upstage, low-level theory; in particular, that complex organized systems are not ontologically different than their low-level components. Evidence for this includes the fundamental fact that complexity emerges only tentatively, that in simulations complexity emerges only in a small number of cases — for an example see also Stephen Wolfram (2002), p. 57. Complexity emerges randomly, and nothing in nature preconditions the appearance of complexity — which seems to imply that complexity is generated only by low-level processes. Kauffman describes complexity as "order for free" (his Chapter IV). He suggests that reductive analysis can fail in general because some systems are too complex to be modeled by anything other than the system itself, so reductive analysis cannot provide a model useful for prediction or simulation — but this is an empirical limit on reductive models, not a metaphysical problem with reductionism in the abstract (see p. 22). In effect, work like Kauffman s is still not a fundamental paradigm shift away from reductionism. An example of a thinker who does reflect such a paradigm shift is Robert Laughlin (2005), who suggests that reductionist paradigms are conceptually and ontologically flawed, and that these paradigms have exercised a deleterious influence on the research programs, interpretations, and instinctive thought-patterns of scientists trained in the academic mainstream. "In passing into the Age of Emergence we learn to accept common sense, leave behind the practice of trivializing the organizational wonders of nature, and accept that organization is important in and of itself — in some cases even the most important thing" (Laughlin, pp. 218-219).

this question takes on for reductionism. This demonstrates a trait of emergent theories which, depending on one's perspective, may be a strength or a weakness. In general, emergence theories both do not and cannot make definitive claims with respect to the ultimate constitution of the simplest units relevant to the theory in question. Emergence theories study these simplest units with respect to the contributions they make to higher-level organization. By necessary, they are agnostic with respect to low-level properties that have no high-level effects. As a result, emergence theories (unlike reductive theories) do not offer a definitive description of the phenomena in question: details which are not organizationally significant are not considered by the theory. On the other hand, emergence theories do not need to offer complete description: a certain amount of descriptive open-endedness is appropriate. Emergence theories do not take on the metaphysical burdens which attach to reductive theories. Whether this is works to their credit or discredit depends on whether or not we look to physical science to answer metaphysical questions.[6]

Any scientific activity must suppose, explicitly or not, a theory of how scientific terms — and, by extension, the minds of scientists as they use these terms — refer to the things science is explaining. Science has its own version of a word-to-world or "theory-semantic" mapping problem, and different intuitions of how theories and paradigms relate theory-concepts — both within theory-semantics and in the minds of scientists, scholars, and conversants — can dispose different researchers to disagree in assessments of theory-ontological effectiveness.

So I suspect that the reduction / emergence debate is driven, at least in part, by two competing views of the "language-to-world" mapping problem, in the specific guise of *theory* semantics. I sense that there are two competing paradigms vis-a-vis this mapping problem, as follows:

- On one theory (associated with reductionism), science terms and scientists' minds *directly refer* to particular worldly things. Ideal explanation works with a language in which particulars and individuated and their properties, behaviors, and dispositions fully explained. A complete theory of electrons, for example, would permit us to single out any particular electron and explain its activity, accommodating for quantum randomness.

[6] In another sense, emergence theories can sometimes help reductive theories achieve explanatory completeness by filling in explanatory gaps between low-level and high-level theories. Such theories, for example, can explain how life emerged from nonliving molecules. By assessing the likelihood that complex patterns can emerge from simple foundations, emergence theories can advocate for a metaphysical preference for ontological simplicity and nonteleology over theological or teleological approaches to the origin of life, of consciousness, and other mysteries. In this guise, emergence theory acts as a complement to reductive theory. More radical kinds of emergence theory, however, seek to challenge rather than complement reductionism. These more radical theories, I believe, must on pain of inconsistency abandon the metaphysical aspirations which reductionism takes on; we then have to decide whether metaphysical open-endedness is a worthwhile trade-off for simpler, less ambitious theories.

- On an opposed theory (associated with emergentism), explanations are models of high-level, complex behavior. Pieces of these models may, indeed, refer to particular things, such as electrons. However, this referring occurs only in the context of a model. A *decontextualized* reference to an electron, for example, is impossible or nonsensical: any real electron occurs in the context of a physical system which governs its behavior.

For an example of the first theory, consider particle accelerators which try to produce exotic subatomic particles which are too heavy to readily occur in nature. These tend to exist for only a fraction of a second. Needless to say, they cannot be seen directly; instead their presence (or their having been present) is inferred from the printout of a bubble chamber. Nonetheless, physicists studying the printout can conclude that a particle did indeed exist, and can refer to that particle, both with language and in their minds. On this paradigm, a symbol and a mental state is linked to a material thing which was there in space, for a certain period of time.

For an example of the second theory, consider Robert Laughlin's discussion of sound waves traveling through a solid.[7] Physics conventionally considers light as a kind of particle (a light ray as a collection of photons): photons are simple presences in space and time. Sound, on the other hand, is construed as a "phenomenon" rather than as a particle: there is no sound-particle. Nonetheless, sound is quantized (i.e., there is a "minimal possible value" of sound) and, Laughlin argues, sound waves are mathematically very similar to light waves. He suggests that it is pure prejudice on scientists' part to consider light a "real" particle and sound only "analogous to" a particle. For Laughlin, the goal of physics should not be to reduce physical reality to a set of tiny particles. Instead, physical reality is a collection of distinct phenomena, or (in my terms) *ordered situations*, such as sound traveling through a solid. Reduction should stop when we have arrived at an ordered situation which can be explained by a single model. Any further reduction is an explanatory convenience *of the model* and does not imply that the situation being explained is *ontologically* reducible. Laughlin, who is not writing for a philosophical audience, does not frame his critique of reductionism in ontological terms, but I think this is a fair interpretation of his beliefs. Laughlin, and other anti-reductive emergentists, are really outlining a new ontology, one whose basic constituents are *ordered situations*.

Emergence, I believe, is fundamentally a reaction against *ontological* reductionism, against certain ontological theses which are implicit in modern science but which are metaphysical prejudices, not necessarily rooted in empirical fact. One of these prejudices is what Robert A. Wilson calls "smallism": "discrimination in favor of the small. ... Small things and their properties are seen to

[7] *Cf.* Laughlin, pp. 106-112.

be ontologically prior to the larger things that they constitute, and this metaphysics drives both explanatory ideal and methodological perspective".[8] There are other prejudices, however: that *things* are ontologically prior to events and processes; that properties are ontologically dependent on substrata which instantiate them; that patterns of organization are dependent on things which are thus organized. Science shows a preference for the *bare particular*, and only after that particular is ontologically specified can we then discuss how it is organized into complex wholes. Reductive ontology seeks a story about the particulars which instantiate properties, and which take on patterns of organization, before we can even begin to consider properties and organizational patterns themselves. This is why, for example, the problem of identifying the smallest possible physical particles is so important; and also why theories which reduce the complex typology of small particles to variations on one *single* material thing, such as a quantum string, are popular: the distinctions between electrons, quarks, photos, and the like become *part of the theory*, rather than part of the preconditions of the theory. One is left with the most general possible notion of material being, a kind of fundamental particle to exemplify material reality as such. Electrons, quarks, photons, or any other particle of specific *type* cannot exemplify material reality in general, because each one exemplifies only a given type: when, however, we can theorize particles as *strings*, where properties like charge and mass are accidents of their vibrational patterns, then strings as such do indeed exemplify material reality in the most general sense. This is why string theory is favored as a reductive base for physics.

So reductionism, in my opinion, is motivated in part by what Husserl calls "eidetic generalization" attached to specific ontological regions: for the region of material reality, we want to identify the most general possible notion of "material being" and develop a theory around this notion; the resultant theory is a reductive base for other theories whose context or domain is material reality as a whole. Along these lines, *qualia* exemplify the region of consciousness or mental reality: there is no consciousness without qualia, and all qualia belong to consciousness: the theory of qualia is therefore a reductive base for other theories concerned with the mental and cognitive lives of conscious beings. The search for a reductive base is also a search for the most general exemplification of a region of being. Those who are *critical* of reductionism — for example, Robert Laughlin with his critique of string theory [9] — also implicitly criticize this metaphysic of exemplification. We can assume them to oppose the notion that material reality is exemplified by the smallest possible material objects. Wilson's critique of "smallism" is also a critique of the presumption that something small is a better paradigmatic example of material existence (or existence in some other region) than something large.

[8] 2004, p. 22

[9] *Cf.* Laughlin, p. 211.

What motivates this critique of exemplification? Presumably, emergentists are reluctant to assume that material reality is exemplified by particular material things. They intuit that material reality is better characterized by the organizational principles at work in nature; by processes, tendencies, phenomena. *Reality*, in general, is not a collection of particulars; reality is patterns of organization. The distinction I made earlier between scientific language as direct reference and as modeling the world resonates with this current distinction between conceptions of reality. If reality *is* particulars, then language and the mind connect to reality insofar as linguistic symbols can link to, and the mind intend, particular objects. In the reductive paradigm, for the mind to "know" reality, it must come in contact with particulars within this reality: and so I will argue that the phenomenological theory of intentionality has (perhaps surprisingly) a metaphysical traction with reductive ontology. For language to mirror reality, it must have terms which refer directly to objects in reality — not through the media of descriptions or models, but through a pure direct reference, a reference to the object in-itself. If I say "this red book", then I am referring to the book, even directly referring to it, but only through the medium of certain of its properties (its being red; indeed, its being a book). Language, to "map" to the world, must map to the decontextualized particular, to the particular stripped of its inessential properties. For reductive ontology, any contextualization of an object is inessential to its inner being; any object could potentially be a universe unto itself. Any electron could theoretically exist in a world where no other physical objects existed. On the other hand, if we reject this decontextualized picture of reality, if we believe that reality is *essentially* a tableau of contexts where objects occur in consort, in organized patterns, then language is free of the need for idealized reference. Language does not ideally, i.e., decontextually refer; language models reality, rather than picks it apart. Similarly, mental states model reality; they are holistic images of material situations, rather than collections of decontextualized intentional acts. The phenomenological picture of intentionality as the mind directed to particular objects, whose context is reduced to the "horizon" or the "perceptual background", is jettisoned in favor of a more holistic mirroring between the structures of the mind and the order of its environment, its environing situation.

Phenomenology and reductionism are usually seen as combatants rather than partners. However, when the debate between reduction and emergence is laid out in this way, rooted in ontology and in the theory of reference, I think we can see areas where phenomenology edges closer to reductionism than to emergentism. Among them note the following:

- Phenomenology treats qualia — rather than holistic mental states, such as propositional attitudes — as exemplifications of mental reality; much as (reductive) physics regards fundamental particles like electrons and quarks as exemplifications of physical reality. As I will discuss in the next section, qualia present particular challenges to the "theory-semantic mapping problem", in other words, associating qualia-talk with public, empirical

entities. However, reductive theorizing tends to separate the public observability of theoretical entities from questions about their ontological status. Even such world-historically elusive constructs as the Higgs Boson are considered to be real things, not just useful theoretical fictions.

- Phenomenology regards intentionality non-holistically, as (paradigmatically) mental relation to particular things. To be sure, the objects thus intended are themselves, typically, complex: we cannot have perceptual encounters with *true* particulars, like electrons. Nevertheless, the reductive analysis of fundamental particles can be seen as an idealized generalization of our intended larger physical objects, and the particularity of the intended object qua intended is a phenomenological source for the reductive ideal of the bare or *absolute* particular, construed as the true or ideal object of science.

- Husserl's theory of "dependent moments", first presented in the third of the *Logical Investigations*, suggests a property/substrate relationship closer to the reductive viewpoint, in which properties are ontologically dependent on substrata which bear them, as opposed to a more holistic viewpoint, in which particulars are always contextualized, so their properties are not logically "separate" from them.

This list is not intended to be definitive; there are other areas in which phenomenology seems to shade in the direction of emergence theory. In addition, phenomenology is not a rigid metaphysical system; the ontological implications of Husserl's work, for example, differ in important ways from those of Heidegger, Merleau-Ponty, Levinas, or Sartre. Some of these authors seem closer to the reductionist viewpoint, some closer to the emergentist. My own opinion, however, is that phenomenology skews toward reductionism at the deepest levels; that is, as it theorizes the *fundamental nature* of mental reality and of conscious life.

To reiterate, emergence and reduction need not oppose one another. Ideally, explanation needs to work both up and down across hierarchical levels, so a complete theory needs to succeed on both emergent and reductive criteria. In his *Theory of Everything*, for example, Robert Barrow seems to take pains to accommodate both viewpoints and even to modulate between them. Both perspectives are part of the machinery of contemporary science. However, in their more paradigmatic guise, the debate between *reductionism* and *emergentism* is cultural and institutional as well as purely conceptual. A reductive paradigm will incorporate emergent methods, and vice-versa, but the difference between a paradigm and a method is that the paradigm bears the weight of philosophical significance. A scientific paradigm is more than a guiding principle for doing science: it embodies how we see science in its relationship to the world and to human knowledge and experience in general. Any scientific paradigm, taken to its logical conclusion, represents or implies a specific world-view. So, when

the competing demands of upward and downward explanation do engender conflicting intuitions, I think there is room for phenomenology to act as a kind of mediator: it allows us to focus on the *structures of appearing* which convey intuitiveness to emergent accounts, and the *structures of reasoning* which find explanatory closure in reductive analysis.

The interplay between the emergence/reduction debate and phenomenology works in two directions. On the one hand, philosophy of mind is an important terrain for the debate. Convincing arguments that one or the other of these perspectives may yield solutions to problems about the mind would be a strong point in its favor. On the other hand, phenomenology offers some ideas which may shift the terms of the debate.

The competition to "explain" consciousness does not necessarily resonate with phenomenology, because phenomenologists themselves disagree on whether science can or should explain consciousness, that is, whether such an explanation (or the lack thereof) harms or benefits the phenomenological paradigm. Some phenomenologists might therefore find more in common with emergentists, who may lend support to the notion of consciousness as inexplicable on some level. Personally, I believe that the failure of science to explain consciousness (or even to begin such an explanation) cannot help phenomenology. Phenomenology is based on introspection, and failure to situate the contents of introspection (qualia and conscious states) in the natural world undermines our faith in introspection as a forum for structured, publicly disputable argumentation. Some might note, on the contrary, that the contents of consciousness are immediate to our minds and that natural law is available to our minds only through consciousness. From here, one might conclude that explaining consciousness in terms of natural law is logically impossible, and that failure to do so works to the credit of introspective analysis, because it makes such analysis a necessary part of epistemology. This might be Husserl's own view. But I am not persuaded by this argument; in particular, I do not believe that the definitive property of consciousness is its "immediate presence to the mind". I do believe that conscious states *have* this immediate presence, but in my opinion the starting-point for phenomenology is not this immediate presence as a bridge between external reality and the mind, but the structure *of* this immediate presence, i.e., the spatial, temporal, and affective patterns displayed by qualia and by other fundamental units of mental reality. I will clarify this point in a second.

The other direction in which phenomenology relates to the reduction / emergence debate concerns phenomenology as a method and perspective which can arbitrate this debate: in particular, which can assess how each paradigm fits into our larger philosophical world-view. I will demonstrate this point by continuing the above comments about qualia and conscious states.

4 Reduction and Qualia

In this discussion, by *consciousness*, I mean awareness and experience in general: both the qualitative, affective dimension of experience — the specific "feel" of things like red sensations and pains — and cognitive acts, such as judging something to be the case, insofar as I am actually aware of that judgment. Consciousness consists in all mental reality which I am aware of. For any occurrence in consciousness, I must be able to declare as it occurs: "now I am judging that ___" or "now I am experiencing ___". Consciousness therefore excludes subconscious cognitive acts. For example, there may be considerable mental effort expended in walking down the street, but much of this effort is below the level of conscious awareness, although occasionally it will rise to this level (for example, when the street is broken and care must be exercised). Consciousness also excludes most of my knowledge and beliefs, except for those which are directly relevant to my conscious experience at a given moment.

Conscious phenomena can broadly be divided into propositional attitudes and qualia.[10] Propositional attitudes involve first the cognitive act of thinking about states of affairs, i.e., registering them as mental entities, and, second, taking a stance toward them, i.e., believing, doubting, or desiring them. Qualia are the basis of interaction between the mind and the world, and therefore have a place in propositional attitudes, but when discussing qualia in themselves we are interested in their phenomenal feel rather than their determinate content. For example, when I feel a red sensation, I am disposed to believe (to accept the proposition that) something is red; however, if I analyze *red* as property of a sensation, I am not concerned with our tendency to form judgments as a result of qualia; I am concerned with how qualitative feels occur to consciousness in the first place. There are different ways in which I can come to judge something as red; only a subset of these involve actual red sensations. Qualia are therefore more restrictive than propositional attitudes, even though any quale has at least one propositional attitude associated with it (a red sensation includes the belief "this (the sensation) is red"; and usually also the belief that something (in the world) is red). I agree with John Searle that problems about qualia are the fundamental problems in the philosophy of mind.[11] I think it is useful to attribute propositional attitudes even to nonconscious entities: for example, security software will quarantine a file because it *believes* it contains a virus. I think the word "believes" here is useful and intuitive. A robot scanning luggage might sound an alarm because it believes a certain shape could be a bomb. Deep Blue might move the rook because it *believes* the rook is vulnerable, and *fears* it might be captured. I see no reason to restrict propositional-attitude terms like "believes" and "fears" to conscious beings. Entities which entertain propositional attitudes exhibit intelligent behavior; and intelligent behavior can

[10] *Cf.* David Woodruff Smith (2007), p. 189.
[11] Searle (1997), 28-29; (2002), 25-26.

be discussed in functional terms. So we have at least some research program toward explaining human intelligence. Science, however, has no real insights into the origin of conscious awareness itself, as a phenomenon separate and apart from its functional place in intelligent behavior. Why do we feel pain, as opposed to simply knowing that something like a hot stove is dangerous? Why, when touching something hot, do our hands not only instinctively recoil, but we also feel pain? If qualia are defined by their functional roles, then qualia themselves, as experiential details, seem ontologically superfluous.

Yet a scientific explanation of consciousness, if one is possible, demands a scientific explanation of qualia. And qualia are emblematic of the most intractable problems for the prospects of scientific explanations of mind. As we seek to define a language in which a scaffolding for mental-reductive explanation can be built, then, it makes sense to look more closely at the question of qualia, and whether a careful conceptual analysis will make these problems seem more entrenched, or else suggest open the door to possible resolutions.

As we consider the prospects for explaining qualia, we should clarify what actually needs to be explained. First of all, for any specific quale we believe that someone (or something) knows "what it is like" to experiences that quale. Talk about qualia implicitly includes talk about "what it is like" to experience them.[12] The "qualia problem" comes about because scientific data about a quale, no matter how complete, may never explain this "what it is like". A biologist with vast knowledge about bats may never know what it is like to be a bat. The question is whether we can discover this "what it is like" with sufficiently vast knowledge, or whether no amount of scientific data can ever explain the qualitative realm. Regardless of our intuitions on this question, it is useful to preserve the concept of "what it is like" as a clarifying mechanism for talk about qualia, given that we have no unambiguous way to define what qualia are. As objects of scientific exploration, qualia enter our language not through exact definition, but on the heels of a "way of talking". Philosophers of mind generally agree about what the qualia problem is, even thought very concept "qualia" enters our vocabulary only indirectly, embedded in an overall discursive framework of qualia-talk: talk about "phenomenal feels", "what it is like", etc.

To analyze qualia, then, we need to analyze qualia-talk. One fundamental distinction appears within this talk. Suppose I believe that other people know what it is like to have qualia similar to mind — to have red sensations, for example. If we both have red sensations, we both know what they are like. This does not mean, however, that you and I have the same sensations. If we both look at something red, I believe we have similar sensations. If you

[12]The phrase "what it is like" having been popularized by Thomas Nagel's (1974) "What is it like to be a bat?".

look away, I believe that you no longer have these sensations, even though I still have them. So I don't believe that you have my sensations, or that you have sensations because I have them. I believe that we have similar sensations, sensations that are "like" one another, where "like" comes from the phrase "what it is like". Suppose we call the "likeness" of a quale its qualitative character. The qualitative character "red" is the specific feel associated with red qualia. Someone who is colorblind cannot have qualia with this character, and therefore does not know what it is like to have these qualia. A given red quale, however, is localized in one person's consciousness. To specify any single quale q, it is necessary to specify a qualitative character, a conscious subject S, and a temporal episode in which S experiences q.

Having distinguished qualitative character from qualia themselves, we see that there are really two qualia problems: first, explaining where qualia come from; and, second, explaining how they acquire their specific character. The first question is: how do we explain consciousness itself? Why do some things in nature have conscious experience, and others not? The second question is: why is red different from blue, for example? I think the former is the really interesting question about qualia, even if the latter question is just as difficult.

Searle himself has an emergent theory of consciousness; he believes that consciousness is an emergent property of the physical nervous system. His theory, however, is a rather weak kind of emergentism, one which can be integrated with reductionism. Searle believes that material objects can, if they are configured properly (along the lines of the human mind, for example), acquire conscious states. Conscious states are not something ontologically outside the physical realm: consciousness is one ontological region within material nature. Searle, unfortunately, never really justifies his faith in the physical basis of consciousness. Against Searle, prominent philosophers of mind, among them Jaegwon Kim and David Chalmers, have expressed doubts on whether all aspects of consciousness can be physically explained, even if many of them can.[13] Among theories of mind, the prominent current debate is probably that between physicalists, who assume that consciousness itself, including qualia, is physically explainable, and functionalists, who aspire to explain many aspects of mental life, but who remain agnostic on whether qualia can be explained. Functionalists try to *incorporate* qualia into their picture of the mental in various ways: for example, red qualia are interpreted as dispositions to agree that things are red. In doing so, however, functionalists tend to explain qualia in terms of the role which they play in cognitive operations such as making judgments — operations which, as I argued above, non-conscious intelligent beings also perform. Functionalism therefore refuses to find, in qualia, features of consciousness as something *apart from* intelligent behavior.

[13] *Cf.* Kim (2005), p. 172. The doubts he expresses about explaining qualia bear a surprising resemblance to arguments offered by Chalmers

The debate just mentioned is apparently driven by the following: qualia, by definition, are not *public* objects; any quale is an episode in a single consciousness. Even qualitative character is public only under the assumption that different minds feel the same types of sensations. I cannot prove that your red is the same as my red. How then can we conduct scientific research — which by definition requires a public consideration of theories and evidence — on wholly private entities? Functionalism gives us a way to redefine these entities in more public terms. In place of ephemeral red qualia, for example, we have public speech acts, such as vocalizing the word "red". In place of pain, we have publicly observable behavior, such as writhing and moaning. Functionalists assume that in replacing private qualia as objects in need of explanation with their more public associates, we make it easier for science to approach a theory of qualia.

Is this strategy helpful? I have suspicions that it is not. Consider how we would begin to characterize qualia as private objects, even though this requires a leap of faith as we presume that our own qualia resemble other people's. Although my qualia are not accessible to others, I can still, in a public forum, discuss some of the structural features which my own qualia bear. My conversants in a hypothetical forum can debate these points through an introspective study of their own qualia. This public investigation carries weight only if we assume that our qualitative experiences are structurally similar, which cannot be proven; however, we may be prepared to consider this similarity likely enough to be plausibly assumed. In that case, I can propose a structural analysis of qualia to submit to the public forum, and request assent or dissent grounded on others' own introspective considerations. In particular, qualia seem to have the following:

- First, temporal delineation. A quale has a temporal episode where I am aware of it.
- Second, a spatial separation from its surroundings. Qualia are individuated from the context of other qualia which form my entire perceptual consciousness. A red quale, for example, is a colored region which is isolated as a single experience because there are other colors in the background which contrast to it.
- Third, an "affective" relation to my consciousness. To be precise, qualia are episodes happening within my consciousness, and happening to me. They are not controlled by me. I can, if I so choose, imagine something red. There is an imagined red sensation which accompanies this mental act: a quale in the imagination. This quale, however, lacks the vibrancy of real, perceptually present qualia. A quale only seems "real" if it is something I cannot control, which I cannot will to be blue rather than red, or to go away entirely; and therefore if it appears to be caused by reality external to my mind, as opposed to caused by my mind itself, by its powers of imagination and its free will.

Having laid down some features of qualia, then, I submit the following: even if qualia are not physical objects *a priori* — in other words, if there is room to doubt whether or not they are part of physical nature — they *do* have certain features reminiscent of physical objects. We might call them "sort of physical" or, to be more technical, quasi-physical. Like physical objects, they have spatial and temporal delineation, even though the space and time proper to qualia is the inner spacetime of conscious experience, which is not necessarily "objective" space and time. In addition, because qualia are not caused by my (conscious) mind, they certainly seem to be caused by external reality: and this reality seems to be the reality studied by physical sciences, the reality of physical things. I *experience* my red quale as caused by the redness of a physical object: as a *physical* redness, a property of physical things which *translates* into or *causes* a qualitative state in my mind, but does not originate in my mind.

We may not have a clear program to physically *explain* qualia, but if qualia do, indeed, have this quasi-physical structure, or quasi-physical way of being, then this gives us reason to seek a physical explanation for qualia. Qualia and physical reality are not two completely unrelated ontological regions; there is more than pure faith in physics behind the assumption that physics could, one day, have the means to study qualia on their own terms. I therefore must disagree with Kim, for example, when he claims that although this explanation may work in the end, there is no reason to expect or to hope for a physical explanation of qualia.

I think it is ironic that theories of mind which try to make qualia more amenable to scientific explanation, by redescribing them in functional or behavior terms, actually lose their quasi-physical structure, and therefore define away one of the best motivations for pursuing a scientific explanation for qualia in the first place. Qualia are quasi-physical because they have spatio-temporal form, and because they have an affective reality in my experience which suggests that they originate from external, mind-independent reality. If we choose to redefine qualia as functional states, as behavioral dispositions, or as elements in chains of reasoning which lead to propositional attitudes, then both their spatio-temporal and affective aspects are lost. Suppose, for example, that we redefine red qualia as dispositions to assent to "this is red". A red quale, if we remain true to qualia as private episodes, has a spatiotemporal boundary and an affective presence in my experience. My *disposition* to assert "this is red", on the other hand, has neither spatio-temporal form nor affective character: I can tend believe that something is red for many different reasons, some of which involve no affective experience. Robots and computers, who have no affective reality, can also be disposed to assert that things are red. Redefining qualia in propositional or dispositional terms tends to undermine the distinction between conscious beings and non-conscious, but intelligent ones (beings which exhibit some intelligent behavior). Consciousness, however private it may be, is nonetheless a theatre for states and contents — qualia, for example, as contents of consciousness or

as components of conscious states — which have affective and spatio-temporal form and, therefore, a quasi-physical way of being. The quasi-physical aspects of qualia are evident only when we construe qualia as private entities: the various publicly-accessible occurrences which may be associated with qualia lack this quasi-physical dimension. With respect to physical explanation, then, defining away their private character may be regress rather than progress: perhaps the only way to pursue this explanation is to remain committed to qualia's private character, and to take seriously the ways in which, even as private objects, qualia still seem to take on some of the characteristics and causal determinateness of physical things.

Why, despite their quasi-physical aspects, do qualia pose problems for science? The fact that they are not publicly accessible is part of the answer to this question. There is probably more to the answer, however. Consider any given quale: for example, a red sensation of mine. I have a red quale, and decide to analyze it as an example of qualia in general. I therefore refer to it, either while it is phenomenally present, or as something in memory. I fix my attention on it. To treat a single quale as a case study for analysis, I need to "nominate" it as an object of discussion in the public forum. I can do this, arguably, because my conversants have similar experiences of their own. We can therefore agree to talk about my quale, with each participant in the discussion understanding the quale in consideration either through the lens of their own, similar experiences, or by imagination. Perhaps the terms of public discussion are here being muddled; and yet this, in and of itself, does not seem like an impossible burden for our discussion to bear. Inexact as these acts of imagination may be, as we reconstruct in our own minds the experiences which others have, it does seem as if we can discuss our private experiences; that a rigorous discussion of their properties and structure is possible. Privateness, by itself, does not seem like the chief obstacle facing this discussion to the degree that it aspires to the formality and credibility of science.

The deeper problem is perhaps the following: when I nominate my canonical red-quale as an object of public discussion, there is not much that I can say about the quale itself, even if I can give a fairly detailed analysis about how it fits into my conscious experience as a whole. I cannot describe this red quale in much detail, even if I can call it "red". The term "red" is a poor description, and it works in the public forum only to the degree that all participants can look at things which are called red, and consult their own experience as a guide to the phenomenal character which the community means by "red". There is no language which we can use to describe our qualia that would aid in their scientific examination. This is atypical in the scientific realm, because usually the first step toward explaining something is to describe it in detail. In this case, the quale under discussion — my red sensation — is introduced into the public arena not because it has been described in detail, but by a kind of introspective accord between myself and my conversants. They accept my designation of this

quale on faith: I declare that I have singled it out in my mind. The quale is therefore *referred to*, but is not described in any detail. It enters public discourse only *by being referred to*, as a kind of undescribed "this", communally assumed to be *there*, but lacking any specificity in the terms of our language other than the primordial phenomenon of reference.

To the degree that they are objects of public discourse, qualia have no substantial place in language *other than* the fact that we can refer to them via indexical terms like "this": *this quale*, *this sensation*, etc. I suspect that this *reference without description* is part of what makes qualia seem unscientific, seem to be at best second-class citizens in our scientific vocabulary. Those who find this problematic are doubtless inspired by a paradigm in which phenomena are good candidates for scientific explanation to the degree that they can be meticulously described; to the degree that they have a place in our language beyond the minimal presence expressed by indexical expressions like "this". This is a judgment on what makes scientific language successful, and how things presented for scientific exploration, or permitted in the domain of scientific thought, are to be defined. And, as I suggested in the last section, some researcher's unease with qualia in the context of a theory-sematic or "theory-to-world" mapping, are perhaps the main reason why "first person" ontology remains controversial.

Both phenomenology and reductive physics traffic in objects which are ontologically ambiguous. Phenomenology, on the one hand, is "about" qualia, which are objects of public discussion even though they are ontologically private. Phenomenology is a discourse about qualia which cannot be publicly described nor perceived. Physics, too, is about particles and entities which we can observe only indirectly, and which, if the reductive ideal is successful, enter language only by being *posited*, not *described*. The physicist's ideal is to abstract away devices which could be used to describe physical entities, to make these descriptive possibilities part of the theory: the electronness is abstracted from the electron, for example, reduced to an inessential property of the electron, and what is left behind is a "string" of matter, whose vibrational patterns can change at any time, causing it to become some other type of particle. Instead of terms like "electron" being available to draw a particle into language by describing it, these terms are abstracted from, even "bracketed", so as to arrive at the physical particle in its full generality. What is left, though, is a particle which has no essential properties other than being there, coiled in a given region of space. At this level of generality, the particle cannot be described, or modeled; its existence is only that of a pure "this", a pure haecceity. As such, it can enter scientific language and public debate only by a collective agreement to recognize its existence. It does not exist *in* the public forum, in the sense of being described by a model which can be publicly tested against observation. Both phenomenology and physics are committed to public debate about objects which are ontologically reclusive, which, by nature, do not exist as such on the

public stage. It is part of the machinery of these theories to compensate for this reclusiveness, but not everyone accepts that machinery.

Not everyone accepts the notion of public examination of non-public entities. Emergent theories, with their emphasis on publicly accessible *models* as opposed to non-public *objects*, find some of their appeal in their power to resolve this potential paradox. There is no question, I think, that reality as described by an emergent paradigm (for ontology) — as a system of distinct ordered situations which science and language can model — that reality so described is more accessible to public reason: on this paradigm, the fundamental units of physical (and perhaps mental) reality exist in the public arena. On a reductive paradigm, they do not exist in the public arena, and theory must accommodate this reclusiveness in order to be a publicly structured intellectual activity. This is perhaps an argument in favor of emergentism, but I would caution that many of our most respected theories — not only in the natural sciences but also in the human sciences and in ethics and philosophy — are based on public discussion of necessarily private or non-public entities.

It is easy to imagine versions of emergence theory applied to the social sciences as well as to the natural sciences; indeed, one can argue that social science, at least in the domains of economics, sociology, and anthropology, has always followed an emergence paradigm. There are some areas, however, in which non-public entities truly are the fundamental theoretic entities of the social sciences. Consider the theory of human rights. We could, if we are so inclined, develop a high-level theory of human rights: we could consider what benefits come to societies as a whole from recognizing certain fundamental rights, we could analyze the emergence of rights-based legal systems as a large-scale pattern in social and political history. Somehow, I think, this would be missing the point. The discourse of human rights is committed to the particular, to the rejection of large-scale generalizations. Policies which seem defensible when viewed from a wide angle are judged morally culpable when a few individuals are severely harmed by them. One or two particular images — the photos from Abu Ghraib; Maher Arrar tortured in Syria — are enough overpower an entire war, an entire administration, an entire historical project (such as the "war on terror") in the eyes of history. One of the enticements of reductionism is physics is that it permits one single image (a bubble-chamber printout which proves the existence of a theorized particle, for example), or one single theorem, to embody an entire region of physical existence. We, in our society, have a parallel aesthetic sense of the power of one image to embody an entire historical episode: a handful of famous newspaper articles embody the entire Vietnam war; a few lines from Yeats' *The Tower*, from Shostakovich's *Babi Yar* symphony, or one figure from Goya's *Third of May*, all embody entire historical events. There is a reductive streak in our cultures' ethics, aesthetics, and memory.

I will argue that a connection exists in our intellectual life between the reductive emphasis on the particular physical object, the *local* region of physical reality, and the particular mental episode, the single quale, the local conscious experience. Our scientific preference for the reductive particular perhaps originates from our own self-consciousness: our sense of ourselves as occupying a private world potentially decontextualizable from our social and cultural environment, our attachment to the fleeting moment as exemplar of subjective reality, to immediate, local, temporal subjective experience, the localized subjective moment captured in a poem, a painting, a memory, etc. We have, I believe, a reductive view of subjective reality and of human rights, and the latter I think derives at some level from the former: we are prepared to demand rights for ourselves and others because we see in all humans a private, fleeting, subjective world, one which the public should not try to appropriate. This paradigm, I believe, is a relatively recent one; I think both reductive science and our modern, liberal notion of individual subjectivity and human rights are products of the same historical epoch, which began towards the end of the 18th and early 19th centuries. Perhaps the paradigm will change, and perhaps emergentism foretells a broader rejection of reductionism in areas such as ethics and social science. If this new paradigm comes, however, we need to be sensitive to how our ethical and political theories may also be affected: on how the shifting terrain in the philosophy of science can reverberate through the sciences in general, including the social sciences; and we need to ensure that our crucial moral assumptions, and their rationales, are not weakened.

Although the more schematic notions of reduction and emergence arise in the philosophy of (natural) science, I believe (as these comments imply) that these notions are very much relevant to the humanities and social sciences as well. Ultimately, most phenomena require some combination of reductive and emergent analyses. Often these analyses will be complimentary. Sometimes there may be some give-and-take between them: theories at the macroscale level need to assert the autonomy of macroscale appearings and theory-semantics, while those at the microscale level need to reiterate the demand for causal-explanatory precision. Ultimately, a theory is not complete until its causal norms and patterns are not only described, but described in physical terms, that is, for each (type of) causal influence included in a theory, it must be shown how this causal influence actually operates within space, time, and physical entities. At the same time, however, a theory is also not complete until its *phenomenological* norms and patterns are accounted for. Here I mean "phenomenological" in the sense of "appearing" in general. A cosmological theory, for example, is only complete if it explains how the proposed theoretical formations (its equations, for example) correlate with observations in the relevant domains (such as astronomic data). Here we deal with "appearances" in a way that incorporates the imperfections of our observational faculties, both natural to our senses and as augmented by technology, as well as limited by our natural context. Astronomical observation, for example, operates through the effect of the earth's

atmosphere, through "redshift" effects due to light waves' losing energy across cosmic distances, through light bending due to distant heavy objects, etc. But a successful theory needs to predict observations, and explain appearances, so as to accommodate and account for these conditions.

In this sense, there is a connection between the phenomenology of scientific theories and philosophers' (e.g. Husserlian) phenomenology. A (physical) theory of mind and consciousness must account for how mental states, entities, or reality *appear to us* (for example how the state of seeing red objects, with "red" meaning light in some wavelength spectrum, appears as red qualia); by analogy to how cosmological theories, for example, have to explain how astronomical objects appear to us (here on Earth). Continuing the analogy, cosmologies also have to explain their causal processes, for example by modelling gravitational attraction between astronomical objects, or modelling the geometry of spacetime, and how it has changed over time. Theories generally have to evolve in two different directions of scale to accommodate these complimentary demands. Cosmology, for example, has to operate on very large scales to accommodate how cosmic events will translate to appearances here on earth (potentially billions of years and light-years away), but on very small scales to develop a precise (e.g. field) theory of gravitational interaction, gravity waves, spacetime expansion, and so forth. Similarly, scientific accounts of mind have to operate on a large scale to consider the phenomenal reality of qualia (how qualia "feel" being a matter of large-scale perceptions and situations, such as degrees of attention, not just a single quale; qualia never appear in isolation or as a sole, absolulte attentional focus). Simultaneously, they have to operate on a small scale to explain how mental reality, like qualia, occur within or emerge from what are relatively small-scale entities, like nerve cells.

Qualia have an interesting intermediate position in the transition (in scale and in topic) from cognitive "physics" or "neuroscience" (interested in nerve cells, for example, as physical, chemical, and organic entities), and cognitive "science" or "linguistics" (interested in larger-scale neurological architecture, perceptual and semantic gestalts, and so forth). For example, some philosophers feel that qualia are best considered as "emergent properties" of neurological phenomena, so in that context qualia are macro-scale while neurons are micro-scale. On the other hand, from the perspective of an analysis of cognitive-perceptual morphology, qualia are largely micro-scale: they are among the minimal constituent units of larger mental-experiential complexes. This, along with the notorious challenge which qualia pose to scientific explanation, are reasons why properly expressing and modelling qualia are an important part of designing a putative $\mathcal{L}$ of "cognitive-perceptual morphology". I will discuss aspects of integrating qualia at several points in the appendices.

Computational and Functional theories of mind have a tendency to try and

incorporate qualia oversimplisitcally, and somewhat by fiat; for example, by recognizing qualia solely in terms of their epistemic role. Consider our faculty of experiencing qualitative redness, which allows us to recognize red things, in contrast to (say) blue ones. Certainly this is *one* role. But this kind of analysis oversimplifies the correlation between objects and features which characterize them, like color. It is not as if things in the world come attached to a finite list of colors, like balls on a billiard table. Objects evince a whole spectrum of colors, and their apprant color changes with different lighting conditions, with view angle, etc. When observing an objects' color we do not merely say "this is red", for example, and so can only be of a kind which is typically red (like an apple or cherry); or blue, so not an apple or cherry, but maybe a plum or blueberry. Colors do more than just bag objects into "red things" and "blue things". We use colors to reconstruct three-dimensional geometry, predict properties like objects' tactile feel and temperature, develop a sense of ambient light and spatial frames: we infer, for example, that there is an usual excess or deficit of ambient light if things around us seem darker or lighter than we would otherwise expect based on their apparent colors, shapes, and kinds; and this in turn affects how we reconstruct large-scale patterns in environing geometry: where, say, we believe the tree line to lie as we walk across a dark field at dusk.

When identifying the "functional role" of qualia, such as colors, we need to recognize this more nuanced role; how the entire color spectrum, and how coloration distributes across an object's surface, and how this changes over time, all contribute to our sense of objects' geometry and categorization. We can also note provisional correlations between color and other qualia: in nature, for example, blue, brown, and white objects tend to be colder, and red, yellow, or orange things (like embers from a wood fire) are often warmer. A day lit by a bright sun tends to be warmer than a grey, cloudy sky. I, for one, will actually experience a room in a museum as colder if it has a collection of landscapes featuring darker or cooler hues; or warmer if it features landscapes with bright reds, yellows, scenes of sunrise, and so forth.

Such correlations may derive from learning and entrenchment: encounters with hot yellow things and cold brown things may dispose us to guess, provisionally, that yellow things are a little more likely to be warm, and brown ones cool. But we cannot say, *a priori*, that these associations are purely a matter of statistical correlation, and are unrelated to the phenomenal feels of different color-hues, or how sharply we tend to experience color contrasts in different parts of the spectrum. For example, the concept "red" appears to be more expansive than the concept "blue", in the sense that a wider range of hues seem to be gathered under that concept, or are red-examples, for many test subjects. All of these considerations have to be factored in, when assessing for examle our disposition to make assumptions about objects' character based on their color, and about the larger cognitive role of colors generally.

Considering that we can identify functionally relevant cognitive details in the whole color-spectrum, and how it is phenomenally organized and interrelated, I think it is hard to eliminate the full detail and spectrum of qualia even if we grant the functionalist intuition, that mental realities like qualia are best analyzed in functional terms. Moreover, the notion of "functionality" itself needs systematic treatment: how do we identify which systems truly are "functionally similar", or identical? Is an electric car functionally identical to a gas-burning car, because they allow people to drive places, in broadly similar ways? How then do we characterize their differences? Electric cars are better for the environment — they do not release carbon monoxide, for example, or consume fossil fuels — but conventional cars are more convenient; they do not require lengthy rechargning, and gas stations are more prevalent than electrical sources, at least out on the road. Are these *functional* differences between types of cars, or are they *performance* differences, contrasts in how efficiently, economically, cleanly, etc., they perform equivalent functions?

Similar questions apply to functional accounts of mentality and cognition. Are robots functionally similar to human beings, in that both move around and process observed information, though robots are much less mobile and adaptable than people (except in some dangerous environments, where robots may actually perform better)? Perhaps some cognitive tasks that we humans perform, on the basis of empirical observations which we experience through the lens of qualia, can be achieved also by robots or computers who do not experience qualia. But should we consider only this relatively coarse-grained functional correlation, or do we need to analyze the efficiency, speed, adaptability, and overall effectiveness of the computer implementations compared to human abilities? So long as humans remain so much more adapted to our human, social lifeworld than our robotic and computational gadgets, we should be wary of hypothesizing any functional correlation between our minds and their algorithms. Computational implementations can *shed light on* on cognitive processes, but should not be treated as *functionally akin* to cognition or experience.

Even if we grant the functional intuition, then, and consider functional roles as part of our ontological understanding of qualia (and other nuances of mental life) — perhaps even, as a nearly eliminative stance, as ontologically *constituting* qualia, at least with regard to an "official theory" —, it seems to me that the philosophical implications we should draw from these intuitions are almost the opposite of where functionalists tend to take them. Perhaps consciousness (with the full vividness of qualia and self-awareness) evolved precisely because conscious minds are functionally superior to those simpler systems which do not have conscious reality as part of their cognitive arsenal; as part of their perdurant representation of the world. This may help explain why consciousness *evolved*, but it does not eliminate the challenge of actually physically explaining how material things (like brains and nervous systems) can be conscious. To the contrary, it makes this physical explanation all the more central, because it

tends to situate it in an evolutionary context: when conscious mentality started to evolve, what actually happened in the brains of our forebears so that they started actually to have conscious experiences?

To conclude, then, while functional analysis is an important part of the cognitive-scientific repertory, it does not eliminate the need for considering qualia (both the individual quale and the qualities or qualitative characteristics, like the look of red or the feel of cold) as first-class objects in an ontology of "first-person" mentality. So $\mathcal{L}$ should include representations of functional roles and organizations, but also qualia and qualities.

Thus far I have outlined the competing intuitions which a language like my proposed $\mathcal{L}$ can strive to elucidate. On the one hand, $\mathcal{L}$ should describe and model "cognitive-perceptual morphology" — those configurations which engender our intentional attunement to (possible) external things, processes, and events, including ones which are possible but not actual given a particular state of perceptual and empirical afffairs. On the other hand, cognitive-perceptual formations are structures within a field of conscious awareness, even if consciousness is not equallt aware of all structural components. First-person, experiential reality represents the terrain in which the structurations modelled via $\mathcal{L}$ operate — the potential sites of attentional focus and cognitive, perceptual, and motor intentionality, and the afforances in our surroundings which allow us to dynamically switch between attentional and intentional sites. To model both the structural morphology and the field thus structured, $\mathcal{L}$ needs to openly embrace first-person ontology, but to approach subjective reality with a Structalist's instincts, trying to reverse-engineer the morphology of subjective experiences regarded as organized wholes. Having described what, in my opinion, this theory-language wants to accomplish, then, I will now consider in greater detail what kinds of terms and notions it may encompass.

5 Theory languages of intention-bearing configurations

I believe that some cognitive and/or perceptual configurations "bear intentions" in that they have specific structural properties, properties which induce some form of trajectory, indexicality, tokenization, and so forth, which lead toward a cognitive and/or perceptual target. These strutures are activated and apply regardless of whether this target is real or illusory (fictional, imagined, etc.). The theory-language for describing these structures should be such that a morphological characterization of structures which do and do not bear *fulfilled* intentions should be very similar, if not strictly identical. Pursuing such a language may be of interest to phenomenology seen as a philosophical movement responding to

classical topics, because the formations of this language are specifically intended to transcend questions of noematic existence or nonexistence, and therefore can be argued to produce a detailed philosophical theory within a framework in which historical skepticism cannot gain theory-semantic traction. However, I think these rather archaic issues are not the main focus. The larger goal is to develop a language for describing, presenting, and articulating transcendental structures of cognitive and/or perceptual morphology, "transcendental" in that they are organized around intentional targets which may or may not be real. The interest of this research should be construed as largely cognitive, not philosophical.

For reasons I outlined in the first section, I believe that at the purely conceptual level — where we attend entirely to non-perceptual intentionality, like reading Sherlock Holmes — a proper language of "cognitive morphology" in this case will prove to be similar to Conceptual Graph Semantics (`CGS`). It may be useful to adapt `CGS` to the property-oriented framework of Michael Jubien, or to Fauconnier "Mental Spaces", but in broad outlines we can say that a *purely conceptual* intention-bearing configuraion is one which can be expressed as a valid concept-tokenization within a Conceptual Graph, subject to the relevant domain rules as modelled by the graph's "support". The only real phenomenological insight in this case is the analogy I have already implicitly assumed, where paths through a graph mark conceptual trajectories which progress toward a cognitive "target", a mechanism I find comparable to survey routes around more perceptual trajectors. Beyond simply noting how `CGS` graphs can represent patterns of intentional framing, there is not much for phenomenology to do; the question of which domain-rules constrain conceptual iconicity, among examples of various concept-types, depend on domain-specific analyses executed on a case-by-case basis.

So, from here on, I will assume that we are concerned with developing a morphology of intention-bearing *perceptual* as well as cognitive configurations. Cognitive strutures will still be relevant: I do not believe that we can have any *pure perception* without some form of cognitive mediation; for example, that we can perceive an object without identifying some cognitively summarial features of its shape or appearance, such as symmetries or partonomies. Even the absence of any such convenient morphology is a cognitive appraisel of some perceived object, situating it in one general class (or one of such several classes as blob-like things, flexible-sheet-like things, chunky amprphous things, etc.). So a rich language of perceptual detail will include these potential summarizations as well as models for representing complete perceptual form, such as an object's perceived three-dimensional geometry, which is typically the geometry of its surface as a two-dimensional manifold embedded in three-space.

Also, I am not discussing perceptual structures in full generality; only the

morphology of "intention-bearing" configurations, or structures with some sense of cognitive/perceptual trajectories and framings, leading toward one or more "targets". It may be that a complete language of intention-bearing morphology will encompass a full range of possible perceptual structures, but even if so, the language should be organized around those structure relevant for intentionality, and incoporate additional notions (the sense of ambient space, for example) as extensions from this core concern. This suggests that the language will have a different internal organization than if we started with the goal of modelling fully general perceptual morphology at the outset, where we might become engaged with questions such as, what is the scale of the finest-grained perceptually salient feature (of a speck of color, for example) — questions which I think have a psychological dimension that is tangential to the stated concerns of the language at hand.

With the goals of the language demarcated in terms of percpetual-intentional structures, however, I think it would be appropriate the draw notions, motivations, and refinements of the language from a range of sources and research disciplines. We need to distinguish the internal structure and commitments of a theory-language from the philosophical attitudes which may be involved in the research process through which it evolves. Let us agree that it is worthwhile to build a theory-language $\mathcal{L}$ assigned the project of modelling perceptual-morphological structures, particularly those which establish formations of cognitive/perceptual focus and attention (thereby carring the signature of intentional comportments and the processes which lead perceivers to adopt these), along with whatever conceptual and generally sensuous content is deemed relevant to modelling these identified topically-relevant structures. Given this task, it is reasonable that $\mathcal{L}$ will aspire to similarly model perceptual situations of intentional fulfillment and the lack thereof, therefore internally incorporating phenomenological themes conveyed by such rubricks as "bracketing the Natural Attitude". This does not mean that $\mathcal{L}$ should have no terms whatsoever to refer to the distinction between fulfilled and unfulfilled intentions (it can inherit the terms "fulfilled" and "unfulfilled" themselves, for example). Hoeever, such "epsitemological" terms should not be featured in typical $\mathcal{L}$-formations. Insofar as the large majority of $\mathcal{L}$'s semantics and structuration do not make reference to a potential epsitemological "package", a set of terms with acknowledgedly epistemological dimensions and salience, then the internal organizaiton of $\mathcal{L}$ will reflect an influence of "Phenomenological Reduction" or "Suspension of the Natural Attitude". However, it should be a measure of $\mathcal{L}$'s persuasivness and practicality if it can be used in a diversity of contexts, including potential scientific or cognitive-scientific area where the "Natural Attitude" is fully present and endorsed.

So $\mathcal{L}$'s internal organization may model philosophical attitudes such that perception (or consciousness more broadly) is to be investigated apart from a "real world" disclosed to perceptual experience, an attitude which perhaps, taken to

a logical extreme, suggests that the "real world" outside is simply not relevant to or considered by $\mathcal{L}$'s notions. One might thereby guess that scientific or empirical research, for example, which cannot coherently (one can perhaps assume) similarly "suspend belief" in an external world, therefore cannot reasonably be appealed to as sources for $\mathcal{L}$'s development or application. But I believe such a chain of assumptions fundamentally confuses the philosophical maxims which are *modelled by* a language, from the spirit in which the theory-language is used and refined within a research community. Even if the internal organization of $\mathcal{L}$ reflects something like a "bracketing the Natural Attitude", this *internal* paradigm does not need to impose priorities on the intellectual environments where $\mathcal{L}$ is explored, tested, refined, and so forth. The goal of $\mathcal{L}$ is not to creare a hermetic, self-contained symbol-system, in which all thought and expression in some domain is to be translated or reduced to formations wholly inside $\mathcal{L}$. In other words, $\mathcal{L}$ is not a "theory" or "language" in the mathematical sense, which wholly encloses a discursive space. Instead, $\mathcal{L}$ seeks to systematically define certain theory-concepts and their canonical or typical relationships, so that the relevant notions can be used within ordinary language. I may write of "theory-concepts" (or "notions", more informally) to represent concepts which are part of the intellectual architecture of the theory, in constrat to concepts as a general phenomenon among the objects of the theory (similarly theory-semantics, theory-structures, etc.). So far in this text I have adopted terms like "trajector", "configuration", "intentional finality", etc., terms which have an ordinary-language meaning that $\mathcal{L}$ can absorb, but which in ordinary usage are nonetheless rather narrow and targeted, in contrast to broad, multi-faceted, and sometime cross-purposeful words like "consciousness", "real", etc. Moreover, a term like "trajector" has both a provenance in Cognitive Grammar and an obvious relational structure with other speific terms (like "trajectory"). In general, a *theory* in the semi-formal sense of human and natural sciences apart from pure mathematics, provides a suite of such targeted definitions and relations — to be adapted into ordinary-language discourse, but so that some domain of research can be discussed in a specifically systematic, internally organized way.

There is no reason why a theory or a theoretically-supporting language, like this $\mathcal{L}$ should not draw concepts and inspiration from a range of sources and perspectives, including mathematical, computational, and scientific representations of perceptual environments, as well as cultural, introspective, and phenomenological analyses, of everyday-life perceptual situations as well as perceptual situations represented semiotically, aesthetically, or in ordinary language. Nor should a theory-language be restricted to use within specific paradigms. If $\mathcal{L}$ meets the criteria I've described, than I believe it can be used as a tool for crafting discussions of introsecptive reports, empirical research, mathematical analysis, etc.; these various sites of application may have different and even incompatible methodologies, but this does not prohibit $\mathcal{L}$ from being relevant to discourse which adaopts its formations. The contexts where $\mathcal{L}$ is used need not inherit paradigms from each other or from the maxims encoded in $\mathcal{L}$'s internal

order. For example, $\mathcal{L}$ should certainly be applicable to perceptual scenarios like computer graphics, which are indisputably systems where a perceptual morphology can be identified.

In cases like computer-generated and/or displayes media, our comportment to such perceptions demands a two-stage process. We first accept the rather artifical setting of a constructed perceptual expanse within our overall experience, but then, within that context, exercise perceptual intuitions simulating those which would apply if the framed content were considered as real, surrounding, and fully encompassing. But computer graphics can potentially offer analysis which does not merely describe or reflect upon a scene, but models the scene in its entirety in terms of data, computer code, or mathematical equations, all of which are potentially subject to structural or mathematical analysis. Computer graphics offer a variety of formats of increasing sophistication and totality, from digital images to three-dimensional scenes rendered on a two-dimensional screen, to Immersive Virtual Reality Environments. Aside from observing graphics with the tools of a morphological theory, productions within these formats can also be evaluated in terms of their verrisimilude, their producing an experience of immersion or "presence", their suggestive evoking a kinaesthetic sense of tactile or corporeal experience alongside the purely visual. These evaluations can also apply to artistic media, like paintings; in the case of computer grapics, however, such evaluations can be considered alongside formal analysis of graphical code or content. There are also practical applications of Virtual Reality, in particular — for example as training devices, or as therapeutic tools for relieving stress or pain, or physical rehabilitation. The field of Virtual Reality Therapy considers these medical applications and also attempts to formally study the phenomenon of "presence" which we usually hope to achieve through Virtual Reality Environments, an analysis which for some researchers (notably Giuseppe Riva) has an explicitly phenomenological dimension and precendent.

We therefore have numerous options for considering both empirical and formal data relative to computer graphics — evaluations of the effectiveness of computer-generated scenes, for example, either as subjectively judged by respondants who view them, or as evaluations of graphics' effectiveness to serve specific goals in a therapeutic or training setting. This data can be matched with computational analysis of graphics' data and/or code. The development of $\mathcal{L}$ should certainly engage, and theory-semantically incorporate, this sort of data and analysis — not on the assumption that all perception is akin to a hitmap image or even an immersive `VRE`, but because these specific perceptual scenarios can provide a package of terms and relations which have a place in $\mathcal{L}$.

Similar comments apply to mathematical structures and formalisms which may be applied to, or have been used to model, perceptual contents and processes. Quantitative or quasi-quantitative representations have several different

purposes, including building practical computer tools, developing computer simulations for investigating perceptual activity, scientifically connecting perceptualized processes to neurophysical implementations, and providing a systematic representation of theorized structures. However, I think the most obvious application for mathematical formulations in a language like $\mathcal{L}$ is to adapt a package of terms and concepts which have been proven effective in certain formal contexts. It should be noted that "mathematical" systems are not nessarily "numerical" or centrally feature numerical measures, in lieu of "qualitative" structures, which can be formally described in settings like Category Theory, Qualitative Spatial Reasoning, Algebraic Topology, etc. Topological notions like spatial regions, contact and contact algebras, connectedness, continuous transformations, etc., provide formations which can be usefully applied within $\mathcal{L}$ — not because we assume that all perceptual manifolds are somehow formally realized as Topological spaces, or that the degree of abstraction suggested by topological models is appropriate for general perceptual scenarios, but because the strutural role of these contexts in a topological setting may be carried over to the $\mathcal{L}$ context, "modulo" the slightly less formal specification of how $\mathcal{L}$ is envisioned to be used.

Among mathematical systems, then, topology, geometry, mereotopology, and mereogeometry, all have potential applications as sources for intuitions and language which can help us think about and model perceptual content. There seems to be a predilection to use the word "topology" to describe the shape-perception of ordinary surfaces and manifolds which occupy our attention, and do not usually have a succinct mathematical representation. This usage is imperfect, because the details of perceptual content will depend of precise three-dimensional form, even if this form is not conducive to quantitative simplification. If our goal is to model perceptual structures in general, then $\mathcal{L}$ should include representation of extensive shape in full detail, since this will be relevant to visual and perceptual experiences through which our attention is directed to different perceived contents. Perceptual configurations will be experientially different given even minor modifications in precise three-dimensional form, even if the transition between them can be modelled as topologically continuous, and even if the configurations are sinilar in terms of their large-scale organizational patterns, with respect to trajectors and framing, for example. For this reason, part of $\mathcal{L}$ assignment is therefore to include representations of speific three-dimensional form, which is typically the three-dimensional geometry of surfaces embedded in ambient space. However, the intuition that the form of these surface is a matter of *topology*, informally, is perhaps explained by the fact that this three-dimensional immersed geometry rarely exhibits typically "geometric" features, the kind involving relations like congruence, parallels or perpendiculars, and so forth.

Instead, the geometric systems which tend to model precise three-dimensional geometry tend to be based on computational methods: point clouds, triangulations, curvature vectors, or some combination of these, which represent three-

diensional form as data structures that can then be "filled" or "smoothed" out algorithmically. While these are still geometric models, they are designed to manage the kind of free-form morphology that we can intuitively picture in terms of topologically continuous transformations of an underlying manifold. On the other hand, sometimes spatial realtions which need also to be $\mathcal{L}$-representable are indeed topological — including relations which are extensively studied within Cognitive Linguistics, such as how spatial formations engender prepositional and syntactic form. For example, language like "the sheet on the sofa" suggests a topological relation between two surfaces, *topological* because the relation is not effected by a sufficiently small modification of the actual geometry of the surfaces. In addition, the kind of geometric analysis which can be useful for elucidating surface form — differential methods, for example — depend on the underlying topological classification of manifolds in question. The global structure of curvature vector fields, for example, will have different numerical-analytic properties if the space is topologically a sphere, a bounded region, a torus, and so forth.

As I have already suggested, our imperssion of specific three-dimensional geometry depends on recognizing summarial structures when possible, schematic representations of a shape's form and organization. This may involve featural patterns involving perceptual qualities — patterns of coloration on its surface, for example — as well as aspects of geometric shape, like alternative convex or concave regions, or geometric symmetries. These are specifically *geometric* details, but an elucidation of their influence on perceptual form can depend on underlying topological principles. For example, an obvious source of schematic representations of objects' form is symmetry, but objects' shapes can reveal a finite group of symmetries (like a steering wheel) or an infinite group (like a doorknob). So insofar as shape-symmetries are among the morphological principles to be $\mathcal{L}$-represented, a basic distinction within this corner of the language will depend on classifying these different varieties of symmetric patterns. However, this classification is fundamentally topological: the essential difference between the symmetries of the steering wheel and the doorknob is that the former are a discrete (e.g. four-valued) space, while the latter are topologically a circle (a two-dimensional rotation space). So the geometric contrasts reveal an underlying topological representation.

Similarly, we can identify topological foundations behind mereological structures and organization. The most straightforward mereological structure within perceptual content — as disclosed via shape, featuration, or both together — is a kind of partomony of objects or surfaces, which divides them into crisply individuated regions. Sometimes this can combine notions of symmetry with featural details, like coloration. A checkerboard pattern, for example, has an obvious mereological interpretation in terms of component smaller squares, but the square's pattern with respect to one another can be identified through the symmetries of the larger board or surface. Both the mereological and the geometric

patterns, in this case, have a very simple foundational structure. Mereologically, the parts are distinguished by a contrast in just two colors; geometrically, the symmetries are lateral translations at regular intervals. So we can say that the color-pattern has a "kernel" which is a two-element finite (color) space, and the geometric pattern has a kernel of symmetries which can be topologically modelled as $\mathbb{Z}^2$.

The topological basis of mereological and geometric patterns can be seen more clearly in terms of subtler patterns, which can be hard to model in terms of conventional mereological seen as a binary partition of wholes into crisp parts, with clear boundaries such that each "point" is definitively in either one part or another. Consider a color-pattern with a recurring but gradient transition between two colors, so we have a clear sense a division into parts, but not of the proper line of demarcation between parts. This kind of case illustrates that a mereological organization within some whole does not necessarily correspond to a straightforward partonomy on the whole: there are mereological structures which cannot be well represented by simply listing a collection of crisp, individuated parts. In a gradient-pattern case, we can instead focus on the pattern of color variation, which is then superimposed and articulated over the spatial extext. For example, the color scheme may have, as a kernel, a closed loop in color-space, which is then translated and projected onto a physical surface. This kernel, then, is topologically a circle. The contrast betwen a "crisp" partonomy, like evinced by a checkerboard, and a more complex mereological pattern, like a recurring color gradient, can be captured by the contrast, in color space, betewen a finite set and a circle, as (sub) spaces with distinct topologies.

So far I have discussed both patterns in both geometric form and shape as well as color. To some degree these can be separated, but in many cases we only infer color from geometry or vice-versa; more precisely, we are presented with an integrated manifold showing both color and geometric variation and we need to perceptually separate them. More on this in a moment, but let me also observe that color is only one feature of object surfaces which can be disclosed though perceptual qualities. Tactile sensation, also, can be spatially distributed along a surface. Even if we do not actually touch an object, the anticipation of touching and physically manipulating it provides a distinct cognitive impression of spatial form. As I reach toward a surface — to turn a doorknob, smooth out a sheet, etc. — I instinctively and very quickly translate my visual impression of form into the optimsl positioning of my fingers, hands, etc. To points along a surface, then, there correspond a configuration of my overall posture which reflects or "encodes" the surface geometry. Whereas geometric space has three dimension, this encoding belongs within a space of significantly more dimensions. Even though the precise spatial form is a geometric property, the analysis of such high-dimensional configuration spaces depends on identifying their topological properties, particularly when dimensions themselves have different shapes. For example, the configuration space of human (or robotic) arms and hands includes

the angular orientation of the wrist and elbow. Analysis of such spaces — determining the existence of solutions for optimization problems, for example — depends on topologically modelling the their glocal properties; e.g., identifying "holes" in configuration space by locating closed loops (continuous modifications of a configuration that return to their starting point, like fully rotating my wrist) which cannot be "shrunk to a point". While such optimizations can be extremely hard in domains like robotics, our minds solve such problems readily, inferring the optimal poisitoning of our fingers, our toro, and everything in between, with no conscious effort, as we physically interact with objects which initially we perceive only visually.

So while there are a number of different systems and enocoding which can model geoemtric form, and which are relevant to cognitive/perceptual processes — models of surface geomerry, mereogeometry or partonomies of shapes, symmetries, configuration spaces involving corporeal engagement with objects — most of these models have an underlying topological kernel or global characterization, so we have mathematical evidence that the geometry rests on topology. We have intuitive evidence to similar effect, since, as I alluded to, in most perceptual episodes we perceive a fusion of spatial geometry (which we can call "spatiation") and of features like color (say, "coloration", or more generally "featuration"). All perceptual environments have a frame and context which helps establish a sense of depth — this may be the outer boundary of our visual field as a whole, but in a "nested" environment, like a canvas, there is a secondary framing. Variation in apparent color may represent "actual" variation in the colors along a surface, or it may represent the angular orientation of the surface to a light-source, or some combination; determining which is which depends on relating the surface to the enclosing frame. Because this can be inexact, the idea that there is a perceptual geometry independent of perceptual qualities (that we directly see the "shape" of objects) — or that there are perceptual qualities independent of geometry (that we see colors, say, independent of shape); these are both to some degree abstractions.

Certain peceptual environments do provide a formal separation of spatiation and featuration, like computer graphics. Otherwise, we do have a cognitive sense of this separation; we can usually, and very accurately, reconstruct surface geometry from apparent color variation. However, this is an (evidently very neurologiclaly complex) cognitive process; this separation is (in most contexts) not *a apriori* to a perceptual environment. So $\mathcal{L}$ should model both the formal separation of spatiation and featuration and also their fusion within typical perceptual contexts. Computer graphics is also unusual in that there is a well-defined sense of minimal units of featuration and spatiation — for example, individual pixels in a bitmap image, or even real-valued axes of spatial extension within equations used by graphics algorithms. Such point-based models of feature and extension are not irrelevant to $\mathcal{L}$, because they do apply in special (e.g., computer-generated) perceptual environments, and also because mathematical

structures, which presume zero-dimensional spatial points, can be relevant for modelling cognitive operations. In ordinary perception, however, the fundamental organization of spatial extentsion should be based on spatial *regions*, at different scales, which are disclosed thourh featuration, like color variation. Mereotopological models are explicitly region-based theories of spacee, which axiomatically assume regions, and not points, as spatial primitives. However, in this context $\mathcal{L}$ needs to model regions in both space and featurations — that is, the most basic primitive is a compound region which is not a dimensionless point either in space or in perceptual quality, like color, but rather spans a region in both geometric and features spaces. Such compound spaces can be modelled as product space of geometry and (say) color, so lonf as we recognize that the conventional set-theoretic definition of product spaces, which assumes the *a priori* separation of the spaces in the product (or, in Category Theoetic terms, assumes separate left- and right- adjoint functors), is itself an idealization.

Considering the cross-cutting concerns of region-based spatial and featural models, mereological organization of perceived objects and surfaces as a central principle of their cognitive appraisal, and the topological foundation of geometric representations, I believe that Mereotopology represents the most natural foundational language for describing perceptual-morphological primitives. The most important such primitives are three-dimensional object surface, on which are defined regions which reflect the mereological organization of the surface as whole. Some of this mereological structure can be represented directly as a partonomy on the surface manidold, as a two-dimensional space, but more general mereological articulation depends on modelling higher-dimensional "regions" reflecting morphological parameters like symmetries, rotations, featuration, etc. The vast majority of object-surfaces are opaque, and we infer objects' form as the three-dimensional ocntinuum which "fills in" the surface geometry. Some surfaces are (semi) transparent, so we can see other surfaces behind or across them, which includes both transparent surfaces that fully enclose a region (so, despite their transparency, they define an inside and outside), as well as those which obscure or reveal objects behind them relative to a particular perspective. Even rarer are semi-transparent objects which provide an experience of solid transparency, like a glass paperweight. We can also consider objects which are surrounded by semi-transparent media, like water, smoke, or fog. So, alongside the kernel theory of opaque surfaces, we can consider these various forms of transparency and how they affect visual details of opaque objects.

Aside from relations between surfaces, at least one of which is (semi) transparent, there are of course important relations to be identified between non-transparent surfaces: one can fully or partially cover, enclose, geometrically constrain another (like a canvas container which gathers its content into a rectangular shape), etc. Surfaces can be opened, uznipped, peeled back, etc., to reveal other objects and surfaces. Switching to a larger scale, we can also con-

sider the relation of surfaces to the overall ambient space, including ther outer frames of the current perceptual environment, or larger-scale frames like rooms (for indoor scenes) and horizons (for outdoors), as well as smaller or nested frames like the books on a shelf, the dishes on a table, etc. Perceptual qualities like color and tactile feel are generally spread out along surface geometry, but sensory modalities like scents and sounds tend to be perceived relative to the ambient space, from a given direction, but not varying continuously along any given surface. Sometimes we can recognize sounds or scents as coming from a specfic source — like a radio or a fresh loaf of bread — but even here the object is figured as only a directional origin of the sense, in contrast to how colors will "saturate" a surface. We do not generally have noise "continuosly varying" along a radio's exterior, or tastes forming a spatial continuum along a morsel of food. So we should distinguish "continual" sense-qualities with *d*irectional ones. In the haptic domain, tactile feels are continual, but sensations of hot and cold, or for example of the force of wind, are more directional (we can consider a special direction to be properties of ambient space itself, like cold or warmth which does not emanate from a given direction but reflects the overall temperature in a given place). Visual qualities are usually continual, but lights are directional (and potentially ambient, similar to ambient cold or warmth just mentioned).

So our modelling of psrceptual forms can start with the individual object-surface, and expand outward to consider inter-surface relations, effects of transparency, global and nested frames, and ambient space. Further parameters of spatial organization can then identify relations which help establish lines of perceptual survey, attentional focus, landwarks and trajectors, etc. From a perspective like cognitive grammer, it is these more schematic organizations, ones which orient our vision onto particular focal objects, which most directly correspond to analytically meaningful units, like grammatic profiles. However, the process of selectin an object or object-part, as a focus of attention, depends on our construal of precise surface geometry. It is this geometry through which we summarize its form or identify its most salient features or regions: when I attend to a doorknob, for example, the most salient detail in most caes will be its circular bulge, with which I can grasp it. So a rich modelling of surface (mereo)geometry is necessary to capture the cognitive processes through which object (parts) are selected as trajectors, from which the coarser-grained Cognitive Grammar morphologies then become activated.

The perceptual structures covered in my account so far involve only minimal cognitive identification: patterns in shape, color, spatial organization, and geometric part/whole relationships. Clearly these patterns are then overlayed with more conceptually informed cognitive structures: we recognize perceptually distinct blocks as part of larger objects, organized functionally as well as geometrically; we identify physical relations between objects, beyond those which are directly visible: recognizing that a glass *rests on* a table, that a ring *threads through* keys so they stay together, that a sign *hangs from* a chain, etc. On

the basis of these various perceptual and mereological details, we identify concept types and conceptual relations among perceived things, and situate them in larger practical, social, and interpersonal contexts. I will not explore the more context-oriented and situational reasoning involved at this more conceptual level, other than to reiterate my previous argument that most conceptual relations belong in domains and networks which can be modelled with some form of Conceptual Graph Semantics. So, I argue that mereotopology (generalized as necessary to spaces with dimensions beyond those of typical two- or three-space) forms the best foundation for that part of $\mathcal{L}$ directed at basic perceptual units, and that `CGS` forms the best foundation for the elucidation of conceptual formations which contextualize basic object-perception in social and practical situations. The spectrum of $\mathcal{L}$ theory-concepts is organized around the progression between fine-grained mereological details and larger-scale situational conceptualization.

So far I have discussed $\mathcal{L}$ as a hypothetical language, but I believe that the nuanced synthesis which has been envisioned — by scholars working jointly within Cognitive Linguistics and Phenomenology — can use a Semantic-Web style ontology, so as to provide a glossary of theory-concepts and relations which can also semantically annotate texts and research. Possible implementations of such a language are beyond the scope of this paper; so, for purposes of discussion, we can consider $\mathcal{L}$ to be either just a metaphor for the network of theory-concepts which shape scholars' intuitions about perception and cognition, or alternatively as a real specification for a semantic-ontological framework. Both of these interpretations are suitable for exploring how a $\mathcal{L}$-like theory, however systematically or more loosely defined, belongs among the competing senses of "reduction" which apply to science and phenomenology.

6 Extramental Psychology

I believe an $\mathcal{L}$-framework, like I have discussed, can develop a theory of cognitive-perceptual morphology and intentionality, one receptive to both phenomenological and cognitive-linguistic insights. My goal is this section is then to consider this specific theory in the larger context of phenomenology and cognitive science, and how they agree or disagree on some paradigmatic issues.

Based on the name alone, we assume that scientific explanation is the ultimate goal or telos of cognitive science. In other words, a part of cognitive science will be successful if some aspect of mind or cognition is clearly explained in terms of scientific processes, or processes which fit within the general scientific parameters of space and time, material things and physical interactions, propoagations of causes and physical influences, and so forth. This kind

of explanation certainly is not the goal of phenomenology, on its own. On the other hand, we can say that phenomenology, with its analysis of consciousness, clarifies what precisely cognitive science wants to explain.

So long as we simply describe or structurally interpret conscious states, in isolation, we are not concerned with scientific explanation. By analogy, different schools of linguistics — structural, generative, cognitive, etc. — characterize linguistic forms, and even explain linguistic structure in terms of proposed laws of the linguistic realm. A *scientific* explanation, however, must explain how physical beings can "implement" language thus analyzed. Explanation in the isolated realm of language may be part of this explanatory project, but the next step is to explain linguistic laws in physical terms, or to "reduce" linguistic laws to physical organizations.

A thorough but isolated explanatory description of conscious morphology, as proposed via $\mathcal{L}$, similarly is at most just the first step in potential scientific investigation of consciousness. Necessarily, scientific explanation must step outside consciousness in isolation and consider the larger physical and interpersonal world. Such explanation has a social as well as natural dimension: first because science should clarify what features of consciousness are common to different people, whether universal to the human mind or to specific cultures, etc., or conversely specific to individuals, in terms of their unique history and abilities. Moreover, each individuals' consciousness is doubtless shaped by interactions with other people, on several levels, including personal connections with peers and parents and the more impersonal social structures.

Fortunately, a fundamental premise of phenomenology — despite its *methdological* focus on individual consciousness — is that minds are indeed almost perpetually directed to the external world. Intentionality is fundamental to the phenomenological notion of consciousness, and from the *Logical Investigations* onward, Husserl and his followers rejected "psychologism", or the idea that meanings snd structures are "in the mind". Abtract entities, like numbers, are not psychological; similarly, properties, like redness or familiar kinds (tables, trees, etc.), are not just slots in a mental store. On the other hand, phenomenological metaphysics does not assume that numbers or kinds are purely extensional either — that a number is ontologically just a collection of isomorphic sets, for example, or that the property *table* is just the set of all real-world tables. One problem with extensionality is that it tends to circle back to Possible Worlds (is the table in Sherlock Holmes's dining room part of the set of all tables?). Some kinds can be defined in terms of prototypical examples, or as conjunctions of other kinds (a prototypical table has four legs and a level surface; a bachelor is both male and unmarried). But this still requires that we have some account of how prototypical examples, of noncompound kinds, exhibit some kind-property (or "sortal" property, in Michael Jubien's terms),

where this property has an intensional meaning apart from its instances.

The essential aspects of properties, that which unifies their instances and gives them meaning even when they are not instantiated (in fiction, for example); this is related to Husserl's "essences" or *eidein*, and exploring the nature or variation of these property-essences constitutes "eidetic analysis". Essences are not in the mind, but they are not wholly situated within their instances either. They are, in some sense, "extramental ideas"; they have the profile of objects of thought, but are not just ideas in people's minds. Perhaps essences in this sense can often be characterized in terms of structural properties which are both grasped by minds, and influence concrete systems, but have a structural determinateness outside of both registers. Mathematical structures heave features and associated entities — consider the Fibonacci sequence, for example — which can be studied by minds, and influence how physical systems can behave or evolve, but the structures have an existence separate from both these mental and these system representations. Mathematical "Structuralism", which can include Category Theory but also approaches in Philosophy of Mathematics, can potentially provide an account of eidetic properties in terms of properties of structures; and this account can perhaps be extended to more concrete domains by suggesting that individual concepts exist in structured networks, like semantic frames. For example, even concept-prototypes are only conceived as exhibiting conceptual essences within larger conceptual frames. A protypical table is different from a prototypical stand, despite their similar shape, because of their different typical roles in situations. This is not just a matter of geometry: a small folding table, on which one person can eat a meal, may have the shape of a typical stand. The differences are more relational: a stand tends to hold some object for an extended period of time, whereas a table is a practical site of activity where objects tend to be placed and then removed.

Aside from these few comments, an account of eidentic phenomenology is beyond the scope of this paper. My point here, however, is merely that phenomenology fundamentally assumes that the majority of mental contents are not simply psychological constructs, but are mental registerings of extra-mental contents, which can be intentional targets — noemata — as well as the properties and essences through which noemata are disclosed. So, even if phenomenological method organizes around individual consciousness, it is centrally concerned with identifying, within consciousness, extra-mental contents which are interpersonally shared, and which disclose things and their propeties, not as entities in the mind, but as the mind's access to external truth. This "external world" is still the external world *qua* represenatable in terms of conscious modalities; it is still *how things appear* as a product of *how things are*. An object's shape, for example, is manifest in the apparent shape from a given angle: we do not see the entire shape, but we do see this perspectival shape which the larger shape determines. The "externality" of the external world is not a matter of consciousness simply removing itself from reality to become a transparent window

on things, but nor is the external world removed so as to yield a field of pure consciousness. All experienced content is a negotiation between external reality and cognitive/perceptual faculties.

So extra-mentality is a core concern of transcendental phenomenology. "Transcendental" does not mean a solipsistic isolation of consciousness, but rather our access, through consciousness, to a realm of extra-mental objectivities. So even in its transcendental core, phenomenology leads science and philosophy outside the mind. If we then follow this direction, with the goal of gradually compiling materials for a scientific account of mind, we find several possible paths along which this investagation can branch off. We situate consciousness in a world of other persons and things, so we can consider this world from a more intersubjective (cultural, social, communitactive) direction, as well as the physical substrata and lawfullness of the world. At the same time, we find consciousness belonging to a physical and mental self which in both of these registers extends beyond conscious awareness. I consciously experience myself as not just a mind but a body, while also recognizing that not all of the space or empirical order spanned by my body is consciously introspectible. And, as I will argue in this section, we experience mind and body, in ourselves and others, as an integrated and spatially situated whole. This intuition of mind/body togetherness is not a binding scientific truth, but it reveals that in its own self-apprehension, mind belongs to a physical order, an embodiment, in which it appears to be ontologically grounded. If this is true, then mind cannot circle around to conceive of its full realization by introspection alone. There will be cognitive processes, supporting or "implementing" conscious mentality, which are part of the larger mental realm but are not within or available to consciousness.

So as we pass from consciousness out to the extra-mental registers, we can consider intersubjective collectivity, the physical world-order, or the subconscious registers of cognitive process. These three lines of investigation have separate foci, but they are interrelated. I will explore the first two in this section, and the last of these — the relation of consciousness to preconscious or subconscious cognition — in the next section.

As a first step beyond the isolated mind, then, we immediately, as intrinsic to consciousness, have the experience of embodiment and of a unification of senses. We sometimes see parts of our bodies, but we always tactilely feel the presence of the body, with varying degrees of specificity. The shape and perdurance of this somatic background is intrinsically figured in sensory modalities beyond the visual, and especially touch

Most of the structures I have considered thus far are elements of perceptual morphology, which tend to be presented visually, even if other senses can also disclose them. For example, I can derive a sense of direction from sound as

well as sight (I can hear, but not see, the guide on the trail ahead); and I can infer shapes from touch. But our primary access to direction and shape is visual; perhaps even blind people spatially represent these using neurological systems typically involved in visual processing. So we can hypothesize that direction and shape are fundamentally visual phenomena, and relating to them by other senses is derivative. However, there are aspects which I claim are primary to other sense modes, particularly touch. There are tactile features, which distribute across a surface by analogy to color — texture, smooth and rough, etc. Aside from that, the very fundamental notion of "hardness", that sense of objects' materiality, is an important part of reasoning through physical relations — relations which may be represented by spatial form but are more general. The same spatial connection (two objects touching, for example) may reveal several different physical connections: objects merely next to each other, attached, resting on, etc. This depends in part on angular orientation to the relevant frame (usually "resting on", with respect to the force of gravity, depends on vertical orientation relative to the ground, as this axis is inferred from a spatial environment). We gain intuitive understand of these relations through the episodes of our catching a falling object, say, and noting the extra force it carries relative to just touching it; or struggling to separate two attached things (e.g., a jar's lid).

Touch and embodiment figures several ways in perceptual morphology: our visual appraisal tends to distinguish object surfacs from ambient space, but our tactile interaction with objects helps confirm these estimations. The feedback of vision and touch is usually straightforward, and so preconscious, but we can assume that our continual tactile involvement with our surroundings serves to consolidate our instinctive picture of object spatiation. The perpetual contact against our feet when standing, for example, helps perpetuate our sense of vertical direction. Meanwhile, our representation of the global spatial order within our immediate surroundings, is doubtless influenced by other people in the same proximity. When others are present, we anticpate how things appear to them from their view angle, how they may physically interact with them, and how we may mutually communicate about objects through language. Two people walking toward a door, for example, estimate whom is likely to arrive sooner, canonically instigating a ritual where one person is allowed room to open the door and then holds it, allowing the other to pass. We do not always share space with others, but such recurring situations, like the recurrance of such tactile patterns as the feel of the ground, helps us build preconscious trust in our visual instincts. Through this feedback, our visual faculties in building a mental model of environing geometry becomes continually entrenched, so we can trust our preconscious visual operating as a given, and direct conscious attention elsewhere.

On top of this, however, we identify others not only as different points of visual perspective, nor even as embodied selves interacting with the same world

as ours, but also as physical beings disclosed through physical media of touch, force, heaviness, etc. So we try to lift a young child; we are concerned about physical confrontations; we help an injured friend walk; we push someone in a wheelchair. Here we recognize the "body" both as a living, self-regulating dynamic system, but also as to some degree a brute material object, sometimes heavy and wielding its own force. Phenomenologically, this helps motivate our sense that human selves belong to physical nature and that the laws of human reality, perhaps including those of consciousness, are grounded in physical law.

Moreover, our mental schema of surroundings may be based on conscious visual impressions, but the surrounding architecture of the world and its surfaces is represented as a frame for embodied purposes and movements. As I initiate such actions, I do not remain fully conscious of the space and things around me, with the same clarity of visual perception. As I open a door, for example, I trust my physical ability to turn the handle, pull on the door, walk through the space opened, and close it behind me, even as it leaves and bobs in and out of my visual field. Similarly, as I eat an apple, I need only look at it once, as I reach for it. At that point I have already appraised the spatial relations well enough to complete the practical episode based on kinaesthetic and tactile sense alone, so I am free to look, say, at someone I am talking to.

So our perceptual experience lies integrated with our purposeful, operational, embodied interaction with the world and with other embodied selves. We cannot separate out the purely perceptual-experiential dimension of consciousness from this more pragmatic situatedness. With respect to a theory of cognitive-perceptual form, one consequence is that the mentality which experiences and responds to this form is not *just* a perceiver: receptivity to the morphologies expressed via $\mathcal{L}$ is just part of a larger operating in the world. In particular, my awareness of perceptual details can take on varying degrees of attention. Although I am cognizing perceptual forms, this cognition is sometimes preconscious, sometimes peripheral (seeing things "out of the corner of my eye", etc.), and, in general, takes on different measures of experiential vividness. Such effects of attention complicate the mathematical expression of $\mathcal{L}$-configurations, such as the use of numerical encodings to represnt colors. My attention to color difference can vary with the centrality of a specific colored surface to my active concerns. So I may be disposed to notice the contrast of crimson and maroon in some contexts, but not others. To the degree that we want to construct a dimensional complex within $\mathcal{L}$ — an "axiation" of $\mathcal{L}$-configurations so they can be mathematically compared, for example — then we need to model degrees of attention as extra axes which "convolute" dimensions that represent perceptual qualities and locations. This allows us to model, to some degree, the effects of attentional focus both on our sense of space and on perceptual discrimination; which affects how we relate $\mathcal{L}$-configurations to more strictly quantitative complexes, like computer graphics.

Although the rational and experiential force of attention needs to be introduced as an extra parameter on $\mathcal{L}$-formations, nonetheless cognitive-perceptual morphology can help clarify the different structures where attention may be focussed. We direct perceptual attention to some part of a larger scene, and we direct cognitive attention either jointly with perceptual attention or to situational concerns, which may be coincident with the current perceptual scenario, or (as in the case of planning some future action, daydreaming, reminiscing, etc.), not. The mereological articulation of perceptual environments, and their embedding in practical situations, helps inventory the "sites" where attention (both cognitive and/or perceptual) may be focused. $\mathcal{L}$-configurations — cognitive/perceptual scenarios, analyzed morphologically — may be analyzed on their own terms, but as an aspect of mind and consciousness they need to be connected to structures of attention, preconscious thought and planning, practical action, embodied interactions, and so forth. With this in mind, we can see that although $\mathcal{L}$ seeks to theory-semantically isolate cognitive/perceptual form, $\mathcal{L}$ (in my presentation anyhow) is paradigmatically committed to an embodied, interpersonal, interactive theory of mind and consciousness.

So, I want to emphasize, the (theory) *semantic* isolation of $\mathcal{L}$ is not a philosophical isolation; not an assumption that, *in the world*, perceptual consciousness can be disentangled from practical "being". We can *theoretically* isolate perceptual morphology from the larger realm of mind and consciousness, but this is a deliberate reframing so as to capture perceptual episodes, perhaps incompletely, within a theoretical framework. When I was actually back in Montreal, for example, the optical-illusion bus scenario was only a rather small part of my thoughts on those occasions, and it is only in retrospect that I can try to reconstruct perceptual details of trajectors and belief-revisions in abstraction from my actual thoughts at the time, about the day ahead or past, etc. The kind of cognitive/perceptual mentality which is modelled by $\mathcal{L}$ belongs to beings who also feel and behave emotionally, intersubjective, pragmatically, and so forth. Based on our own experience with the world and with others, we certaintly believe (I claim) that those other worldly being are other people, whom we interact and communicate with, who seem to share cognitive/perceptual structures akin to ours, but whose cognitive/perceptual engagement with the world is integrated with their specific bodily situation. They act, talk, and move as if there is a correspondance between perception and bodily location — between what objects they can see relative to their corporal position, for example. On this interpersonal and interactive evidence, it certainly seems as if possessing cognitive/perceptual mentality is part of human beings' *physical* involvement in the world. And, importantly, this intuition helps guide our sense of the likelihood that such mentality is "implemented" in their (and my) brains and bodies.

I believe, then, that there is a practical and experiential foundation for the intuition that consciousness is, in some manner, a physical property of embod-

ied minds. This is not simply a default instinct of scientific world-view, an assumption that all phenomena are assumed physically explainable, *a priori*. The intuition that there is some "reduction" of mental processes to corporeal matter is driven, at least in part, from the observation that people certainly seem to be experiencing the world relative to their embodied positioning — seeing with their eyes, hearing with their ears, touching with their skin, etc. Their perceptual consciouness seems to emanate from the locus of their bodies. This does not automatically mean that all mentality is enclosed in the physical matter which is there, but it certainly suggests that their ontological status as conscious selves is spatially *in situ* with their physical location. There may not be an obvious reduction of mind to matter, but there is an apparent reduction of mental order to a situation in physical space.

Insofar as phenomenologists have considered such topics as mind/body reduction, these interactive and intersubjective considerations come to the fore. Our intuitions on the physical nature of mind are shaped by our interactions with other people as both material and mental selves. We can therefore observe a provisional sense of "phenomenological physicalism" which is perhaps best articulated by David Woodruff Smith's theory of "multiple aspect monism". The mental and the physical (anatomical, material) aspects of selfhood, seem to belong jointly to the same, we can say, spatio-material complex. They appear to be integrated in the space, and within the moving, sensing matter (or "flesh", in Merleau-Ponty's sense) of bodies.

Such intuitions, of course, are driven by our practical interactions with things and people, not by science. So they do not substitute for a scientific (or even meta-scientific, philosophy-of-science) analysis of mind and body and how their connection may reasonably be researched. Nevertheless, the argument that a phenomenological, interpersonal approach to mind/body issues can lead toward a kind of "monism" counters the impression that phenomenology, given its "reductive" stance to scientific beliefs, is hostile to physical conceptions of mind. Not all phenomenologists accept the chain of speculations I have presented, but they represent one philosophical attitude within the compass of phenomenological thought.

This can perhaps explain why writers who do directly engage the more scientific issues of mind and body, for example within the Analytic philosophy of mind, tend to be more receptive to "physicalist" paradigms if they are also sympathetic to phenomenological insights and vocabulary. John Searle, for example, simultaneouly argues for the physicality of consciouness and for the metaphysical validity of "first person" or "subjective" ontology. David Woodruff Smith, in works like *Mind World* and "Mind and Body" (in the *Cambridge Companion to Husserl*), argues for a theory of mind and body (to state it briefly) as multiple aspects of one substrate. Searle and John Petitot speak of "reduction"

and "emergence" as split-layer characterizations linking body (or neurophysical substrate) and mind (or conscious experience). These philosophers describe themselves as challenging what they see as the dominant positions in philosophy both by centralizing consciousness as immediately experienced, but also by developing an account of the physical stature of consciousness with respect to physical science and physical form itself, as opposed, for example, to functional states or computational systems.

By contrast, the dominant position in Analytic Philosophy has, for at least one or two generations, seemed to lean toward a computational or functionalist account of mind, which is not a direct reduction of mental states to physical matter. Instead, the relation of mind to matter is mediated by functionally organized systems, which can be materially implemented and can also characterize some (maybe not all) aspects of mental life. Those parts of mentality which are hard to accommodate in functional terms — like qualia, for example, at least in terms of their own intrinsic qualities, as opposed to the system of qualitative differences which can play a conceptual and classifying role — tend to be ontologically relegated to tangential status, and "reduced" from the core functionalist theory.

Although cognitive linguistics, functionalist theories of mind, and Conceptual Graph Semantics belong to quite distinct intellectual traditions, we can see some interesting correspondances between them on this specific issue of conceptual knowledge as a functional specification. In particular, we can define *intelligence* as a functional characteristic of certain organized systems, relative to conceptual frames and networks. An intelligent system, on this definition, would be one which has learned the conceptual frames modelling some domains and is able to identify instances of concept-types and relations within observations or data, and from there draw domain-relevant conclusions or anticipations. This is intended as only one notion of "intelligence", setting aside notions like insight and creativity, which are often associated with human intelligence. However, as so presented, intelligent syatems respond to external situations by "activating" their internal representations of concept domains.

For cognitive thinkers like Lakoff and Johnson, this account needs a proper context: conceptual knowledge is activated in the course of embodied interaction with the world. This embodiment marks a fundamental distinction between human intelligence and the kind of "functionally intelligent" systems which are programmed only to respond to very specific domains. Human intelligence is more expansive, flexible, and adaptive, because our perceptual and practical engagement with the world both requires and ensures that our conceptual knowledge is constantly changing.

Nevertheless, George Lakoff in particular argues that much of our concep-

tual cognition is preconscious: we are not introspectively aware of how present situations and perceptions activate the relevent conceptual configurations. I will explore the question of this *preconscious* conceptualization in a later section. We observe, however, that both cognitive linguistics and functionalist theories of mind recognize a preconscious dimension to concept-processing; to the effective utilization of knowledge about domain-specific conceptual structures. However, from this these two paradigms draw very different conclusions. For functionalism, it can seem as if consciouness itself is being relegated at best to an ontological side-show. For cognitive linguistics as represented by George Lakoff, preconscious and consciousness are integrated into an embodied unity.

Meanwhile, I would argue, cognitive linguists who are more directly associated with phenomenology — like Ronald Langacker and Jordan Zlatev — seem further removed from a functionalist approach to concepts. From this more phenomenological perspective, concept-processing is preconscious not because it represents a functional operating that can exist outside of consciousness entirely, but because concepts themselves are mental residues of conscious experiences which have been cognitively assimilated. The simulated conceptual knowledge of computers or robots is derivative on and a simulacrum of conscious conceiving. This claim, I admit, implicitly assumes some notion of "entrenchment" or "residue" sourcing concepts from conscious experience. The details and scope of such a process certainly need further exposition. But for now, I simply want to note that there are several different parameters to a contrast between Cognitive Phenomenology, Embodied Cognition, and Functionalism. One of these is whether cognition is canonically conscious or preconscious. Another is whether cognitive operations are canonically symbolic or, we can say, interactional: concepts as mental tools, intrinsically linked to physical activity.

Analytic Philosophers of Mind may skirt a simplistic Reductionist or Behaviorist paradigm in which conscious experiences are so ontologically or methodologically problemmatic that they can simply be ignored, but they still advanced a methodology in the Philosophy of Mind in which rigorous analysis of conscious experience, specifically *as* conscious, is hard to gain traction. Influential experts like Jaegwon Kim or Daniel Dennett do not necessarily deny the "hard problem of qualia", but they do advocate a functionalist or computational paradigm in which phenomenological details — like specific perceptual qualities — are analytically represented in terms of their functional or operational roles. This paradigm then tends to elide the distinction between conscious cognition and non-conscious algorithms. For example, it can be hard to distinguish between the functional operation of computer software which can recognize a satirical news headline in the *Onion* or the *Daily Show* — and not, for example, classify the story as real news — from a person who actually enjoys the joke. The mere algorithmic identification of what makes a joke different from a real statement is equated (at least relative to the conceptual resources of a philosophy of mind) to the pleasure which good humor can arise in conscious people.

So even when Analytic Philosophers do not, as a matter of philosophical principle, endorse a complete reduction of conscious states to their engendered mental operations, they arguably construct a theory where such reduction is hard to avoid, once philosophical motivations give way to technical argument. This criticism of the Analytic Philosophy of Mind extends well beyond Phenomenology; a similar critique of "symbolic" or "Symbol Processing" philosophies of mind is a central theme of Embodied Cognition. George Lakoff (sometimes with Mark Johnson as coauthor) presents a detailed list of challenges to (what he describes as) paradigms in prior philosophy and cognitive science, particularly their "disembodied" and "symbol-processing" view of mind. Prototype Theory, for example, defining conceptual extension in terms of similarities to prototypical examples, can be contrasted to "symbolic" logical semantics because names or symbols for concepts do not just "quantify" over individuals as binary sets, with each individual either inside or outside a concept's extension.

There are really two nuances at issue here: the graded or "fuzzy" applicability of a concept to its bearers, and the organization of concept-extensions around a framework of prototypes and similarities. Replacing binary with graded set-membership in itself represents a turn against "symbol-processing" abstractions, one explored through a range of different theories and formulations (Rough Sets, Fuzzy Logic, etc.); on the other hand, emphasizing similarity as a foundation of conceptuality has its own recent heritage, for example as a central theme in Peter Gardenförs's theory of *Conceptual Spaces*. Lakoff implicitly merges these two themes, challenging an academic "status quo" in the process, but it should be noted — with respect to how Lakoff's approach, or "Embodied Cognition" in general, departs from received paradigms — that the degree to which this divergence is driven by the "graded membership" (counter-) paradigm or by the "concept prototype" (counter-) paradigm seems subject to debate.

Similarly, Lakoff emphasizes how our cognitive model of our surroundings is fundamentally structured by "embodiment", for example by our spatial orientation to surronding objects, by spatial relations between and among perceived objects, by our possibility of continuous movement within our environments, etc. Corporal directions and movement (up or down, say, relative to bodily orientation) provide a metaphoric or structural schema projected onto objects or linguistic meanings. Mark Johnson, in his writing which is not co-authored with Lakoff, also extended Embodied Cognition to a range of philosophical and aesthetic topics. For example, *The Body in the Mind* establishes a link between cognitive linguistics and the philosophy of science, analyzing how embodied schema underlie scientific reasoning. I think this particular application is important to the question of mind/body reduction, with regard to our intuitions of how physical explanation seems to convincingly ground causal explanation. Still, Lakoff is particularly vocal in establishing a new approach and conceptualization for cognitive science, self-consciously in comparison to prior approaches, and applied outside of science proper. This trend involves several different in-

terrelated theories or topics, such as Concept Prototypes; analysis of Metaphor, not just within language, but extended to cognition or opinions in general, including (as in *Moral Politics* and *Whose Freedom?*) to politics and culture; analysis of cognitive schema (for example with respect to spatial relations) as providing semantic and linguistic structure; and analysis of cognition in terms of embodied interaction with surroundings. This latter theme may be contrasted with "symbolic" paradigms, for example by arguing that a mental image of surrounding objects — like a table or a chair — is not just an abstract symbol representing a concept like "this table", but rather an evolving orientation to a system whose appearance and boundaries may continuously change, subject to our movements and situational interests. For example, depending on the current situation, we may be engaged with a table as a single physical object (if we are trying to move it, for example), or as an evolving site of activity (as when someone invites us to "come to the table" for a meal).

Continuing this example, it seems clear that a "symbol-processing" paradigm — where "the table" is a single, atomic mental token referring to a single perceived physical object — is far too simplistic. There are several different critiques which we can address to this account, including challenging the idea that our mental image of the table is an abstract, atomic symbol which designates an object the way that a proper name identifies a person; and also the idea that a table is a fairly simple, undifferentiated referential object, ignoring the situational and mereological nuances which modify our active and perceptual comporment to the table — so "the table" as concept can refer to a variety of different mereological complexes (the table and chairs, and dishes and place-settings on it, the people around it, etc.). Moreover, we can distinguish between a detached observation where "the table" refers to something perceived from some distance, and an active or engaged perception where the table is present in our minds in pragmatic or operational ways as well as directly perceptual ones. The table is on our minds and situationally relevant in a variety of actions, such as bringing a dish from the kitchen, fetching another chair, etc., even if it perceptually enters in and out of presence or focus. So there are various permutations both in terms of the bearer of the concept "the table" in a given situation — different mereological and physical unities or stuctures which may be subsumed under this concept — as well as different mixtures of perceptual, sensory, operational, and cerebral orientation toward the table within our perceptual attitudes.

So critiquing a "symbolic" paradigm of mind-object relations may involve the claim that this paradigm fails to respect the full varity of these permutations, or it may involve the more philosophical claim that the notion of a mental image, or a component of a cognitive schame, as a "symbol" — this paradigm in and of itself — is conceptually flawed or misleading. When constrasting the trends which Lakoff identifies in terms of "Embodied Cognition" with the earlier paradigms which can be collectively designated under the heading of "symbolic" or "symbol-processing" models of mind, I think it remains an open

question whether the "symbolic" paradigm can be reconciled — to some degree or by making some theoretical contribution — to the "embodied" paradigm, by sustaining the general notion of mental images as symbols but embracing a more nuanced account of the varities in construing the unities which these symbols designate and of how this desgination works — by internalizing formations like graded sets, mereological theories of referential targets, etc.

From the perceptive of Cognitive Phenomenology, certainly Lakoff is correct to critique functionalist or computationalist "symbol-processing" paradigms, but, to the degree that we approach these issues from a phenomenological view of intentionality and cognitive/perceptual morphology, our version of this critique may not fully align with Lakoff's. Both Analytic Phenomenology and Embodied Cognition critique paradigms which rely too simplistically on formalisms like First-Order Logic and "symbolic" mind-object relation theories. But these paradigms can be challenged more on philosophical grounds, or more on the grounds that formalisms like first-order logic need to be replaced with more nuanced formalisms, like fuzzy logic, graded sets, mereotopology, various modal logics, etc. For transcendental phenomenology, mental states can be analyzed and, within the distortions of analytic reasoning, isolated and reconstructed according to some language of conscious morphology. This results in an analytic separation of the mental contents that intend an object from the object itself, as a putative external thing. This does not mean that our mental impressions of things, or *noeses* to things' *noemata*, are "symbols" designating things as their referents. But some of the separateness between a symbol and that which it symbolizes carries over to the phenomenological stance.

Return briefly to the optical-illusion bus case. According to my analysis, perceived contents, like the escalator, walls and ceilings of the ground-level station, form a perceptual configuation which leads toward an (apparent-) bus "trajector". This configuration holds apart from the bus's actual existence, and confirms that even though the bus is illusory, it is not a pure hallucination: it is presented as situated in a specific and non-illusory context. For example, the bus is seen as occupying a (real) place on the ground. Of course, by the same argument that the perceptual configuration lending determinateness to an apparent bus does not definitively demand the bus's existence, we can say that those other elements within the perceptual trajectory are also potentially illusory — the escalator, ceilings, and so forth. However, perception is usually self-correcting: when there are gross competing interpretations of perceptual situations, subsequent perception usually eliminates (all but) one of the possibilities. We can therefore say, from a practical point of view, that I mentally register e.g. the escalator as real.

So my experience simultaneously represents the separation and connectedness of mental impressions with things in the world. There is always some

possibility that perceptions do not disclose real objects; but, most of the time, the things I think I see are also things I do see. When intentions are fulfilled, I see no need to introduce some further separation and say that the real bus I see, for example, is a "copy" or "mental image" of an external thing. The possibility of perception being illusory does not compel us to separate perception and the perceived when it is *not* illusory. We can say that intending perceptions and external objects are connected by a *contingent* identity. Because the phenomenological theory of intentionality recognizes this *contingency*, it must philosophically represent some separateness between mental content and extra-mental reality; but because intentionality is directed to extra-mental targets, it must also recognize that, when intentions are fulfilled, the things I perceive just are things in the extra-mental world.

Or, if I see an apple, there are not two apples, one on the table and one in my mind. If I look around, then back, and meanwhile someone has eaten the apple, I may expect to see and even can, if I want, imagine the apple still there. If then someone places a different apple where the previous one was, it is incorrect, I believe, to say that because there beforehand was an apple in my mind, now we have added a second apple on the table. When I was not looking at a real apple, but only mistakenly thinking, or else imagining, an apple there, what was in my mind was not an apple — not even a "mental" kind of apple, in contrast to a real apple. I would say instead that it was an "apple-like" imagination.

In a case like the illusory bus, which in the illusion occupies a non-illusory spatial extent, illusory and fulfilled intensions are welded together. The escalator and ceilings are real, but they conspire to form part of an illusion-bearing configuration. Even when the bus is real, it is relative to a particular vantage point that the escalator and ceiling form a trajectory leading my sight toward the bus lanes, and also the functional knowledge that I must ride up the escalator to get there. These contents take on the cognitive role of landmarks to the bus's trajector; and although they may be real, when I appraise them through the lens of my current purpose, I attribute to them status as landmark or trajector which do not intrinsically belong to them. So while my impressions of these contents are not "symbols", as they fit within the configuration where for me they are perceptually unified, they take on these additional valences related to perceptual and practical lines of survey and operations. Such "annotating" of morphemes in a structured totality, we can argue, is in some ways a symbolic activity, even if we are reluctant on ontological grounds to call the entities thus annotated as "symbols".

So we might say, provisionally, that with respect to the correspondance between functional intelligence and conceptual frames, phenomenology stands to one side as we can find some similarities between the (otherwise opposed) perspective of "embodied" cognitive linguistics and functionalist theories of mind;

but, with respect to the proper model of separation between noeses and noemata, phenomenology may actually reveal some similarities with functionalism and in contrast to embodied cognition. Perceptual configurations are not composed of mental *symbols*, but their organizational principles, relative to perceiving subjects' orientation and telos, take on structures of symbolic systems.

Starting with Husserl, Phenomenology recognized that there are many variations in our comportment to intended (perceived, conceived) objects, including perceptual, operational, affective, and so forth — we can look at the table, admire its design, interact with it both physically and through activities like setting out a meal, etc.; there are also variations in how our mental image or thoughts of things relate to things themselves, as explicit percepts, memories, things seen through pictures or representations, percepts which enter in and out of focus, and so forth. These variations apply both to perceptual and also active, "embodied" engagement, and it would certainly be relevant to compare Husserl's inventory of these possibilities with the theories of embodied schema developed by thinkers like Lakoff and Johnson. However, even as phenomenology developed robust theories of different modalities and degrees of attention and intentional engagement, these variations are still conceptualized within a methodology which prioritizes intentional relations (in all their modalities) as part of explicitly conscious states.

And such emphasis on consciousness is not always compatible with Embodied Cognition. Many of the cognitive processes which shape embodied, operational schema are presumed or appear to be largely *sub*conscious, and work with objects of experience insofar as they are conceived outside direct awareness, for example in anticipation or recent memory, where they belong within a mental system but are not mentally or perceptually present within an inventory of conscious contents at a particular moment in time. As I reach for a dish to carry to the table, for example, the table itself may not be consciously present either in my sights or my thoughts, but it is still involved in my overall conception of the situation at hand.

With these various institutional and exegetical factors considered, then — and setting aside the recognizably phenomenological theories of Cognitive Grammar — we can sense some parallels in the relation of cognitive science and phenomenology, on the one hand, and between phenomenology and sociology or culture. Here I am referring to those branches of cognitive and human sciences which are generally sympathetic to phenomenology in the informal sense of first-person experience and subjectivity — in other words, by contrast with behaviorist, or empirical data-driven paradigms be they in the philosophy of mind or in, say, sociology. Phenomenology, Cognitive Linguistics, and Cultural Studies or "Humanities Theory" in different forms, all critique a mechanistic view of mind and the lifeworld, and cultivate more interpretive, interactional method-

ologies. Empirical studies may have a role, but appeals to research intuitions are judged to have equal or greater value — like a linguist demonstrating a theoretical point by intuitively assessing sentences' admissability; or a sociologist exploring social trends, like an election result, not (or not just) with statitistics but with personal or neighborhood case-studies. But behaviorist and empiricist paradigms can be surpassed in different ways, and phenomenology centrally features the constitution of (social and natural) reality in consciousness; whereas cognitive and cultural sciences often confront the subconsious dimensios of concepts and values. The relationship of consciousness to cognition has engendered similar confusion and controversy as the relationship of consciousness to culture (along with politics, ideology, social structure, etc.).

I believe that a survey of different reductive and explanatory projects, within the topics of consciousness, cognitition, intersubjectivity, and so forth, should look more closely at how consciousness, culture, and cognition overlap and cross in these ways. These considerations apply borh within theories or philosophy of mind more narrowly, as well as in the booader space of cognitive science and the humanities. There are several different ways we can develop a multi-scale picture of mental reality within the larger space of the physical and socio-cultural world. I would distinguish the following:

- An experiential-phenomenology account of consciousness which is receptive to the physical foundation and realizability of mind, but emphasizes the affective, first-personal nature of conscious experience. Here the separation between consciousness and physicality is largely a matter of subjective emphasis. When considering consciousness as a first-personal domain, we focus on the affective self-awarenss of conscious presentations, which includes specifying how the impressional isolation and zonal scoping of affective experience helps ground our scientific intuitions. Here an association is proposed between experiential affect and physical causation, the difference between these being a matter of the modality of accounts, not a matter of ontological separation. Affect is relative to first-person awareness, whereas physical causation is reasoned according to normative representations of an impersonal or interpersonal world. But we can believe, and intuit, that experiential affects are one manifestation of physical causal influences.

- A different, more pragmatic or *enactive* account, treats cognition as one mode of attunement toward our surrounding environment, deemphasizing the difference between conscious and preconscious, and between mental activity and physical or motor activity of ourselves as living beings. Our minds are part of, and should be analyzed in the context of, our adaptation to the ecosystems of our lifeworld — which includes natural ecology but also the norms and structures of communal life. Here the ontological separation between mentality and physical substrata can be explored by analogy to ecological adaptation in general, where environmental factors

shape organisms' physical form and morphogenesis because, ultimately, those forms are causally determined by the need to fit within an ecological niche.

- Finally, we can also identify a functional approach to cognition which regards physical substrate as implementations of functionally specifiable system-organizations. Here the ontological separation between mental reality and physical substrata is conceived by analogy to the broader distinction between functional systems and their physical realizations. While the more "enactive" paradigm pursued a more organic analogy — cognition seen in terms of biological adaotation — this more functionalist intuition is more mechanical and computation; cognition as a functional specification, of a kind akin to (if far more complex than) existing computers and robots.

Ultimately, these different paradigms complement, intersect, and challenge each other in overlapping ways, so they are not so much mutually exclusive paradigms but, rather, three different trends in the overall patterns of a research community seeking to build a coherent account out of diverse, and sometimes fractious, intuitions. In the remainder of this main text, I will try to clarify some of these lines of intuition, as I see them.

7 Embodiment and Physicalism

With this inventory of some issues relating phenomenology to cognitive linguistics as a background, I will now try to explore in greater detail how the main line of cognitive-linguistic development can be contrasted to a parallel and slightly divergent notion of Cognitive Phenomology. Consider now to the passage from Jordan Zlatev, with which I introduce this paper, identifying a paradigm of "noneliminative physicalism"in Cognitive Linguitics. For Zlatev, this paradigm allows theoretical autonomy for higher-scale phenomena, but apparently subscribes to a reductive view of physical explanation. Specifically, the properties of larger physical objects are determined by properties and structural associations between their smaller constituents. For Zlatev, this implies that subjective content or "First Person Ontology" (in Zlatev's words, content described by "not privileging the objective, third-person perspective, but rather starting from, and keeping a focus on, the *experiences* of speakers..." [p. 6]) — this content is somehow not "really real". For this reason, Zlatev argues that cognitive linguistics in the Lakoff and Johnson vein "is quite inconsistent with phenomenology" [p. 2].

I think Zlatev frames important issues, but for my own arguments I will qualify his comments in two ways. First, I think it may prove philosophically

difficult to distinguish Cognitive Phenomenology from Embodied Cognition in terms of ontological commitments. As I wanted to indicate by juxtaposing Zlatev's discussion with a quote from David Woodruff Smith, I think some phenomenologists also express a grounding or "monism" where subjective contents are "really" physical. Recall my earlier critique of "mental copies" — where, for example, I argued that there is only one apple, which may be both in my perception and on the table, or only in my imagination. If I endorse this account, then I do not accept a notion of two different species of content, mental content and real or worldly things, so that the first could be a "copy" or "symbolization" of the second. This does not mean that I reject a real "subjective ontology" or "first-person perspective"; far from it. But it does mean that I do not represent the contents of subjective ontology as mental copies of worldly things. My own construal of the subjective realm is determined more by matters of spatiotemporal location and proximity. If I hold an apple, for example, then there is a physical process which is uniquely occurring my embodied proximity, subjectively registered as the sense of physical contact between the apple and my hand. This experiential episode is "subjective" because it is only myself, no-one else, who experiences the apple in this way, even if someone else expereinces it visually; and also because I am aware of myself feeling the apple; I recognize it as one sensual content within a spatially and thematically organized perceptual totality. We can perhaps express this as a "configuational" or "zonal" account of subjectivity, as compared to an "epistemological" account.

By "zonal" I mean that there is a unique zone of interaction between myself, both physically and mentally, and physical things, like the half-eaten apple. This is a zone defined by physical afforfances, where I can move myself in different directions, and also move my limbs and generally turn in various ways without changing my location. Objects are also extended, take on shapes, move through, and can be moved within my surrounding proximate space. So my experience of this space primordially registers a contrast of figure and ground: the ambient space is a containing background, which does not take on any particular shape but is framed by shaped surfaces establishing perceptual and operational frames and boundaries, like windows, ceilings, or natural landmarks. This interplay of cognition with sensory, conscious experience is fundamentally subjective, and the contents and structure of these proximate zones are entities in a distinct subjective ontology, because of both spatial and experiential forms in this space as perceptually disclosed. On the one hand, perception itself has a zonal configuration. Objects and spatial expanses are perceived according to their relative distances, and lines of sight and potential movement, with ourselves as a central but unseen locus. We can perhaps also recognize nested or concentric zones: somatic sensations, like hunger, may not be directly localized to our bodies; but they are not perceived as coming from external things or directions either. Then there are things that I touch directly; then things I see but do not touch; and finally I can hear sounds, and occasionally sense scents, which have a direction but originate somewhere out of sight. Any sensation whatsoever carries within

it this zonal structuring of my surroundings.

The subjective ordering of perceptual environments is not only a matter of a "self" as a spatial center. A second aspect of this ordering is the contrast between ambient space and the objects, as well as lines of force and energy, which are extended in and propagate through this space. Particular objects are a focus of attention and cognitive orientation, or "trajectors", in Ronald Langacker's term, which I adopt, and will use frequently, outside of just a linguistic context. Trajectors are experienced within some background or "expanse", perhaps open air, but consider such language as "a boat in water", "tracks in the snow", etc. What I am calling an "expanse" here is one form of a "landmark", in Langacker's terms, and these two phrases sugget linguistic evidence that this landmark/expanse contrast is a fundamental cognitive formation. But this is not just a schema of spatial relations: the relation of objects to media in which they extend and move (like air and water) determines how physical processes play out in a spatial environment. So in this situation we are not only mentally representing spatial organization, conceiving objects' locations and spatial relations. We also become directly or intuitively aware of physical interactions, whether occurring or potential, involving ourselves and objects or objects and each other. So all consciousness reveals a "zonal structure", a sense of our surroundings organized as a network of physical as well as spatial relations.

Returning to Zlatev's reading of Embodied Cognition theorists, like Lakoff and Johnson, I think it is also relevant to note how many idas in cognitive linguistics have been tested, refined, or formalized with various formal or computational system. For example, a central feature of Lakoff's larger system has been the semantics of prepositions — the complex rules for which prepositions are correct in which situations (contrast "paint on the wall" with "paint over the wall"). Lakoff uses this theory as an entry-point into his overall approach to cognitive schema, semantics, and metaphor. Given this priory, Terry Regier grabbed some attention by showing how artificial neural networks could be trained to anticipate proper uses of prepositions, analyzing *over* in particular, based on training data showing (as spatial configurations) representative cases in English. Joseph Goguen has also spearheaded projects to algorithmically model the "Conceptual Integration" theories of Gilles Fauconnier and Mark Turner, with results which have been applied in domains like narrative and poetry, as well as ordinary language. Even the basic structures of Embodiment need to be replicated, to some approximation, in fields like Robotics. As I will also discuss here, Lakoff and Johnson emphasize that much of the conceptual and operational activity involved in human embodiment and social interactions are *preconscious*; we instinctively apply conceptual frames and cognitive schema, so as to integratet ourselves into social and practical situations. Given this emphasis on preconscious conceptual ability, and how many schema important to cognitive linguistics can be computationally simulated, I think we can question how closely the Embodied Cognition branch of cognitive linguistics actually de-

pends on an underlying metaphysic of physical reduction. Instead, we can argue that these theories actually identify conceptual and motor faculties that may be functionally implemented on a wide range of physical platforms.

This is not to say that robots or natural language processes mimic human selves competently: the gap between computers and humand minds and bodies is arguably qualitative, not just quantitative, in the sense that faster processors or better algorithms, alone, probably will not close this gap. Perhaps our embodied practice is driven by a collection of modules, some of which can be computationally simulated, but the holistic integration of them all lies beyond computable algorithmics. However, Embodied Cognition uses accounts of rules and formal representations of cognitive processes, to promote cognitive-scientific explanations of cognition. To the degree that these representations have explanatory merit, this is largely, as far as I can tell, a product of the functional architecture they identify. I am not aware of significant analyses in cognitive linguistics in which any specific physical properties of nerve cells or the neurological domain is given an important role. Certainly it is considered important to consider neurophysical implementations of mental operations; but this neurophysical substratum is invoked simply as the particular mechanism which, in biological minds, implements some functionally specified sytem. The weight of explanation lies in the credibility of the proposed functional reading. Within the philosophy of mind, this general attitude tends to be associated with Functionalist paradigms, perhaps along with a "token" reductionism (the idea that a given *token* of mental operation may have a certain physical correlate, but there is no isomorphism between *types* of mentality and types of physical systems). Functualism, moreover, is typically contrasted with Physicalism (including the noneliminative variety).

All this considered, then, I think in terms of Zlatev's account it is more productive to apply "Noneliminative Physicalism" to Cognitive Phenomenology proper, not to the Embodied Cognition which Zlatev identifies as separate, and which I think has at best a weak, functionalist-token flavor of Physicalism. This is not to equate Lakoff and Johnson's account, say, with a conventional "symbolic" functionalism, specified largely in terms of symbolic representations of facts or environments. Embodied Cognition implies a more "ecological" functionalism, in which mentality is just one part of organisms' functional adaptation to their environment. From this perspective, cognitive representations are analogous to the chemical or physical signals which simple organisms use to survive in their own environments; conscious mentality is only one form of functioning and thriving in nature. On the other hand, Embodied Cognition theories are also sometimes described as "Experientialist", indicating that they take seriously the first-person, experiential dimension of mental processes — even though a significant part of cognitive functioning is understood to be preconscious. This ambiguity can perhaps be resolved by foregrounding our personal, experiential reality, but arguing that this is our own human adaptation to our environment,

one where social relations are particularly significant. We have adapted to nature by building complex societies, and organizing our mental representations of the environing world around an idea of self-conscious, perduring personal identity.

So the phrase Embodied Cognition perhaps connotes a balance of sometimes competing metaphysical interests: experience, embodiment, ecology, and natural or physical science. This invites comparison with other academic communities which might recognize the term "Embodied Cognition", for example within cultural studies, or associated with the phenomenology of Merleau-Ponty. In the text I've cited here, Zlatev expresses frustration that "the name ... Husserl, always seems to appear in a negative context in experientialist writings, and that of Merleau-Ponty, whose work is possibly most relevant for the proposed 'embodied realism', hardly at all" (p. 3). Meanwhile, although George Lakoff has devoted considerable effort to social and political applications of cognitive topics — in particular, analyzing American politics through the lens of "family metaphors" — I am not aware of a sustained attempt to relate Embodied Cognition with themes of embodiment as they appear in, for example, Gender Studies or cultural and semiotic studies of race, class, ethnicity, or sexual orientation. To some degree, the lack of textual overlap across these areas may be a product of geography. Many leading figures in Cognitive Linguistics are based in California, including Lakoff, Fauconnier, Langacker, Goguen, and Sowa — the latter four at San Diego. One outlier often included in this group is a Swede, Peter Gardenfors, who also identifies "a French semiotic tradition" — citing Jean Petitot in particular — "which shares many features with the American (mainly Californian) group". Jean Petitot represents an approach to phenomenology which is informed by analytic philosophy, natural science, and mathematics, one expressed through prominent texts like *Naturalizing Phenomenology* and, to some degree, the *Cambridge Companion to Husserl*. Editors and contributors to these volumes include Petitot and other Europeans, but also some leading American phenomenologists, like David Woodruff Smith, Barry Smith, Shaun Gallagher, and Sean Dorrance Kelley. I have also found an extensive literature of both theory and also practical software projects, in French language contexts (including Quebec), based on certian cognitve-linguistics formations, notably Conceptual Graph Semantics. So the Californian cognitve-linguistic milieu is not completely isolated; I believe however that more research is needed to clarify how these different researchers can be integrated.

As I've mentioned, I refer to "Cognitive Phenomenology" to relate the "Analytic" phenomenology of David Woodruff Smith or Jean Petitot, for example, with some part of Cognitive Linguistics, especially that inspired by Ronald Langacker. Cognitive Phenomenology and Cognitive Linguistics have many common features; both, for example, criticize a simplistically "mathematical" or "extensionalist" semantics, which identifies words with concepts, construed as sets of objects. Instead, concepts have an inescapably cognitive dimension, in-

tegrating distinct but not wholly unrelated schema, often visually apprehended schema of spatial relations, but incoporating other schemes as well — for example, based on tactile or kinaesthetic perceptual modes, or on funtional in lieu of spatial totalities. The intersecting semantic layers of words like "over" or "tree" are the rule, rather than the exception (consider "get over it!"; "paint over the scratch"; "over the hill", in both senses; "geneological tree"; "Abstract Syntax Tree", in computer programming).

I would argue, however, that Cognitive Phenomenology differs from Embodied Cognition in giving a more central role to *conscious* experience, which includes but also supercedes the perceptual episodes through which cognitive schema like the above are disclosed. I would suggest that, outside the analysis of particular mental schema, there is a broader Phenomenological Epistemlogy which addresses the relationship of consciouness to the world more holistically. This includes epistemic concerns at a more local scale, considering how imperfections in judgment and sensation are addressed within extended perceptual episodes: how constitutive synthesis and belief-revision act within an epistemic dynamic wherein we can reasonably trust, on most occasions, our cognitive-perceptual understanding. I also believe that Phenomenological Epistemlogy extends beyond these local judgment-situations to included a broader, intuitive picture of the fundamental causitive structures ordering the empirical, perceived world. Any particular cognitive schema is exercised within cognitive-perceptual episodes, which represent not atomic belief-states but dynamically evolving judgment situations; and these situations are in turn situated in an Experiential Reason in which certain beliefs about causation and empirical order are motivated through the aegis of conscious experience. Within this broader reasoning, I believe certain mental schema stand out apart from the specific schema typically identified in cognitive linguistics; that certain schema are a kind of meta-schema which transcend the more particular situations modelled by ordinary schema.

I have already presented several schema I would classify in this "meta" category, including the "zonal" configuration centered on an embodied spatio-temporal locale, and the representations of figure/ground, trajector/expanse, matter/space, etc. To these I would add schema like "perceptual triangulation", where I recognize other people's perspectival impressions of objects and scenarios as different from, but communicable with, my own, as well as the overall possibility of linguistic and semiotic exchange, and of interpersonal, situational reasoning. In other words, I recognize the external world not just as a physical expanse but as a theater of societal and significatory practices. Finally, I would also include the schema of epistemic perceptual orientation: that is, my recognizing that acertaining things to be the case depends on specific, and physically articulable, relations between myself and things of interest. I can sometimes suddenly remember something I had forgotten, but to acquire *new* information I need to situate myself perceptually before the relevant object, or

before some indirect representation or description. Information itself is associated with locales and proximities where the information is physically available. This constellation of schema and assumptions do not represent a particular piece of knowledge, but rather are global construals of how knowledge and knowing beings themselves can exist.

I also believe that these "meta" schema depend foundationally on *consciousness*; they are not preconscious or functionally simulable cognitive rules, but rather schema of self and other, of subject and object, which become part of mentality as soon as any consciousness whatsoever is present. We can say that certain epistemological formations depend on the "structure" of consciouness, but not in the sense that we rationally analyze consciousness from a philosophical perspective. Instead, I would argue that the mere fact of consciousness as a feature of someone's mental life creates, within the mental realm, a metaphysic of what "world" or "physicality" itself actually entails. Insofar as the capacity of consciousness evolves over time, perhaps as part of prenatal development, then the same neurological formations which emerge to support consciousness, simultaneously represent consciousness as the experience of a self, spatially located in a physical world, where "physical" names certain rules and limitations of empirical order.

Considering the importance of *spatial* relations in the compass of overall cognitive schema, it is worth noting that consciousness precedes vision, and so by extension do representations of spatial relations. Before we "see" spatial orderings, we "feel" them, in terms of the tactile and physical contact of things against our hands, or in our mouths. This insight can influence how we analyze certain typical spatial and physical scenarios. For example, if we see a moving billiard ball strike a stationary one, we expect the latter ball also to move and the first to slow down, and veer off, consistent with the angle of contact. If we construe this as a matter of *spatial* relations, on which a physical interpretation is then imposed, we might reason that we "discover" this correlation of the balls' movements by repeated observations. In other words, the basic mechanical principle exercised in this scenario is a "spatial rule", a maxim of the world's spatial order. By contrast to this analysis, I would suggest that we do not "discover" these mechanical principles by observation; we are predisposed to anticipate the balls' movements by instinctively reasoning about their spatial locations by analogy to our own. If we assume that our cognitive framing of the situation centers, initially, on the stationary ball, then it is fully intuitive to expect the moving ball's force to displace the stationary ball, as the former crosses the latter's proximity. We project onto that situation our own experience of being physically contacted by moving things, or stationary things which resist *our* movement; in other words, things which cross our own spatial locale, because either we or they are in motion. This susceptibility to being "crossed" by mechanical force is implicit in any locale whatsoever; it is what it means to *be* a spatial location in the first place.

After all, we do not initially have a notion of "different" locales, prior to our sight and the ability to move around. There is only *one* location, the "zone" of our own tactile experience, and the lines of contact which things have in different trajectories and positions as we touch them. Once we start to see and to crawl, we acquire the sense of an "over there", and so of different possible locations, where other things are located. But our primordial sense of what a location *is* is to be a zone of physical contact, crossed by lines of force and mechanics. So, in the above example, once we cognitively center on a stationary ball, on its location, then we immediately project this zonal schema onto that place: the neurological or cognitive process of cognizing that place *as a location* carries within itself the anticipations of force and contact, which are sutured to the very notion of location-ness in the shadow of our very first moments of conscious awareness.

I believe this primordial metaphyics of force and location, of materiality and space, becomes embedded in our cognizing of space and spatial, as well as physical, relations, by virtue specifically of *conscious* experience: of our conscious awareness of physical contact and touching, of our sense that it is "we" who are feeling the contact, initiating the touch, etc., so there is a zone or location where *we* are, which can then be generalized to locations where *other things* are. This is not a preconscious "conceptual frame"; a rule-based reasoning of space or mechanics that could be programmed into a computer. To be sure, a computer could be taught a "rule" that moving things engender other motions, subject to patterns that can be expressed via vector arithmetic. But this learned rule does not carry the same epistemological weight for a computer as it does for a person, assuming we can speak (perhaps metaphorically) about a computer's "epismtemology". If we can somehow imagine ourselves taking on the "mind" of a computer, then we could believes ourselves capable of "learning" rules of (for example) mechanics, but we can imagine these seeming explanatorily incomplete. After all, what "enforces" the rule; or, to put it differently, how does the stationary ball "know" to start moving? What is the rule that connects the rules of mechanics to the spatial things themselves, that "inserts" that rule-following out there in that spatial region? Because computers always are presented with an "implemented" world, a set of data which they are to take as empirically given, the whole register of computer reasoning seems to exclude the kind of higher-order intuition which could account for empirical as anything *but* implemented, and therefore has no way of conceiving of a world without having to separately conceive, outside of that world, something which "implements" it. This then threatens the same kind of infinite regress which can bedevil certain arguments that use far-fetched scenarios to argue for the ontological possibility of non-physical consciousness — for example, the idea that our whole empirical world may be just a simulated order implemented by some (infinitely powerful) computer. But what implements this hypothetical computer itself, and what implements the implementation, and so forth? The only definitive encapsulation of this kind of regress is to understand the universe as self-implementing, to

understand rules not as "maxims" designed, like legal code, but as implicit in the very existence of space, time, matter, physical influence, and information.

I do not believe we need sophisticated metaphysical reasoning to envision this self-implementing universe; on the contrary, for reasons I have outlined, I think this picture of a self-implementing universe comes to us as soon as we have any consciousness whatsoever, before even vision and motility. We do not have a regulated empirical order which compels us to seek a telos for that regularity; we simply have the thereness of touch and contact, the physical predictability of force and placement which is intrinsic to location-ness itself. Once we start to see and observe, and notice patterns and regularities, then we do acquire the conceptual resources to reason about empirical order in a broader fashion, and to explore the principles which can give explanatory clarity to the mystery of the world's repetitions. But we come to this search for empirical explanation with an implicit understand of space and location itself that incorporates notions of force and mechanics. So we have an intuitive picture of how the worlds' physicality and its empirical orderliness are integrated together; of how states of affairs are determined by lines of force and physical influence, spatial locales and proximity, within and across which causative agents operate.

So I believe the foundations of what we consider "physical explanation", the intuitive basis of scientific reasoning, can be directly traced to structures of consciousness. Insofar as physical explanation stays within the bounds of these foundations, and their generalizations and scientific codifications, I think it is entirely appropriate to seek a theory of consciousness within the resources of physical causative explanation in general. This is not an eliminating or even a marginalization of conscious experience, but on the contrary an attempt to reconstruct the situating of consciousness within the world *on its own turns*: to define consciousness according to a *physics of place* whose intuitive ground is the zonal structures through which, carried along by conscious experience itself, we first acquire the very notions of space, location, "thereness", matter, or physical existence.

This presents my own account of a "Noneliminative Physicalism", and why I believe this is consistent with a Cognitive Phenomenology. I do not claim to attribute similar speculations to other writers who might accept the Cognitive Phenomenology mantle; so take the above analysis as you wish. What I wanted to focus on here has been the different senses of "reduction" that may be associated with Cognitive Phenomenological theories — including but not limited to the set of ideas I just presented. So we can bracket the preceding argumentation so far and consider this as only one version of a "co-reductive" paradigm in which both phenomenological and scientific reductions have some traction. Furthermore, the very possibility of co-reductive analysis compels us to look technically at different ways how properties, theories, systems, or entities can

be reductive versions or explanations of one another.

8 Conscious and Preconscious

The previous several sections have explored the complex relations between cognitive functionality, consciousness, and the preconscious. Often the functional roles, which we can attribute to given cognitive processes, do not depend on (or in some cases even permit) conscious awareness. So exploring cognition largely through the lens of functional organization, tends to displace consciousness, in itself, as the central topic of a theory of mind. Moreover, as I argued at the end of §4, there are paradigms in both cognitive and human sciences which challenge the centrality of consciousness as a causative factor in human events and reality. In arguing for a paradigmatic compatibility between phenomenology and "physicalism", I have tried to defend a construal of mentality in general which is simultaneously centered on consciousness, but also sympathetic to the scientific world-view and the goal of physically explaining consciousness, or "Naturalizing" phenomenology. This argument was focussed specifically on science and the philosophy of mind.

My interest here is to expand this argument outward — to argue for the continued relevance of phenomenology to cognitive and cultural topics, fully granting that not all mental phenomena — especially, not all mental operations of cognitive and cultural significance — are conscious or introspectible. Even though the realm of mind is much wider than the realm of consciousness, I claim that consciousness remains a crucial organizing principle of mental life in general, at least for conscious minds. While this point may be relevant to a disciplinary comparison of phenomenology to (say) cognitive science and cultural studies, it is also important to considering how reductive theories of consciousness — which will have to recognize a finer-grained, unconscious layer of mental process — can remain sympathetic with phenomenological accounts. Ideally, phenomenology and scientific theories of consciousness will be different, but complimentary.

Certaintly not all cognitive or neurological processes are subject to present awareness. Nevertheless, the fact that these processes are involved in developing mental states or cognitive schema in which some contents are indeed experientially present; in which presence within awareness serves as a marker to identify which percepts are attentionally centered, which environing objects are crucially proximate, and which volitions are situationally current — this overall structural role for consciousness, or the overall structuration of (temporally unfolding networks of) mental states around what passes into and out of consciousness, fundamentally shapes the role and efficacy of cognitive processes, whether con-

scious or not. Neglecting conscious nuance on the grounds that truly causally (or functionally) significant mental processes are *sub*conscious, misses the point that these processes in general operate through the medium of conscious mental reality, through their structuring or aggregative role within other mental contents which are indeed conscious.

Referring to the phenomenological theory of protention and retention, we can see how contents are anticipated, confirmed, then relegated to a conscious or preconscious horizon, in a continual feedback loop. So long as our construal of objects and situations is largely accurate, we take this feedback for granted, and experience ourselves as freely choosing where to direct attention at any one time. A similar cycle of conscious attention, retention, memory, and belief formation, I believe, applies on a broader temporal scale with respect to topics like personal identity and political beliefs. For example, subconscious mental states which bear cultural or political relevance (like various ideological prejudices) are only causally effective by adding affect to other, conscious states. So to the degree that we consider persons' practical engagement with the world as moral and political — not merely physical and situational — we can still apply an analysis of how cognitive science and phenomenology, sometimes from opposite directions, consider the integration of conscious and preconscious within an integrated mentality.

When considering consciousness in relation to both culture and cognition, it is important to bear in mind that the domain of the "subconscious" includes memories or experiences which were once conscious (and potentially can become so again, perhaps in new iterations). Our political attitudes, for example, may be shaped by events and conversations we saw and heard in the distant past (in our childhood, for example), but these were nonetheless explicit conscious experiences at one time. It is not as if ideology is driven by some Freudian machinery which is fated to be perpetually "repressed"; which, in other words, is simply of an ontological register fundamentally incompatible with being conscious. Similarly, subconscious cognitive processes may include layers of reality which are indeed *ontologically* removed from consciousness — we cannot be conscious of the quantitative details of activity of individual neurons, for example, at least when they are actually acting as part of our current thoughts. However, the realm of "subconscious" cognition also includes recent or more distant memories, experiences which structure our continually evolving framework of conceptual and situational beliefs. Conscious experience recedes from present awareness, but some of its form and attended details becomes preserved in operational maxims, or schematic beliefs.

With respect to culture and cognition, I believe we should take seriousely the notion of culture as an "emergent system" based on individual cognitive acts. I by no means claim that culture (or economic or social reality) is "nothing

but" a set of individual cognitive acts, the way an oversimplified precis of an economic theory may claim that economic activity is nothing but a set of people acting within their (financial) rational self-interest. In fact, economics is quite concerned to model the kind of feedback loop which causes panics and bubbles, or recessions and recoveries — the degree to which the observation of others' economic choices influence our own in a way that can magnify self-reinforcing economic trends. Here the departure of economic activity from an idealized model of discrete economic decisions can be quantitatively formulated and analyzed, at least to some approximation. On the other hand, economic decisions cannot exist in isolation — there is no one-person economic system. Economic systems and economic choices exist in a kind of mutual ontological dependency roughly analogous to macro-scale bodies of water and water molecules. Extending the analogy, culture cannot exist without particular cognitive acts of individuals, but human cognition, or at least the cognitive reality which occupies most of our daily lives, directly involving our personal and social identities and histories, cannot exist outside of culture and society. Neither culture nor cognition are ontologically reducible to the other, at least in any extreme eliminative sense, but they are ontologically inter-dependent.

Similarly, consciousness may not absolutely depend on culture and society — we do not simply lose consciousness when isolated from other people, even for an extended period of time — but the cognitive acts through which objects of consciousness are "constituted", or unified into their apparent perceptual form and details, have evolved in the context of a human rationality engaged in a social, interpersonal lifeworld. I have discussed how, in perception of objects from our own vantage point, we anticipate their appearance to other people in other positions, which also cognitively prepares our appraisal of those objects as our own positions change. Our communications with other people, our shared language and semantics, helps to consolidate our perceptual and cognitive construals of categories and classifications. So a collective conceptual and semantic framework structures our consciousness of objects and situations, and introduces an interpersonal dimension to micro-scale perceptual episodes and cognitive acts even when, in a particular moment, other people are not specifically around. Here, I can add to this analysis the idea that particular instances of interpersonal, cognitive/conceptual rapport, in this sense, constitutes a kind of fine-grained articulation which manifests, on a larger scale, as cultural and societal norms and paradigms. As a result, concepts of multi-scale relations between theories — between phenomenological and sociological models of intersubjectivity, for example — can in this kind of context provide a useful meta-theoretic role.

Over the decades, these social notions became increasingly significant in the phenomenological movement. We can point to the concept of the lifeworld, in Heidegger and later Husserl; and then further the moral, political, and emotional analyses within Existential Phenomenologists, like Levinas, Sartre, and to some

degree Merleau-Ponty. Analyses of consciousness in a more Cartesian setting, such as Descartes' hypothetical encounter with a sugar cube, in the experience of a skeptical philosopher trying to distinguish what is certain and what is merely presupposed in his conscious perception, or a hypothetical scientist seeking an absolute ground to his scientific investigations; these analyses give way to a more Sartrean account of the consciousness of someone looking for a friend in a café, or in the midst of a sexual encounter, or looking at a tree in a park. Novels, like *Nausea*, become a vehicle for phenomenological analysis, along with more conventional philosophical texts.

But even as consciousness itself, in this Existential context, is seen as only one part of personal and natural reality, the phenomenological method still centralizes conscious awareness as the foundation of its analysis. As a result, one can reasonably question whether the phenomenological method — setting aside the phenomenological "world-view", and considering just how phenomenology as an intellectual theory may be adapted by different scientific and theoretical contexts — whether this method is suited for the analysis of social and culural realities in which many of the political and social themes, which influence personal reality and are spread between individuals and across time, are subconscious or not directly perceived by individuals. I have mentioned the dynamics partly separating Cognitive Phenomenology from Embodied Cognition, but in a more humanistic context, we can see a related dynamic in the transition between Existential Phenomenology and (post) Struturalism, whose theme was often individuals' unconscious replication of social structures and ideology through their language, attitudes, economic and political choices, consumer behavior, and the media and culural signs and representations which we endorse — whether through commerce, critical praise, or just our private aesthetic appreciation. In terms of the relationship between consciousness and culture, the tenor of these lines of development suggest a fundamental questioning of the place of consciousness in defining social and cultural phenomena, given that the definitive structures regulating these phenomena operate within and between people in largely subconscious ways.

These are legitimate questions from a rigorous, meta-theoretic point of view, but at a more superficial level any attempt to deny the cultural importance of individual conscious experience is arguably non-sensical. Many Americans, for example, believe that other Americans' criticisms of Barack Obama are driven by subconscious racial bias — that those Americans are fundamentally uncomfortable with a "Black President", but also rationally recognize the unreasonableness of this discomfort, so they subconsciously sublimate their feelings into suspicion that Obama is secretly Muslim, for example, or that his mixed-race, Hawaian-Kenyan-Indonesian heritage and history is atypical of most Americans, to the degree that he fails to understand their lives and concerns. On the other hand, a differect faction suspects some Americans' enthusiam at having a First Black President compels them to overlook what the former perceive as his flaws,

or his lack of experience. We can debate the merits of these specific analyses, but the underlying premise — that some of our political or ideological beliefs are structured by subconscious rationales or prejudices — seems uncontrovertible.

But what is the proper model of conscious/preconscious relations in this example? Even those who suggest that subconscious factors influence voters' impressions of Barack Obama, are claiming that these factors dispose them — contrary to a purely rational analysis of Obama's skills and platform as a politician — to respond either favorably or negatively to his persona or his message. The phenomena which these subconscious factors are invoked to explain — positive or negative reactions to a speech or a campaign — these are intrinsically conscious phenomena, experiences of and laden with emotional and affective resonance. Even if subconscious (positive or negative) racial bias has a causative effect on some Americans' feelings toward Obama, the medium through which these effects operate is the consciousness of people as they see Obama on television, hear a speech, etc., in full conscious awareness, modified by positive or negative affects which are also consciously felt. Conscious experience is the medium through which subconscious causal influences become operative (at least in this kind of case), which means both that they depend on consciousness for their effectiveness, but also that not all causal factors shaping consciousness are themselves subject to consciousness.

I have used the example of Americans' impressions of Barack Obama, but for a more substantial example of this dynamic we can turn to questions of personal and cultural identity and ideology. As Gender Theorists consider parameters of gender identity, for example, they consider such realities as women's (and men's) experience of their bodies, their sexual personas, their emotional relations with others — all of which are parameters of personhood which exist only insofar as they affect conscious reality, even if not all structural factors at play rise to the level of conscious awareness. Although "Structuralists" like Althusser emphasized the subconscious propagation of social tropes, early Feminist Theorists, like Kristeva and Irigaray, while receptive to the subconscious dimension of social paradigms and political infrastructure, also chastized structural analysis for neglecting personal experience. For several generations, then, subconscious structure and conscious experience has been in tension as analytic foci within humanities theory, as different theories and conceptualizations emerged, with successive iterations of disciplines like Gender Studies, Cultural Studies, "Humanities Theory", etc., sometimes among hybrid disciplines which became recognized only within this time frame.

This sometimes convoluted relationship between culture and consciousness may be compared, in a different and more recent context, to how conceptualizations of consciousness and cognition inter-operate in contemporary settings where philosophy and cognitive science intersect. In applying his theories of

metaphor to American Politics, for example, George Lakoff repeatedly argued that metaphoric cognition — and many cognitive operations in general — are applied preconsciously, as part of how we conceptually frame a situation, rather than our conscious attention to things within a situation. Indeed, we can certainly accept (and I have argued here) that perceptual and situational contents are experienced with varying degrees of consciouness and attentional focus. There are preconscious, passive, and active processes which register and frame the perceptual and conceptual details relevant to our current situation, and to our specific concerns within it. The question at issue is whether there is a fundamental, *ontological* difference between conscious and preconscious: between the functional activity of mental or neourological modules which apply conceptual frames to perceptual scenarios and more general situations, and mental content which has the signature of conscious — perhaps not actually experienced in a given moment, but the memory, or mere passive awareness, of an episode which was once fully conscious.

In arguing for an $\mathcal{L}$-like theoretical framework, I assumed that the passive or preconscious aspects of cognitive/perceptual processes can be self-consciously *distorted*, lifted from their actual phenomenology and publicized as theoretical objectivities. This magnification of what is normally outide vivid awareness, like the study of living things under a microscope, is a deliberate distortion which serves public-discursive ends. We can debate the merits of introspective methods, but the mere fact that introspection necessarily reconfigures the introspected is not, in itself, a problem: such reconstructive (mis)representation is fundamental to theoretical reason in general, whether directed at atoms, the solar system, or human minds. So this addresses one part of a criticism which may be leveled against phenomenological method. But what about the idea that preconscious contents, by definition, just are not introspectible at all, notwithstanding our acceptance of introspective distortion as inevitable and perhaps theoretically desirable? To consider this, we need to reconsider how contents weave back and forth between consciousness and preconscious, and then ask how much of the preconscious, as a whole, is covered within this process.

One more case-study. I have often walked through Flushing Meadows – Corona Park, though I am not there now. While it is not consciously present, I nevertheless have a rather imprecise, schematic memory of its major paths and landmarks. I would apprehend their appearance and interrelationships in much greater detail were I to walk over there later today, but I still have a fairly effective mental map of the layout and routes through the park, forged in part from previous efforts to navigate it. I could, for example, give someone directions of how best to enter the park from Flushing or Corona. My cognitive schema of the paths and streets they connect to is largely subconscious, but some of its form can be consciously iconified if I imagine or draw a map, say; and the experiences through which I acquired that schema will be revisited in full conscious clarity next time I visit the park. Of course, even here the

schema transcends momentary conscious awareness; I may have phenomenally present before me one particular stretch of path, but forming an image of how paths connect to one another depends on relating what is present now with recent memory, suturing the seen and the remembered into a cognitive whole. Explicitly conscious impressions, however, will "renew" my memory of particular details, allowing my full schematic inventory to be rebuilt, both to counteract the effects of deteriorating memory and to allow my representation to adapt to changing external conditions, like the park being redesigned.

Consciousness is not binary: there are varying degrees of awareness, and also varying degrees of clarity through which things are remembered. I may be looking at a collection of ten books on the table, phenomenally aware of all of them but not aware that they indeed number ten. I could count them, so this information is available in my current conscious perceptions, but not itself conscious. Or, I may be unaware that one of the books currently in my line of sight is a book I am looking for. When I suddenly realize this, I have a more detailed awareness of contents before me, even if there is no actual corresponding change in perceptual state. Similarly, when I first awake in the morning I may only gradually become aware of the sun shining outside. Attention focusses on certain objects and percepts and suppresses my ability to perceive details in other contents, even if these contents are in a position viz-a-viz my line of sight or overall perceptive orientation such that they could be experienced in full clarity. Correlative to this tendency of consciousness to filter attention, however, there is also a faculty through which we can broadly suppress attention: we can daydream, directing cognitive attention to hypothetical things and places not consciously present, but we can also dim awareness overall, as when we are trying to fall asleep, or to dull a pain. There is no reason why these phenomena are outside the purview of phenomenological investigation — we can certainly do a phenomenological analysis of daydreaming, for example, or of falling asleep, or of the sedative effects of alcohol or painkillers. The central theme of phenomenology is not conscious contents marked with the full intensity of present awareness, but the spectrum of degrees in intensity through which contents of awareness are present in our experiences. This thematics does not exclude subconscious structures, insofar as subconscious schema can be related to a spectrum of intensity which also includes conscious contents. As recent experiences fade into memory, for example, their conscious valence gradually recedes: suppose we attempt to remember what we did yesterday. Perhaps some noteworthy event will remain clearly in our minds, so the consciousness of the memory will be almost as vivid as our consciousness of the present. Most of those memories however will be indistinct, so the consciousness of the memory is consciouness of something vague and faded: we may remember eating at a restaurant, for example, but not remember the color of the lettering of the restaurant's name, or whether its facade was in brick or glass, or whether the door through which we entered was on the left or right side of the building. In time the percepual details will largely fade, and what will be left in memory

is conceptual summaries: we may be able, for example, when walking through the neighborhood in the future, to identify where we have dined in the past and whether we liked the meal; even if we no longer have any memory of actual perceptual events which occurred therein.

When our surroundings are present in full sensory awareness, the mental form through which we represent them tends to be highly sensitive to perceptual details: every qualitative variation, every minimal patch of color or texture, is its own site of potential awareness. We do not attend to all of these structures at once, but we are dimly aware of each of them and are poised to direct attention to them if needed. For every distinct patch of color in our visual surroundings, for example, we can potentially focus in that direction and ascertain to which object that color belongs. The formal structures which can model this intense awareness, like Mereotopology and Mereogeomtry, are those best suited to detailed models of three-dimensional surfaces, variations in color and appearance, perceptual directions, and so forth — the fine-grained appraisal of external objects' shapes and properties. As impressions recede to memories, however, these fine-grained manifolds become gradually replaced with schematic summaries, situational or conceptual precis of what had happened: the meal was good; the best way into Corona Park is down 47th avenue. The structure of these schematic memories often mimics linguistic form, and we can speculate that there is a close relationship between the cognitive processes of memory-retention and of language and semantics. We cannot readily use language to describe the rich perceptual detail of present awareness, but we can capture what we remember of the past — of what we did yesterday, for example — by writing down a few sentences ("I went to the library"; "I had lunch in Chinatown", and so forth).

I believe that both the mental layers of vivid, fine-grained perception and schematic, coarse-grained memory (or situational summary or anticipation) are suited to some manner of formal modelling, even if in the spirit of approximation and theoretical simplification. I have argued here that Mereotoplogy is particularly appropriate for modelling fine-grained perceptual impressions, and that Conceptual Graph Semantics is suited for coarse-grained, situational and schematic modelling. Whatever our favorite technicalities, if we have some account of mental states being represented via formalisms at different degrees of granularity — Mereotoplogy and Conceptual Graph Semantics, for argument's sake — then I suggest that the interplay of these formalizations is of interest in both a phenomenological and a cognitive-scientific context. For example, phenomenology can clarify how the perceptual intensity of sensations can fade even as certain perceptual structures retain some level of awareness: there is a consciousness of a memory, even if this is different from the kind of consciousness which the remembered things once had; and there is a kind of tokenized or anticipatory presence of things in consciousness even if they are not currently perceived, like the table in the other room. On the other hand, cognitive the-

orizing can help clarify the structural process through which perceptual details are selected and filtered so as to yield the kind of schematic summarizations which define memories, conceptual frames, situational volitions, and similarly rather coarse-grained mental structures.

I believe this interplay of fine-grained perception and coarse-grained conceptualizations is relevant to cultural and social mentality, as well as cognition in general. I will use the word "entrenchment" to describe the process by which experience and judgments of the perceptually present are simplified and retained in memory and other future mentality (note that my use of this word differs from that of both Gardenförs and Langacker; I do not intend to suggest any noteworthy theoretical link between these uses). Anyhow, the cognitive process of entrenchment is also a phenomenological process of de-intensification in which many sensory details and fine-grained judgments are filtered out, but broader conceptual architectures are still defined and refined through a selective process. We can now speculate that the interplay of concious perception and conceptual entrenchment can be identified also as an efficacious process within cultural and political belief-formation and the emergence of ideological and communal norms and value-systems. In a political context, the word "entrenchment" sometimes has a negative connotation, suggesting rigid ideology; here though it can describe the gradual reversal, as well as formation, of prejudice. For example, a person may over time come to support measures protecting gay and lesbian equality, based on their experiences with gay or lesbian people who they know or admire. The integration of these positive impressions is a form of entrnechment in that these sentiments, formed within a particular situation, become "entrenched" as part of our conceptual schemes even if the situational details are largely forgotten. The assimilation of particular social and cultural situations to political and cultural concept schemes is certainly a cognitive phenomenon, but it is also an obvious source for many of out cultural norms and political attitudes.

Moreover, both culture and cognition share a similar, and similarly complex, relation to conscious experience. We can say that cognitive science in general treats the full range of our belief and concept systems, how these are internally structured and marshalled for relevant situaitons. The vast majority of our beliefs and acquired concepts remain subconscious at any given point in time. Similarly, cultural norms are communicated and sustained through individuals' largely subconsciously mimicking of those around them, and through the general repeatability of social situations in terms of the lifeworld structures and physical infrastructures which are both the product of particular cultural frameworks and also tend to preserve them. In both these domains, conscious experience rests within a web of not-consciously-posited concepts and knowledge, what Robert MacIntyre and David Woodruff Smith (for example) describe as "Background Horizons". However, insofar as conscioussness stands out from these horizons precisely because conscioussness does have an experiential intensity, the added attention and specificity attached to explicitly conscious contents can play dif-

ferent structural roles, both within cognition in general and in social or cultural reasoning in particular. I do not need direct perceptual experience to have some mental impression of a place or situation — to return to a previous example, I have some reprensentation of the layout of Flushing Meadows, even though I am now indoors and a brisk walk away from there. We can then consider the difference between the park as I can conceive of it now, and the park as I would comport to it were it phenomenally before me. Although I can have subconscious representations, insofar as things are phonemenally present to me I can also discover new things about them; I can correlate my memories or anticipations with new details, attending to the properties of objects which I can now empirically observe. This represents one specific, epistemic role for conscious experience in particular, in contrast to mental schema in general: consciousness is productive of new observations, new belief-formations, new property-identifications within perceived objects.

Aside from the contrast of the conscious present from once-conscious but now subconscious forms and memories, we can also consider the difference between active and passive conscious awareness — between, for example, looking at a book without realizing it to be one I am looking for, and then with this realization. Conscious contents have that added component of active awareness, of central focus, depending on the play of my interests and attention. Evidently then there are subconscious processes which not only organize conscious experience, but also modulate degrees of attentional awareness based on our situations and interests. Active conscious awareness therefore acts as a kind of mark or annotation upon perceptual contents, signalling their active centrality to my perceptual orientation, their temporal immediacy, or their interest or importance. The tendency of this content to stand out from passive awareness or subconscious schematization is also a tendency for conscious presences to be marked with particular affective intensity; with different forms of practical or cognitive urgency. Active against passive awareness marks the contrast, for example, between my not even noticing the faint tickling on my leg compared to the sudden realization that this sensation is caused by a crawling wasp. Evidently there is some subconscious mechanism which does notice and attend to these background sensations, but there is then some further "decision" as to whether or not a passively acknowledged perception needs to be elevated to active attention — the identification of the tickle as caused by a wasp preceding the sudden, disruptive conscious identification of the wasp being there, which causes me to quickly become distracted from my prior thoughts and move to brush it away. In many cases, something becomes conscious because it is the bearer of particularly intense affects, or signals some sort of danger, or can provide new information. Consciousness can be described as a kind of "annotation" within the web of beliefs and concepts in general, one which marks certain content as perceptually present, epistemically salient, or affectively significant: consciousness marks the distinction between the present and the recent or distant past; between what is directly before us and what is around us but not within our

immediate observational orientation; between what demands our attention in our surroundings and what can be relegated to indistinct, passive awareness.

This account of consciousness as "annotation" emphasizes the affective, sometimes laden or urgent role of consciousness as a marker of general cognitive content. This role is not necessarily explored with full rigor in traditional phenomenology, which may be one reason why social and cultural theorists turned away from phenomenology in developing theories of affect, emotion, existential intensities, and so forth, to explore the social and political domains — domains which are sometimes marked by irrationality, violence, passions, etc. Affectivity nevertheless plays a central role in consciousness, one which needs to be integrated into phenomenological accounts: affectivity marks the epistemic origin of perceptual content in external properties rather than our own volition, for example; we consider our perceptions as a source of productive information about the external world because properties of external things affect us, in ways which we cannot imaginatively control. Affectivity also engenders the experience of ourselves as subjects within our experiential totality, of our bodies and embodied experience, for example, which helps us to form a mental image of our physical orientation within our surroundings; and of ourselves as enduring personal identities. So conscious awareness is not just the awareness that certain states of affairs obtain, that the table is red, for example, but also the preceiving of these properties through tokens of experiential detail which carry with them affective and sensory intensity. Some of these (like a table's red) are fairly mundane, simply signalling perceptual beliefs as engendered by current awareness and not by memories, dreams, and so forth; but other experiential affects carry greater weight, suggesting phenomena like danger, pain, pleasure, etc. As both a vehicle for shaping physical intuitions — sensitizing and familiarizing us with notions of force and energy, mechanics and materiality — and as an issue of our personal, embodied concerns, of pain and pleasure, physical activity and the ease or difficulty with which it can be carried out, affectivity encompasses important parts of both the epistemological and the social and cultural dimensions of consciousness.

In this section, I have argued that some preconscious content is obtained from consciousness by processes of entrenchment and memory-formation. I do not claim that all preconsciousness is derived from consciousness by these or any other mechanisms, but I believe an important overlap between conscious and preconscious reflects two structures: the contrast between fine-grained perceptual attention and coarser situational summary; and the role of affectivity in marking moment-to-moment attentive focus. Having argued in this paper as a whole that intersubjectivity and embodiment are formative for a phenomenologically motivated belief in the physical realizability of consciousness, I will add at this point that affect too, in my opinion, is a key source for these intuitions.

In particular, I believe, affect is central to our understanding of what is "physical nature" and therefore of what it means to be a physical science, or physical theory. As we seek a "physical theory" of consciousness, then, we should consider how the integration of phenomenology and primordial affectivity can provide an account of, relative to out conscious intuitions, the notion of "physical theory" actually *means*.

I have referred several times to a kind of noneliminative, multi-scale reduction, representing a confederation rather than subsumption between two theories. Analysis burrows down to a lower-scale theory for causal physical explanation, but circles back to a higher-scale theory to articulate patterns of macroscopic autonomy, organization, and emergent observability. I believe a similar "dialectics of emergence" can be seen in consciousness viz-a-viz physical science. The contrast in scale may be less well-defined, but the techniques of transcendental phenomenology allow analysis to direct attention away from perceived physical objects, and toward the configurations which bear these perceptions. But we cannot attend to this perceptual intentionality without considering also the conscious totality in which it rests as foreground. And the everpresent background of conscious experience is a somatic, embodied receptivity to the world as a whole. We experience ourselves as a mentality *in situ* that, largely beyond our voluntary control, is affected by apparently external objects and forces. The world we experience ambiently around us is not just a realm of spatial relations, but a space saturated with lines of force and potentials of physical influence, between us and things and between things themselves. So the pure phenomenology of experience charts analytically from the extra-mental to perceptual configurations, but then circles again out into the world — except the world is no longer conceived just as a configuration of spatial forms, but as an expanse of material spaces and surfaces.

Into this web of mutual physical affect, we come to recognize that the state of a particular thing is affected by and may be largely determined by the effects of other things upon it. There is a determinateness of physical influence which we can set alongside the determinateness of perceptual form: we develop the intuition that the "how things are" of perceived form is determined by an encompassing physical-causative web, where effects are carried between things via propagating physical influences. As this picture is gardened into the full accomplishment of modern science, it seems to describe the world around us, but also within us. The concepts of external scientific explanation emanate from our sense of a web where we, too, belong. We not only believe or assume this as a rational maxim: we experience it. Our sense of primordial physical affect, of the realm of physical influence including us in its spatiality, is not preconscious, but an omnipresent harmonic baseline within consciousness.

So affectivity spans a spectrum from the most primordial ground of mate-

rial consciouness to the ballet of interpersonal emotion and subjectivity. Affect is manifest in both of the registers I have highlighted: the fine-grained, "mereotopology" of basic object-perception, and the coarse-grained, conceptual netwoking of situational reason. Beyond the cognitive/conceptual dimension of situations lies a broader context of culture, politics, and personal identity, which serves to frame and contextualize perception in a manner similar to situational concept networks, only encompassing a broader spatio-temporal and domain scope. I will not devote further space to these more general topics, except to note that a well-developed theory of cognitive and perceptual form, influenced by both cognitive linguistics and by phenomenology, can help set the stage for similar cognitive-phenomenological integration on different scales: generalizing cognitive grammar to cognitive semiotics, or extending the phenomenological account of intersubjectivity to a more systematic Cultural Studies and theory.

9 Final Comments

Suppose we have a working theory of cognitive-perceptual intentionality, and we call $\mathcal{L}$ a more or less systemantic inventory of its important terms and relations. Again, $\mathcal{L}$ is not designed as a formal or mathematical language, where all perceptual situations, for example, can be expressed as some sort of "$\mathcal{L}$-sentences". Instead, if the theory is successful, any intention-bearing cognitive/perceptual configuration can be described and discussed in ordinary language, which adopts $\mathcal{L}$ formulations.

Within its scope, then, $\mathcal{L}$ can help shape descriptions of cognitive/perceptual morphology such that perceptual consciousness can be exlored in isolation both from considerations of real-world correlates of perceived objects and contents, and of the brain states and neurological processes which correlate with perceptual experience. So $\mathcal{L}$ is "reductive" both in the sense of reducing the scope of its primary concern, and in reductively framing talk about knowledge and about mental states, so that the specifically cognitive/perceptual aspects of such talk can be singled out and analyzed in isolation.

Despite this reductive scenario, however, $\mathcal{L}$ by no means imposes or presupposes a paradigm where epistemological or scientific concerns are simply eliminated. To the contrary, the theory-semantic isolation of $\mathcal{L}$-concepts can potentially enable reductve analyses in the opposite directions. Suppose that, for an intention-bearing configuration $\mathcal{C}$, we can provide a $\mathcal{L}$-inspired analysis and description of $\mathcal{C}$. This analysis will present the specific morphological profile of $\mathcal{C}$ as one specific perceptual situation. We therefore have a structural description of the enviroment to which a perceiving subject is then comported, as that environment is perceptually manifest. So, insofar as we believe that some

physical or neurological system interacts with that environment through these perceptual structures, $\mathcal{C}$ provides a schematic representation of the structures which a neurophysical receptive system must cognize. Particular aspects of $\mathcal{L}$ can be correlated with particular neurophysical mechanisms which can "implement" some $\mathcal{L}$-structures, or, better, can implement a mechanism to perceive, cognize, respond to, and interact with $\mathcal{L}$-morphemes and the worldly objects which display them. Far from "reducing away" questions of a neurophysical substratum for cognitive/percetpual phenomenology, $\mathcal{L}$ helps to isolate individual phenomenological features so that a correlation between morphology and neurophysics can be built up piecewise. Instead of a single reductive account which can be rejected on purely philosophical grounds, we have the possibility of semi-independent reductive "modules", which can be explored and tested in isolation, and consider just one aspect of perceptual morphology: object surfaces, transparency, spatial organization, conceptual object classifcation, etc.

Most scientific reductive analysis is multi-scale: we descibe the norms and patterns among phenomena on one scale in terms of those on a finer-grained scale. In some cases, the explanatory power of the reductive account can engender a meaningful theory-semantic shift at the higher scale. For example, the power of genetics and evolution to explain biodiversity alters the implied semantics of expressions like "Natural Selection". The high-level language, which can say things like "the giraffe's neck is designed to reach high-up leaves", on its own terms leaves open semantic possibilities of, in this example, a "designer" who deliberately creates biological form. The theory of evolution shows this to be a semantic illusion; there is no "designer", and the phenomena which invite high-level characterizations in such terms (like the functionality of the giraffe's neck) can be explained on a more low-level scale (as the gradual selection of favorable traits, among a space of genetic possibilities). This is an example of reduction in scale (switching from a description at the anatomical level, to a theory at the genetic or molecular scale), which in this case is also a reduction in ontological commitments (eliminating notions of an "intelligent designer").

There are some well-known scientific analyses which similarly "reduce away" ontological posits that proved to be scientifically unfounded: epicycles, phlogiston, ether, humours, etc. But I do not believe these are typical reductive scenarios, despite — or maybe because of — the simple symmetry in these cases between a high-scale but metaphysically gratuitous theory, and a lower-scale and ontologically economical one. Most reductive analysis requires a detailed semantics on two or more different scales, so that an explanation can show that certain phenomenal stuctures — disclosed through the lower-scale semantics — are convincing physical, causal, and/or morphological explanations of patterns disclosed through higher-scale semantics. Such explanation is only persuasive if the semantics at both scales are richly specific and there is a plausible morphological link between them. There may not be morphological similatities *per se*, for example, between the giraffe's neck and DNA; but we have a persua-

sive account of how genetic structure can determine larger-scale biological form throuth the morphogenesis of adult anatomy.

In the case of neurophysics and perception, reductive analysis is complicated by the fact that two different domains — consciousness and brain states, for example — are not only on different scales; they seem to belong to different ontological "registers". The giraffe's neck and its DNA may be on two different physical scales, but at least each are physical objects or object-parts. Perceptual experience is directed at macroscopic worldly objects, but is not itself an object (in any noncontroversial sense of the word). This is surely why intuitions about consciousness as an "emergent property" of the brain, such as those advocated by John Searle, are less persuasive then emergent accounts whcich Searle mentions by analogy, like transparency or liquidity. There seems to be an ontological gap, not only a gap in scale, between conscious states and brain states, which is different in kind from contrast in granularity between water buckets and water molecules, or panes of glass and a chrystal lattice. Brains are not just fine-grained magnifications of consciousness.

Nevertheless, a theoretical framework and theory-language can help us to identify recurring patterns of cognitive/perceptual organization relative to the higher-scale, macroscopic world. A hypothetical language like $\mathcal{L}$ can structure descriptions of perceptual scenarios, whether they be derived from introspection, experimental reports, evaluations of computer graphics, semiotic interpretations of artistic space, or cognitive analyses of grammatic acceptability, relative to spatial schema. I can take real-life episodes, whether actual or hypothetical, outline them in informal language, and then try to represent them more technically with $\mathcal{L}$ formulations. So we can try to reconstruct the recurrent morphological patterns in everyday situations: seeing by the light of the sun through a window; looking for a book on a shelf; opening a door; eating an apple; imagining Sherlock Holmes; hurrying to a bus stop. Readers may or may not agree with my interpretations, but a common language like $\mathcal{L}$ allows reports of private, conscious experiences, and their structural details, to be phrased in a more systematic ways, one more conducive to public debate.

With regard to my optical-illusory bus, for example, by describing it as a figment of my imagination, I obviously place the bus or bus-impression, in and of itself, outside the realm of collective discourse. However, by trying to go further and recount the perceptual environment which set up the illusion, which made it credible, I tried to appeal to themes of trajectors and trajectories, of the similar appearance of lights reflected by glass and seen through glass, and also by perceptual self-correcting, as an optical illusion from one vantage point subsequently becomes clarified. It is at least plausible that words like "trajector" and "trajectory" are publicly meaningful because they refer to morphological details which all conversants can understand, by appeal to their own perceptions.

If this is true — and convesants can evaluate each such word on its own — they can be adopted as notions within $\mathcal{L}$'s theory-semantics. By reconstructing perceptual episodes in terms of $\mathcal{L}$ configurations, I can then submit a theoretical accounts on a case-by-case, or episode-by-eposide basis. Conversants may not find my episodic use of $\mathcal{L}$ accurate or convincing, but if they do, then we have publically vetted construals of perceptual phenomena — representations which may originate with a single person's experience, but which strike multiple people as effective representations of general perceptual processes. If we then consider neurophysical "implementations" of thse described processes, we may progress toward a reductive account of phenomenological episodes in scientific terms.

I do not claim that such an acount will resolve all metaphysical problems associated with consciousness and subjectivity. There is still the profound question of how cellular or electrical operations, even when gathered into an emergent unity, can physically realize the rich, intense, pleasant or painful affect, emotions, and "raw presence" of our conscious lives. Affects or emotion genarally respond to large-scale situations or attach to smaller-scale experiential content: we can be happy that everyone came to the reunion, or engrossed by a taste of wine. The sense of "raw presence", for example, that vulnerability of our bodies to external forces and dangers, provides both one important criteria for how we cognitively model our immmediate surroundings, and also provides experiential contrast between fantasy and reality, between imagined objects and real matter. This contrast, I believe, is an important part of a phenomenological epistemology, but it lies outside the direct concern of $\mathcal{L}$. Nevertheless, the affect of "raw presence" annotates some particular part of an overall perceptual situation — maybe the feel of some surface I am touching, or a property of the ambient surround, like hot or cold, or some direcitonal force, like wind. In any case, $\mathcal{L}$ configurations can isolate the "sites" to which affects or emotions are attached, be they perceptual or situational. This does not resolve questions of the physical realizability of affective reality, but at least it serves to integrate affect into cognitive/perceptual form.

So, a scientific theory of cognitive/perceptual form will not resolve all problems of mind and consciousness, but perhaps investigation of the neurophysical basis of affectivity can piggyback on an explanation of neurophysical implementations of a mentality which engages cognitive/perceptual forms. In any case, questions of affect or emotions are tangential to the kind of transcendental phenomenology associated with phenomenological "reduction". This is that aspect of phenomenology which is sometimes thought to be incompatible with natural science, and with the overall reductive project of the scientific worldview. I claim that this paradigmatic gap is an illusion. Isolating the description of cognitive/perceptual form, from the many other topics we can raise about consciousness — its emotional and affective dimension, its epistemic status, its physical realizability, etc. — allows a framework like $\mathcal{L}$ to develop a theory-semantics entirely devoted to a morphology of conscious experience. But show-

ing that neurophysical systems can implement a mentality which experiences these forms, properly conceptualizing and responding to them, certainly does not show that the domain of reality modelled by $\mathcal{L}$ is illusory or ontologically eliminable. Just the opposite — such a reduction should help validate the structure of a $\mathcal{L}$: should consoldate its stature as a vehicle for describing a conscious structuration which is a real part of the physical world.

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