Cognitive Science And The Law

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I
Preliminary Remarks

The law is committed to the use of human reason and human language. It is a commitment that is not going to change.

Until recently, the nature of reason and language were taken to be relatively unproblematic. But with the rapid development of the cognitive sciences, where language and thought are studied empirically, so much has been learned that is new about language and thought that old understandings can no longer be taken for granted. What has changed radically are notions as fundamental as the nature of categorization, definition, truth, rationality, causation, and literalness—notions that pervade the law. As these changes become better known, both in the academic world and beyond it, the question for the law will be how to respond to them.

The initial tendency will, of course, be to do nothing, to stick to demonstrably false views of language and thought simply because they are there. But as more and more people become educated to these changes, the law will eventually have to respond. The time to begin thinking about that response is now, while it is still possible to consider in a timely fashion the positive, creative possibilities that such changes may allow. At present, there is only one legal scholar who is rethinking the law in these terms—Steven Winter. Winter's proposals for the reform of standing law and his reply to the critique of rights both make use of this new knowledge from the cognitive sciences. I will discuss Winter's work briefly below as a case study in how these ideas can be put to a positive, productive use.

However, the main thrust of this paper is not to make concrete suggestions for the law. It is rather to be informative, to provide very briefly an overview of some of the more important of these developments. My examples will not be
taken from the law, partly because I am not a legal scholar, and partly because what I am presenting are scientific results, not private opinions, nor an a priori philosophical program, nor a specific political or legal agenda. But before I move on to examples, I should point out that these empirical results do have broad philosophical implications, implications that Mark Johnson has been working out, not just for the philosophy of mind, but also for ethics. Here are some of those implications stated in as brief a fashion as possible:

Objectivism

Contemporary law has inherited from Western philosophy a set of views about the nature of categories, word meaning, and truth. I will refer to those views as 'objectivist'. They include among them the following:

—The classical theory of reference: Words refer to things in the world, either by virtue of their sense (Frege) or by virtue of a historical "dubbing" (Putnam-Kripke).

—Categories are defined by necessary and sufficient conditions on the properties of their members. Categories have clear boundaries.

—There is an objectively correct way to understand the world. That is, categories of mind can fit objectively existing categories of things in the world. Our conceptual system is thus natural because it reflects reality.

—There is a neutral perspective, and objectivity consists in taking that perspective.

—Language is divided into the literal (which can fit the world) and the figurative (which cannot).

—The law uses literal language that can always be applied to the facts of the matter from a neutral perspective.

—Reason is value-neutral and permits one to move logically from abstract general principles to the logical decision of concrete cases in a fully objective fashion.

The empirical evidence against these views is overwhelming, and we will discuss some of it shortly.

Subjectivism

To falsify the objectivist worldview is not to verify a subjectivist one. Thus, the evidence also suggests that the following subjectivist views are equally
incorrect:

—Conceptual systems are arbitrary.

—What counts as truth is purely a matter of historical contingency.

—All ‘facts’ are socially constructed.

—The concepts we have and what we take as facts are all results of historical contingency, either historical accident or, more likely, the exercise of power by specific individuals, social classes, or groups with extraordinary power.

—The law always involves the arbitrary use of power, since it involves the application of arbitrary concepts to socially constructed ‘facts’ to determine ‘truths’ which can only be historically contingent.

The empirical evidence against such totally subjectivist views is equally overwhelming.

The False Dichotomy

It is often assumed that objectivism and subjectivism are the only possibilities: to deny objectivism is to be a subjectivist and conversely. But, as we shall see there is a third choice, one that better fits the empirical data. However, the false dichotomy has taken its toll, with each side seeing the faults in the other and thinking there was no other choice.

The objectivist view was taken for granted in the enlightenment and is presupposed in classical liberalism. Justice is seen as being served when the objective facts of the matter are brought into accord with abstract moral or legal principles through the application of a universally valid and value-neutral process of reasoning. Objectivism has been the dominant philosophical view from Aristotle to Descartes to the British empiricists, and it is very much alive in contemporary Anglo-American philosophy. From philosophy it has crept into virtually every academic discipline.

The subjectivist view is commonly taken, in philosophical circles, as dating from Nietzsche and Heidigger. Today it is represented most notably in the works of Foucault and Derrida. It has spread from the Continent, and is represented in America in the works of such philosophers as Richard Rorty. It forms the common core of beliefs in the postmodernist / critical theory / deconstructionist community, which now extends from literary criticism to anthropology to law.

Subjectivism has two political manifestations. The first is progressive-to-radical: The wealthy are seen as being in control not only of capital and of political power, but also of our very concepts and world views, which allows them to dictate what constitutes ‘fact.’ Liberalism is seen as taking the resulting world
view as 'natural', which makes liberalism a handmaiden to the rich and powerful: it perpetuates the hegemony of the rich by perpetuating their worldview. Because conceptual systems are seen as arbitrary and merely historically contingent, it is assumed that they can be changed once those who are oppressed by such worldviews see, through the exercise of cultural critique and the deconstruction of traditional 'factual' description, that change is possible.

The second manifestation of subjectivism is fascist in nature: Subjectivism can be seen as a will-to-power view, in which an elite that sees fact as socially constructed sets out to do its own social construction of reality. It has been claimed that the fascist possibilities presented by subjectivism makes sense of the fact that Heidigger and De Man were Nazis.

Experientialism

As we shall see, the evidence from the cognitive sciences goes against both the objectivist and subjectivist views. Mark Johnson has seen this evidence as pointing to a third philosophical view, one that is neither objectivist nor subjectivist, a philosophical view called Experientialism.

Experientialist philosophy claims, on empirical grounds, that our conceptual system is embodied and imaginative. Its embodied nature rules out subjectivism, since the relevant aspects of our bodies and brains are common to all human beings and not things that change from culture to culture. Its imaginative nature rules out objectivism, since imagination of the sort discovered in our conceptual systems does not fit any objective conception of reality.

Experientialism is an interactionist position. It observes that an important part of our conceptual system is grounded in our everyday interactions in our physical and social environments. This part of our conceptual systems looks objective to us, since we factor out our role in the interactions. It is this part of our conceptual system that objectivists most commonly point to for justification of their position. (“There really is a glass of water on the table in front of me and I can pick it up and drink it.”) It is here that experientialism fits the reasonable intuitions of objectivists.

But experientialism also takes into account those aspects of our conceptual system that are imaginative, often metaphorical, projections from relatively direct, physically and socially grounded experience. Such concepts, which can vary significantly across cultures and time periods, are grist for the subjectivists' mill. They too exist, and here experientialism fits the reasonable intuitions of the subjectivists.

What we wind up with is a limited relativism, with the limits placed by empirical observation. Though experientialism fits the reasonable intuitions of both objectivists and subjectivists, it will, of course, make neither happy. The reason is that both camps want a uniform philosophy, one that projects from their reasonable intuitions to all other cases. The empirical data simply do not
warrant such a projection. Cognition is complex, and a philosophy that is to be responsive to the discoveries of cognitive science must be responsive to those complexities.

With this sense of what the philosophical stakes are, let us now turn to examples.
II

Some Empirical Results
About The Nature Of Concepts

Color Concepts

Philosophers as far back as Locke have distinguished between "primary" and "secondary" properties. The primary properties are those that objects have as part of their very nature. The secondary properties are those that objects appear to have because of our perceptual apparatus. Color is the classic example of a secondary property.

We now know an enormous amount about color. Color concepts do not mirror the objective structure of the world. Wavelengths of light exist in the world, but wavelengths do not determine color concepts. Color concepts seem to be determined by three factors:

-A neurophysiological apparatus.

-A universal cognitive apparatus.

-Culturally-determined choices that apply to the input of the universal cognitive apparatus.

The neurophysiological apparatus involves a system of color cones in the eye and neural connections between the eye and the brain. These determine response curves whose peaks are at certain pure hues: pure red, green, blue, yellow, white, and black. Other colors -- for example, orange and purple and brown -- are "computed" by a general cognitive apparatus given neurophysiological input. A cultural-specific cognitive apparatus takes this input and determines a system of color concepts by shifting color centers, determining major contrasts, etc. As a result, human color concepts have certain general properties. They are not uniform—they have "central" best examples, which are either neurophysiologically determined pure hues or cognitively computed focal colors that are perceived as "pure"—pure orange, brown, purple, etc. Color concepts have fuzzy boundaries, where response curves dip and overlap. Color boundaries vary greatly from culture to culture. Central colors do not vary much, but do show some variations due to culturally determined choices of contrast.

Color concepts are thus neither purely mentalistic, nor a mirror of external reality. They are determined by (1) the reflective properties of real-world objects, (2) our neural mechanisms, and (3) our cognitive mechanisms. For details, see Lakoff, 1987, ch. 2.
Natural Kind Concepts

The idea that concepts mirror nature, that they are internal representations of external reality, finds its most common justification in the idea of natural kinds. Real zebra, lions, and elephants, on this view, form sets in the real world, the sets being characterized by necessary and sufficient conditions on the properties of such animals. Biological concepts like ZEBRA, LION and ELEPHANT are supposed to be reflections such an external reality, and hence also defined by necessary and sufficient conditions.

Ernst Mayr of Harvard, one of the principal figures in modern evolutionary biology, has taken pains to point out the fallacies in viewing biological species as "natural kinds" defined in this way, that is, as sets defined by the essential properties of their members. The natural kind view was characteristic of pre-Darwinian biology, but has been known to be false since Darwin. Mayr (1984) cites seven properties of species that are at odds with the idea that they are sets defined by essential properties.

First, species do not have a homogeneous structure with all members sharing defining properties. Only statistical correlations among properties can be given.

Second, since a species is characterized partly in terms of reproductive isolation, it is defined not purely in terms of internal properties of individuals, but in large part with relation to other groups.

Third, a species is not defined only by properties of individual members. It is characterized in terms of its gene pool, though no individual has more than a small portion of the genes in the pool.

Fourth, if one considers populations distributed over broad areas, there is not always a distinct point at which one can distinguish one species from two.

Fifth, the concept 'belongs to the same species as' is not transitive. There are documented cases of populations A, B, C, D and E in contiguous areas, such that A interbreeds with B, B with C, C with D, D with E, but A does not interbreed with E. Since 'belongs to the same set as' is always a transitive relation, species cannot be sets.

Sixth, biological species do not always have necessary conditions for membership. Both interbreeding capacity and morphological similarity go into the characterization of a species. But they may not always go together. There are three kinds of cases: (a) One population may split into two, which may retain the same physical characteristics, but may no longer be able to interbreed. (b) Physical characteristics may change, while interbreeding capacity remains. (c) In cases of uniparental reproduction, interbreeding is not a factor.
Seventh, status as a separate species may depend on geographic location. There are two cases: (a) Two populations may interbreed in one habitat, but not in another. (b) Two populations in the same habitat may not interbreed at one point in history; neither population changes, but the habitat changes, and interbreeding becomes possible. Natural kinds, on the other hand, are not defined relative to habitat.

For all these reasons, evolutionary biology is inconsistent with the idea that natural kinds of living things are sets defined by the shared essential properties of their members. This invalidates the classical theory of natural kind concepts as referring to natural kinds in the world, where kinds are sets defined by necessary and sufficient conditions on shared essential properties of their members. The classical theory of natural kind concepts is in conflict with Darwinian biology, which is perhaps the best-substantiated scientific theory of the modern age.

**Basic-Level Concepts**

One of the most striking results that has emerged from the empirical study of concepts has been the discovery by Brent Berlin, Eleanor Rosch, and their co-workers of basic-level concepts. Prior to their work, a building-block view of concepts had largely prevailed: it was thought that there were conceptual primitives, and that complex concepts were built up out of primitive concepts by being combined through principles of logical combination.

The old view fit both the objectivist and mentalist view of categories: On the objectivist account, the primitives were taken as mirroring external reality, for example, as referring to natural kinds. On the mentalist account, they were taken as finitary symbols, to be combined with other finitary symbols to form complex categories. Feature semantics was a special case in which the features were taken as combining only via Boolean operations. The primitives were taken as being cognitively basic, and the complex categories as being cognitively complex. The primitives, that is, the most cognitively basic concepts, were on this view seen as having no internal structure.

What Berlin and Rosch discovered was that the most cognitively basic concepts are not like logical primitives at all. First, they have very rich internal structure. Second, they are "in the middle" of the conceptual hierarchy, and thus violate the old notions of conceptual compositionality. Third, they were neither purely mentalistic, nor mirrors of external reality.

For example, they found that concepts like CAT, CHAIR, and CAR are cognitively basic. Take conceptual hierarchies like ANIMAL, CAT, MANX; FURNITURE, CHAIR, ROCKING CHAIR; VEHICLE, CAR, SPORTS CAR. ANIMAL, FURNITURE, and VEHICLE are superordinate; MANX, ROCKING CHAIR, and SPORTS CAR are subordinate.
The basic level is neither the highest nor the lowest level of conceptual organization. The basic level is the level at which human beings interact with their environments most effectively and process and store and communicate information most efficiently. It is a level that is characterizable only in terms of the way that human beings with bodies and minds interact with their environment.

-It is the level at which those things to which the concept applies have overall shapes that are perceived similarly.

-It is the highest level at which a single mental image is associated with the concept as a whole.

-It is the highest level at which a person uses similar motor programs for interacting with entities that the concept applies to.

-It is the level at which subjects are fastest at identifying entities that the concept applies to.

-It is the level with the most commonly used labels for entities that the concept applies to.

-It is the level first named and understood by children.

-It is the first level to enter the lexicon of a language in the course of history.

-It is the level with the shortest primary lexemes.

-It is the level at which terms are used in neutral contexts.

-It is the level at which most of our knowledge is organized.

-It is the level at which most culturally-determined functions for objects are defined.

Basic-level categories are thus basic in four respects:

Perception: Overall perceived shape; single mental image; fast identification.

Function: General motor programs; general cultural functions.

Communication: Shortest, most commonly used and contextually neutral words, first learned by children and first to enter the lexicon.

Knowledge Organization: Most attributes of category members are stored at this level.
Let us consider some examples. Take mental images. We can form a general mental image for *cat* or *table*. But with superordinate categories like *animal* or *furniture*, there is no single mental image that covers the entire category. Thus, we have mental images for chairs, tables, beds, etc., but none for a piece of furniture that is not an image of a table, chair, bed, etc. Similarly, we have general motor programs for using chairs, tables, etc. But we have no motor programs for using furniture in general.

Or consider knowledge organization. We have a lot of knowledge about cars, which are basic-level. If you ask someone what they know about a car, it will turn out that they know a great deal. If you ask what they know about vehicles (the superordinate category), it will turn out not to be very much compared to what is known about cars. If you ask someone what they know about sportscars, it will not be very much more than what they know about cars. Thus, most of our knowledge is organized at the basic level.

The basic level is also the level at which people categorize real world objects most accurately. Berlin, Breedlove, and Raven (1974) and Hunn (1977), in massive studies of Tzeltal plant and animal names, found that at the basic level, folk terminology for plants and animals fit biological taxonomies almost perfectly. At higher and lower levels, accuracy dipped sharply. They hypothesized two reasons for this, one having to do with the world and the other, with the nature of human perception and cognition. In the the case of plants and animals, the basic level corresponds to the level of the biological genus. This is one level above the level of the species. In any given local ecosystem, one species of a given genus usually adapts better than other species. Thus, it is most common in a local environment to find only one species representing a genus. This results in relatively easy-to-perceive differences in overall shape among species in a locale. Since perception of overall shape is one of the determinants of the basic level, it makes sense that judgments of category membership are most accurate at this level.

It thus appears that our conceptual system is grounded at the basic level, and that we generalize upwards and specialize downwards. That is, our conceptual system is grounded at the level at which human beings interact with their environment most efficiently.

Complex Schemas

What is the meaning of "Tuesday"? If, as the mirror of nature view suggests, concepts reflect an external reality, then weeks must be things existing objectively in the world. But weeks do not exist in nature. Weeks are an imaginative creation of the human mind. Different cultures have different lengths of weeks. In Bali, there are many kinds of weeks of various lengths, all of which exist simultaneously. In order to know what "Tuesday" means, we need to know what weeks are and how they are structured.
The kinds of imaginative structures required for the definition of concepts such as "Tuesday" have been called "frames" or "schemas". The central claim of contemporary cognitive anthropology is that most of our cultural reality resides not in the artifacts of society, but in the culture-specific schemas imposed by human beings (see Holland and Quinn, 1987). Complex collections of schemas that characterize the culturally-accepted structuring of domains of experience are called folk theories. Charles Fillmore has argued in a host of works on frame semantics (see annotated bibliography) that words are defined only relative to such schemas. "Tuesday" is meaningful only relative to a week-schema. The same is true of "bar mitzvah", "associate professor", "second base", "fiancée", nor any of the thousands upon thousands of realities defined by reference to cultural schemas. These realities reside in human minds, not in anything "external". The need for such schemas has become generally accepted throughout the cognitive sciences.

Fillmore has argued at great length that lexical items are defined only with respect to such schemas. This challenges the traditional definition of what a definition is, namely:

A complex concept is DEFINED by a collection of necessary and sufficient conditions on less complex (and, ultimately, primitive) concepts.

Within Fillmore's frame semantics and other variations on it (e.g., theories of scripts, schemas, cognitive models, etc.) definition is defined very differently. Each word designates an element in a frame (or schema or script or cognitive model). Such frames are not defined as getting their meaning via correspondences with objectively characterized external reality. Frames are special cases of what I have called idealized cognitive models (Lakoff, 1987); they are idealizations and abstractions that may not correspond to external reality well or at all. Fillmore (1982b) looks in detail at the classic case of bachelor, which he argues is defined in terms of necessary and sufficient conditions -- relative to an idealized cognitive model of social structure, not relative to reality. In the idealized model, everyone is heterosexual, marriage is monogamous, people get married at roughly a certain age and stay married to the same person, married men support their wives, etc. A bachelor is just an unmarried man of marriageable age, relative to this idealized model.

The model, of course, doesn't accord very well with reality. In the idealized model, the question of whether the following are bachelors does not arise: The pope, Tarzan, a moslem who is permitted to have four wives but only has three, a man who has been in a coma since childhood, etc. These are not good examples of bachelors, and whether one would want to call them bachelors at all depends on how one would want to stretch the definition. "Stretching the definition" means ignoring or modifying certain aspects of the idealized model -- while leaving the necessary and sufficient conditions of the idealization intact.

In some cases, the cognitive models may be metaphorical in nature. A case in point is the English modal verbs (must, may, can, etc.) which Sweetser (1989)
argues are defined via metaphor. Other such examples are given in Lakoff and Johnson (1980). Metaphorical definitions and various other kinds of definitions go beyond Fillmore's frame semantics and, correspondingly, beyond Putnam's stereotypes, and classical schema theory. For a detailed discussion, see Lakoff, 1987, chapters 5-7 and case studies 1 and 2.

Prototypes

Brugman (1988) showed that there are two levels of prototype structure:

—Low-level prototype structure concerns the relationship of concepts to things that they are applied to: a concept may fit an entity or a situation to a degree. For instance, a spatial relation concept may fit a spatial relationship between two entities more or less well. Take the sentence The plane flew over the mountain. The over relation will fit very well when the plane's trajectory goes right above and across the mountain. As the trajectory deviates from being right above and moves to the side, the concept over fits less well and the concept to the side of fits better.

—High-level prototype structure concerns the internal structure of concepts and the way that concepts can fit together in networks to form radial categories. There are four known kinds of high-level prototype structure (Lakoff, 1987, chaps. 5 and 6):

1. Graded structure, as when the concept contains gradations (e.g., rich).

2. Schema discrepancy, as when a schema does not accord perfectly with other background schematic knowledge. (Fillmore's bachelor case is an example.)

3. Radial structure, as when concepts form radially structured networks (Two examples are mother and over).

4. Metonymic structure, as when a lower-level concept stands for the concept as a whole. (Any social stereotype, typical case, ideal, etc. would constitute an example.)

Let us begin with a simple example of a radial category.

Mother

Some categories are characterized by clusters of cognitive models. There is an all-important difference between clusters of models and clusters of features: models have an internal structure that features do not have. An example of a concept
characterized by a cognitive model cluster is the concept mother. According to the classical theory of categorization, it should be possible to give clear necessary and sufficient conditions for mother that will fit all the cases and apply equally to all of them. Such a definition might be something like: *a woman who has given birth to a child.* But as we will see, no such definition will cover the full range of cases. *Mother* is a concept that is based on a complex model in which a number of individual cognitive models converge, forming an experiential cluster. The models in the cluster are:

-The birth model: the person giving birth is the mother.

The birth model is usually accompanied by a genetic model, although since the development of egg and embryo implants, they do not always coincide.

-The genetic model: the female who contributed the genetic material is the mother.

-The nurturance model: the female adult who nurtures and raises a child is the mother of that child.

-The marital model: the wife of the father is the mother.

-The genealogical model: the closest female ancestor is the mother.

The concept mother normally involves a complex model in which all of these individual models converge to form a cluster. There have always been divergences from this cluster; stepmothers have been around for a long time. But because of the complexities of modern life, the models in the cluster have come to diverge more and more. Still, many people feel the pressure to pick one model as being the right one, the one that *really* defines what a mother is. But although one might try to argue that only one of these characterizes the "real" concept of mother, the linguistic evidence does not bear this out. As the following sentences indicate, there is more than one criterion for "real" motherhood:

-I was adopted and I don't know who my real mother is.

-I am not a nurturant person, so I don't think I could ever be a real mother to any child.

-My real mother died when I was an embryo, and I was frozen and later implanted in the womb of the woman who gave birth to me.

-I had a genetic mother who contributed the egg that was planted in the womb of my real mother, who gave birth to me and raised me.
By genetic engineering, the genes in the egg my father's sperm fertilized were spliced together from genes in the eggs of twenty different women. I wouldn't call any of them my real mother. My real mother is the woman who bore and raised me, even though I don't have any single genetic mother.

In short, more than one of these models contributes to the characterization of a real mother, and any one of them may be absent from such a characterization. Still, the very idea that there is such a thing as a real mother seems to require a choice among models where they diverge. It would be bizarre for someone to say:

-I have four real mothers: the woman who contributed my genes, the woman who gave birth to me, the woman who raised me, and my father's current wife.

When the cluster of models that jointly characterize a concept diverge, there is still a strong pull to view one as the most important. This is reflected in the institution of dictionaries. Each dictionary, by historical convention, must list a primary meaning when a word has more than one. Not surprisingly, the human beings who write dictionaries vary in their choices. Dr. Johnson chose the birth model as primary, and many of the applied linguists who work for the publishers of dictionaries, as is so often the case, have simply played it safe and copied him. But not all. Funk and Wagnall's Standard chose the nurturance model as primary, while the American College Dictionary chose the genealogical model. Though choices made by dictionary-makers are of no scientific importance, they do reflect the fact that, even among people who construct definitions for a living, there is no single, generally accepted cognitive model for such a common concept as "mother".

When the situation is such that the models for mother do not pick out a single individual, we get compound expressions like stepmother, surrogate mother, adoptive mother, foster mother, biological mother, donor mother, etc. Such compounds, of course, do not represent simple subcategories, that is, kinds of ordinary mothers. Rather, they describe cases where there is a lack of convergence of the various models.

And, not surprisingly, different models are used as the basis of different extended senses of mother. For example, the birth model is the basis of the metaphorical sense in

-Necessity is the mother of invention

while the nurturance model is basis for the derived verb in
-He wants his girlfriend to mother him.

The genealogical model is the basis for the metaphorical extension of *mother* and *daughter* used in the description of the tree diagrams that linguists use to describe sentence structure. If node A is immediately above node B in a tree, A is called the *mother* and B, the *daughter*. Even in the case of metaphorical extensions, there is no single privileged model for *mother* on which the extensions are based. This accords with the evidence cited above which indicates that the concept *mother* is defined by a cluster of converging models.

This phenomenon is beyond the scope of the classical theory. The concept *mother* is not clearly defined, once and for all, in terms of common necessary and sufficient conditions. There need be no necessary and sufficient conditions for motherhood shared by normal biological mothers, donor mothers (who donate an egg), surrogate mothers (who bear the child, but may not have donated the egg), adoptive mothers, unwed mothers who give their children up for adoption, and stepmothers. They are all mothers by virtue of their relation to the ideal case, where the models converge. That ideal case is one of the many kinds of cases that give rise to prototype effects.

So far we have seen three sources of prototype effects: models with a graded scale (e.g. *rich*), classical models with background conditions (e.g. *bachelor*), and cluster models (e.g. *mother*). But there are two other types of sources of prototype effects that are even more interesting: metonymic models and radial categories. Let us begin with metonymic models.

**Metonymic Models**

Metonymy is one of the basic characteristics of cognition. It is extremely common for people to take one well-understood or easy-to-perceive aspect of something and use it to stand either for the thing as a whole, or for some other aspect or part of it. The best known cases are those like the following:

One waitress says to another: The ham sandwich just spilled beer all over himself.

Here the *ham sandwich* is standing for the person eating the sandwich. Another well-known example is the slogan:

-Don't let El Salvador become another Vietnam.

Here the place is standing for the events that occurred at that place. As Lakoff and Johnson 1980 showed, such examples are instances of general patterns; they do not just occur one-by-one. We will refer to such patterns as *metonymic models*.
A particularly interesting case of metonymy occurs in giving answers to questions. It is common to give an answer that evokes the information requested, and there seem to be language-particular metonymic models used to do so. Take, for example, the case described by Rhodes (1977). Rhodes is a linguist who does field work on Ojibwa, a Native American language of central Canada. As part of his field work, he asked speakers of Ojibwa who had come to a party how they got there. He got answers like the following (translated into English):

-I started to come.
-I stepped into a canoe.
-I got into a car.

He figured out what was going on when he read Schank and Abelson's *Scripts, Plans, Goals, and Understanding*. Going somewhere in a vehicle involves a structured scenario (or in our terms, an Idealized Cognitive Model, or ICM):

Precondition: You have (or have access to) the vehicle.
Embarcation: You get into the vehicle and start it up.
Center: You drive (row, fly, etc.) to your destination.
Finish: You park and get out.
End-Point: You are at your destination.

What Rhodes found was that in Ojibwa it is conventional to use the embarcation point of an ICM of this sort to evoke the whole ICM. That is, in answering questions, part of an ICM is used to stand for the whole. In Ojibwa, that part is the embarcation point.

Ojibwa does not look particularly strange when one considers English from the same point of view. What are possible normal answers to a question such as "How did you get to the party?"

-I drove. (Center stands for whole ICM)
-I have a car. (Precondition stands for whole ICM)
-I borrowed my brother's car. (This entails the Precondition, which in turn stands for the whole ICM)

English even has special cases that look something like Ojibwa.

-I hopped on a bus. (Embarcation stands for whole ICM)
-I just stuck out my thumb. (Embarcation stands for whole ICM)

In short, English can use the Embarcation metonymically to stand for the whole ICM, just in case there is no further effort involved, as in taking a bus or hitchhiking.
There are many metonymic models in a rich conceptual system, and they are used for a wide variety of purposes. The kind of most interest for our present purposes are those in which a member or subcategory can stand metonymically for the whole category for the purpose of making inferences or judgments.

Metonymic Sources of Prototype Effects

As Rosch observed, prototype effects are surface phenomena. A major source of such effects is metonymy -- a situation in which some subcategory or member or submodel is used (often for some limited and immediate purpose) to comprehend the category as a whole. In other words, these are cases where a part (a subcategory or member or submodel) stands for the whole category -- in reasoning, recognition, etc. Within the theory of cognitive models, such cases are represented by metonymic models.

The Housewife Stereotype

We have seen how the clustering of cognitive models for mother results in prototype effects. However, an additional level of prototype effects occurs in the mother category. The source of these effects is the stereotype of the mother as housewife. Social stereotypes are cases of metonymy -- where a subcategory has a socially recognized status as standing for the category as a whole, usually for the purpose of making quick judgments about people. The housewife-mother subcategory, though unnamed, exists. It defines cultural expectations about what a mother is supposed to be. And because of this, it yields prototype effects. On the whole in our culture, housewife-mothers are taken as better examples of mothers than nonhousewife-mothers.

Such goodness-of-example judgments are a kind of prototype effect. - But this effect is not due to the clustering of models, but rather to the case of a metonymic model in which one subcategory, the housewife-mother, stands for the whole category in defining cultural expectations of mothers. Other kinds of metonymic models will be discussed below.

Working Mothers

A working mother is not simply a mother who happens to be working. The category working mother is defined in contrast to the stereotypical housewife-mother. The housewife-mother stereotype arises from a stereotypical view of nurturance, which is associated with the nurturance model. According to the stereotypical view, mothers who do not stay at home all day with their children cannot properly nurture them. There is also a stereotypical view of work, according to which it is done away from the home, and housework and child-rearing don't
count. This is the stereotype that the bumpersticker "Every Mother Is A Working Mother" is meant to counter.

The housewife-mother stereotype is therefore defined relative to the nurturance model of motherhood. This may be obvious, but it is not a trivial fact. It shows that metonymic models like stereotypes are not necessarily defined with respect to an entire cluster. In this case, the metonymic model is characterized relative to only one of the models in the cluster -- the nurturance model. Here is some rather subtle evidence to prove the point:

Consider an unwed mother who gives up her child for adoption and then goes out and gets a job. She is still a mother, by virtue of the birth model, and she is working -- but she is not a working mother!

The reason is that it is the nurturance model, not the birth model, that is relevant for the interpretation of the phrase. Thus, a biological mother who is not responsible for nurturance cannot be a working mother, though an adoptive mother, of course, can be one.

This example shows the following:

-A social stereotype (e.g., the housewife-mother) may be defined with respect to only one of the base models of an experiential cluster (e.g., the nurturance model).

-Thus, a metonymic model where a subcategory stands for the whole category may be defined relative to only one model in a complex cluster.

-A subcategory (e.g., working mother) may be defined in contrast with a stereotype (e.g., the housewife-mother).

-When this occurs, it is only the relevant cognitive model (e.g., the nurturance model) that is used as a background for defining the subcategory (e.g., working mother).

Thus, only those mothers for whom nurturance is an issue can be so categorized. Stepmothers and adoptive mothers may also be working mothers, but biological mothers who have given up their children for adoption and surrogate mothers (who have only had a child for someone else) are not working mothers -- even though they may happen to be holding down a job.

Such models of stereotypes are important for a theory of conceptual structure in a number of ways. First, as we have seen, they may be used to motivate
and define a contrasting subcategory like working mother. This is important because, according to the classical theory, such cases should not exist. In the classical theory, social stereotypes, by definition, play no role in defining category structure, because they are not part of any necessary and sufficient conditions for category membership! In the classical theory, only necessary and sufficient conditions can have a real cognitive function in defining category membership. For this reason, the classical theory permits no cognitive function at all for social stereotypes. But the fact that the conceptual category working mother is defined by contrast with the housewife-mother stereotype indicates that stereotypes do have a role in characterizing concepts.

Secondly, stereotypes define a normal expectation which is linguistically marked. For example, the word but in English is used to mark a situation which is in contrast to some model that serves as a norm. Stereotypic models may serve as such a norm:

NORMAL: She is a mother, but she isn’t a housewife.
STRANGE: She is a mother, but she’s a housewife.

The latter sentence could only be used if stereotypical mothers were not housewives. Conversely, a category defined in contrast to a stereotype has the opposite properties.

NORMAL: She is a mother, but she has a job.
STRANGE: She is a mother, but she doesn’t have a job.

In summary, we have seen two kinds of models for mother:

-A cluster of converging cognitive models.
-A stereotypic model, which is a metonymic model in which the housewife-mother subcategory stands for the category as whole and serves the purpose of defining cultural expectations.

Both models give rise to prototype effects, but in different ways. Together, they form a structure with a composite prototype: the best example of a mother is a biological mother who is a housewife, principally concerned with nurturance, not working at a paid position, and married to the child’s father. This composite prototype imposes what is called a representativeness structure on the category: the closer an individual is to the prototype, the more representative a mother she is.

Representativeness structures are linear. They concern nothing but closeness to the prototypical case, and thus they hide most of the richness of structure that
exists in the cognitive models that characterize the category. Representativeness structures, though real, are mere shadows of cognitive models.

It is important to bear this in mind, since prototype theory is sometimes thought of as involving only such linear representativeness structures and not cognitive models.

The study of representativeness structures has played an important role in the history of prototype theory -- largely in demonstrating that prototypes do exist and in making a bare first approximation to finding out what they are and what properties they have. But a full study of category structure must go well beyond just isolating a prototype and giving a linear ranking of how close prototypical cases are. At the very least, it must provide an account of the details of the cognitive models that give rise to the representativeness structure.

Radial Structures

Here are some kinds of mothers:

- The central case, where all the models converge. This includes a mother who is and always has been female, and who gave birth to the child, supplied her half of child’s genes, nurtured the child, is married to the father, is one generation older than the child, and is the child’s legal guardian.

- Stepmother: She didn’t give birth or supply the genes, but she is currently married to the father.

- Adoptive mother: She didn’t give birth or supply the genes, but she is the legal guardian and has the obligation to provide nurturance.

- Birth mother: This is defined in contrast to adoptive mother: given an adoption ICM, the woman who gives birth and puts the child up for adoption is called the birth mother.

- Natural mother: This used to be the term used to contrast with adoptive mother, but it has been given up due to the unsavory inference that adoptive mothers were, by contrast, "unnatural." This term has been replaced by birth mother.

- Foster mother: She is being paid by the state to provide nurturance.

- Biological mother: She gave birth to the child, but is not raising it and there is someone else who is and who qualifies to be called a mother of some sort.

- Surrogate mother: She has contracted to give birth and that’s all. She may or
may not have provided the genes, and she is not married to the father and is not obligated to provide nurturance. And she has contractually given up the right to be legal guardian.

-Unwed mother: She is not married to the father at the time of the birth.

-Genetic mother: This is a term I have seen used for a woman who supplies an egg to be planted into someone else's womb, and has nothing else whatever to do with the child. It has not yet to my knowledge become conventional.

These subcategories of mother are all understood as deviations from the central case. But not all possible variations on the central case exist as categories. There is no category of mothers who are legal guardians but who don't personally supply nurturance, but hire someone else to do it. There is no category of transsexuals who gave birth but have since had a sex-change operation. Moreover, some of the above categories are products of the twentieth century, and simply did not exist before. The point is that the central case does not productively generate all the these subcategories. Instead, the subcategories are defined by convention as variations on the central case. There is no general rule for generating kinds of mothers. They are culturally defined and have to be learned. They are by no means the same in all cultures. In the Trobriands, a woman who gives birth often gives the child to an old woman to raise. In traditional Japanese society, it was common for a woman to give her child to her sister to raise. Both of these are cases of kinds of mothers that we don't have an exact equivalent of.

The category of mother in this culture has what we will call a radial structure. A radial structure is one where there is a central case and conventionalized variations on it which cannot be predicted by general rules. Categories that are generated by central cases plus general principles -- say, the natural numbers -- are not radial structures, as we are defining the term. We are limiting radial structures only to cases where the variations are conventionalized and have to be learned. We are also ruling out cases where the central case is just more general than the noncentral case -- that is, where the noncentral cases just have more properties than the central case, but no different ones. Radial structures are extremely common, and we will discuss them in very great detail below.

Some Kinds of Metonymic Models

So far, we have looked at one case of a metonymic model: the housewife-mother stereotype. It defines a subcategory that is used to stand for the entire category of mothers in defining social expectations. Any time a subcategory (or an individual member of a category) is used for some purpose to stand for the category as a whole, it is a potential source of prototype effects. For this reason, metonymic models play an important role in prototype theory. Let us look at
them a bit more closely.

In general, a metonymic model has the following characteristics:

- There is a "target" concept A to be understood for some purpose in some context.

- There is a conceptual structure containing both A and another concept B.

- B is either part of A, or is closely associated with it in that conceptual structure. Typically, a choice of B will uniquely determine A, within that conceptual structure.

- Compared to A, B is either easier to understand, easier to remember, easier to recognize, or more immediately useful for the given purpose in the given context.

- A metonymic model is a model of how A and B are related in a conceptual structure; the relationship is specified by a function from B to A.

When such a conventional metonymic model exists as part of a conceptual system, B may be used to stand, metonymically, for A. If A is a category, the result is a metonymic model of the category, and prototype effects commonly arise.

Most metonymic models are, in fact, not models of categories; they are models of individuals. Lakoff and Johnson (1980, Ch. 8) have shown that there are many types of metonymic models for individuals. There are also many types of metonymic models for categories; each type is a different kind of source for prototype effects. There are as many types of metonymic prototype effects as there are kinds of metonymic models for categories. Here are some of the types I have come across so far.

Social Stereotypes

As we saw in the case of the housewife-mother, social stereotypes can be used to stand for a category as a whole. Social stereotypes are usually conscious and are often the subject of public discussion. They are subject to change over time, and they may become public issues. Since they define cultural expectations, they are used in reasoning and especially in what is called "jumping to conclusions". However, they are usually recognized as not being accurate, and their use in reasoning may be overtly challenged.

Here are some examples of contemporary American stereotypes:
The stereotypical politician is conniving, egotistical, and dishonest. The stereotypical bachelor is macho, dates a lot of different women, is interested in sexual conquest, hangs out in singles' bars, etc. The stereotypical Japanese is industrious, polite, and clever.

Since social stereotypes are commonly used to characterize cultural expectations, they tend to be exploited in advertising, and in most forms of popular entertainment.

Incidentally, the bachelor stereotype provides a second level of prototype effects in addition to those that are a consequence of the bachelor ICM not fitting certain situations. Let us take a situation where the background conditions of the bachelor ICM do fit, a situation in which there are no cases that the concept was not defined to deal with: no priests, no gays, no Moslems with only three wives, no Tarzans. In these situations, there can still be prototype effects, but the effects will arise within the clear boundaries of the category. In such cases, the social stereotype of a bachelor will characterize the best examples, and those undisputed bachelors who don't fit the social stereotype will be less good examples.

A bachelor who is macho, promiscuous, and nondomestic fits the stereotype of bachelor better than, say, a nonmacho man who likes to take care of children, prefers stable relationships with one person, is not interested in sexual conquest, loves housework and does it well, etc. Stereotypes are used in certain situations to define expectations, make judgments, and draw inferences. Thus, for example, if all one knew about someone was that he was a bachelor, one might be surprised to find that he loves housework and does it well, likes to care for children, etc. Thus, even though the bachelor ICM is defined within the classical theory and has clear boundaries in situations that conform to the background assumptions, prototype effects may still occur internal to the category boundaries, due to the presence of a social stereotype.

Incidentally, we often have names for stereotypes, for example, Uncle Tom, Jewish Princess, stud, etc. These are categories that function as stereotypes for other categories.

Typical Examples

These are cases like the following:

Robins and sparrows are typical birds.
Apples and oranges are typical fruits.
Saws and hammers are typical tools.
Social stereotypes are usually conscious and subject to public discussion -- and may even have names. However, the use of typical category members is usually unconscious and automatic. Typical examples are not the subject of public discussion, and they seem not to change noticeably during a person's lifetime. They are not used to define cultural expectations. They are used in reasoning, as Rips (1975) showed, in the case where subjects inferred that if the robins on a certain island got a disease, then the ducks would, but not the converse. Such examples are common. It is normal for us to make inferences from typical to nontypical examples. If a typical man has hair on his head, we infer that atypical men (all other things being equal) will have hair on their heads. Moreover, a man may be considered atypical by virtue of not having hair on his head. There is nothing mysterious about this. An enormous amount of our knowledge about categories of things is organized in terms of typical cases. We constantly draw inferences on the basis of that kind of knowledge. And we do it so regularly and automatically that we are rarely aware that we are doing it.

Reasoning on the basis of typical cases is a major aspect of human reason. Our vast knowledge of typical cases leads to prototype effects. The reason is that there is an asymmetry between typical and nontypical cases. Knowledge about typical cases is generalized to nontypical cases, but not conversely.

Ideals

Many categories are understood in terms of abstract ideal cases -- which may be neither typical nor stereotypical. For example:

The ideal husband: a good provider, faithful, strong, respected, attractive.

The stereotypical husband: bumbling, dull, pot-bellied, ...

Naomi Quinn (personal communication) has observed, based on extensive research on American conceptions of marriage, that there are many kinds of ideal models for a marriage: successful marriages, good marriages, strong marriages, etc. Successful marriages are those where the goals of the spouses are fulfilled. Good marriages are those where both partners find the marriage beneficial. Strong marriages are those which are likely to last. Such types of ideals seem to be of great importance in culturally significant categories -- categories where making judgments of quality and making plans are important.

A lot of cultural knowledge is organized in terms of ideals. We have cultural knowledge about ideal homes, ideal families, ideal mates, ideal jobs, ideal bosses, ideal workers, etc. Cultural knowledge about ideals leads to prototype effects. There is an asymmetry between ideal and nonideal cases: we make judgments of
quality and set goals for the future in terms of ideal cases, rather than nonideal cases. This asymmetry is a consequence of a pattern of inference that we use with ideals. Ideals are assumed to have all the good qualities that nonideal cases have, but not conversely.

Paragons

We also comprehend categories in terms of individual members who represent either an ideal or its opposite. Thus, we have institutions like the ten-best and ten-worst lists, the Halis of Fame, Academy Awards, the Guinness book of World Records, etc. We have baseball paragons: Babe Ruth, Willie Mays, Sandy Koufax, etc. Paragons are made use of in constructions in the language: a regular Babe Ruth, another Willie Mays, the Cadillac of vacuum cleaners, etc. Scientific paradigms are also characterized by paragons. Thus, for example, The Michaelson-Morley Experiment is the paragon of physics experiments -- and is used by many people to comprehend what a great experiment in physics is.

A great many of our actions have to do with paragons. We try to emulate them. We are interested in the life stories of great men and women. We use paragons as models to base our actions on. We have a great deal of interest in experiencing paragons -- we watch All-Star games, go to Academy Award-winning movies, travel to the Seven Wonders of the World, and seek to own the paragons of consumer goods. We are constantly acquiring knowledge of paragons, and regularly base our actions on that knowledge. Incidentally, we also commonly base inferences on a folk theory that people who are paragons in some domain are paragons as people. Thus, people are shocked to find great baseball players or powerful politicians engaging in normal rotten human behavior.

Generators

There are cases where the members of a category are defined, or "generated", by the central members plus some general rules. The natural numbers are perhaps the best-known example. The natural numbers are, for most people, characterized by the integers between zero and nine, plus addition and multiplication tables and rules of arithmetic. The single-digit numbers are central members of the category natural number; they generate the entire category, given general arithmetic principles. In our system of numerical representation, single-digit numbers are employed in comprehending natural numbers in general. Any natural number can be written as a sequence of single-digit numbers. The properties of large numbers are understood in terms of the properties of smaller numbers, and ultimately in terms of the properties of single-digit numbers.
The single-digit numbers, together with addition and multiplication tables and rules of arithmetic, constitute a model that both generates the natural numbers and is metonymic in our sense: the category as a whole is comprehended in terms of a small subcategory.

The natural numbers, in addition, have other models that subdivide the numbers according to certain properties -- odd and even, prime and nonprime, etc. Such models are not metonymic. They work by classical Aristotelian principles. But they only define subcategories of the natural numbers. The category as a whole is defined metonymically and generatively by the single-digit numbers plus rules of arithmetic.

To make matters more complicated, other kinds of numbers are also defined by metonymic generative models: the rationals, the reals, the imaginaries, the transfinite cardinals, etc. Thus rational numbers are understood as ratios of natural numbers, and real numbers are understood as infinite sequences of natural numbers. In other words, the rationals and the reals are understood metonymically in terms of the natural numbers -- a subcategory used to generate the larger categories.

Submodels

Another way to comprehend a category is via a submodel. Take the category of natural numbers again. The most common submodel used is the subcategory of powers of ten: ten, a hundred, a thousand, etc. We use this submodel to comprehend the relative size of numbers. The members of such a submodel are among what Rosch refers to as Cognitive Reference Points, which have a special place in reasoning, especially in making approximations and estimating size. Cognitive reference points within a submodel show prototype effects of the following sort: Subjects will judge statements like 98 is approximately 100 as being true more readily than statements like 100 is approximately 98.

Some submodels have a biological basis: the primary colors, the basic emotions, etc. Others are culturally stipulated, e.g., the Seven Deadly Sins.

Salient Examples

It is common for people to use familiar, memorable, or otherwise salient examples to comprehend categories. For example, if your best friend is a vegetarian and you don't know any others well, you will tend to generalize from your friend to other vegetarians. After a widely publicized DC-10 crash in Chicago, many people refused to fly DC-10's, choosing other types of planes despite the fact that they had overall worse safety records than DC-10's. Such people
used the salient example of the the DC-10 that crashed to stand metonymically for the entire category of DC-10's with respect to safety judgments.

Similarly, California earthquakes are salient examples of natural disasters. A. Tversky and Kahneman (1983) demonstrated that people use such salient examples in making probability judgments about the category of natural disasters. The reasoning used is what Tversky & Kahneman refer to as the conjunction fallacy. We know from probability theory that the probability of two events, A and B, occurring is always less than the probability of just one of the events, say B. Thus the probability of coins A and B both coming down heads is less than the probability of just B coming down heads.

The theory of probability is defined for events A and B which are not related to one another. Cognitive models may, however, relate events in our minds that are unrelated in the external world. What Tversky & Kahneman found was that when we have a salient cognitive model relating events A and B, it affects our judgments of the probability of A and B both occurring.

The following is a typical example of the kind Tversky & Kahneman used. One group of subjects was asked to rate the probability of:

A massive flood somewhere in North America in 1983, in which more than 100 people drown.

A second group was asked to rate the probability of

An earthquake in California sometime in 1983, causing a flood in which more than 1000 people drown.

The estimates of the conjunction of earthquake and flood were considerably higher than the estimates of the flood. Tversky & Kahneman conclude:

The attempts to predict the uncertain future, like the attempts to reconstruct the uncertain past, which is the domain of history and criminal law, are commonly based on the construction of hypothetical scenarios. These scenarios, or *best guesses*, tend to be specific, coherent, and representative of our mental model of the relevant worlds.

In short, a cognitive model may function to allow a salient example to stand metonymically for a whole category. In such cases, our probability judgments about the category are affected.

To summarize, we have seen the following kinds of metonymic models: social stereotypes, typical examples, ideal cases, paragons, generators, submodels, and salient examples. They have a cognitive status, that is, they are used in reasoning. And they all yield prototype effects of some sort.
Metaphorical Structuring of Concepts

We all learned in high school English classes that metaphors are linguistic expressions, usually found in poetry, that express some similarity. Ordinary nonpoetic language, we were taught, is nonmetaphorical. This is a false theory, one that has unfortunately been with us at least since the time of Aristotle. To begin to get an idea of why this is false, let us begin with a simple example.

English is full of expressions that reflect the conceptualization of love as a journey. Some are necessarily about love; others can be understood that way:

Look how far we've come. It's been a long, bumpy road. We can't turn back now. We're at a crossroads. We may have to go our separate ways. We're spinning our wheels. The relationship isn't going anywhere. The marriage is on the rocks.

These are ordinary, everyday expressions. There is nothing extraordinary about them. They are not poetic, nor are they necessarily used for special rhetorical effect. Those like Look how far we've come, which aren't necessarily about love, can be so understood. Examples like this show that what is involved is not just conventional language, but a conventional mode of thought. They reflect a way of thinking about love:

The lovers are travellers on a journey together, with common goals. The relationship is their vehicle, and it allows them to pursue those common goals together. The journey isn't easy. There are impediments, and there are places (crossroads) where a decision has to be made about which direction to go in and whether to keep travelling together.

The mode of travel can be of various types: car (long bumpy road, spinning our wheels), train (off the track), boat (on the rocks, foundering), plane (just taking off, bailing out).

The metaphor involves understanding one domain of experience, love, in terms of a very different domain of experience, journeys. The metaphor can be understood as a mapping (in the mathematical sense) from a source domain (in this case, journeys) to a target domain (in this case, love). The mapping is tightly structured. There are ontological correspondences, according to which entities in the domain of love (e.g., the lovers, their common goals, their difficulties, the love relationship, etc.) correspond systematically to entities in the domain of a journey (the travellers, the vehicle, destinations, etc.).

**ONTOLOGICAL CORRESPONDENCES**

- The lovers correspond to travellers.
- The love relationship corresponds to the vehicle.
- The state of being in the relationship corresponds to travelling in the same vehicle.
- The intimacy of being in the relationship corresponds to the physical closeness of being in the vehicle.
- The lovers’ common goals correspond to their common destinations on the journey.
- Difficulties correspond to impediments to travel.

The mapping includes epistemic correspondences, in which knowledge about journeys is mapped onto knowledge about love. Such correspondences permit us to reason about love using the knowledge we use to reason about journeys. Let us take an example:

Two travellers are travelling somewhere in a vehicle and it hits some impediment and gets stuck. If they do nothing, they will not reach their destinations. There are a limited number of alternatives for action.

1. They can try to get it moving again, either by fixing it or getting it past the impediment that stopped it.
2. They can remain in the stuck vehicle, and give up on getting to their destinations in it.
3. They can abandon the vehicle.

The alternative of remaining in the stuck vehicle takes the least effort, but does not satisfy the desire to reach their destinations.

The ontological correspondences map this scenario (sometimes called a "knowledge structure" in the cognitive sciences) onto a corresponding love scenario, in which the corresponding alternatives for action are seen. Here is the corresponding love scenario that results from applying the ontological correspondences to this knowledge structure.

Two people are in love and pursuing their common goals in a love relationship. They encounter some difficulty in the relationship which, if nothing is done, will keep them from pursuing their goals. Here are their alternatives for action:

1. They can try to do something so that the relationship will once more allow them to pursue their goals.
2. They can leave the relationship as it is and give up on pursuing those goals.
3. They can abandon the relationship.

The alternative of remaining in the relationship takes the least effort, but does not satisfy goals external to the relationship.

What constitutes the love-as-journey metaphor is not any particular word or expression. It is the ontological and epistemic mapping across conceptual domains, from the source domain of journeys to the target domain of love. The metaphor is not just a matter of language, but of thought and reason. The language is a reflection of the mapping. The mapping is conventional, one of our conventional ways of understanding love.

If metaphors were just linguistic expressions, we would expect different linguistic expressions to be different metaphors. Thus, "We've hit a dead-end
street would constitute one metaphor. "We can't turn back now" would constitute another, quite different metaphor. "Their marriage is on the rocks" would involve a still different metaphor. And so on for dozens of examples. Yet we don't seem to have dozens of different metaphors here. We have one metaphor, in which love is conceptualized as a journey. It is a unified way of conceptualizing love metaphorically that is realized in many different linguistic expressions.

Another way to put the question is this: How can a speaker of English know that a relatively neutral journey sentence such as

Look how far we've come.

can be about love (as well as about other activities that are conceptualized as journeys)? A grammar of English and an English dictionary would be of no use. None of the individual words would be listed in an English lexicon as being about love. Not "look" or "far" or "come" (in the sense used here). What we need to know is that we live in a culture in which love is conceptualized as a journey.

But where is this knowledge localized? It is not part of the grammar or lexicon of English, nor is it part of any general concept of metaphor. Rather, it must be part of our conceptual system -- part of the way we understand what love is. There is a single metaphor, and it is conceptual in nature: love is understood as a journey. As a result, many expressions about journeys of the appropriate sort -- "dead-end street," "crossroads," etc. -- can be understood as being about love.

What is particularly interesting is that new and imaginative extensions of the mapping can be understood instantly, given the ontological correspondences and other knowledge about journeys. Take the song lyric,

-We're going riding in the fast lane on the freeway of love.

The travelling knowledge called upon is this: When you drive in the fast lane, you go a long way in a short time and it can be exciting and dangerous. The danger may be to the vehicle (the relationship may not last) or the passengers (the lovers may be hurt, emotionally). The excitement of the love-journey is sexual. Our understanding of the song lyric depends upon the pre-existing metaphorical correspondences of the love-as-journey metaphor. The song lyric is instantly comprehensible because those metaphorical correspondences are already part of our conceptual system. An understanding of novel metaphor, in most cases, will depend on the understanding of conventional metaphors.

The love-as-journey metaphor was the example that first convinced me that metaphor was not a figure of speech, but a mode of thought, defined by a systematic mapping from a source to a target domain. What convinced me were the three characteristics of metaphor that we have just discussed:

1. The systematicity in the linguistic correspondences.
2. The use of metaphor to govern reasoning and behavior based on that reasoning.
3. The possibility for understanding novel extensions in terms of the conventional correspondences.
Metaphorical conceptual structure has become one of the most thoroughly studied and best documented areas in contemporary cognitive science. The basic results are these:

—Most abstract concepts are understood via metaphorical mappings from the structures of more concrete concepts.

—The mappings are cognitive in nature, and independent of particular linguistic realizations.

—The mappings are asymmetric.

—The mappings are not arbitrary, but rather are grounded in experience.

—Linguistic metaphors arise when linguistic expressions for for source domain concepts are also used for target domain concepts.

Each metaphorical mapping captures generalizations of two sorts:

1) Systematic polysemy, as when words that have senses in a source domain, have systematically corresponding senses in a target domain. An example would be words referring to the vertical spatial dimension (e.g., up, down, rise, fall, plummet, high, low) are systematically used for quantity, according to the correspondence: MORE IS UP, LESS IS DOWN. Examples include: Prices shot up. Prices are down. The cost of living rose. IBM fell on the NY exchange. Stocks plummeted.

2) Systematic inference pattern correspondences between the source and target domains. Take as an example the metaphor that ANGER IS A HOT FLUID IN A CONTAINER. Inferences about enclosed hot fluids map onto inferences about anger. (See Lakoff, 1987, case study 1.)

Correspondingly, generalizations from these two areas of empirical research (systematic polysemy and cross-domain inference correspondences) provide evidence for the existence of such metaphorical mappings.

The first really detailed study of such a case was Michael Reddy’s (1979) paper on the the conduit metaphor, where Reddy showed that speakers of English have only one major metaphorical mapping for comprehending what communication is. The mapping is:

—Ideas are objects.

—Linguistic expressions are containers.

—Communication is sending (idea-objects in linguistic containers)

Examples include:

I couldn’t get the idea across to her. The meaning is right there in the words. Your words are hollow. I couldn’t find one new idea in the whole paper. I didn’t get much out of what he said.

The most obvious and straightforward demonstration that metaphor can impose inferential structure on concept is Gentner and Gentner's remarkable 1983 study of electricity concepts. Since electricity is not something that its directly apprehended on its own terms, it can only be understood via metaphor. There are two basic metaphorical concepts of electricity: the fluid concept and the crowd concept. Gentner and Gentner show, experimentally, that subjects make different inferences about electricity depending on which metaphorical conceptualization they use.

The Gentner and Gentner study points up an important property of our conceptual system: A conceptual domain may be structured by different metaphorical concepts in different, and conflicting, ways. Lakoff and Johnson (1980, chaps. 16 and 17) show how this works for the concept of an argument.

One of the most interesting cases where different metaphors structure a single conceptual domain is our understanding of conceptual structure itself. The classical notion of a concept is based one of our metaphors for ideas, the ideas-as-objects metaphor, in which:

-Ideas (or concepts) are objects.
-Understanding is grasping.
-Thinking is manipulating.
-Memory is storage.
-Creative thought is object production.
-Communication is sending.
-Becoming informed is receiving ideas.
-The structure of a concept is the part-whole structure of an object.
-The mind is a machine people use for manipulating or producing ideas.

Examples include:
That concept is hard to grasp. The idea went right by me. Let me play with the concept for a while. I'll file that one away. He's been churning out ideas for years. I'm taking it all in. This concept is constructed out of a number of smaller concepts. I'm a little rusty today.

The symbol manipulation view of cognitive science is largely based on this metaphor. Concepts are represented by symbols, which are taken as abstract objects. Recursive function theory, which is the mathematics of symbol manipulation, is thus seen as the proper mathematics for cognitive science. Over the years the most advanced machines of the times were metaphoric models for the mind: the steam engine (I'm cookin' with steam!), the telephone switchboard (He's got his wires crossed), and most recently the computer. The computer metaphor for mind is thus the most recent use of this general metaphor.

It is common for everyday metaphors to be the basis of expert theories. When this occurs, such theories seem 'intuitive.'
Another major metaphor for understanding our mental life is the thought-as-motion metaphor, in which:

- Ideas are locations.
- Thinking is moving.
- Efficient thought is direct motion.
- Conclusions are destinations.
- Rationality is a force (the force of reason).
- A proof is a step-by-step tour from an initial to a final location.
- Epistemic modality is force dynamics.
- An argument is a battle over territory.

Examples include:

Let’s get straight to the point. Once he reaches this point in the argument, he’ll be forced to that conclusion. Let’s proceed in a step-by-step fashion. I could gain any ground with him. He’s arguing in circles.

A third major metaphor for mental life is the ideas-as-food metaphor, in which:

- Ideas are food.
- Creation of ideas is food preparation.
- Communication is feeding.
- Understanding is digesting.
- Attitude toward ideas is taste.
- The mind is an organism requiring nourishment.

Examples include:

We don’t spoon-feed our students. That’s food for thought. There’s too much information here for me to digest it all. That’s a half-baked idea. I’m starved for ideas. That smells a little fishy.

A fourth major metaphor is understanding-as-seeing, in which

- Ideas are objects
- Understanding is seeing
- Clarity is unobstructed vision
- Communication is placing an object in view
- Different viewpoints are locations from which an object looks different
- Remembering is keeping an object in sight

At present, between 100 and 200 such general metaphorical mappings have been identified for English. The results indicate that the bulk of our abstract concepts are metaphorical in nature. This does not mean that the target domains of metaphors have no nonmetaphorical structure. All is means is that whatever nonmetaphorical structure there is in the target domain, it underdetermines the conceptual structure of the domain and hence metaphorical structures are necessary to provide enough structure for systematic inferences.

Since metaphors are grounded in physical and social experience, metaphorically structured concepts are not purely mentalistic. And of course, they are not
mirrors of an external reality.

Spatial Concepts and Cognitive Topology

Imagine watching a tennis match. Each time the ball is hit, it moves along a trajectory with respect to the net. It may travel over, under, through, around, or into the net. The number of potential trajectories is, of course, infinite. Yet any speaker of English can categorize those trajectories in terms of one of these five prepositions. Those prepositions characterize spatial concepts. What must spatial concepts be like if they are to correctly categorize an infinity of possible trajectories in such scenes.

The answer that cognitive linguists have proposed is that they must be topological in character, topological in the sense that they generalize over geometry by virtue of preserving neighborhood relations. Take the sense of over that shows up in The ball went over the net. Over is a composite of a number of cognitive topological and orientation concepts. First, there must be a PATH (the trajectory of the ball), with a potential IMPEDIMENT (the net) along it. The impediment must be VERTICAL. Second, there must be two BOUNDED REGIONS (or CONTAINERS) on either side of the impediment. Third, there must be lack of CONTACT between the path and the impediment. PATHS, BOUNDED REGIONS, and CONTACT are cognitive topological concepts, commonly referred to as 'image-schemas'.

Within cognitive semantics, cognitive topological concepts play multiple roles:

1. They are elementary structures that fit together to characterize spatial relation concepts, that is, they can fit visual scenes.
2. They have built-in logics by virtue of their topological structures and those logics characterize spatial inferences.
3. By virtue of the cognitive topological character, they can not only fit visual scenes, but can also be used for the purpose of abstract reason when that are mapped by metaphor onto abstract domains. Spatial inferences, under metaphorical mappings, become abstract inferences.
4. Because there are natural cognitive relationships among cognitive topological structures, such relationships give rise to polysemy—cases where a single word has a number of systematically related meanings.

The Container Schema

To date, the best philosophical discussion of image-schemas is Mark Johnson's *The Body in the Mind* (Johnson, 1987). As in other cases, cognitive topological concepts are neither rejections of an external reality, nor are they purely mentalistic. They are grounded in our perceptual system, and arise via our regular interactions in our everyday environments.
Take, for example, a CONTAINER schema -- a schema consisting of a boundary distinguishing an interior from an exterior. The CONTAINER schema defines the most basic distinction between IN and OUT. We understand our own bodies as containers -- perhaps the most basic things we do are ingest and excrete, take air into our lungs and breathe it out. But our understanding of our own bodies as containers seems small compared with all the daily experiences we understand in CONTAINER terms:

Consider just a small fraction of the orientational feats you perform constantly in your daily activities--consider, for example, only a few of the many in-out orientations that might occur in the first few minutes of an ordinary day. You wake out of a deep sleep and peer out from beneath the covers into your room. You gradually emerge out of your stupor, pull yourself out from under the covers, climb into your robe, stretch out your limbs, and walk in a daze out of your bedroom and into the bathroom. You look in the mirror and see your face staring out at you. You reach into the medicine cabinet, take out the toothpaste, squeeze out some toothpaste, put the toothbrush into your mouth, brush your teeth, and rinse out your mouth. At breakfast you perform a host of further in-out moves--pouring out the coffee, setting out the dishes, putting the toast in the toaster, spreading out the jam on the toast, and on and on.

--Johnson, 1987

Johnson is not merely playing on the words in and out. There is a reason that those words are natural and appropriate, namely, the fact that we conceptualize an enormous number of activities in CONTAINER terms. Lindner (1981) describes in detail what is involved in this for 600 verbs containing the particle out, not just physical uses like stretch out and spread out, but in metaphorical uses like figure out, work out, etc. As Lindner observes, there are a great many metaphors based on the CONTAINER schema and they extend our bodily-based understanding of things in terms of CONTAINER schemas to a large range of abstract concepts. For example, emerging out of a stupor is a metaphorical, not a literal emergence from a container.

Let us consider some of the properties of this schema.

The CONTAINER Schema

Bodily experience: As Johnson points out, we experience our bodies both as containers, and as things in containers (e.g., rooms) constantly.

Structural elements: INTERIOR, BOUNDARY, EXTERIOR.

Basic Logic: Like most image-schemas, its internal structure is arranged so as to
yield a basic 'logic'. Everything is either inside a container or out of it -- P or not P. If container A is in container B and X is in A, then X is in B -- which is the basis for modus ponens: If all A's are B's and X is an A, then X is a B. Since categories are metaphorical containers, Boolean logic is a product of container logic plus a metaphor mapping container schemas into categories.

Sample Metaphors: The visual field is understood as a container: things come into and go out of sight. Personal relationships are also understood in terms of containers: one can be trapped in a marriage and get out of it.

The 'basic logic' of image-schemas is due to their configurations as gestalts -- as structured wholes which are more than mere collections of parts. Their basic logic is a consequence of their configurations. This way of understanding image-schemas is irreducibly cognitive. It is rather different from the way of understanding logical structure that those of us raised with formal logic have grown to know and love. In formal logic there are no such gestalt configurations. What I have called the 'basic logic' of a schema would be represented by meaning postulates. This might be done as follows: Let CONTAINER and IN be uninterpreted predicate symbols, and let A, B and X be variables over argument places. The logic of the predicates CONTAINER and IN would be characterized by meaning postulates such as:

For all A, X, either IN(X,A) or not IN(X,A).

For all A, B, X, if CONTAINER(A) and CONTAINER(B) and IN(A,B) and IN(X,A), then IN(X,B).

Such meaning postulates would be strings of meaningless symbols, but would 'given meaning' by the set-theoretical models they could be satisfied in.

On our account, the CONTAINER schema is inherently meaningful to people by virtue of their bodily experience. The schema has a meaningful configuration, from which the basic logic follows, given basic cognitive operations such as superimposition and focusing. An example is given in Figures 1 - 4.

[Note to printer: Insert Figures 1 - 4 about here]

On our account, the very concept of a set, as used in set-theoretical models, is understood in terms of CONTAINER schemas (see Lakoff, 1987, case study 2 for details).

The PART-WHOLE Schema
Bodily experience: We are whole beings with parts that we can manipulate. Our entire lives are spent with an awareness of both our wholeness and our parts. We experience our bodies as WHOLEs with PARTS. In order to get around in the world, we have to be aware of the PART-WHOLE structure of other objects. In fact, we have evolved so that our basic-level perception can distinguish the fundamental PART-WHOLE structure that we need in order to function in our physical environment.

Structural elements: A WHOLE, PARTS, and a CONFIGURATION.

Basic logic: The schema is asymmetric: If A is a part of B, then B is not a part of A. It is irreflexive: A is not a part of A. Moreover, it cannot be the case that the WHOLE exists, while no PARTS of it exist. However, all the PARTS can exist, but still not constitute a WHOLE. If the PARTS exist in the CONFIGURATION, then and only then does the WHOLE exist. It follows that, if the PARTS are destroyed, then the WHOLE is destroyed. If the WHOLE is located at a place P, then the PARTS are located at P. A typical, but not necessary property: The PARTS are contiguous to one another.

Sample metaphors: Families (and other social organizations) are understood as wholes with parts. For example, marriage is understood as the creation of a family (a whole) with the spouses as parts. Divorce is thus viewed as splitting up. In India, society is conceived of as a body (the whole) with castes as parts, the highest caste being the head and the lowest caste being the feet. The caste structure is understood as being structured metaphorically according to the configuration of the body. Thus, it is believed (by those who believe the metaphor) that the maintenance of the caste structure (the configuration) is necessary to the preservation of society (the whole).

The LINK Schema -

Bodily Experience: Our first link is the umbilical cord. Throughout infancy and early childhood, we hold onto our parents and other things, either to secure our location or theirs. To secure the location of two things relative to one another, we use such things as string, rope, or other means of connection.

Structural Elements: Two entities, A and B, and LINK connecting them.

Basic Logic: If A is linked to B, then A is constrained by, and dependent upon, B. Symmetry: If A is linked to B, then B is linked to A.

Metaphors: Social and interpersonal relationships are often understood in terms of links. Thus, we make connections and break social ties. Slavery is understood as
bondage, and freedom as the absence of anything tying us down.

The SOURCE-PATH-GOAL Schema

Bodily Experience: Every time we move anywhere there is a place we start from, a place we wind up at, a sequence of contiguous locations connecting the starting and ending points, and a direction. We will use the term "destination" as opposed to "goal" when we are referring to a specifically spatial ending point.

Structural Elements: A SOURCE (starting point), a DESTINATION (end point), a PATH (a sequence of contiguous locations connecting the source and the destination), and a DIRECTION (toward the destination).

Basic Logic: If you go from a source to a destination along a path, then you must pass through each intermediate point on the path; moreover, the further along the path you are, the more time has passed since starting.

Metaphors: Purposes are understood in terms of destinations, and achieving a purpose is understood as passing along a path from a starting point to an endpoint. Thus, one may go a long way toward achieving one's purposes, or one may get sidetracked, or find something getting in one's way. Complex events in general are also understood in terms of a source-path-goal schema; complex events have initial states (source), a sequence of intermediate stages (path), and a final state (destination).

Other image-schemas include an UP-DOWN schema, a FRONT-BACK schema, etc. At present, the range of existing schemas and their properties is still being studied.

Image-Schema Transformations

There are certain very natural relationships among image-schemas, and these motivate polysemy, not just in one or two cases, but in case after case throughout the lexicon. Natural image-schema transformations play a central role in forming radial categories of senses (Lakoff, 1987, chap. 6 and case study 2). Take, for example, the end-point-focus transformation. It is common for words that have an image-schema with a path to also have the corresponding image-schema with a focus on the end-point of the path, as Bennett, 1975 observed. Here are some typical pairs:

-Sam walked over the hill. (path)
-Sam lives over the hill. (end-of-path)
-Harry walked through that doorway. (path)  
-The passport office is through that doorway. (end-of-path)

-Sam walked around the corner. (path)  
-Sam lives around the corner. (end-of-path)

-Harriet walked across the street. (path)  
-Harriet lives across the street. (end-of-path)

-Mary walked down the road. (path)  
-Mary lives down the road. (end-of-path)

-Sam walked past the post office. (path)  
-Sam lives past the post office. (end-of-path)

It should be noted that although such pairs are common, they are not fully productive.

-Sam walked by the post office. (path)  
-Sam lives by the post office. (= near; ≠ end-of-path)

Here, by has a path schema, but no corresponding end-point schema.

-Sam ran from the house. (path)  
-Sam stood three feet from the house. (end-of-path)

-Sam ran to the house. (path)  
-*Sam stood (three feet) to the house. (≠ end-of-path)

*From allows both path and end-of-path schemas, but to only allows a path schema.

Path schemas are so naturally related to end-point schemas that people sometimes have to think twice to notice the difference. The same is true of the schema transformation that links multiplex (sometimes called "plurality") and mass schemas. It is natural for expressions like all and a lot that have a mass schema to also have a multiplex schema.

-All men are mortal. (MX)  
-All gold is yellow. (MS)

-She bought a lot of earrings. (MX)  
-She bought a lot of jewelry. (MS)

This schema transformation, of course, doesn’t hold for all quantifiers:
- She bought two earrings. (MX)
- She bought two jewelry. (MS)

There are also verbs which have both schemas:

- He poured the juice through the sieve. (MS)
- The fans poured through the gates. (MX)

The same systematic polysemy obtains for other verbs of liquid movement, such as spill, flow, etc.

- The wine spilled out over the table. (MS)
- The fans spilled out over the field. (MX)

There is a special case of the multiplex-mass transformation in which the multiplex entity is a sequence of points and the mass is a one-dimensional trajector (that is, a continuous line). A variety of prepositions permit both schemas.

- There are guards posted along the road. (MX)
- There is a fence along the road. (1DTR)

- He coughed throughout the concert. (MX)
- He slept throughout the concert. (1DTR)

- There were stains down his tie. (MX)
- There were stripes down his tie. (1DTR)

There is a natural relationship not only between a one-dimensional trajector and a sequence of points. There is also a natural relationship between a one-dimensional trajector and a zero-dimensional moving trajector (that is, a point) that traces a path.

- Sam went to the top of the mountain. (0DMTR)
- The road went to the top of the mountain. (1DTR)

- Sam ran through the forest. (0DMTR)
- There is a road through the forest. (1DTR)

- Sam walked across the street. (0DMTR)
- There was a rope stretched across the street. (1DTR)

Certain image-schemas have what Lindner (1981) refers to as "reflexive" variants, in which two distinct elements of a given schema are identified. As a result, the schematic relation holds not between two distinct entities, but between one entity and itself. "RF" indicates a reflexive schema and "NRF" indicates a nonreflexive
schema. The natural relationship between reflexive and nonreflexive variants of a schema yields systematic polysemy for words like *apart, over, up, out,* etc.

Here are some examples:

-He stood *apart from* the crowd. (NRF)
-He book fell *apart.* (RF)

-He rolled *over* me. (NRF)
-He rolled *over.* (RF)

-The cat walked *up to* me. (NRF)
-The cat curled *up.* (RF)

-She poured the syrup *out of* the jar. (NRF)
-The syrup spread *out over* the pancakes. (RF)

Let us consider for a moment what is natural about these image-schema transformations.

*Path-focus* <--> *end-point-focus*: It is a common experience to follow the path of a moving object until it comes to rest, and then to focus on where it is. Also, many paths are traveled in *order* to arrive at an endpoint that is kept in sight along the way. Such everyday experiences make the path-focus / end-point-focus transformation a natural principle of semantic relationship.

*Multiplex* <--> *mass*: As one moves further away, there is a point at which a group of individuals, especially if they are behaving in concert, begins to be seen as a mass. Similarly, a sequence of points is seen as a continuous line when viewed from a distance.

*ODMTR* <--> *IDTR*: When we perceive a continuously-moving object, we can mentally trace the path it is following, and some objects leave trails -- perceptible paths. The capacity to trace a path and the experience of seeing a trail left behind make it natural for the transformation linking zero-dimensional moving trajectors and a one-dimensional trajector to play a part in semantic relations in the lexicon. (Incidentally, the word *path* itself is polysemous, with meanings that are related by this transformation.)

*NRF* <--> *RF*: Given a perceived relationship between a TR and a LM which are two separate entities, it is possible to perceive the same relationship between (a) different parts of the same entity or (2) earlier and later locations of the same entity, where one part or location is considered LM and the other TR.

In short, these image-schema transformations are anything but arbitrary. They
are direct reflections of our experiences, which may be visual or kinaesthetic.

In summary, spatial relation concepts are made up of complexes of elementary cognitive topological concepts. Such concepts have the following characteristics:

(1) They are grounded in perceptual and motor experience, and are hence meaningful in themselves.
(2) They have internal analog structure that gives rise to inferences.
(3) They fit together via superposition.
(4) They bear natural cognitive relationships to one another, which motivate polysemic relations.
(5) They are subject to metaphorical mappings.

Conclusion

In the early 1970's, when researchers from the various cognitive sciences began to perceive that they were involved in a common enterprise, none of these findings existed. Yet in a short 20 years, our most fundamental ideas of what concepts are has been changed in a revolutionary manner.

The findings cited above come from a variety of fields: cognitive psychology, anthropology, neurophysiology, and linguistics. They converge on the following characterization of the nature of concepts:

—Some concepts are directly grounded in bodily or social experience. Others are imaginatively projected from them, with further constraints on grounding. The mechanisms of projection include category formation, and metaphorical and metonymic mapping.

—The conceptual system is grounded in two ways: by basic level concepts and by cognitive topology.

—Cognitive topological concepts are not finitary; they are analog structures both for the perceptual recognition of spatial relations and for the representation of the internal structure of concepts. As gestalt structures, elementary topological concepts have internal structure and are so not primitives in the technical sense. Inferential aspects of concepts appear to be built into their cognitive topology. No meaning postulates, or anything like them, are necessary.
III

Cognitive Science, Philosophy, and The Law

Empirical results like those cited above are inconsistent with both objectivist and subjectivist philosophical views. The imaginative aspects of conceptual structure (like metaphor and radial categories) are inconsistent with objectivist views, while the embodied aspects, which do not vary culturally, are inconsistent with subjectivist views. What is required is an experientialist philosophy, along the lines that Mark Johnson has been articulating for the past decade.

This matters because the law has traditionally been committed to many objectivist views. It also matters because the most vocal current critics of traditional legal philosophical views are subjectivists who come from the postmodernist / critical theory / deconstructionist tradition. The establishment and its most vocal critics are both at fault.

Experientialism offers a way out of the false objective/subjective dichotomy. In its interactionist foundations, it takes both the external world and our experience of it as real. It avoids a commitment to external essences, while also avoiding the nihilism charge often made against subjectivists. It acknowledges the (important but limited) role of historical contingency and relativism, while not contradicting our most evident truths. And it makes these issues empirical, rather than a matter of a priori philosophizing.

Winter's Application
Of Cognitive Science to the Law

It will come as no news to any contemporary legal theorist that the law uses conceptual metaphor. Tushnet, for example, in his "Corporations and Free Speech" (in David Kairys' The Politics of Law: A progressive Critique), discusses three important legal metaphors: the corporation as person, the free marketplace of ideas, and money talks (in which campaign contributions give contributors a 'voice'). Tushnet, as one would expect, sees the metaphors only from a negative perspective. And there is indeed much that is negative about the cases Tushnet cites, where, for example, corporations, as metaphorical persons, are seen as having First Amendment rights.

Since metaphor is simply a normal mode of thought, it, like any other normal but previously unrecognized mode of thought, can be used to positive effect. To my knowledge, the only person who has so far mastered the relevant cognitive science well enough to apply it to legal theory has been Steven Winter (Winter 1988, 1989, to appear). In fact, his application has been so extensive and so thoughtful that I would not pretend to be able to summarize it here. I will touch only on a few of his themes.
What I find especially refreshing and encouraging about Winter's work is its positive, constructive aspect. In his paper on the concept of standing, Winter correctly points out the metaphors implicit in the concept of standing, what aspects of reality those metaphors hide, and the abuses that follow from that. As usual, he documents his case in overwhelming detail. But Winter doesn't stop with a critique. Instead, he reasons as follows:

—People reason using metaphor and radial categories.
—The law is committed to the use of human reason.
—The law should therefore actively recognize metaphor and radial categories, and make it possible to use them overtly in framing laws.
—Since human concepts are commonly defined by a multiplicity of metaphors, so it should be possible to define legal concepts by a multiplicity of metaphors.

He then goes on to propose a new legal concept of standing—a radial concept, which keeps the traditional individualistic model as central, but has five group models (each based on different metaphors) as extensions of the radial concept. One of the group models is the one used in class action suits; the other four are new, and would function to redress the realities hidden by the metaphors of the traditional model. The idea is a powerful one:

Where the obfuscatory power of metaphor has created abuses, redress them using the creative power of metaphor together with the ability to form radial concepts.

In short, our new understanding of reason does not just provide another means for critique and complaint; it provides the mechanism for progressive remedy.

Another theme of Winter's is an application of prototype theory:

—Laws characterize prototypical cases.
—The cases that reach the appellate courts (hence, those discussed in law school) are the cases that fall outside the prototype.
—Since the law recognizes only the classical theory of categories (which is false), it must rely on legal fictions, often employed with arbitrary judicial power, to make nonprototypical cases look like they fall within the bounds of some classical category.
—If you only look at such nonprototypical cases, the law can look rather arbitrary. In the prototypical cases—the cut and dried ones—it fits human experience reasonably well.
—Instead of being nihilistic and incorrectly seeing all law as involving the arbitrary use of power, one should focus on the problem: How law can most reasonably be extended from prototypical to nonprototypical cases by natural conceptual mechanisms? But in order to even discuss the issue, the law must recognize prototype theory.

Again, the focus is positive: Use cognitive science to isolate the problem area, give legal recognition to the realities of human reason, and use our new knowledge of reason to seek possible remedies.
A third theme of Winter's arises in his reply to the critique of rights (Winter, 1989). Winter analyzes the metaphors that jointly define the concept of rights. What Winter finds is that the metaphors employed are ingenious and quite positive—they are necessary in order to insure our functioning free from random violence and state domination. In short, the metaphors used to characterize the concept of rights each has a positive function.

Moreover, the fact that the concept of rights is defined by metaphor does not make rights any less real or less important. What Johnson and I found is that metaphors can become real when people live their lives according to them. For example, the time-as-money metaphor has become real for many people in our society because we have set up institutions in which people must function as if time were a money-like resource. Winter observes that the question of whether rights are real has nothing to do with their metaphorical status. Rights will be real, he says, taking a cue from the late Robert Cover, if we make them real by our committed actions, and not otherwise. "There are no rights without the harnessing of the coercive power of the State to insure their fruition." (Winter, 1989)

If we deny the existence of rights, we will be less likely to act as though they exist and thus it will be less likely that we will have them.

What Winter has shown us is that the new knowledge that cognitive science has provided about the nature of human reason can be put to positive use in legal theory. It can provide not only for a more realistic, focussed, justified, and non-nihilisitic critique, but can go beyond that to suggest sensible remedies. Moreover, it can allow progressive legal thinkers to avoid wasting their efforts on ill-conceived and counterproductive critiques, like the critique of rights.

Summary

Our new empirically-based knowledge about the nature of human reason contradicts many philosophical assumptions taken for granted by the law. It also contradicts much of deconstruction, critical theory, and postmodernist thought.

Our new knowledge about reason, especially about metaphor and categorization, can be used for a thoroughgoing critique both of what the law hides and of judicial arbitrariness. But it goes well beyond critique, since it can be used positively in the service of sensible progressive reform.

What this new knowledge threatens in the law, however, characterizes much of traditional legal theory:

- It threatens the idea that law always moves from abstract legal principles to the decision of particular cases via universally valid logical principles.

It threatens the idea that categories are defined by necessary and sufficient conditions with fixed boundaries, and that legal categories defined in this way will objectively either fit a given real world situation or not.
—And it threatens the idea that all judicial thought is literal thought, a matter of the application of cold logic rather than the application of imaginative metaphorical thought.

But this new knowledge need not be seen as a threat to anything but injustice—the kind of injustice sanctioned by allowing a false theory of concepts to have legal status. Our new knowledge about how we think should be seen not as nihilistic, or as a threat to public order, or as mere carping critique. It can be seen instead as providing an occasion for positive progressive reform, as well as a new and deeper appreciation for such magnificent accomplishments of the metaphoric imagination as the concept of rights—feats of the imagination that can be made real only by committed action.
References


