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Methods and Generalizations

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I. MEANING, LANGUAGE, COGNITION

Linguists agree on one thing - that language is diabolically hard to study. They do not always agree, however, on the how's, the why's, and the what for's: how one should go about studying it and how speakers manage to do what they do; why it is so hard and why exactly we bother to study it; what language is for, and what linguistics is for. A mainstream view that has been popular in the last thirty years (but not necessarily before that) offers the following answers.

How linguists do it: they collect grammaticality judgments from natives and concurrently build and check hypotheses about the formal structure of particular languages and languages in general. How humans do it: they come equipped biologically with innate language-specific universals, that require only minimal fine-tuning when exposed to a particular specimen.

Why it's hard: easy for the child who has the innate universals already set up, hard for the linguist lost in a forest of idiosyncrasies that hide the deeper principles. Why bother? So that we can discover such principles.

What is language for?: The story here is that this question is not a priority for the scientist. We can worry later about function, communication, and meaning generally. And what is linguistics for? Well, there is the platonic reward of discovering structure for the sake of structure itself. And then there is biology: Since the universals are in the brain, they must also be in the genes; linguistics is theoretical biology; geneticists and neuroscientists will fill in the messy details of its implementation in our bodies.

This strange and simple story contains its own methods and generalizations. The appropriate methods are in the 'how to do it' - collecting grammaticality judgments and so

on. What counts as generalizations are the formal principles that apply to wider ranges of phenomena and/or languages.

In contrast to this sharply autonomous view of language structure, cognitive linguistics has resurrected an older tradition. In that tradition, language is in the service of constructing and communicating meaning, and it is for the linguist and cognitive scientist a window into the mind. Seeing through that window, however, is not obvious. Deep features of our thinking, cognitive processes, and social communication need to be brought in, correlated, and associated with their linguistic manifestations.

The cognitive linguistics enterprise, we believe, has already been remarkably successful. It is not far-fetched to say that perhaps for the first time a genuine science of meaning construction and its dynamics has been launched. This has been achieved by intensively studying and modeling the cognition that lies behind language and goes far beyond it, but which language reflects in certain ways, and which in turn supports the dynamics of language use, language change, and language organization.

Echoing Erving Goffman, I have called this backstage cognition. Language is only the tip of a spectacular cognitive iceberg, and when we engage in any language activity, be it mundane or artistically creative, we draw unconsciously on vast cognitive resources, call up innumerable models and frames, set up multiple connections, coordinate large arrays of information, and engage in creative mappings, transfers, and elaborations. This is what language is about and what language is for.

Backstage cognition includes viewpoints and reference points, figure-ground/profile-base/landmark-trajector organization, metaphorical, analogical, and other mappings, idealized models, framing, construal, mental spaces, counterpart connections, roles, prototypes, metonymy, polysemy, conceptual blending, fictive motion, force dynamics.

Well, where does all this come from? Did it all just spring up in the fertile mind of cognitive linguists, giving them an unlimited supply of new notions to draw from in order

to explain some linguistic facts that they wish to talk about? And if so, isn't all this a considerable weakening of linguistic theory, letting in so many flaky new gimmicks that virtually anything at all becomes easily but vacuously explainable?

Mais pas du tout. Rather remarkably, all the aspects of backstage cognition just alluded to receive ample justification on non-linguistic grounds from a variety of sources. Some have been extensively studied in psychology (e.g. prototypes, figure-ground, analogy), others in artificial intelligence and/or sociology (frames, roles, cultural models), literature and philosophy (metaphor). Metonymy, mental spaces, force dynamics, conceptual blending, initially studied primarily by linguists have been shown to apply to cognition generally. The notion of viewpoint and reference point is presumably even more general, given the nature of our visual systems and orientation.

Needless to say, all these features of backstage cognition deserve to be studied and understood in their own right, not just as a means of explaining linguistic distributions. To cognitive scientists who are not linguists, the linguistic distributions matter very little. And for cognitive linguists, there has been a major shift of interest. The cognitive constructs, operations, and dynamics, and the understanding of conceptual systems have become a central focus of analysis. The linguistic distributions are just one of many sources of relevant data.

This shift bears on the methods employed and the generalizations obtained. Methods must extend to contextual aspects of language use and to non-linguistic cognition. This means studying full discourse, language in context, inferences actually drawn by participants in an exchange, applicable frames, implicit assumptions and construal, to name just a few. It means being on the look-out for manifestations of conceptual thought in everyday life, movies, literature, and science. This is because introspection and intuition are woefully insufficient to tell us about general operations of meaning construction. When we volunteer a meaning for an isolated sentence, we do it typically on the basis of defaults

and prototypes. It is only in rich contexts that we see the full force of creative on-line meaning construction.

As for generalizations, the most powerful ones are those which transcend specific cognitive domains. In our work on conceptual blending, we see as a strong generalization the discovery that the same principles apply to framing, metaphor, action and design, and grammatical constructions. This is not an internal generalization about language, it is an external one relating linguistic phenomena to non-linguistic ones. Such generalizations seem primordial to the understanding of how language relates to general cognition, but they are precluded in principle by the autonomous approach evoked above. It is no surprise, then, if that approach finds no connection between language and the rest of cognition, for that autonomy is built into the very method that serves to build up the field of inquiry and the theories that are its by-products.

Although cognitive linguistics espouses the age-old view that language is in the service of meaning, its methods and results have been quite novel. The results in fact have been somewhat surprising. At the most general level, here are three that I find striking. I will call them respectively Economy, Operational Uniformity, Cognitive Generalization.

ECONOMY AND THE ELIZA EFFECT

By Economy, I mean the following: any language form in context has the potential to trigger massive cognitive constructions, including analogical mappings, mental space connections, reference point organization, blends, and simulation of complex scenes. When we try to spell out backstage cognition in detail, we are struck by the contrast between the extreme brevity of the linguistic form and the spectacular wealth of the corresponding meaning construction. Very sparse grammar guides us along the same rich mental paths, by prompting us to perform complex cognitive operations. What is remarkable is that by and large subjects engage in quite similar constructions on the basis of similar grammatical prompts, and thereby achieve a high degree of effective

communication. The reason seems to be that the cultural, contextual, and cognitive substrate on which the language forms operate is sufficiently uniform across interlocutors to allow for a reasonable degree of consistency in the unfolding of the prompted meaning constructions. How this works remains in many ways mysterious. What is clear is that language is radically different from an information carrying and information preserving system, such as a code or telecommunications. Language forms carry very little information per se, but can latch on to rich preexistent networks in the subjects' brains and trigger massive sequential and parallel activations. Those activated networks are of course themselves in the appropriate state by virtue of general organization due to cognition and culture, and local organization due to physical and mental context. Crucially, we have no awareness of this amazing chain of cognitive events that takes place as we talk and listen, except for the external manifestation of language (sounds, words, sentences) and the internal manifestation of meaning: with lightning speed, we experience meaning. This is very similar to perception, which is also instantaneous and immediate with no awareness of the extraordinarily complex intervening neural events.

What we are conscious of determines our folk-theories of what is going on. In the case of perception, the folk theory, an extremely useful one for us as living organisms, is that everything we perceive is indeed directly the very essence of the object perceived, out there in the world and independent of us. The effect is contained entirely in the cause. In the same way, our folk theory of language is that the meanings are contained directly in the words and their combinations, since that is all that we are ever consciously aware of. The effect (meaning) is attributed essentially to the visible cause (language). And again, this folk-theory is extremely useful to us as human organisms in everyday life. It makes sense. At another level, the level of scientific inquiry, this folk-theory, like other folk-theories, is wrong, and the information processing model of language breaks down. This reveals that, as humans experiencing language, we are fooled by an interesting variant of the Eliza effect. The famous computer program Eliza produced what looked like a sensible

interaction between a psychiatrist and a subject operating the program, but the rich meaning that seemed to emanate from the machine was in fact read in (constructed) by the subject. And strikingly, just like a perceptual illusion, this effect cannot easily be suspended by rational denial. In the case of Eliza, the illusion may be hard to block, but it is easy to see. The more general illusion that meaning is in the language forms is both hard to repress and hard to acknowledge. And for that reason, it has made its way into many scientific accounts of language. In such accounts, the notion that forms have meaning is unproblematic, and the "only" problem becomes to give a formal characterization of such meanings associated with forms. Clearly, if the presupposition that there are such meanings is in error, the very foundations of such accounts are in jeopardy. It has been, I believe, a major contribution of cognitive linguistics to dispel this very strong unquestioned assumption.

OPERATIONAL UNIFORMITY

It is commonly thought that very different operations apply to the various levels of linguistic analysis. For example, syntax governs the sentence, and semantics provides it compositionally with a meaning. At a higher level, other quite different operations apply to produce implicatures, derived meaning, indirect speech acts. Then rhetorical and figurative devices may kick in, such as metaphor and metonymy.

Our findings suggest a very different picture. Backstage cognition operates in many ways uniformly at all levels. Figure-ground and viewpoint organization pervades the sentence (Talmy (1978), Langacker (19987/1991)), the Tense system (Cutrer (1994)), Narrative structure (Sanders and Redeker (1996)), in signed and spoken languages, and of course many aspects of non-linguistic cognition. Metaphor builds up meaning all the way from the most basic levels to the most sophisticated and creative ones (Lakoff and Turner (1989), Grady (1997)). And the same goes for metonymic pragmatic functions (Nunberg (1978)) and mental space connections (Sweetser and Fauconnier (1996), Van Hoek

(1996), Liddell (1996), which are governed by the same general Access principle. Frames, schemas and prototypes account for word level and sentence level syntactic/semantic properties in cognitive and construction grammar (Lakoff (1987), Fillmore (1985), Goldberg (1997), Langacker (1987/91)), and of course they guide thought and action more generally (Bateson (19972), Goffman (1974)). Conceptual blending and analogy play a key role in syntax and morphology (Mandelblit (1997)), in word and sentence level semantics (Sweetser (this volume)), and at higher levels of reasoning and rhetoric (Robert (1998), Coulson (1997), Turner (1996)). Similarly, we find force dynamics and fictive motion (Talmy (1985, 1998) operating at all levels (single words, entire systems, like the modals, and general framing).

This operational uniformity is unexpected, remarkable, and counter-intuitive. It has taken cognitive linguists a lot of hard work and theoretical conceptual rethinking to uncover this series of powerful generalizations. There are quite a few interesting reasons for the difficulty of thinking in this new way. One is that language does not come with its backstage cognition neatly displayed 'on its sleeve'. Everything that counts is deeply hidden from our consciousness, and masked by the 'folk theory' effects mentioned earlier. Another difficulty has to do with the long tradition of apprehending limited aspects of language in a self-contained, language-specific, descriptive apparatus. The resulting specialized technical vocabulary has been immensely helpful in launching a coherent linguistic science, but regrettably it has also shielded linguistics from a more comprehensive cognitive framework in which the right questions could be asked.

COGNITIVE GENERALIZATION

Operational uniformity, as outlined in the previous section, pertains essentially to language and reasoning. The uniformity is across linguistic levels, the word, the sentence, the sentence and its context, the whole discourse, and ultimately general reasoning. And yet, there are broader and even more interesting generalizations, those that transcend

specific cognitive domains. Cognitive linguists have been especially attentive to this dimension of the new research, and they have argued persuasively for the cognitive generality of the mappings, correspondences, bindings, integration, perspectival organization, windows of attention, pragmatic functions, framing, force dynamics, prototype structures, and dynamic simulations that underlie the construction of meaning as reflected by language use. As a result, linguistics is no longer a self-contained account of the internal properties of languages; it is in its own right a powerful means of revealing and explaining general aspects of human cognition.

II. THE CASE OF CONCEPTUAL INTEGRATION

Any science is deeply dependent on the methods at its disposal and finds its essence in the types of generalizations that it seeks to attain. For this reason, changes of methods and shifts in the notion of what constitutes a generalization have a major impact on the evolution of scientific inquiry. The transitions from alchemy to chemistry, from classical thermodynamics to particle kinetics, from Euclid's geometry to Descartes', display the full force of such changes when we look back at them with hindsight. At the time of the transition itself, however, things are more fuzzy. It is not immediately clear in what respect methods have changed, and to what extent the generalizations have become different. Some of this may be true today, mutatis mutandis, in the shifts of emphasis that cognitive science has triggered with respect to the role and study of language within the scientific field of cognition in general.

In the present paper, I will use the work some of us have been doing on conceptual blending to illustrate the more general epistemological issues evoked above. Some familiarity with conceptual blending in general is assumed. The reader may consult Fauconnier and Turner (1996, 1998), Coulson (1997) for general presentations of the framework.

GENERAL FEATURES AND ORIGINS OF OUR CONCEPTUAL BLENDING THEORY

Blending is a widely applicable cognitive operation. It matches two input spaces through a partial cross-space mapping and projects selectively from both inputs into a third space, the blend, which gets elaborated dynamically. The cross-space mapping exploits shared schematic structure in the inputs or develops additional shared schematic structure. This common structure is contained and elaborated in a fourth space, the generic space. The four spaces (inputs, generic, and blend) are connected through the projective links and constitute a 'conceptual integration network' (henceforth CIN for short). A typical example is Seana Coulson's 'trashcan basketball', a game that students in a dormitory might invent, consisting of throwing crumpled paper balls into a trashcan, and scoring points as in basketball. The inputs would be respectively the game of basketball itself and the dorm situation. The mapping would link the basket to the trashcan, the players to the students, the ball to the crumpled paper, with additional links developed for zones, out of bounds, etc. The initial generic space consists of an object being thrown into a container by someone. In the blend, the new game gets elaborated along with the physical constraints on this game specific to the dorm situation. This elaboration yields the emergent structure of the blended space.

We know at present that blending operates as part of many cognitive phenomena in action, design, science, language, art, etc. We also know that it can operate very quickly on-line in everyday thought and action, or very slowly over centuries as in scientific evolution and conceptual change generally, that it can be novel or entrenched to various degrees, highly noticeable or cognitively invisible, purely mental or materially and physically anchored. None of this was immediately apparent. Blending was first noticed in isolated phenomena where it seemed exceptional and even exotic.

In my own work, blends first became manifest in analogical counterfactuals such as *In France, Watergate would not have hurt Nixon*, which set up a blended situation with some features of France and others of the U.S. and the Watergate scandal. This blend is

elaborated and used to reason and make points about the French and American political systems, mentalities, cultural models, etc. Mark Turner and I started developing a theory of blends on the basis of anomalies in metaphor theory and source-target projection. Len Talmy had noticed lexical and metaphorical blends in his work on 'rubbersheet cognition'. Doug Hofstadter and David Moser had pointed out cases of frame blends and before that Erving Goffman had noted the phenomenon of frame-mixing. Arthur Koestler recognized in the Buddhist monk puzzle an instance of creativity through blending. And no doubt one could find similar observations throughout the history of thought, as suggested in Turner (1996), who points out a similar example in Aristotle.

In the research on this topic that Mark Turner and I started in 1993, the initial motivation was internal to metaphor theory - what we called a refinement of the theory from the two-domain (source/target) model to a four space model in order to accomodate richer inferential schemes. But quickly, other examples showed that metaphor was only one of many cognitive phenomena involving blending. There were the analogical counterfactuals that we already knew about, and then what we later called frame networks (the *Regatta*, *Kant*, and *Buddhist monk* examples).[1] These conceptual phenomena were manifested through language, but non-linguistic cases were quick to follow. We found that number theory in mathematics had gone through many successive blends, typically involving inputs of space and inputs of number. And Jeff Lansing pointed out to us other fascinating cases in physics (Fourier and Maxwell's work) where scientific evolution and conceptual change had been achieved through the construction of elaborate CIN's. Dan Gruen made us aware that computer interfaces, such as the Macintosh desktop, were also cases of the same cognitive construction process, and we went on to find many other cases in action and design generally. Back to language, we were now able to see Langacker's entrenched integration processes in grammar and Goldberg's fusion of grammatical constructions as yet other manifestations of the same uniformly characterizable cognitive operation. Later work would provide many more generalizations in diverse areas such as morphology and

syntax (Mandelblit (1997)), literature (Oakley (1995), Freeman (1997), music (Zbikowski (1997), humor (Coulson (1997).

The point of briefly recapitulating this development of the research on conceptual integration networks is to get back to the issue of method and generalizations. In the landscape of autonomous mainstream linguistics evoked at the beginning of this paper, there is virtually no way to generalize cognitive operations in the manner just outlined and there is no method that would lead to this type of generalization. It is worth discussing a little more why this is so. There are several aspects that conspire to make it so.

LIMITATIONS OF CONVENTIONAL LINGUISTICS

First, within the study of language itself in conventional linguistics, components are sharply divided in such a way that the descriptive and theoretical primitives of each component are so different that they are generally incommensurable. This makes it impossible not just to find the appropriate generalizations, but even to ask the type of questions that might lead to such generalizations. So for example, in studying CIN's we find a continuum of networks that share fundamental properties and differ along certain gradients (single-framing networks, frame networks, one-sided networks, two sided networks, ...). On this continuum we find Fregean logical forms, counterfactuals, analogies, metaphors of various sorts, and many intermediate cases that fall in between these prototypical cases. I return below to some of the distinctions along this continuum. The problem, if one grants that this is a powerful generalization, is that it is meaningless in the standard vocabulary of conventional linguistics and so-called formal semantics, in which logical forms, metaphors, and analogical counterfactuals are not even comparable at any level, theoretical or descriptive, let alone cognitive.

Second, the methods of conventional linguistics weigh heavily against the possibility of discovering regularities of the kind exemplified by CIN's. Grammaticality or acceptability judgments are not the appropriate observational data. Truth-conditional

inferences or Gricean implicatures are not either. The point here is that a certain way to conceive the problem space of linguistics, or of semantics in philosophy, has determined methods and observational categories in such a way that central questions (of the form suggested by CIN's and many other constructs of cognitive semantics) cannot even be posed. As I see it, this is not only a great obstacle to scientific progress; it is also socially among the researchers in the field a source of deep misunderstandings. To the extent that the observational categories are accepted and commonly used uncritically, the new questions are not just peripheral, less important, and so on, for conventional linguistics. Rather, they make no sense at all. This is a serious concern, since generation after generation of linguists is trained according to such methods and observational distinctions. It is not a matter of different frameworks or different theories. It is, more seriously, a matter of apprehending the world of the data and the data in the world in ways that are so different that they may end up being incommensurable.

Within conventional linguistics and philosophy of language, then, we find a pretheoretical division of components and phenomena, and accepted methods for gathering data which stand in the way of making important connections and generalizations. But as regrettable as those two aspects may be, there is a third which is possibly even worse. This third aspect is the separation of matters pertaining to form and meaning in language from everything else outside of language. In the case of CIN's, the pertinent generalization is not just the one that lets us see a continuum from Fregean propositions to frames to counterfactuals and to metaphors. It is the broader generalization that links this continuum itself to a vast array of conceptual, cultural, physically and socially embodied cognitive phenomena, for example the ones cited above - evolution of the concept of number in mathematics, design of computer interfaces, emergence of new activities such as games or other cultural practices, blending with material anchors, and many more. The generalization does not consist in a reduction. All these phenomena are acknowledged to be very different from each other and to constitute rich and diverse instances of human

experience. The generalization consists in being able to identify a common cognitive operation that plays a part in all of these cases. The unity and uniformity of such processes remains hidden as long as incommensurable frameworks, methods and terminologies remain attached to different areas of action and cognition.

GENERALIZATIONS AND LIMITING CASES

Let me now go into a little more detail, using aspects of conceptual integration theory to illustrate the broader epistemological points. Science proceeds by means of a dialectical succession of differentiations and unifications. In the case of language and thought, it is undeniably useful to identify and distinguish fixed and novel meanings, predicate-argument structure, figurative vs. more literal expressions, conditionals of various sorts, and so on. At the same time, when fine distinctions are made along many dimensions, a contrary force invites us to look for unity behind the diversity.

Take a straightforward example from geometry. An hyperbola, an ellipse, a parabola, a circle are all clearly different shapes. At an intuitive level, they fall into different categories. Mathematically, they can be given different precise geometric characterizations, specific to each kind of curve. Even more different intuitively from such curves are the straight line, or a fortiori the geometric point. And yet, all these geometric shapes can be viewed as variations on a single theme - the two-dimensional planar section of a three-dimensional (quadric) cone. Keep the plane perpendicular to the axis of the cone, and you get all circles, tilt the plane to obtain ellipses, tilt a little more for parabolas, and tilt again for hyperbolas. Move the plane parallel to one of the sides of the cone until the parabola condenses into a straight line. Move the plane towards the vertex of the cone, until ellipses or circles shrink into a single point. All of these shapes are conic sections, and in spite of the sharp differences they display, fit on the same conceptual continuum. On this continuum, we find prototypes - the oval of an ellipse, the parabola of the cannonball shooting through the air, the circle of a beer coaster, the asymptotic hyperbola.

And we find limiting cases - the straight line, the point, the circle itself relative to ellipses, or the parabola as a limiting case of ellipses stretched out to infinity.

A theory of conic sections offers a way to see a useful mathematical unity behind the obvious diversity of shapes and figures, without reducing this diversity to a single prototype (we do not say that because these shapes, when viewed from this perspective, belong to the same continuum on which the circle is a prototype, they are therefore all more or less prototypical circles). CIN's offer a similar way to see unity behind the obvious diversity of particular manifestations of meaning constructions. We start, as in the conic section case, by formulating the general characterization evoked above (cross-space mapping, projection into a blend, emergent structure by completion and elaboration, etc.). Then we look at specific variants of this general structured dynamic process.

Coulson's trashcan basketball, in spite of its simplicity, represents a fairly general kind of CIN. It is called a two-sided network, because there is frame projection from both inputs (basketball and throwing paper into baskets). There is emergent structure in the blend through mental elaboration and physical confrontation with the affordances of the real world in which the blend is run. Notice that the basketball blend does not fall into one of the particular more specific forms which I shall show are prototypes along the continuum of blending. It is not understood as a metaphor. It is not counterfactual; the new game really takes place. It is not a Fregean composition of basketball and paper-throwing. It is not an analogy between two preexisting domains (basketball and waste disposal) - the point of the blend is not to point out some analogy between those two domains, and exploit one (basketball) to make inferences about the other (paper disposal).

Now, as in the 'point as conic section' example, let's look at some limiting cases of CIN's. A generic space has elements and relations. Take a limiting case where the number of relations is zero and the number of elements is two. Take Input 1 in the network to be a subpart with two role-elements and one relation of a more general frame, for example the *father-child* subframe of our more general kinship frame. And take Input 2 to consist only

of two elements with no relation between them, e.g. *Paul* and *Sally*. A simple cross-space mapping can link the two inputs, with a minimal generic space, as in Fig. 1.

FIG. 1

Now, project structure from both inputs into a blended space, with fused counterparts, as shown in Fig. 2.

FIG. 2

This is of course a very simple network, and the structure in the blend is almost entirely obtained by composition of the input structures. It is essentially equivalent to a Fregean composition, expressed in logical notation by something like

FATHER (Paul, Sally)

It is also equivalent to filling in slots in a frame (father, ego) with fillers (Paul, Sally). In English, this blend would be triggered by sentences like *Paul is the father of Sally*. Another way to think about the resulting blend is to view it as instantiating the projection of the kinship frame in Input 1 onto the situation in Input 2, consisting of Paul and Sally.

We call a CIN with such properties (frame projected from one input, and content projected from the other input) a *Single-framing Integration Network*. Needless to say, if this were the only form of integration ever observed, there would be scant justification for

setting up a theory of conceptual blending. Simple framing (or its Fregean equivalent) would suffice.

Still, in spite of the glaring simplicity of single-framing frameworks, it is worth looking just a little at the embryonic blending that they do contain, because it will turn out to have consequences for our continuum. First, there is some non purely compositional structure in the blend after all, since a new role has been created that was in neither input, the role *father of Sally*. Reference to this new role is possible after it has been created:

Paul is the father of Sally. As <u>such</u>, he is legally responsible for this auto accident.

Second, some structural information in Input 2 was used in setting up the cross-space mapping and then projected to the blended space: that *Sally* is a girl or woman's name, while *Paul* is a boy or man's name. Since *father* is specified in the kinship frame as 'man', it matches *Paul* and not *Sally*. In the blend, we have the information that Paul is a man, and also the additional structure that Sally is a daughter, not a son. This is provided less trivially than it seems by automatic alternations in the kinship frames of Input 1 (female ego-father / daughter-ego). As a result, another role, *daughter of Paul*, is set up implicitly in the blend. Now we can take another look at the Generic space. When a kinship frame is mapped onto two people, the generic is more than just any two elements. It has attribute structure; fathers and daughters are people; Paul and Sally are people. So the generic space in our example is the simple structure of 'two people'. This is a slightly abstract notion, since the kinship roles are people in an abstract sense. As the CIN gets elaborated dynamically, the Generic space itself gets elaborated. The two people are additionally a man and a woman/girl. The fact that all spaces, including the generic, get elaborated dynamically in the construction of a network is an important general property of CIN's. So after elaboration, the Single-framing CIN in our kinship example looks something like the configuration of Fig. 3.

FIG. 3

Recall that this kind of example would not by itself constitute strong evidence for blending. The point is different. If CIN's generally are part of our meaning construction capacity, then Single-framing CIN's are available as one particular type of CIN, and they account for the kind of meaning construction usually subsumed under framing or Fregean propositions. In other words, we don't need CIN's for one kind of phenomena, and Fregean propositions or framing for another. This is of course like saying that we don't need a theoretical framework for circles distinct from the framework used to study ellipses and hyperbolas. That in turn does not mean that we can't study the special properties of circles (as opposed to other conic sections). By the same token, we may want to study the special properties of Single-framing networks (as opposed to other CIN's), because such networks are common and constitute a prototype on the continuum of CIN's. In fact, looking back in this light on the Fregean (and Tarskian) approach to meaning, we can say that typical semantic theories took what we're calling here Single-framing CIN's to be the defining prototype for all of core meaning construction, and dismissed other phenomena such as metaphor or analogy as belonging to entirely different areas like rhetoric or general reasoning.

The above argument for understanding framing as a prototypical (and limiting) case on a continuum of CIN's is based on theoretical economy and generality of cognitive operations. But we can offer additional empirical evidence in its favor. If we are indeed dealing with a continuum, then we should find CIN's that are close to Single-framing, but that let in slightly different projections or emergent structure, not available purely compositionally. Consider first mythological variants of fatherhood such as:

Zeus is the father of Athena. She was born out of his head, fully clad in armor.

This example points to the fact that there was more pattern completion and projection from inputs in the *Paul* and *Sally* case than we had realized. We would have inferred naturally from that case the existence of a mother, biological birth, baby, and so on. All these

inferences are cancelled in the *Zeus* and *Athena* case. But some more general schemas of human progeneration are maintained - the offspring comes out of the body of a parent. The key to this is selective projection from the inputs and particular elaborations in the blend. In Input 2, the actors are deities with special dispensations with respect to ordinary biology. The second sentence (*She was born …*) explicitly asserts a particular elaboration of the blend that prevents the usual projections from the kinship input 1. Fregean compositionality would fail to allow any of this. There would either be excessive projections from the kinship frame, which would make the Zeus case contradictory. Or else, there would be a stripped down minimal notion of fatherhood, which would then fail to account for the richness of inference in the ordinary case of Paul and Sally. Of course, the Zeus case cannot be attributed to figurative speech or analogy. In spite of the non-conventional birth methods employed, Zeus is still quite literally Athena's father. Family structure is inferred along with sentiments and emotions that come with it.

Now consider a neighbor who takes care of Sally for the day while Paul is away, carrying out fatherly duties like making her lunch, accompanying her to school, reading bedtime stories. That neighbor can say to Sally: *I'm your father for today.* A different blend than before is constructed. Family structure, genealogy, and progeneration are no longer projected, but many other typical aspects of the father-daughter relationship are projected (routines, taking care, responsibility, affection, protection, guidance, authority, ...). Compositionality is no longer at all an option to account for this case. Too many properties felt as central are missing. We have moved along the CIN continuum from the pole of Single-framing networks. But clearly, we have not reached a point on the continuum that would be felt intuitively to be metaphorical. Fatherhood is not a metaphor for what the neighbor is doing. In fact, although some analogy has now contributed to the mapping, the function of this blend is stronger than just analogy between the neighbor's actions and a father's actions. The neighbor in this local context is really filling in the role of the father in relevant respects, not just doing something 'similar' to what the father does.

The flexibility of blending with selective projection and contextual elaboration allows for this intermediate kind of situation which doesn't fit a prototypical semantic or pragmatic characterization.

III. THE CONTINUUM OF C.I. NETWORKS

This brings me back to the epistemological issue of what constitutes a generalization. I am offering evidence for seeing apparently disparate notions like framing, metaphor, etc. as manifestations of a deeper unitary operation of integration. But that evidence, in addition to generalizing over the types of phenomena, suggests that we are not dealing with discrete types but rather with a continuum, on which certain CIN's stand out as prototypical of metaphor, or counterfactuality, or framing, etc. This predicts correctly that we will find a range of conceptual integration phenomena along this continuum, which do not fit neatly into the usual types. The analogy here could be made with numbers. It was a non-trivial extension of arithmetic to view integers and fractions ("proportions") as belonging to a common continuum of rational numbers, and the concept of that continuum in turn led to the consideration of other types of numbers that might lie among (and between) the others. Their empirical manifestation was found in 'distances' (lengths), e.g. the Pythagorean hypotenuse of a right triangle.

Consider further examples linked to *father*: *The Pope is the father of all catholics. The Pope is the father of the Catholic church. George Washington is the father of our country.* They are farther along the continuum. The first still has people in the generic space. Selective projection has emphasized authority, size of the family, responsibility, leadership, social role (from the kinship input) and specific properties of religion, catholicism from the input with *the Pope* and *all catholics*. The second arguably projects the role of a child to a single social entity (*the Church*). The corresponding generic is more abstract. The blend reflects a type of socio-cultural model, in which a social entity (church, nation, community) is the "child" of its leader. Although *father* is no longer applied in

anything like a literal sense, such examples are probably felt to be extensions of the use of *father* rather than clear metaphors. With the George Washington sentence, we go a little bit further by highlighting the causality in time between the parent and child, and between the founder and the nation. This abstraction, forcing a generic schema at a higher level, increases the perceived difference between the two inputs and their domains. The impression of metaphor is undoubtedly stronger. And that subjective impression reaches a higher point when the two domains are even more explicitly distinguished, as in *Newton is the father of physics.* Physics, as opposed to church and country does not even stand in metonymic relation to people and groups of people. Yet, Newton and Washington as adult men, have all the criterial biological features of possible fathers plus some of the stereotypical social ones (authority, responsibility, ...). The CIN's are two-sided - they bring in frame structure from both inputs. Even more subjectively metaphorical are cases like *Fear, father of cruelty,* where the two domains (emotions/qualities and people/kinship) have no literal overlap at all, and the projected shared schema is correspondingly abstract (causality). And finally, the acrobatic metaphor *The child is the father of the man* comes around almost full circle by using background knowledge (children grow into men) to create emergent structure in the blend giving a rich instantiation to the abstract generic causal structure which maps kinship to the human condition in an unorthodox way.

This gradient of the CIN continuum along the dimension of metaphoricity allows us to see the similarity between framing in prototypical metaphors and framing in logic. In the blend for *Fear, father of cruelty*, a new conception of fear and cruelty has been created. Fear and cruelty are endowed with a kinship structure which is much more than an abstract causal relation. This is the equivalent in CIN terms of what Lakoff and Johnson have often said about enriching the conceptualisation of a target through metaphor. But it is also of the same cognitive nature as the much less spectacular process of projecting a kinship subframe onto Paul and Sally. Extension is possible in both cases. We can wonder who the mother, siblings or children of Sally might be. And we can wonder who the mother, siblings or

children of cruelty might be. We can ask if Fear and Cruelty travel together like Father and Son, or if the Son shows up only when the Father has prepared the ground for him. In other words, elaboration of the blend in a metaphorical CIN will rely heavily on rich aspects of the 'source' input, not just on the abstract causal schema in the generic space. This is parallel to the elaborations of a blend in a Single-framing CIN on the basis of the frame projected from the framing input. It's once we know that Paul and Sally are father and daughter that we think of looking for the rest of their family or of asking what their father-daughter relationship is like. Blends lead to new conceptualizations which lead to new actions. For example, the notion of *computer virus* is a blend of biological and computational inputs. The conceptualization *computer virus* helps to lead the expert's thinking and action in a certain direction: the creation of *vaccines* and *disinfectants*.

I will return below to other noteworthy aspects of the CIN continuum, in particular along other dimensions than the metaphorical. But first, let us recapitulate the arguments for generalization and see if there is or is not available evidence from other sources. The first argument is one of structural and dynamic generality. Previously sharply distinguished processes like framing and metaphor can be viewed as instances of the more general (and independently needed) notion of CIN. The second argument is one of continuity. Between a Single-framing CIN based on *father* and a metaphorical one also based on *father*, we find many intermediate cases, which are not prototypically Fregean or prototypically metaphorical. Such CIN's can differ from each other in their one-sidedness (entire frame from one input) or two-sidedness (frame projection from both inputs), in the type of selective projection, in the similarity or dissimilarity of the domains for the inputs, in the abstractness of the generic space, and other factors not yet mentioned.

The kinds of blends we have been talking about can be constructed using language. The evidence we have invoked is semantic. Can we find syntactic evidence for the generalizations defended here? One kind of evidence would be very strong: if the phenomena considered here are indeed instances of the same kind of meaning construction

(through CIN's), then this might be reflected syntactically by the use of a single syntactic form to prompt their construction. In fact, English, almost too good to be true in this regard, has a construction which is specialized in exactly this way. The construction is the apparently harmless but actually immensely powerful construction "NP_x is NP_y of NP_z". Turner (1991) has explained how this construction can sytematically prompt metaphorical and analogical mappings. NP_x and NP_z identify elements x and z in a target space. NP identifies element y in a source space. The copula *is* indicates that x and y are counterparts. And the understander must identify the two relevant domains and set up an implicit element w to be the counterpart of y. Turner gives examples like *Vanity is the quicksand of reason.* The target is concerned with human traits like reason and vanity, the source has to do with travelling and falling into quicksand. The missing element w is the traveller. The structure in the source is one of a traveller falling into quicksand, and therefore failing in his enterprise (perhaps to the point of dying). In the target we understand that reason is similary seriously impeded by vanity. The blend corresponding to the grammatical construction "NP_x is NP_y of NP_z" is thus:

FIG. 4

But now, quite interestingly from the point of view of our generalization along the CIN continuum, we see that the same construction also provides Single-framing blends, when the mapping is not a metaphor, but a simple framing. *Paul is the father of Sally* has the very same syntactic form as *Vanity is the quicksand of reason*, and as argued above yields the blend of Fig. 2, mapping the kinship subframe "father-ego" onto the two people Paul and Sally, and integrating the two inputs into a more richly structured blend. The mapping scheme is exactly the same as in the metaphorical case: x and z in one space are Paul and Sally. y in the other space is the role "father", and it is the counterpart of x

(Paul). The missing element w is the 'ego' of the kinship frame. This is shown in Fig. 5, identical to Fig. 2 plus the x, y, z, w labels:

FIG. 5

We can therefore take the construction "NP *be* NP *of* NP" in English to be a general prompt to construct an XYZ blend (a CIN). The construction will cover not only single framing and metaphor, but also all the intermediate CIN's mentioned above (*Zeus is the father of Athena, I'm the father of Sally for today, The Pope is the father of the Church*, and so on).

But doesn't *of* have a prototypical meaning linking part and whole, as in *the door of the car* or *the top of the building*? Of course, and this is precisely the point of our generalization and an illustration that prototypes are found all along the continuum. The word *top* does not in itself denote a part of a building. It is part of a more general frame - roughly things that have vertical orientations and are bound in space. So when we point to a location in the building and say *This is the top of the building*, we are constructing a Single-framing XYZ blend, just as in the other cases. "*this*" identifies location x in Input 2 (the building); "*the top*" identifies a vertical extremity y in the "top-bottom" frame of Input 1, "*the building*" identifies element z in Input 1. The missing element w is the general notion of verticaly oriented thing in the frame of Input 1. This is shown in Fig. 6.

FIG. 6

In this Single-framing CIN, the relevant generic relation common to the two inputs is indeed "part-whole": y is a part of w, and x is a part of z. So we see that because we

have more general vs. more specific frames, one effect of Single-framing can be to set up a part-whole relationship. The same is true for "*door of the car*". *door* identifies quite generally something that opens into a container. That general frame of a container with a 'door' is projected onto the more specific frame of 'car', and the XYZ mapping scheme plus construction of the Single-framing CIN identifies a part of a car with specific properties of the 'container with an opening' frame.

So the picture that emerges is something like the following. "*x is the y of z*" is a syntactic construction that prompts the conceptual construction of a CIN with the general properties outlined above - x and z in one input, mapped to y and w in another input, and integration into a blend from those two inputs. The kind of CIN will depend on the kinds of inputs we build based on the linguistic characterizations of x, y, z, and background and contextual information. Words like *father, top, door,* will evoke certain frames easily, and may prompt Single-framing (a simple default strategy that yields what we perceive to be a more literal meaning). But discrepancy between the two inputs (as in *father of cruelty*) will lead to more elaborate CIN's and subjective feelings of increased non-literality and metaphoricity along the continuum.

Notice that when an entrenched metaphor is the appropriate conventional way to frame an input, as for example with TIME AS SPACE (*Christmas is not far*) the corresponding CIN will constitute the default, and there will be no feeling at all of metaphoricity. For example with our XYZ construction, expressions like *the end of the week, the middle of the month* construct a CIN based on the cross-space mapping of space (middle of an object, end of an object or path) onto time. Because this cross-space mapping is the conventional metaphor TIME AS SPACE, it is directly available and the expression is 'felt' to be literal. Subjective feelings of metaphoricity or non-literality have more to do with distance from entrenched defaults and basic mappings, than with whether metaphor is actually involved or not. Another way to say this is that conventional blends based on basic and general metaphors are not felt subjectively to be different from many

kinds of conventional single framing, although they are technically in different positions on our continuum of CIN's. Cognitive effort and specificity of domains interact in this respect with the continuum. This can be taken as an additional argument for the fundamental unity of the processes at work.

The fact that syntactic constructions may characterize CIN's in this way allows us to look at issues of composition and compositionality in a more revealing way. There has often been a tension in linguistic theories between the formal compositionality of syntactic forms and the none-compositionality of the corresponding meanings. But we can now see syntactic forms as prompting mapping schemes rather than conveying static truth conditions. And those mapping schemes (as opposed to static truth conditions) can be composed in a way that follows the overt syntactic composition.

In Fauconnier and Turner (in preparation), we show in some detail how this works for the "*x is the y of z*" construction discussed above. We show that the successive blends systematically triggered by sentences like:

Elizabeth is the roommate of the daughter of Paul.

Prayer is the echo of the darkness of the soul.

are exactly the same, in spite of the fact that the first composes two Single-framing networks (and is therefore equivalent to an ordinary Fregean composition), while the second composes two highly metaphorical CIN's and is not truth-compositional.

I will not give the technical derivation here, but the idea is fairly simple. "*Elizabeth is the roommate of z* " sets up a CIN linking an initial space with people to a frame of housing (input space APARTMENT). A blend is created in which Elizabeth has the role roommate with respect to a second element z, constructed by a second '*of*' construction which links z to another space containing the kinship frame ego-daughter. "*the daughter of Paul* " links z to *daughter* and *Paul* to ego, and blends again, giving the configuration of Fig.7:

FIG. 7

Applying the very same instructions to the formally identical sentence, *Prayer is the echo of the darkness of the soul*, yields exactly the same blending configuration, as shown in Fig. 8.

FIG. 8

In Fig. 7, we have a composite frame, and the links in the CIN allow us to access the appropriate inputs - the two people Paul and Elizabeth in one space, the role roommate in another, and the role daughter in a third. As a result of this successive blending, a third person has now been added to the 'people' input. The space element for that person is entirely characterized by its position in the blend and links to the spaces containing frames. The meaning in this case is created by successive Single-framing CIN's. In Fig. 8, the ultimate mapping configuration is the same, but the cross-space mappings are metaphorical. The blend is intuively more complex, because it contains elements which belong simultaneously to the domain of sound and to the domain of light. The understander presumably expands more cognitive effort because the overall integration is none-standard and because the CIN's are highly two-sided.

It is also interesting to see in these examples that the composition of the mapping schemes can follow the linear order of the English sentence:*Elizabeth* to *roommate* starts the cross-space mapping; *of* signals the integration and the blended space; *daughter* moves us to a kinship space with a second projection; *of* signals the second integration; *Paul* provides the last missing element for this integration, from the initial input space. The same would be true in the composite metaphorical blend: the metaphor of *prayer* as an *echo* starts the process, and sets up a space of sound. *darkness* links the first blend to a new

space of light, and *soul* provides the last missing element to complete the second integration and the multiple metaphor.

The mapping schemes could also be composed in the reverse order, 'daughter of Paul' first, and then 'roommate of'. The resulting configuration (Fig. 7) does not reflect any ordering. This seems desirable since we might be processing the sentence from scratch and be introducing the frames in the order in which they appear linguistically, or we might have already set up the integration 'daughter of Paul' before building the composite blend.

Fregean composition does not apply for the metaphorical case, and for the single-framing one, it would have to follow the reverse order, building the compositional meaning bottom up, right to left.

Our view of compositionality, only sketched out here, would generalize a fundamental process of meaning construction over the entire continuum of CIN's. It would retain the insights of truth-conditional composition for strict single-framing networks, while accounting for the many cases which are not compositional in the sense of truth-conditional semantics.

CONCLUSION

I have attempted in this paper to discuss some general methodological issues pertaining to the study of language in the framework of modern cognitive science, and to illustrate some of the points with examples from current work on conceptual integration.

One emphasis from this perspective is that explaining linguistic distributions is not an end in itself. Rather, it is one of the many facets of an overall understanding of cognition and language. A second point (economy) is that language forms carry very little information per se, but derive their power by activating preexistent networks in a way that creates emergent structure. A third point is the operational uniformity of much backstage cognition, hidden from consciousness, counterintuitive, and masked by our folk-theories. From uniformity follows cognitive generalization. Linguistics becomes more than a self-

contained study of language; it contributes to revealing and explaining general aspects of human cognition.

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[1] Here are brief descriptions of the three cases of frame networks mentioned in the text:

The debate with Kant *[philosophy teacher expressing his/her opinion]*
I claim that reason is a self-developing capacity. Kant disagrees with me on this point. He says it's innate, but I answer that that's begging the question, to which he counters, in *Critique of Pure Reason*, that only innate ideas have power. But I say to that, what about neuronal group selection? And he gives no answer.

The Buddhist monk
Riddle of the Buddhist monk and the mountain: A Buddhist monk begins at dawn one day walking up a mountain, reaches the top at sunset, mediates at the top for several days until one dawn when he begins to walk back to the foot of the mountain, which he reaches at sunset. Making no assumptions about his starting or stopping or about his pace during the trips, prove that there is a place on the path which he occupies at the same hour of the day on the two separate journeys.

The boat race *[excerpt from a sailing magazine]*
As we went to press, Rich Wilson and Bill Biewenga were barely maintaining a 4.5 day lead over the ghost of the clipper *Northern Light*, whose record run from San Francisco to Boston they're trying to beat. In 1853, the clipper made the passage in 76 days, 8 hours. —"Great America II," *Latitude 38*, volume 190, April 1993, page 100.

(They are analyzed in Fauconnier and Turner (1996, 1998))

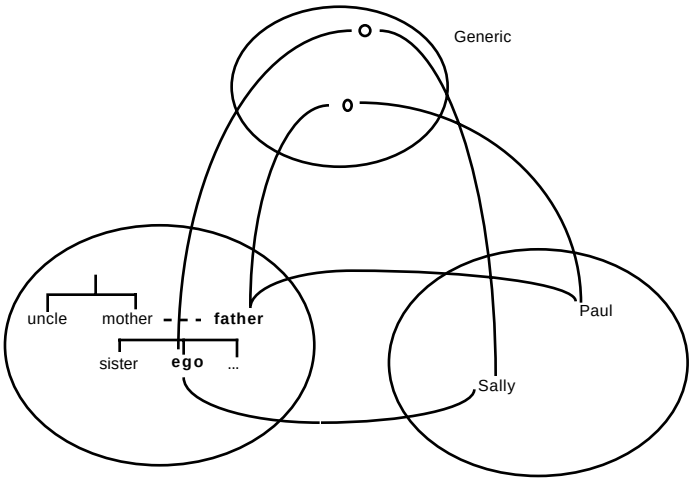

FIG. 1

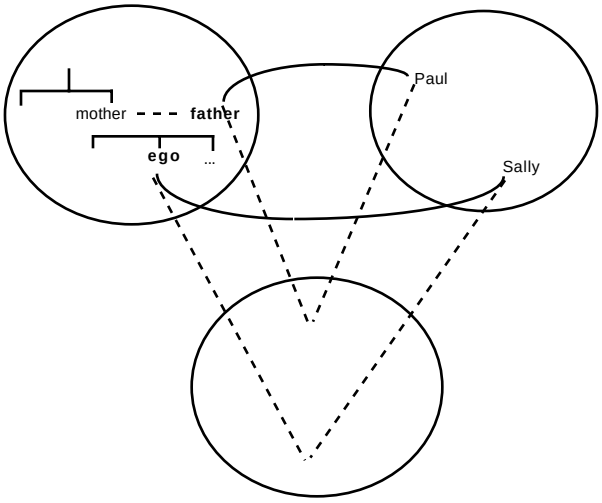

FIG. 2

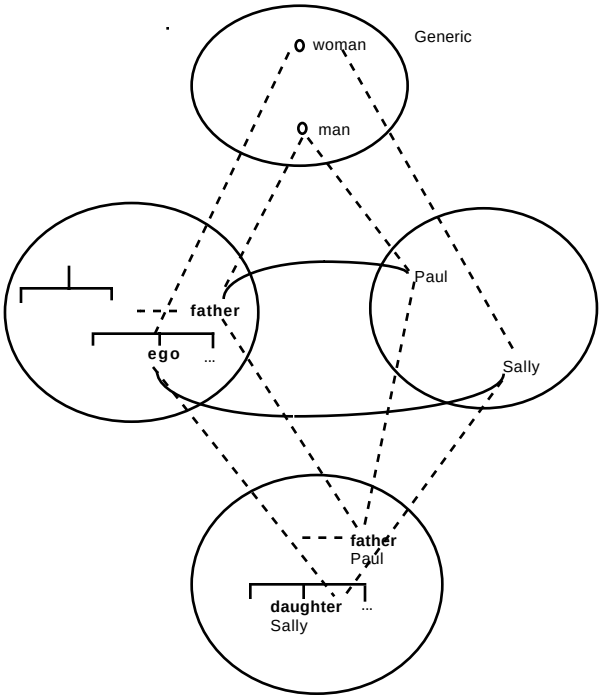
Generic
woman
man
father
ego
...
Paul
Sally
father
Paul
daughter
...
Sally

FIG. 3

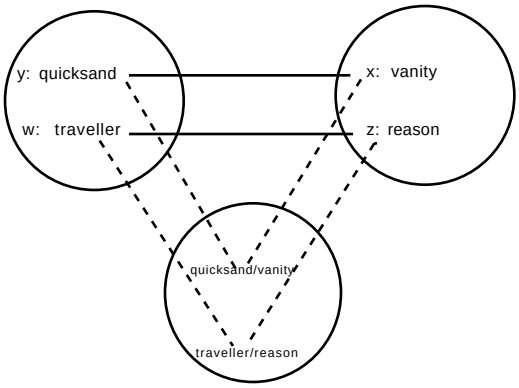
y: quicksand
w: traveller
x: vanity
z: reason
quicksand/vanity
traveller/reason

FIG. 4

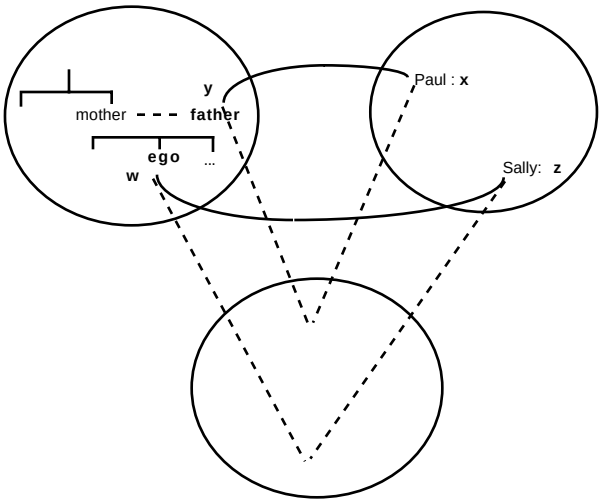

FIG. 5

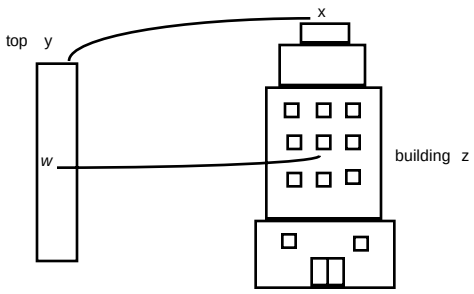

FIG. 6

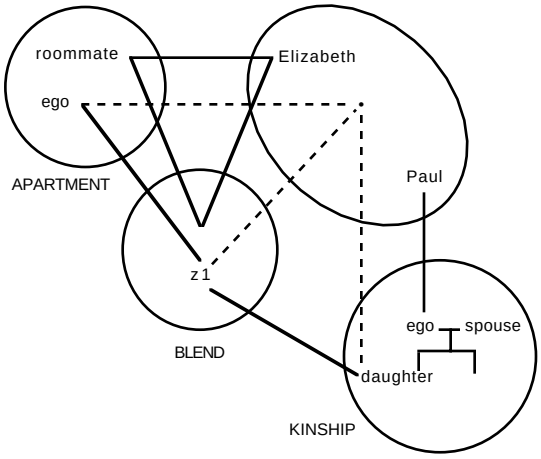
roommate
Elizabeth
ego
APARTMENT
Paul
z1
ego
spouse
BLEND
daughter
KINSHIP

FIG. 7

.

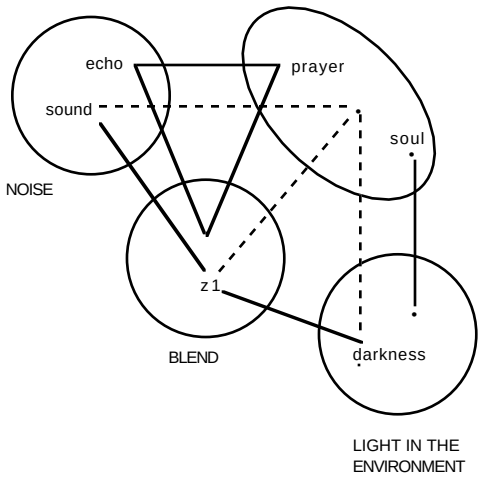
echo
prayer
sound
soul
NOISE
z1
BLEND
darkness
LIGHT IN THE
ENVIRONMENT

FIG. 8

References

Bateson, G. 1972. *Steps to an Ecology of the Mind.* New York: Ballantine Books.

Coulson, Seana. 1997. *Semantic Leaps: Frame-Shifting and Conceptual Blending*. UCSD Ph. D. dissertation.

Cutrer, Michelle. 1994. *Time and Tense in Narratives and Everyday Language*. Doctoral dissertation, University of Calfornia at San Diego.

Dinsmore, J. 1991. *Partitioned Representations.* Dordrecht: Kluwer.

Fauconnier, G. 1994. *Mental Spaces*. New York: Cambridge University Press. [Originally published (1985) Cambridge: MIT Press.]

Fauconnier, G. 1997. *Mappings in Thought and Language.* Cambridge: Cambridge University Press.

Fauconnier, G. & E. Sweetser. 1996. *Spaces, Worlds, and Grammar.* Chicago: University of Chicago Press.

Fauconnier, G. & Turner, M. 1996. Blending as a central process of grammar. In *Conceptual Structure, Discourse, and Language*, Ed. Adele Goldberg. Stanford: Center for the Study of Language and Information [distributed by Cambridge University Press].

Fauconnier, G. & Turner, M. 1998. Conceptual Integration Networks. *Cognitive Science.*

Fauconnier, G. & Turner, M. (in preparation). *Making Sense.*

Fillmore, C. 1985. Frames and the Semantics of Understanding. *Quaderni di Semantica VI.2.* 222-253.

Freeman, Margaret. 1997. Grounded spaces: Deictic -self anaphors in the poetry of Emily Dickinson. *Language and Literature* 6:1, 7-28.

Goffman, E. 1974. *Frame Analysis*. New York: Harper and Row.

Goldberg, A. 1994. *Constructions.* Chicago: University of Chicago Press.

Hofstadter, D. 1995a. *Fluid Concepts and Creative Analogies.* New York: Basic Books.

Koestler, Arthur. 1964. *The Act of Creation* . NY: Macmillan.

Kunda, Z., D. T. Miller, and T. Clare. Combining social concepts: the role of causal reasoning. *Cognitive Science 14.* 551-577.

Lakoff, George. 1987. *Women, Fire, and Dangerous Things* (Chicago: University of Chicago Press), case study 1, pages 380-415.

Lakoff, George and Mark Johnson. 1999. *Philosophy in the Flesh.* New York: Basic Books.

Lakoff, George and Mark Turner. 1989. *More than Cool Reason: A Field Guide to Poetic Metaphor* (Chicago: University of Chicago Press).

Langacker, R. 1987/1991 . *Foundations of Cognitive Grammar. Vol.I. ,II,* Stanford University Press.

Liddell, Scott K. 1996. Spatial representations in discourse: Comparing spoken and signed language. *Lingua* 98:145-167.

Mandelblit, Nili 1997. *Grammatical Blending: Creative and Schematic Aspects in Sentence Processing and Translation.* Ph.D. dissertation, UC San Diego.

Moser, D. and D. Hofstadter. (undated ms.) Errors: A Royal Road to the Mind. *Center for Research on Concepts and Cognition.* Indiana University.

Nunberg, G. 1978. *The Pragmatics of Reference*. Bloomington, Ind.: Indiana University Linguistics Club.

Oakley, Todd. 1995. *Presence: the conceptual basis of rhetorical effect*. Ph. D. dissertation, University of Maryland.

Robert, Adrian. 1998. "Blending in the interpretation of mathematical proofs." In: *Discourse and Cognition: Bridging the Gap.* Edited by Jean-Pierre Koenig. Stanford: Center for the Study of Language and Information (CSLI) [distributed by Cambridge University Press].

Sanders, J. and G. Redeker. 1996. Perspective and the Representation of Speech and Thought in Narrative Discourse. In Fauconnier, G. & E. Sweetser, eds. *Spaces, Worlds, and Grammar.* Chicago: University of Chicago Press.

Sweetser, E. 1990. *From etymology to pragmatics: the mind-as-body metaphor in semantic structure and semantic change*. Cambridge: Cambridge University Press.

Sweetser, Eve. "Mental Spaces and Cognitive Linguistics: A Cognitively Realistic Approach to Compositionality." this volume.

Talmy, L. 1977. "Rubber-sheet Cognition in Language." *Proceedings of the 13th Regional Meeting of the Chicago Linguistic Society*.

Talmy, L. 1978. "Figure and Ground in Complex Sentences." In: *Universals of Human Language: Syntax* .(vol. 4). Edited by Joseph Greenberg. Stanford University Press.

Talmy, L. 1985. Force Dynamics in Language and Thought. *Papers from the Parasession on Causatives and Agentivity.* Chicago: Chicago Linguistic Society.

Talmy, L. 1998. Fictive Motion in Language and "ception." In Paul Bloom, Mary Peterson, Lynn Nadel, and Merrill Garrett, eds., *Language and Space*. Cambridge, Mass.: MIT Press.

Turner, Mark. 1991. *Reading Minds: The Study of English in the Age of Cognitive Science.* Princeton: Princeton University Press.

Turner, Mark. 1996. *The Literary Mind*. (New York: Oxford University Press).

Van Hoek, Karen. 1997. *Anaphora and Conceptual Structure.* Chicago: The University of Chicago Press.

Zbikowski, Lawrence. 1997. "Conceptual blending and song." Manuscript, University of Chicago.