Supplementary Readings

Chapter 6  Language and Cognition

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In the cognitive linguistic view, a conceptual metaphor is defined as understanding one conceptual domain in terms of another conceptual domain.

The two domains that participate in conceptual metaphor have special names. The conceptual domain from which we draw metaphorical expressions to understand another conceptual domain is called source domain, while the conceptual domain that is understood this way is the target domain. Thus, the abstract concepts, such as, life, arguments, love, theory, ideas, social organizations, and others are target domains, while the concrete concepts, like journeys, war, buildings, food, plants, and others are source domains. The target domain is the domain that we try to understand through the use of the source domain.

1. Common Source Domains

In studying the most common source domains, I found that the most systematic comprehensive survey is provided by the Cobuild Metaphor Dictionary. I have supplemented the list of sources offered by this metaphor dictionary with some additional ones from my survey of metaphor research. Below, I will briefly mention the most frequent sources.

1.1. The Human Body

The human body is an ideal source domain, since, for us, it is clearly delineated and we know it well. This does not mean that we make use of all aspects of this domain in metaphorically understanding abstract targets. The aspects that are especially utilized in metaphorical comprehension involve various parts of the body, including the head, face, legs, hands, back, heart, bones, shoulders, and others. Some examples follow:

the heart of the problem

to shoulder a responsibility

the head of the department

1.2. Health and Illness

Health and illness are, of course, aspects of human body. Both the general properties of health and illness and particular illnesses frequently constitute metaphorical source domains. Some examples include:

a healthy society

a sick mind

She hurt my feelings.
1.3. Animals

The domain of animals is an extremely productive source domain. Human beings are especially frequently understood in terms of properties of animals. Thus, we talk about someone being a brute, a tiger, a dog, a sly fox, a bitch, a cow, a snake, and so on. But the metaphorical use of animal terms is not limited to human beings, as indicated by the example “It will be a bitch to pull this boat out of the water.” In this instance, the term bitch denotes any difficult situations. The body parts of animals are also commonly used in the metaphorical conceptualization of abstract domains. This way of understanding nonphysical domains is also very common in languages of the world, as Hein and his colleagues show.

1.4. Plants

People cultivate plants for a variety of purposes: for eating, for pleasure, for making things, and so on. In our metaphorical use, we distinguish various parts of plants; we are aware of the many actions we perform in relation to plants; and we recognize the many different stages of growth that plants go through. Here are some examples:

- a budding beauty
- He cultivated his friendship with her.
- the fruit of her labor
- Exports flourished last year.

1.5. Buildings and Construction

Human beings build houses and other structures for shelter, work, storage, and so on. Both the static object of a house and its parts and the act of building it serve as common metaphorical source domains. Some examples follow:

- a towering genius
- He’s in ruins financially.
- She constructed a coherent argument.

1.6. Machines and Tools

People use machines and tools to work, play, fight, and for pleasure. Again, both the machines and tools and the activities related to them show up as metaphorical expressions, as illustrated by the examples below:

- the machines of democracy
- conceptual tools
- She produces a book every year.

1.7. Games and Sport

People play and they invent elaborate activities to entertain themselves. Games and sport are characterized by certain properties that are commonly utilized for metaphorical purposes. For
example, many games have rules and this property occurs in examples such as “He plays by the rules” and “We want an even playing field.” Additional examples from the domain of games and sport include:

*to toy* with the idea

He tried to *checkmate* her.

He’s a *heavyweight* politician.

1.8. Money and Economic Transactions (business)

From very early on, people living in human society have engaged in economic transactions of various kinds. These transactions often involve the use of money and commodities in general. The commercial event involves a number of entities and actions: a commodity, money, handing over the commodity, and handing over the money. Our understanding of various abstract things is based on this scenario or parts of it. Below are some examples:

*Spend* your time wisely.

I tried *to save* some energy.

She *invested a lot* in the relationship.

1.9. Cooking and Food

Cooking food as an activity has been with us ever since the beginning of humanity. Cooking involves a complex process of several elements: an agent, recipe, ingredients, actions, a product, just to mention the most important ones. The activity with its parts and the product serve as a deeply entrenched source domain. Here are some examples:

What’s your *recipe* for success?

That’s a *watered-down* idea.

He *cooked up* a story that nobody believed.

1.10. Heat and Cold

Heat and cold are extremely basic experiences. We feel warm and cold as a result of the temperature of the air that surrounds us. We often use the heat domain metaphorically to talk about our attitude to people and things.

in the *heat* of passion

a *cold* reception

an *icy* stare

a *warm* welcome

1.11. Light and Darkness

Light and darkness are also basic human experiences. The properties of light and darkness often appear as weather conditions when we speak and think metaphorically. Let us see some examples:
a *dark* mood

She *brightened* up.

a *cloud* of suspicion

There was a *cloud* over their friendship.

I do not have the *foggiest* idea.

She was in a *haze* of confusion.

1.12. *Force*

There are various kinds of forces: gravitational, magnetic, electric, mechanical. We see these forces as operating on and affecting us in many ways. The forces take many shapes in the physical world: waves, wind, storm, fire, and agents pushing, pulling, driving, sending another thing. These forces effect various changes in the thing acted on. There are many different effects as there are different forces. The metaphorical conceptualization of several abstract domains in terms of forces is reflected in the examples below:

She *swept me off my feet*.

You’re *driving* me nuts.

Don’t *push* me!

I was *overwhelmed*.

1.13. *Movement and Direction*

Movement—either self-propelled or otherwise—is yet another basic experience. Movement can involve a change of location or it can be stationary. When it involves a change of location, it is associated with direction: forward and backward, up and down. Changes of various kinds are conceptualized metaphorically as movement that involves a change of location. This is indicated by the examples:

He *went* crazy.

She solved the problem *step by step*.

Inflation is *soaring*.

Our economy is *galloping ahead*.

Obviously, this is not a complete survey of domains that participate in conceptual metaphors as sources. Further sources include various basic entities, such as containers, substances, physical objects, and several others. Common source domains also include the various properties of objects and substances, such as their shape, color, size, hardness, transparency, sharpness, weight, and many more. However, despite the representative nature of the list, we get a sense of the most common source domains and the kind of world that our most common metaphors depict. In this world, it seems, there are people, animals, and plants; the people live in houses, they have bodies, they eat, they get sick and get better; they move around and travel; they live in a physical
environment with all kinds of objects and substances in it; the objects and substances have all kinds of properties; the physical environment affects the people; and the people make tools, work, and engage in various other transactions with other people. This is an extremely simplified world, but it is exactly the simplified nature of this world that enables us to make use of parts of it in creating more abstract ones.

2. Common Target Domains

In the same way as the source domains apply to several targets, the targets also have several sources. Target domains are abstract, diffuse, and lack clear delineation; as a result, they “cry out” for metaphorical conceptualization. I can only survey the most common target domains and their most important sources.

2.1. Emotion

The domain of emotion is a part excellence target domain. Emotion concepts such as anger, fear, love, happiness, sadness, shame, pride, and so on are primarily understood by means of conceptual metaphors. The source domains of emotion concepts typically involve forces. Thus, we have examples like:

She was deeply moved.

He was bursting with joy.

He unleashed his anger.

Given that emotions are largely comprehended via force metaphors, it is not surprising that, etymologically, the word emotion derives from the Latin e meaning “out” and move meaning “to move.”

2.2. Desire

As regards metaphorical conceptualization, desire is similar to emotion. It is also comprehended as a force, not only as a physical one but also often as a physical force like hunger or thirst. It is also often understood in terms of heat. Some examples include:

The jacket I saw in the shopwindow pulled me into the store.

She is hungry for knowledge.

I am starved for affection.

He’s burning to go.

2.3. Morality

Moral categories such as good and bad, as well as honesty, courage, sincerity, honor, and their opposites, are largely understood by means of more concrete source concepts. Among these, economic transactions, forces, straightness, light and dark, and up-down orientation are especially important, as the examples below indicate:

I’ll pay you back for this.
She resisted the temptation.

He’s a straight shooter.

He’s a shady character.

That was a lowly thing to do.

2.4. Thought

How the human mind works is still little known. This situation makes it no surprise that people, both lay persons and experts, try to understand the mind by resorting to metaphors of various kinds. Rational thought is comprehended as work—the manipulation of objects in a workshop. Less active aspects of thought are understood in terms of perception, such as seeing. Some examples to demonstrate this follow:

She’s grinding out new ideas.

He hammered the point home.

He searched for the memory.

I see your point.

2.5. Society / Nation

The concepts of society and nation are extremely complex, and this complexity calls for metaphorical understanding. Common ways of comprehending society and nation involve the source concepts of person and family.

What do we owe society?

neighboring countries

a friendly nation

the founding fathers of the country

Other aspects of society are viewed as machines or the human body:

the machinery of democracy

the functioning of society

the ills of society

2.6. Politics

Politics has to do with the exercise of power. Political power is conceptualized as physical force. Politics has many additional aspects that are understood by means of a variety of further source domains, including games and sport, business, and war.

They forced the opposition out of the House.

The president plays hardball.
There was a great deal of haggling over the issue.

The fight erupted over abortion.

2.7. Economy

Economy is usually comprehended via metaphor. Its most commonly used source domains include building, plants, journey (movement, direction), as shown by the examples:

German built a strong economy.

the growth of the economy

They pruned the budget.

China’s economy is galloping ahead.

2.8. Human Relationships

Human relationships include such concepts as friendship, love, and marriage. These and similar concepts are metaphorically viewed as plants, machines, and buildings, as shown by the examples:

Their friendship is in full flower.

It’s budding relationship.

They had to work on their relationship.

They built a strong marriage.

2.9. Communication

We conceive of human communication as involving a speaker and a hearer, a message consisting of some meaning encoded in linguistic expressions, and a transfer of this message from the speaker to the hearer along some channel. Metaphorically, we view the linguistic expressions, meanings, and the transfer of the message as containers, objects, and sending, respectively. Here are some examples to illustrate this:

You are putting too many ideas into a single sentence.

That’s a dense paragraph.

She gave me a lot of information.

2.10. Time

Time is notoriously difficult concept to understand. The major metaphor for the comprehension of time is one according to which time is an object that moves. Many common everyday expressions demonstrate this:

The time will come when…

Christmas is coming up soon.

Time flies.
in the following week …

Time goes by fast.

2.11. Life and Death

Life and death are concepts that are heavily metaphorical in nature. Their metaphorical conceptualization is pervasive in both everyday language and literary works. Life is understood as a journey to some destination. Moreover, it is metaphorically day, light, warmth, and others. Birth is conceived of as arrival, whereas death is viewed as departure, as well as night, darkness, and cold.

The baby will arrive soon.

Grandpa is gone.

His father passed away.

2.12. Religion

Key aspects of religion involve our view of God and our relationship to God. God, similar to the concepts of society and nation, is conceptualized as a person: Father, Shepherd, King, etc. It follows from the metaphor that believers are viewed as God’s children, sheep, subjects, etc. Other aspects of religious experience involve the conceptualization of such notions as eternity, life after/before death, and so on which are necessarily metaphorical, since we have no experience of them.

2.13. Events and Actions

Events and actions are superordinate concepts that comprise a variety of different kinds of events and actions. For example, reading, making a chair, doing a project in the lab, plowing, or whatever are kinds of actions. Aspects of events include such notions as change, cause, purpose, means, and so on. Here are some examples that show this:

He went crazy.

She turned thirty last month.

You’re driving me nuts.

The goal sent the crow into a frenzy.

She has reached her goals in life.

As can be seen, these common target domains can be roughly classified as psychological and mental states and events (emotion, desire, morality, thought), social groups and processes (society, economy, human relationships, communication), and personal experiences and events (time, life, death, religion). The superordinate concepts of events and actions are difficult to place in this scheme. Another difficulty is to see exactly how the simplified world, as depicted in the most common source domains, fits and “maps onto” the groups of common target domains described above.

Metaphors We Live By

George Lakoff & Mark Johnson

Metaphor is for most people a device of the poetic imagination and the rhetorical flourish—a matter of extraordinary rather than ordinary language. Moreover, metaphor is typically viewed as characteristic of language alone, a matter of words rather than thought or action. For this reason, most people think they can get along perfectly well without metaphor. We have found, on the contrary, that metaphor is pervasive in every life, not just in language but in thought and action. Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature.

Primarily on the basis of linguistic evidence, we have found that most of our ordinary conceptual system is metaphorical in nature. And we have found a way to begin to identify in detail just what the metaphors are that structure how we perceive, how we think, and what we do.

To give some idea of what it could mean for a concept to be metaphorical and for such a concept to structure an everyday activity, Let us start with the concept ARGUMENT and the conceptual metaphor ARGUMENT IS WAR. This metaphor is reflected in our everyday language by a wide variety of expressions:

ARGUMENT IS WAR

Your claims are indefensible.

He attacked every weak point in my argument.

His criticisms were right on target.

I demolished his argument.

I’ve never won an argument with him.

You disagree? Okay, shoot!

If you use that strategy, he’ll wipe you out.

He shot down all of my arguments.

It is important to see that we don’t just talk about arguments in terms of war. We can actually win or lose arguments. We see the person we are arguing with as an opponent. We attack his positions and we defend our own. We gain and lose ground. We plan and use strategies. If we find a position indefensible, we can abandon it and take a new line of attack. Many of the things we do in arguing are partially structured by the concept of war. Though there is no physical battle. There is verbal battle, and the structure of an argument—attack, defense, counterattack, etc.—reflects this. It is in this sense that the ARGUMENT IS WAR metaphor is one that we live by in this culture; it structures the actions we perform in arguing.
This is an example of what it means for a metaphorical concept, namely, ARGUMENT IS WAR, to structure what we do and how we understand what we are doing when we argue. The essence of metaphor is understanding and experiencing one kind of thing in terms of another. It is not that arguments are a subspecies of war. Arguments and wars are different kinds of things—verbal discourse and armed conflict—and the actions performed are different kinds of actions. But ARGUMENT is partially structured, understood, performed, and talked about in terms of WAR. The concept is metaphorically structured; the activity is metaphorically structured, and, consequently, the language is metaphorically structured.

Moreover, this is the ordinary way of having an argument and talking about one. The normal way for us to talk about attacking a position is to use the words “attack a position.” Our conventional ways of talking about arguments presuppose a metaphor is not merely in the words we use—it is in our very concept of an argument. The language of argument is not poetic, fanciful, or rhetorical; it is literal. We talk about arguments that way because we conceive of them that way—and we act according to the way we conceive of things.

So far we have examined what we will call structural metaphors, cases where one concept is metaphorically structured in terms of another. But there is another kind of metaphorical concept, one that does not structure one concept in terms of another but instead organizes a whole system of concepts with respect to one another. We will call these orientational metaphors, since most of them have to do with spatial orientation: up-down, in-out, front-back, on-off, deep-shallow, central-peripheral. These spatial orientations arise from the fact that we have bodies of the sort we have and that they function as they do in our physical environment. Orientational metaphors give a concept a spatial orientation; for example, HAPPY IS UP. The fact that the concept HAPPY is oriented UP leads to English expressions like “I’m feeling up today.”

HAPPY IS UP; SAD IS DOWN

I’m feeling up. That boosted my spirits. My spirits rose. You’re in high spirits. Thinking about her always gives me a lift. I’m feeling down. I’m depressed. He’s really low these days. I fell into a depression. My spirits sank.

Physical basis: Drooping posture typically goes along with sadness and depression, erect posture with a positive emotional state.

CONSCIOUS IS UP; UNCONSCIOUS IS DOWN

Get up. Wake up. I’m up already. He rises early in the morning. He fell asleep. He dropped off to sleep. He’s under hypnosis. He sank into a coma.

Physical basis: Humans and most other mammals sleep lying down and stand up when they awaken.

HEALTH AND LIFE ARE UP; SICKNESS AND DEATH DOWN

He’s at the peak of health. Lazarus rose from the dead. He’s in top shape. As to his health, he’s way up there. He fell ill. He’s sinking fast. He came down with the flu. His health is declining. He dropped dead.

Physical basis: Serious illness forces us to lie down physically. When you’re dead, you are
physically down.

HAVING CONTROL or FORCE IS UP; BEING SUBJECT TO CONTROL or FORCE IS DOWN

I have control over her. I am on top of the situation. He’s in a superior position. He’s in a superior position. He’s at the height of his power. He’s in the high command. He’s in the upper echelon. His power rose. He ranks above me in strength. He is under my control. He fell from power. His power is on the decline. He is my social inferior. He is low man on the totem pole.

Physical basis: Physical size typically correlates with physical strength, and the victor in a fight is typically on top.

MORE IS UP; LESS IS DOWN

The number of books printed each year keeps going up. His draft number is high. My income rose last year. The amount of artistic activity in this state has gone down in the past year. The number of errors he made is incredibly low. His income fell last year. He is underage. If you’re too hot, turn the heat down.

Physical basis: If you add more of a substance or of physical objects to a container or pile, the level goes up.

FORESSABLE FUTURE EVENTS ARE UP (and AHEAD)

All up coming events are listed in the paper. What’s coming up this week? I’m afraid of what’s up ahead of us. What’s up?

Physical basis: Normally our eyes look in the direction in which we typically move (ahead, forward). As an object approaches a person (or the person approaches the object), the object appears larger. Since the ground is perceived as being fixed, the top of the object appears to be moving upward in the person’s field of vision.

HIGH STATES IS UP; LOW STATUS IS DOWN

He has a lofty position. She’ll rise to the top. He’s at the peak of his career. He’s climbing the ladder. He has little upward mobility. He’s at the bottom of the social hierarchy. She fell in status.

Social and physical basis: Status is correlated with (social) power and (physical) power is UP.

GOOD IS UP; BAD IS DOWN

Things are looking up. We hit a peak last year, but it’s been downhill ever since. Things are at an all-time low. He does high-quality work.

Physical basis for personal well-being: Happiness, health, life, and control—the things that principally characterize what is good for a person—are all UP.

VIRTUE IS UP; DEPRAVITY IS DOWN

He is high-minded. She has high standards. She is upright. She is an upstanding citizen. That was a low trick. Don’t be underhanded. I wouldn’t stoop to that. That would be beneath me. He fell into the abyss of depravity. That was a low-down thing to do.
Physical and social basis: GOOD IS UP for a person (physical basis), together with a metaphor that we will discuss below, SOCIETY IS A PERSON (in the version where you are not identifying with your society). To be virtuous is to act in accordance with the standards set by the society/person to maintain its well-being. VIRTUE IS UP because virtuous actions correlate with social well-being form the society/person’s point of view. Since socially based metaphors are part of the culture, it’s the society/person’s point of view that counts.

RATIONAL IS UP; EMOTIONAL IS DOWN

The discussion fell to the emotional level, but I raised it back up to the rational plane. We put our feelings aside and had a high-level intellectual discussion of the matter. He couldn’t rise above his emotions.

Physical and cultural basis: In our culture people view themselves as being in control over animals, plants, and their physical environment, and it is their unique ability to reason that places human beings above other animals and gives them this control. CONTROL IS UP thus provides a basis for MAN IS UP and therefore for RATIONAL IS UP.

Spatial orientations like up-down, front-back, on-off, center-periphery, and near-far provide an extraordinarily rich basis for understanding concepts in orientational terms. But one can do only so much with orientation. Our experience of physical objects and substances provides a further basis for understanding—one that goes beyond mere orientation. Understanding our experiences in terms of objects and substances allows us to pick out parts of our experience and treat them as discrete entities or substances of a uniform kind. Once we can identify our experiences as entities or substances, we can refer to them, categorize them, group them, and quantify them—and, by this means, reason about them.

Just as the basic experiences of human spatial orientations give rise to orientational metaphors, so our experiences with physical objects provide the basis for an extraordinarily wide variety of ontological metaphors, that is, ways of view events, activities, emotions, ideas, etc., as entities and substances.

Ontological metaphors serve various purposes, and the various kinds of metaphors there are reflect the kinds of purposes served. Take the experience of rising prices, which can be metaphorically viewed as an entity via the noun inflation. This gives us a way of referring to the experience:

INFLATION IS AN ENTITY

Inflation is lowering our standard of living.

If there’s much more inflation, we’ll never survive.

We need to combat inflation.

Inflation is backing us into a corner.

Inflation is taking its toll at the checkout counter and the gas pump.

Buying land is the best way of dealing with inflation.

Inflation makes me sick.
In these cases, viewing inflation as an entity allows us to refer to it, quantity it, identify a particular aspect of it, see it as a cause, act with respect to it, and perhaps even believe that we understand it. Ontological metaphors like this are necessary for even attempting to deal rationally with our experiences.

The range of ontological metaphors that we use for such purposes is enormous. The following list gives some idea of the kinds of purpose, along with representative examples of ontological metaphors that serve them.

**Referring**

My fear of insects is driving my wife crazy.

That was a beautiful catch.

We are working toward peace.

The middle class is a powerful silent force in American politics.

The honor of our country is at stake in this war.

**Quantifying**

It will take a lot of patience to finish this book.

There is so much hatred in the world.

DuPont has a lot of political power in Delaware.

You’ve got too much hostility in you.

Pete Rose has a lot of hustle and baseball know-how.

**Identifying Aspects**

The ugly side of his personality comes out under pressure.

The brutality of war dehumanizes us all.

I can’t keep up with the pace of modern life.

His emotional health has deteriorated recently.

We never got to feel the thrill of victory in Vietnam.

**Identifying Causes**

The pressure of his responsibilities caused his breakdown.

He did it out of anger.
Our influence in the world has declined because of our lack of moral fiber.

*Internal dissension* cost them the pennant.

**Setting Goals and Motivating Actions**

He went to New York to *seek fame and fortune*.

Here’s what you have to do to *insure financial security*.

I’m changing my way of life so that I can *find true happiness*.

The FBI will act quickly in the face of a *threat to national security*.

She saw getting married as the *solution to her problems*.

As in the case of orientational metaphors, most of these expressions are not noticed as being metaphorical. One reason for this is that ontological metaphors, like orientational metaphors, serve a very limited range of purposes—referring, quantifying, etc.

The Body in the Mind:
The Bodily Basis of Meaning, Imagination, and Reason

Mark Johnson

The Objective Theory of Meaning

1. Meaning is an abstract relation between symbolic representations (either words or mental representations) and objective (i.e., mind-independent) reality. These symbols get their meaning solely by virtue of their capacity to correspond to things, properties, and relations existing objectively “in the world.”

2. Concepts are understood as general mental representations (Kant) or as logical entities (Frege)—in either case, highly abstract and well-defined—that can be used to identity what things or objects there are, what properties they have, and what relations they can stand in. Concepts must be relatively “general” in character if they are to contain or present what is common to several particular objects. The concept “chair,” for instance, applies to all chairs (specifies what all chairs share in common that makes them “chairs”), and so incidentally is not a particular image of this or that chair.

3. Concepts are “disembodied” in the sense that they are not tied to the particular mind that experiences them in the way that, say, images and embodied (in me), whereas my concept of a chair can be objective and float free of any given embodiment. It is this shareable, abstract, and general nature of concepts that is supposed to make our knowledge possible, communicable, and objective.

4. The task of a theory of meaning is to be able to explain the meaningfulness of any string of symbols that is not nonsense. This task is usually defined as follows: To give the meaning of a particular utterance is to give the conditions under which it would be true, or the conditions under which it would be “satisfied” by some state of affairs in the world. To give the meaning of an assertion, such as “All our dishes are dirty,” would be to specify the circumstances that would make the sentence true. To give the meaning of a command, such as “Wash the dishes by noon,” would be to give the state of affairs in the world that would satisfy the command. The theory of meaning need not perform this massive task of stating conditions of satisfaction for every possible sentence, but it must be able to do so in principle. What is required is a recursive theory that shows how we can build up larger true or satisfied units from smaller true or satisfied units, which are taken as semantic primitives. And, on the assumption that there is a relatively small number of basic logical connectives for relating the semantic primitives, such a recursive theory would not be an impossible task.

5. Any analysis of meaning must be given ultimately in terms of literal concepts. There can be no irreducibly metaphorical or figurative concepts in the final analysis. This restriction is required by the Objectivist thesis that basic concepts pick out objects, properties, and relations in the world
completely independent of human beings and their processes of understanding. The argument is simple: the basic concepts into which meaning is analyzed must map definite, discrete, and fixed objects, properties, and relations. This requires concepts that are definite, discrete, and fixed. Such concepts are called “literal.” Metaphorical projections are not the sort of structures that could map onto the world so described, for they involve category crossings that do not exist objectively in the world. Objectivists grant that metaphor and other imaginative projections play a role in discovery and invention and that they may even be necessary for our understanding. Nevertheless, any Objectivist analysis of meaning must ultimately be reducible to literal concepts and propositions, and the structure of rationality cannot be irreducibly figurative.

6. It is important to notice that the Objectivist theory of meaning is compatible with, and supports, the epistemological claim that there exists a “God’s-Eye” point of view, that is, a perspective that transcends all human limitation and constitutes a universally valid reflective stance. For example, meanings are treated as relations among symbols and objective states of affairs that are independent of how any individual person might understand or grasp those relations. It is alleged that there is a position outside this relationship from which the fit of symbol and thing can be judged. Concepts are said to stand in logical relationships as a matter of objective fact, regardless of how human might comprehend them or organize them into systems. Conceptual structure is thought not to be determined by “subjective” process of cognition on the part of persons trying to grasp the meaning of a concept. It is often claimed that it is the philosopher’s exalted task to deal with these “objective” meanings, concepts, and logical connections, which it is left to psychology to study the “subjective” cognitive operations that govern how we grasp concepts and how they “make sense to us.”

The Objective View of Rationality

1. Reasoning is a rule-governed manipulation of connections among symbols. It consists in a series of operations in which connections among symbols and rule-governed combinations of symbols are established and traced out according to various logical canons or principles. Such reasoning, for instance, might have the form, “Something X being given, something else Y follows by a rule of deduction.”

2. The core of rationality is formal logic. Concepts can be joined together to form propositions of various sorts, and there is a limited number of “logical connectives” (and, or, if-then, etc.) that define the possible relations, either of concepts to one another (as in “red and blue,” “red or blue,” etc.) or of propositions (as in “It is raining and it is cold”; “It is raining or it is not raining”; etc.). There are also “rules of inference” for deciding whether the connections between propositions are valid or not.

3. As with the Objectivist view of meaning, so here, too, rationality is essentially disembodied; it consists of pure abstract logical relations and operations independent of subjective processes in the reasoner’s mind. It is usually granted that images, metaphorical projections, and analogical leaps may be part of our mental processes in making novel connections, thinking up new arguments, and drawing out conclusions from premises. But such cognitive processes irrelevant to the logical reconstruction and evaluation of rational judgments. Thus, a distinction is often drawn between an alleged context of discovery, involving psychological processes for generating new ideas or theories, and a context of justification, in which we reconstruct the
logical relations of a theory in order to show its grounding and certitude. This way in which the idea or theory was thought up doesn’t matter in the context of justification. Reason is regarded as consisting only of operations tracing out formal relations that obtain among symbolic representations (words, mental representations, concepts, propositions), and this is supposed to be independent of any particular content of those representations that is tied to our processing of them. Of course, the content or material that we are reasoning about will affect the nature of the conclusion drawn, but this in no way affects the structure of rationality as such.

4. The idea of a transcendent rationality also supports a God’s-Eye-View account of knowledge, parallel to the version reinforced by the Objectivist account of meaning. It is assumed that human beings can somehow “plug into” a transcendent, autonomous rationality that stands beyond all historical developments. Reason is what it is at all times and all places, regardless of the person doing the reasoning. This essential, fixed structure of rationality is the basis for claims to trans-historical and a priori truth. It is even more difficult here (than with the theory of meaning) to see how such a picture can avoid a commitment to a God’s-Eye-View, since reason is regarded in essentialist and transtemporal terms.

**The Importance of the Body in Meaning and Reason**

I am going to explore some of the more important ways in which structures of our bodily experience work their way up into abstract meanings and patterns of inference. Special attention is devoted to imaginative structuring and projection, as they affect human meaning, understanding, and rationality. My argument begins by showing that human bodily movement, manipulation of objects, and perceptual interactions involve recurring patterns without which our experience would be chaotic and incomprehensible. I call these patterns “image schemata,” because they function primarily as abstract structures of images. They are gestalt structures, consisting of parts standing in relations and organized into unified wholes, by means of which our experience manifests discernible order. When we seek to comprehend this order and to reason about it, such bodily based schemata play a central role. For although a given image schema may emerge first as a structure of bodily interactions, it can be figuratively developed and extended as a structure around which meaning is organized at more abstract levels of cognition. This figurative extension and elaboration typically takes the form of metaphorical projection from the realm of physical bodily interactions onto so-called rational processes, such as reflection and the drawing of inferences from premises. I shall try to show that what are often thought of as abstract meanings and inferential patterns actually do depend on schemata derived from our bodily experience and problem-solving.

There are two especially controversial aspects of the view I will be developing concerning the centrality of image schematic structures in the organization of meaning and in the nature of our inferences. The first is their apparently nonpropositional, analog nature. The second is their figurative character, as structures of embodied imagination.

This book consists chiefly in an extended development of these characteristics of image schemata and their radical implications for a theory of human meaning, understanding, and rationality. The key terms to be explicated include: “image schema”, “metaphor,” “imagination,” “nonpropositional,” and “embodied.” Since my general perspective is partly at odds with the mainstream theories, it is important to guard against assuming that I employ these terms with their standard meanings. Although I intend to keep these key notions connected to their ordinary
meanings, it is necessary to extend them beyond their usual scope. For example, I will not be using “metaphor” in the traditional sense as merely a figure of speech; rather, I shall identify it as a pervasive, indispensable structure of human understanding by means of which we figuratively comprehend our world. And I shall argue that “imagination” is a basic image-schematic capacity for ordering our experience; it is not merely a wild, non-rule-governed faculty for fantasy and creativity. Furthermore, I will eventually show that certain image-schematic meaning structures are not “propositional” in the traditional sense, and yet they are propositional in a special sense that makes them central to our rationality. At the end of my account, I hope to have given these terms meanings that are both connected to standard or ordinary usage but that make better sense of our experience of meaning and reasoning than the received views do.

**Putting the Body Back into the Mind: Procedure**

The problem I have tried to identify in our most influential contemporary theories of meaning (and their attendant theories of rationality) is the absence of an adequate account of the crucial role of understanding in all meaning. I have suggested that this understanding typically involves image-schematic structures of meaning and patterns of thought. It is my chief task in this book to explain what this means and how these structure operate.

My epigram of this understanding is “putting the body back into the mind.” Imaginative projection is a principle means by which the body (i.e., physical experience and its structures) works its way up into the mind (i.e., mental operations). By using the term “body” I want to stress the nonpropositional, experiential, and figurative dimensions of meaning and rationality.

My procedure in what follows requires some explanation. In the following chapter I explore a small segment of human discourse to illustrate what I will be meaning by embodied patterns of imagination. The next three chapters provide accounts of typical structures of recurring aspects of human bodily experience, in order to show how they play a crucial role in what we take as meaningful and in how we reason. Chapter 5 explores the pervasiveness of these image schemata and shows how they determine meaning relations and constrain understanding. The final three chapter explore the underlying theories of meaning, understanding, imagination, and knowledge that emerge from this approach.

As animals we have bodies connected to the natural world, such that our consciousness and rationality are tied to our bodily orientations and interactions in and with our environment. Our embodiment is essential to who we are, to what meaning is, and to our ability to draw rational inferences and to be creative. My phenomenological description of image-schematic experiential structures and their figurative elaborations and projections onto abstract domains of understanding is the basis for an enriched account of human meaning and rationality. It is a start on a project that would seek to fill in the gaps created by all those theories whose rigid dichotomies force them to compartmentalize and fragment life, and to ignore the centrality and indispensability of embodied imagination in life and thought. I attempt to do this by giving a plausible description of some of the more prominent ways in which meaning and rationality are tied to bodily experience, as it is imaginatively structured. I am exploring the ways in which *the body is in the mind*.

The Way We Think: Conceptual Blending and the Mind’s Hidden Complexities

Gilles Fauconnier & Mark Turner

The Elements of Blending

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

The Buddhist Monk example reveals the central principles of the network model of conceptual integration. We will lay them out here.

Mental Spaces

Mental spaces are small conceptual packets constructed as we think and talk, for purposes of local understanding and action. In the Buddhist Monk network, we have a mental space for the ascent and another mental space for the descent. Mental spaces are connected to long-term schematic knowledge called “frames”. Mental spaces are very partial. They contain elements and are typically structured by frames. They are interconnected, and can be modified as thought and discourse unfold. Mental spaces can be used generally to model dynamic mappings in thought and language.

Input Spaces. In the Buddhist Monk network, there are two input mental spaces. As shown in Figure 1, each is a partial structure corresponding to one of the two journeys. The day of the upward journey is d_1, the day of the downward journey is d_2, the monk going up is a_1, and the monk going down is a_2.

Cross-Space Mapping. A partial cross-space mapping connects counterparts in the input mental
spaces (see Figure 2). It connects mountain, moving individual, day of travel, and motion in one mental space to mountain, moving individual, day, and motion in the other mental space.

**Generic Space.** A generic mental space maps onto each of the inputs and contains what the inputs have in common: a moving individual and his position, a path linking foot and summit of the mountain, a day of travel, and motion in an unspecified direction (represented in Figure 3 by double-headed arrow).

**Blend.** There is a fourth mental space, the blended space, that we will often call “the blend” (see Figure 4). Each of the mountain slopes in the two input mental spaces is projected to the same single mountain slope in the blended space. The two days of travel, d1 and d2, are mapped onto a single day d’ and are thus fused. But the moving individuals and their positions are mapped according to the time of day, with direction of motion preserved, and therefore cannot be fused.
Input Space 1 represents dynamically the entire upward journey, while Input Space 2 represents the entire downward journey. The projection into the blended space preserves times and positions. The blended space, which has time $t$ and day $d'$ contains a counterpart of $a_1$ at the position occupied by $a_1$ at time $t$ of day $d_1$ as well as a counterpart of $a_2$ at the position occupied by $a_2$ at time $t$ of day $d_2$.

**Emergent Structure**

The blend develops emergent structure that is not in the inputs. First, *composition* of elements from the inputs makes relations available in the blend that do not exist in the separate inputs. In the blend but in neither of the inputs, there are two moving individuals instead of one. They are moving in opposite directions, starting from opposite ends of the path, and their positions can be compared at any time of the trip, since they are traveling on the same day, $d'$. Second, *completion* brings additional structure to the blend. This structure of two people moving on the path can itself be viewed as a salient part of a familiar background frame: two people starting a journey at the same time from opposite ends of a path. Third, by means of *completion*, this familiar structure is recruited into the blended space. At this point, the blend is integrated: It is an instance of a particular familiar frame, the frame of two people walking on a path in opposite directions. By virtue of that frame, we can now run the scenario dynamically: In the blend, the two people move...
along the path. This “running of the blend” is called *elaboration*. Running of the blend modifies it imaginatively, delivering the actual encounter of the two people. This is new structure: There is no encounter two people in the blend are projected back to the “same” monk in the two input mental spaces. The meeting place projects back to the “same” monk in the two input mental spaces. The meeting place projects back to the “same” location on the blend is the same as the time of day in the input spaces when the monk is at that location. The mapping back to the input spaces yields the configuration suggested by Figure 5.

As we run the blend, the links to the inputs are constantly maintained, so that all these “sameness” connections across spaces seem to pop out automatically, yielding a flash of comprehension. But for this flash to occur, counterpart links must be unconsciously maintained even as they changed dynamically across these spaces. Given the way we have built the blend, we know that any point on the path in the blend projects to counterparts in the input spaces. More generally, anything fused in the blend projects back to counterparts in the input spaces. But this “geometric” knowledge of correlations among time, position of the monk, and location on the path in the
different spaces is completely unconscious. What comes into consciousness is the flash of comprehension. And it seems magical precisely because the elaborate imaginative work is all unconscious.

**The Features of Blending**

Blending in the riddle of the Buddhist Monk has features that turn out to be universal for conceptual integration.

Building an integration network involves setting up mental spaces, matching across spaces, projecting selectively to a blend, locating shared structures, projecting backward to inputs, recruiting new structure to the inputs or the blend, and running various operations in the blend itself. We will talk about these operations in sequence, but it is crucial to keep in mind that any of them can run at any time and that they can run simultaneously. The integration network is trying to achieve equilibrium. In a manner of speaking, there is a place where the network is “happy.” Context will typically specify some conditions of the equilibrium, as when we are instructed to find a solution to the riddle of the Buddhist Monk. The network will achieve equilibrium if structure comes up in the blend that projects back automatically to the inputs to yield the existence of the special point on the path. More generally, what counts as an equilibrium for the network will depend on its purpose, but also on various internal constraints on its dynamics.

The Basic Diagram in Figure 6 illustrates the central features of conceptual integration: The circles represent mental spaces, the solid lines indicate the matching and cross-space mapping between the inputs, the dotted lines indicate connections between inputs and either generic or blended spaces, and the solid square in the blended space represents emergent structure.
While this static way of illustrating aspects of conceptual integration is convenient for us, such a diagram is really just a snapshot of an imaginative and complicated process that can involve deactivating previous connections, reframing previous spaces, and other actions. We think of the lines in this diagram as corresponding to neural coactivations and bindings. Here, then, are the essential aspects of blending, presented in a sequence not meant to reflect actual stages of the process:

- **Conceptual integration network.** Blends arise in networks of mental spaces. In the network illustrated in the Basic Diagram, there are four mental spaces: the two inputs, the generic space, and the blend. This is a minimal network. Conceptual integration networks can have several input spaces and even multiple blended spaces.

- **Matching and counterpart connections.** In conceptual integration, there is partial matching between input spaces. The solid lines in the Basic Diagram represent counterpart connections produced by matching. Such counterpart connections are of many kinds: connections between frames and roles in frames, connections, metaphoric connections, and, more generally, “vital relations” mappings. When matches are created between two spaces, we say that there is a cross-space mapping between them.

- **Generic space.** At any moment in the construction of the network, the structure that inputs seem to share is captured in a generic space, which, in turn, maps onto each of the inputs. A given element in the generic space maps onto each of the inputs.

- **Blending.** In blending, structure from two input mental spaces is projected to a new space, the blend. Generic spaces and blended spaces are related: Blends contain generic structure captured in the generic space but also contain more specific structure, and they can contain structure that is impossible for the inputs, such as two monks who are the same monk.

- **Selective projection.** Not all elements and relations from the inputs are projected to the blend. Sometimes two counterparts are both projected, sometimes only one, sometimes none. Sometimes counterparts in the input spaces are fused in the blend, but often not. And, finally, sometimes an element in one input without a counterpart in the other gets projected to the blend.

- **Emergent structure.** Emergent structure arises in the blend that is not copied there directly from any input. It is generated in three ways: through composition of projections from the inputs, through completion based on independently recruited frames and scenarios, and through elaboration (“running the blend”).

- **Composition.** Blending can compose elements from the input spaces to provide relations that do not exist in the separate inputs. In the Buddhist Monk example, composition yields two travelers making two journeys at the same time on the same path, even though each input has only one traveler making one journey. Counterpart elements can be composed by being included separately, yielding two monks; or by being projected onto the same element in the blend, as when the two days in the two inputs are projected onto the same day in the blend. We refer to this kind of projection as “fusion”.

- **Completion.** We rarely realize the extent of background knowledge and structure that we
bring into a blend unconsciously. Blends recruit great ranges of such background meaning. Pattern completion is the most basic kind of recruitment: We see some parts of a familiar frame of meaning, and much more of the frame is recruited silently but effectively to the blend. Figure 7 demonstrates this well-known psychological phenomenon, where we see two line segments and a rectangle and, through pattern completion, infer that there is a straight line running “behind” the rectangle. A minimal composition in the blend is often automatically by the scenario of two people journeying toward each other that it takes some thinking to see that the “journeying toward each other” scenario is much richer than the “two monks” composition.

• **Elaboration.** We elaborate blends by treating them as simulation and running them imaginatively according to the principles that have been established for the blend. Some of these principles for running the blend will have been brought to the blend by completion. We run the Buddhist Monk blend to get the “encounter” in the blend that provides the solution to the riddle. We are able to run the blend because we know the dynamics of the scenario of two people making opposite journeys along a path, which was brought in by pattern completion. That scenario gives us principles having to do with the passage of time, the possibilities of self-locomotion, and so on. Part of the power of blending is that there are always many different possible lines of elaboration, and elaboration can go on indefinitely. We can run the blend as much and as long and in as many alternative directions as we choose. For example, the two monks might meet each other and have a philosophical discussion about the concept of identity. That particular elaboration would divert us from the purpose of solving the riddle, but it could also lead to something interesting and useful. The creative possibilities of blending stem from the open-ended nature of completion and elaboration. They recruit and develop new structure for the blend in ways that are principled but effectively unlimited.

Blending operates over the entire richness of our physical and mental world.

Composition, completion, and elaboration lead to emergent structure in the blend; the blend contains structure that is not copied from the inputs. Note that in the Basic Diagram (Figure 6), the square inside the blend represents emergent structure.

Cognitive science is a new field that brings together what is known about the mind from many academic disciplines: psychology, linguistics, anthropology, philosophy, and computer science. It seeks detailed answers to such questions as: What is reason? How do we make sense of our experience? What is a conceptual system and how is it organized? Do all people use the same conceptual system? If so, what is that system? If not, exactly what is there that is common to the way all human beings think? The questions aren’t new, but some recent answers are.

This book is about the traditional answers to these questions and about recent research that suggests new answers. On the traditional view, reason is abstract and disembodied. On the new view, reason has a bodily basis. The traditional view sees reason as literal, as primarily about propositions that can be objectively either true or false. The new view takes imaginative aspects of reason—metaphor, metonymy, and mental imagery—as central to reason, rather than as a peripheral and inconsequential adjunct to the literal.

The traditional account claims that the capacity for meaningful thought and for reason is abstract and not necessarily embodied in any organism. Thus, meaningful concepts and rationality are transcendental, in the sense that they transcend, or go beyond, the physical limitations of any organism. Meaningful concepts and abstract reason may happen to be embodied in human beings, or in machines, or in other organisms—but they exist abstractly, independent of any particular embodiment. In the new view, meaning is a matter of what is meaningful to thinking, functioning beings. The nature of the thinking organism and the way it functions in its environment are of central concern to the study of reason.

Both views take categorization as the main way that we make sense of experience. Categories on the traditional view are characterized solely by the properties shared by their members. That is, they are characterized (a) independently of the bodily nature of beings doing the categorizing and (b) literally, with no imaginative mechanisms (metaphor, metonymy, and imagery) entering into the nature of categories. In the new view, our bodily experience and the way we use imaginative mechanisms are central to how we construct categories to make sense of experience.

We will be calling the traditional view objectivism for the following reason: Modern attempts to make it work assume that rational thought consists of the manipulation of abstract symbols and that these symbols get their meaning via a correspondence with the world, objectively construed, that is, independent of the understanding of any organism. A collection of symbols placed in correspondence with an objectively structured world is viewed as a representation of reality. On the objectivist view, all rational thought involves the manipulation of abstract symbols which are given meaning only via conventional correspondences with things in the external world.
Among the more specific objectivist views are the following:

- Thought is the mechanical manipulation of abstract symbols.
- The mind is an abstract machine, manipulating symbols essentially in the way a computer does, that is, by algorithmic computation.
- Symbols (e.g., words and mental representations) get their meaning via correspondences to things in the external world. All meaning is of this character.
- Symbols that correspond to the external world are *internal representations of external reality*.
- Abstract symbols may stand in correspondence to things in the world independent of the peculiar properties of any organisms.
- Since the human mind makes use of internal representations of external reality, the mind is a *mirror of nature*, and correct reason mirrors the logic of the external world.
- It is thus incidental to the nature of meaningful concepts and reason that human beings have the bodies they have and function in their environment in the way they do. Human bodies may play a role in *choosing* which concepts and which modes of transcendental reason human beings actually employ, but they play no essential role in *characterizing* what constitutes a concept and what constitutes reason.
- Thought is *abstract* and *disembodies*, since it is independent of any limitations of the human body, the human perceptual system, and the human nervous system.
- Machines that do no more than mechanically manipulate symbols that correspond to things in the world are capable of meaningful thought and reason.
- Thought is *atomistic*, in that it can be completely broken down into simple “building blocks”—the symbols used in thought—which are combined into complexes and manipulated by rule.
- Thought is *logical* in the narrow technical sense used by philosophical logicians; that is, it can be modeled accurately by systems of the sort used in mathematical logic. These are abstract symbol systems defined by general principles of symbol manipulation and mechanisms for interpreting such symbols in terms of “models of the world.”

Though such views are by no means shared by all cognitive scientists, they are nevertheless widespread, and in fact so common that many of them are often assumed to be true without question or comment. Many, perhaps even most, contemporary discussions of the mind as computing machine take such views for granted.

In recent years, conceptual categories have been studied intensively and in great detail in a number of the cognitive sciences—especially anthropology, linguistics, and psychology. The evidence that has accumulated is in conflict with the objectivist view of mind. Conceptual categories are, on the whole, very different from what the objectivist view requires of them. That evidence suggests a very different view, not only of categories, but of human reason in general:

- Thought is *embodied*, that is, the structures used to put together our conceptual systems grow out of bodily experience and make sense in terms of it; moreover, the core of our conceptual
systems is directly grounded in perception, body movement, and experience of a physical and social character.

- Thought is imaginative, in that those concepts which are not directly grounded in experience employ metaphor, metonymy, and mental imagery—all of which go beyond the literal mirroring, or representation, of external reality. It is this imaginative capacity that allows for “abstract” thought and takes the mind beyond what we can see and feel. The imaginative capacity is also embodied—indirectly—since the metaphors, metonymies, and images are based on experience, often bodily experience. Thought is also imaginative in a less obvious way: every time we categorize something in a way that does not mirror nature, we are using general human imaginative capacities.

- Thought has gestalt properties and is thus not atomistic; concepts have an overall structure that goes beyond merely putting together conceptual “building blocks” by general rules.

- Thought has an ecological structure. The efficiency of cognitive processing, as in learning and memory, depends on the overall structure of the conceptual system and on what the concepts mean. Thought is thus more than just the mechanical manipulation of abstract symbols.

- Conceptual structure can be described using cognitive models that have the above properties.

- The theory of cognitive models incorporates what was right about the traditional view of categorization, meaning, and reason, while accounting for the empirical data on categorization and fitting the new view overall.

I will refer to the new view as experiential realism or alternatively as experientialism. The term experiential realism emphasizes what experientialism shares with objectivism: (a) a commitment to the existence of the real world, (b) a recognition that reality places constraints on concepts, (c) a conception of truth that goes beyond mere internal coherence, and (d) a commitment to the existence of stable knowledge of the world.

Both names reflect the idea that thought fundamentally grows out of embodiment. “Experience” here is taken in a broad rather than a narrow sense. It includes everything that goes to make up actual or potential experience of either individual organisms or communities of organisms—not merely perception, motor movement, etc., but especially the internal genetically acquired makeup of the organism and the nature of its interactions in both its physical and its social environments.

Experientialism is thus defined in contrast with objectivism, which holds that the characteristics of the organism have nothing essential to do with concepts or with the nature of reason. On the objectivist view, human reason is just a limited form of transcendental reason. The only roles accorded to the body are (a) to provide access to abstract concepts, (b) to provide “wetware,” that is, a biological means of mimicking patterns of transcendental reason, and (c) to place limitations on possible concepts and forms of reason. On the experientialist view, reason is made possible by the body—that includes abstract and creative reason, as well as reasoning about concrete things. Human reason is not an instantiation of transcendental reason; it grows out of the nature of the organism and all that contributes to its individual and collective experience: its genetic inheritance, the nature of the environment it lives in, the way it functions in that environment, the nature of its social functioning, and the like.
The issue is this:

Do meaningful thought and reason concern merely the manipulation of abstract symbols and their correspondence to an objective reality, independent of any embodiment (except, perhaps, for limitations imposed by the organism)?

Or do meaningful thought and reason essentially concern the nature of the organism doing the thinking—including the nature of its body, its interactions in its environment, its social character, and so on?

Though these are highly abstract questions, there does exist a body of evidence that suggests that the answer to the first question is no and the answer to the second is yes. That is a significant part of what this book is about.

Why does all this matter? It matters for our understanding of who we are as human beings and for all that follows from that understanding. The capacity to reason is usually taken as defining what human beings are and as distinguishing us from other things that are alive. If we understand reason as being disembodied, then our bodies are only incidental to what we are. If we understand reason as mechanical—the sort of thing a computer can do—then we will devalue human intelligence as computers get more efficient. If we understand rationality as the capacity to mirror the world external to human beings, then we will devalue those aspects of the mind that can do infinitely more than that. If we understand reason as merely literal, we will devalue art.

How we understand the mind matters in all these ways and more. It matters for what we value in ourselves and others—for education, for research, for the way we set up human institution, and most important for what counts as a humane way to live and act. If we understand reason as embodied, then we will want to understand the relationship between the mind and the body and to find out how to cultivate the embodied aspects of reason. If we fully appreciate the role of the imaginative aspects of reason, we will give them full value, investigate them more thoroughly, and provide better education in using them. Our ideas about what people can learn and should be learning, as well as what they should be doing with what they learn, depend on our concept of learning itself. It is important that we have discovered that learning for the most part is neither rote learning nor the learning of mechanical procedures. It is important that we have discovered that rational thought goes well beyond the literal and the mechanical. It is important because our ideas about how human minds should be employed depend on our ideas of what a human mind is.

It also matters in a narrower but no less important way. Our understanding of what reason is guides our current research on the nature of reason. At present, that research is expanding faster than at any time in history. The research choices made now by the community of cognitive scientists will shape our view of mind for a long time to come. We are at present at an important turning point in the history of the study of the mind. It is vital that the mistaken views about the mind that have been with us for two thousand years be corrected.