The Mind is an Autocatalytic Vortex

Blending Is Indispensable for Advanced Narrative Cognition

In The Literary Mind, I argued that the modern mind derives from our remarkable capacity to deploy a cohort of basic mental operations – story, projection, blending, and parable. These operations are a pack, a troupe, a self-feeding cyclone, an autocatalytic vortex, a breeder reactor, a dynamic heterarchy – choose your metaphor; they labor together.

Some of the evidence I presented in The Literary Mind can be misinterpreted, it seems, as suggesting that advanced narrative cognition comes first in the sequence, and that upon this rock the other operations build their conceptual church. My purpose here is to correct that misinterpretation.

Mature narrative cognition does not exist without blending. Blending is not a second step.

Story, Projection, and Parable

Evolutionarily and developmentally, the mental cohort I call story, projection, blending, and parable precedes the human singularities we know as language, art, music, mathematical and scientific discovery, religion, advanced social cognition, refined tool use, advanced music and dance, fashions of dress, and sign systems. This mental cohort makes our higher-order human behaviors possible, evolutionarily and developmentally.

Story is our ability to construe and imagine situations as complexes of events, objects, and actors engaged in interdependent activity. In scientific inquiry, story is often called “narrative,” “narrative cognition,” or “narrative imagining.” It operates constantly in our thought. Its complex operation is almost entirely unconscious, although aspects of its operation can be dragged onto the stage of consciousness. For human beings, story is anything but a costly or special mental operation. It is fundamental to the modern mind.

Projection is the operation of making various kinds of mental connections. Rudimentary forms of projection occur throughout mammalian and primate cognition. A particularly important system of projection, called blending or conceptual integration, is also available in rudimentary forms throughout mammalian and primate cognition, but human beings developed the most advanced form, double-scope blending. Indeed, the ability for double-scope blend-
ing seems to separate the cognitively modern human mind from its precursors.

Parable is the use of double-scope blending on story. The use of double-scope blending on story creates blended narrative conceptual structures, of the sort that characterize human higher-order cognition, with its species-wide capacities for exceptional creativity and innovation.

In sum, the mental cohort of story, projection, blending, and parable is constantly at work in human thought, mostly below the horizon of consciousness. It is not cognitively costly and is not special.

Or rather, double-scope blending is indeed special – in the sense that it belongs to only our species; it seems to be ours alone. But it is not special within our species; it is not special to particular times, activities, or people. Double-scope blending is uniformly available and constantly deployed across our entire species, all the time, morning, noon, and night. It is equally at work in the most impressive and in the least remarked aspects of human behavior and thought. The use of double-scope blending on story creates narrative conceptual products that are special to human beings. But the mental cohort of story, projection, blending, and parable belongs equally to all human beings, now and presumably for at least the last fifty thousand years. Advanced narrative cognition is not a precursor of this cohort. Rather, the cohort working together spirals up, and advanced narrative cognition is a product of their cooperation.

The Blending of Mature Narratives

The theory of blending, or conceptual integration, originated in joint work by Gilles Fauconnier and me in 1993 (for surveys, see Fauconnier & Turner, The Way We Think; Turner, “The Blending website”). The theory has advanced greatly in the intervening fifteen years, and many people have worked to extend blending theory in a transdisciplinary way.

In early work, emphasis was often laid on the double-scope blending of stories to create a blended story. The Literary Mind, to take the most obvious example, begins with “The Tale of the Ox and the Donkey,” from The Thousand and One Nights. I analyzed there at length the principles of blending as they operate in constructing the network of narrative structures involved in the tale of the ox and the donkey. That network includes a blended narrative with creative, innovative, emergent narrative structure of its own.

Similarly, in “Double-Scope Stories” (Turner, “Double-scope stories”), I analyzed conceptual integration networks that have as inputs to the blend separate and conflicting mature narrative structures.

In analyses such as these (although not others), my procedure invited misinterpretation. Specifically, in those analyses, I presented at the outset different sophisticated narrative structures, which served as inputs to the blend, and I focused on how they are blended.
Such a procedure was misleading, it seems, in a crucial way. From this procedure, it is easy to slide into the assumption that narrative comes first, and that blending works subsequently on achieved narratives. From this procedure, it is easy, it seems, to assume that mature narratives can arise in the mind to begin with *absent* the mental work of blending.

On the contrary, although rudimentary narrative cognition appears to be available across mammalian and primate cognition, the powers that human beings have for advanced narrative cognition are a product of double-scope blending.

- **Higher-order narrative cognition is a product of double-scope blending.**

I will present here ways in which double-scope blending cultivates advanced narrative cognition.

In the overall view I present, rudimentary *story* and double-scope *blending* interact. Blending goes to work on rudimentary *story*, to produce advanced *story*. Advanced story, and indeed particular advanced stories, are then available to lend their power back to blending. The result is a feedback loop—an autocatalytic vortex, a self-reinforcing cyclone of cognitive innovation.

**Conceptual Integration Networks**

Let us begin with a thumbnail sketch of conceptual integration, conceptual integration networks, and kinds of conceptual integration networks.

*Conceptual integration*, also called “blending,” is a *basic mental operation* that works on *conceptual arrays* to produce *conceptual integration networks*. Certain conceptual arrays provide *inputs* to the network. Selective projection from the input conceptual arrays and from the relations between them carries elements and relations to a *blended conceptual array* that often has *emergent structure* of its own. This blended conceptual array is often referred to as “the blend.” The blend typically does not obliterate the inputs. It provides a *human-scale, integrated scenario* that serves as a *conceptual anchor* for the conceptual integration network it grounds.

This thumbnail sketch omits many complexities:

- Conceptual integration always has as its goal the creation of conceptual integration networks.
- The original basis for the network’s creation can derive from any of the arrays that end up participating in the conceptual integration network.
- Conceptual work can be done on any of the participant arrays at any time during the construction of the network.
- There can be multiple inputs and successive and iterated blends.
- There can be, and usually are, hyper-blends that have blends as inputs.
- A conceptual array can be decompressed in interesting ways so as to create a network in which the original conceptual array ultimately counts as a blend.
Emergent structure must be thought of as arising not only or even chiefly in the blend, but rather in the entire network.

And so on.

In *The Way We Think*, Fauconnier and I analyze the way in which conceptual integration can blend conceptual frames.

When frames are blended, the operation is called double-scope conceptual integration and the resulting network is called a double-scope integration network.

Double-scope integration is the most advanced form of conceptual integration. To give a more exact definition, double-scope integration is the blending of input frames into a blended frame whose organizing frame-level structure includes at least some organizing structure from each of the two input frames that is not shared by the other. Often but not always, the input frames to the double-scope integration network are incompatible.

**Double-scope integration networks** are the most advanced form of conceptual integration network. There are others:

**Simplex networks.** A simplex network is a conceptual integration network in which one input space has a familiar abstract frame (such as the kinship frame parent-ego) that is designed to embrace certain kinds of values, and the other input space is a relatively specific situation presenting just such values. For example, if we wish to say that two people – John and James – stand in a certain kin relation, we say something like “John is the father of James.” The parent-ego frame of kin relation is in one input space; the other input space has John and James. In the blended space, John is the father of James, and there is a new role father of James.

**Mirror networks.** In a mirror network, two input spaces share topology given by an organizing frame, and the blend inherits that organizing frame. A standard example of a mirror network is “Regatta.” In “Regatta,” a freight-laden clipper ship, *Northern Light*, set the record for an ocean voyage from San Francisco to Boston in 1853 and a modern catamaran named *Great American II* is in the process of making that run in 1993. A sailing magazine named *Latitude 38* reports, “As we went to press, Rich Wilson and Bill Biewenga [the crew of the catamaran] were barely maintaining a 4.5 day lead over the ghost of the clipper *Northern Light.*” Here, the two inputs – we label them “1853” and “1993” – have the organizing frame boat making an ocean voyage. The blend has an extension of that frame: two boats making ocean voyages and moreover racing as they make them.

**Single-scope networks.** A conceptual integration network is single-scope if the inputs have different organizing frames and only one of those frames is projected to organize the blend. For example, a cartoon of presidential candidates having a shoot-out evokes a single-scope network. The frame gunslingers at a shoot-out is projected from one of the inputs to organize the blend. As long as the shoot-out frame is the only one used to organize the blend, then the network is single-scope. But if frame-level organizing structure from the other input is later on projected to the blend so as to play a role in the orga-
The mind is an autocatalytic vortex. With only the slightest conceptual work, single-scope networks slide instantly along the cline toward double-scope networks.

Double-scope networks. A conceptual integration network is double-scope if different input frames are blended into a blended frame whose organizing frame-level structure includes at least some organizing structure from each of the two input frames that is not shared by the other. Again, single-scope networks sit atop a very slippery slope and slide easily into double-scope structure. The gradient between them is important to keep in mind. It is not clear that any actual ecologically valid conceptual integration network has been discovered that on thorough analysis turned out to be purely single-scope. Single-scope networks exist as in-principle reference points in the theory. Double-scope networks involve frame blending.

An Example of a Double-Scope Blend of Stories

An editorial cartoon titled “World Food Crisis” (Chappatte) appeared in The International Herald-Tribune on the morning of the day I gave the talk on which this chapter is based. I chose it for the talk as an example of the ubiquity of the double-scope blending of stories.

The cartoon shows a bland, pudgy, middle-aged American pumping fuel – “Bio-ethanol” – from a green and tan gas pump into the tank of his green car. The car’s bumper sticker says, “Go Green.” The gas pump has a sign presenting an image of a half-shucked ear of ripe corn. This unappealing American is looking over his shoulder at two emaciated people, one vaguely Asian – with minimally Asian eyes, a stereotypical woven bamboo peasant farmer horn hat, and a shift –, the other wearing only low-hanging shorts, his body deformed by the stereotypical edema potbelly and thin hair of children suffering from protein-deficient diets. The vaguely Asian character is lifting a rice bowl with both hands in a classic gesture of supplication. The edemic character, lethargic, dangles his hands at his side and watches wide-eyed. The American says, casually, one hand in his pocket, “Sorry, I'm busy saving the planet.”

What we call “expressions” – speech, signs, gestures, cartoons, visual representations – are not themselves conceptual integration networks. They are prompts, material artifacts, sometimes material anchors for cognition. Conceptual integration networks are not external material artifacts; they are mental arrays. Such mental arrays mean; the external expressions do not mean. Words, symbols, signs do not mean. They are prompts for us to construct meanings by working on knowledge we have with processes we already possess. In no sense is the meaning of any expression “contained” in the expression. It is the mental arrays that mean. The prompts are just prompts. The prompts say nothing themselves independent of the richly detailed knowledge and powerful cognitive processes we bring to bear.
Inevitably, since knowledge varies, different interpreters may activate somewhat different knowledge in constructing a meaning in response to the same given prompts. Since attention varies, different interpreters may construct different integration networks, depending on the qualities of their attention to the prompts. The overarching purpose in this chapter is not to provide any interpretations – the cartoon is just an example to make a point about mental operation. The ultimate goal is to explain the way we think, including the way we interpret. Such an explanation must include an explanation for why interpretation should vary in the ways it does across interpreters. That the theory of conceptual integration does not present an algorithmic mechanism, with a unique product from given inputs, is not a demerit of the theory but an indispensable strength. To ask cognitive science to propose models of mental operation that would produce a single interpretation, and in particular a single correct or approved interpretation, would be a confusion of the purpose of science. It would be like demanding that evolutionary biology produce a model of evolution that excludes any possibility of variation in the outputs, despite the fact that variation is exactly what we see in the biological evidence. The models of thought and action we offer, if they are not to be disconfirmed immediately, must accord with the kinds of variation and regularity we actually find in the ecologically valid data of human higher-order cognition. Interpretation varies, and our models must capture the precise nature of that variation.

So let us take one interpretation of the cartoon and look at some of the processes needed to produce it.

The cartoon is easily taken as suggesting two narratives. One of these narratives involves the typical behavior of Americans disregarding the needs of the world’s starving populations while assuaging their guilt, or, anyway, manufacturing an acceptable self-image by participating in activities that count popularly as helping the environment, even when those activities are in fact self-serving, useless, or deleterious. The other narrative involves the needs of impoverished and deprived people worldwide that go unheeded by the developed nations.

I will not here discuss the all-important subject of compression in conceptual integration networks (see Turner, “Compression and Representation,” “The Art of Compression,” “The Way We Imagine;” Fauconnier & Turner, “Rethinking Metaphor”), but remark in passing on the considerable compression achieved in this conceptual integration network. On one side lie the vast range of individual American behaviors, the many different ways these behaviors affect the environment, the consequences of American government, the psychology of self-delusion, and the scientific and technical details of inventions such as ethanol and their actual effect on the environment. On the other side lie the foreign needy, deprived of not only food but also shelter, health care, education, and security. In projection through the conceptual integration network down into the blend, these ranges of diffuse structure
are compressed to human scale: an exchange between one American filling his
car with ethanol and two deprived foreigners requesting food.

There are clear prompts in the cartoon for both the compression and the
blending of two distinct narratives. The landscape over the shoulder of the
American who is fueling his car is barren except for a line that looks like the
horizon of the globe of the Earth. The feet of the foreigners lie below that
horizon, but their bodies rise above it, as if they are standing on the other
side of the globe but visible right here at the gas station. In the narrative of
the world’s food crises, none of the destitute, emaciated, hungry foreigners
can make a direct personal appeal to an unexpecting individual American at
a gas station. In the narrative of the American consumers, none of them
speaks directly to individual hungry foreigners, and the hungry foreigners
prototypically do not understand English.

The frame used for the cartoon is an extremely common, familiar, human-
scale frame of request and denial between individual human beings who can
see each other and communicate with each other directly through speech and
gesture. This is a third narrative input to the blend.

But the secondary detail populating the frame makes it completely fantas-
tic: it is strictly impossible that an American in America fueling his car could
see in his actual visual field (without distance technologies) two foreigners
who are in fact not in America, who are continents away, who are appealing
to him directly to provide them with food (many kinds of basic food around
the world being compressed into rice, which alone, for example, would not
solve the problem of protein deficiency). It is geographically impossible that
two impoverished and hungry people who are on different continents can be
standing next to each other. It is strictly impossible that the American could
utter (without distance technologies) a spoken expression in English that
would be heard by them on separate continents, neither of which is North
America. The American moreover has no rice, certainly no cooked rice to put
into the rice bowl.

There are many other items in the cartoon that are at least implausible.
Yet no one encountering this cartoon is looking for it to serve as a representa-
tion of a visible single scene on Earth. For example, the “Bio-Ethanol” pump
carries the label, “Pure Corn.” The presentation of this phrase is an exploita-
tion of an accident: corn can be thought of as a sustainable agriculture prod-
uct, as opposed to petroleum resources, and corn happens to be used in the
production of ethanol. And so the American, eager for any token of envi-
ronmental sensitivity, can take the view that the fuel is somehow eco-
friendly, despite the arguments that net consumption of petroleum is in-
creased by the manufacture and use of ethanol instead of gasoline. The word
“pure” can be taken as the kind of thing the willfully self-deluded American
wannabe environmentalist likes to associate with his activities, the way
American suburban adolescents who know nothing about combat wear mili-
tary fatigues or martial arts paraphernalia as indications of their personal
identity. But of course, the phrase “pure corn” in American English is used to
indicate “nonsense.” No vendor of a commercial product is going to label it in such a way as to indicate that the rationale of its provision is fraud, nonsense, pure corn (except ironically, for consumers who will pay for irony, and then the product is the irony itself). We recognize immediately that the use of “pure corn” involves a projection from a fourth narrative, the one in which an editorializing voice is communicating directly with us, the reader of the cartoon. The cartoonist is exploiting the accident of the existence of corn in one of the narratives to do some editorializing. The entire scene is, if taken as a representation of an actual event, crazy.

But no one reacts to this cartoon as if it is surreal or mentally taxing, a jumble of impossible conflicts, because no one takes it as a representation of an actual event. Its impossibility is no impediment, and in many ways an asset, to its role in communicating truth about actual reality. The cartoon is embraced instantly and with no feeling of mental effort as a coherent snapshot, a vignette as recognizable as a lightning bolt, summing up the gist of the matter, connecting the newspaper reader, the American populace, the world’s needy, and the cartoonist’s opinion.

I adduce this cartoon and this interpretation of the cartoon as an example of the blending of well-formed narratives, which are recognizably distinct but connected by elaborate domino-trains of causality, evaluation, and other conceptual relations. Those causal chains, across very many agents, are compressed so that in the small blended narrative, the causality is direct, between few agents, and the cartoonist’s implicit editorializing on that human-scale scene can be expanded to indicate his editorializing on the world food crisis.

I could as well have made this point using not a cartoon but rather examples from the high end of the canon. For example, I could have presented Shakespeare sonnets 37, 52, 73, 94, 97, 106, picked out for each of them the multiple rich narratives they invite us to imagine, and then analyzed how the sonnets prompt us to blend those rich narratives to remarkable effect.

These are the kinds of examples, and the kinds of analysis, that can lead to the mistaken view that, independent of blending, we can construct fully-formed advanced narratives, in fact several of them, and then, as an extra, optional step, bring in the turbocharged engine of blending to manufacture a blended story.

My purpose here is to indicate that this is a false view of both blending and story. Blending is always at work, even in basic human cognition, and story as a human mental operation depends fundamentally upon blending, from the start, at level zero.

In the rest of this study, I will analyze ways in which the human capacity for narrative cognition is itself a product of double-scope blending. This use of blending to construct elements for narrative cognition is crucial to the way we think but almost always goes unnoticed in consciousness.
Advanced Narrative Cognition as a Product of the Evolution of Double-Scope Blending

Previous work has explored the ways in which double-scope blending is indispensable for language, advanced representation, mathematical and scientific invention, social ontology of institutions such as distributed law and economic markets, and a range of other human singularities (see Fauconnier & Turner, The Way We Think, “The Origin of Language,” “Rethinking Metaphor;” Turner, Cognitive Dimensions). A fortiori, any narrative cognition whose content includes products of these operations – such as conversation, grammatical constructions with rich pragmatics such as “Sorry, I’m busy x-ing,” cars, stereotypical fashion carrying social significance such as socio-economic status, rice bowls, money, credit cards, gas pumps, and so on – depends on double-scope blending. But as interesting and fundamental as that dependence undoubtedly is, I skip over it here as by now established.

To bring into perspective the question of how double-scope blending advances narrative cognition, let us consider what might be the differences between story as a human cognitive operation and story as it is available to other species. To be sure, it is exceptionally difficult to read the mind of any animal, human or nonhuman. All cognitive scientific methods – linguistic analysis, measurement of task performance, controlled experiments, computer simulation and modeling, lesion studies, brain imaging – are indirect, requiring plausible inference whose warrant derives from rich theory. Our best methodological hope lies in using multiple methods to see whether their indications align in pointing to the same conclusion.

But with nonhuman animals, we are deprived of many of our best methods. We cannot interview them, prompt for linguistic performance, analyze linguistic behavior they do not have, explain anything but rudimentary tasks to them – if, indeed, we can explain tasks to them at all –, observe their behavior in rich, ecologically valid scenarios of the sort for which they are adapted, and so on. Indeed, the difficulties of inquiring into the capacities of members of other species have led to strong efforts and some rapidly changing views over the last decade, as in the alert from Tomasello, Call, and Hare of a few years ago: “New data suggest that relatively drastic revisions are needed in our theoretical accounts of what other animal species understand about the psychological states of others” (153).

Nonetheless, plainly, there is little evidence that members of other species enjoy various features of advanced narrative cognition of the sort deployed constantly and effortlessly by human beings. In some cases, there is compelling evidence that nonhuman animals certainly do not have these abilities. No nonhuman animal, for example, seems to understand beliefs held by others. It appears that there is a general mammalian line of parsing immediate perception into objects and events with the understanding of some of those objects as animate, and a general ape line of parsing immediate perception so
as to understand some of those animate others as having direction to a goal. But this does not mean that any of the members of other species has

- a conception of oneself as possessed of a characteristic personal identity running through time;
- conceptions of other agents as similarly possessed of characteristic personal identities running through time;
- conceptions of other agents as possessed over time with the standard system of elements in folk psychology, that is, emotions, goals, and beliefs that drive actions and reactions;
- a conception of oneself that includes relationships with the psychology of others, and, conversely, conceptions of those others as themselves possessed of conceptions of self that contain relationships with the psychology of oneself, that is, the self doing the original considering of those others;
- a conception of oneself and one’s personal identity as richly inhabiting both the past and the future.

In short, the kinds of narrative thinking available to nonhuman animals appear to be far below the rich higher-order capacities for narrative thinking common to human beings. In what follows, we will go through the role of double-scope blending in the achievement of these specific capacities of advanced narrative cognition.

Self as Agent in Narrative Cognition

As we analyzed in The Way We Think, the work of projection to connect conceptual arrays relies heavily on a set of Vital Relations. Two of these Vital Relations are Analogy and Disanalogy, which always work together. There is a very basic pattern of blending across such separate analogous arrays, which works to compresses them into a single blend. In the blend, there is a unique element that undergoes change. The relations of analogy across the separate mental inputs are projected and compressed to unique identity in the blend, and the associated disanalogous relations across the separate mental inputs are projected and compressed to change in the blend for that unique element. The result is a human-scale blend of change for a unique, abiding element.

We discussed in The Way We Think the example, presented in Zoobooks, of the evolution of dinosaurs into birds. What is happening in this case is this: there are many different organisms (specific dinosaurs), with analogies and disanalogies connecting them. None of these organisms “turns into” another organism or “changes” into another organism or even “changes” its features in the direction of features possessed by later organisms. Rather, in conceptual integration networks, members of the species at a given time are compressed into stereotypes of the species at a given time, with stereotypical characteristics. These kinds of compressions are extremely common across conceptual structure. For example, if half of Ohio voters voted one way and
the other half the other way, this vast number of voters can be compressed to just two voters who oppose each other in the blend and “stand for” the population of voters. One can imagine the political cartoon. In an alternative compression, if 60% of Pennsylvania voters voted one way and 40% the other way, they can be compressed to a single voter who has a 60% “probability” of voting one way and a 40% “probability” of voting the other way.

The resulting stereotyped stages of the dinosaur in sequence across evolutionary time are then further compressed in the conceptual integration network into a single unique dinosaur in the blend. The Analogy vital relations across the inputs are compressed to Uniqueness in the blend and the Disanalogy vital relations are compressed to Change for that unique identity. So the “beginning” dinosaur undergoes “change” that “ends” in the bird.

We analyzed many similar cases that are immediately intelligible even as they rely upon quite complex and nuanced conceptual integration networks involving compression of analogy and disanalogy to uniqueness and change. The North American Pronghorn, for example, is said to run so amazingly fast because it is running from the “ghosts of predators past.” That is, it is remembering. The analogies across the pronghorns in evolutionary time are compressed to identity for the species; the evolutionary outcome of great speed is compressed to an intentional processes in the blend, i.e. “learning” – a kind of change – by this species; and its current behavior, in fact the result of the differences produced by evolutionary mechanisms across generations, is compressed to another intentional process in the blend, i.e. “remembering.”

Fauconnier (Mappings in Thought and Language) analyzed cases like “The President changes every four years,” on the reading that there is a role, President, and that its value is different every four years. Sweetser (“Role and individual readings of change predicates.”) surveys work on such change predicates for roles, as it relates to expressions such as “The cars get three feet bigger when you enter Pacific Heights,” “The fences get taller as you move westward across the United States,” and “The paint gets darker as you move down the wall”.

Vera Tobin observes that it is common to refer to a literary work as a unique identity that undergoes change. She cites Hugh Kenner’s comment on the five-stanza version of Marianne Moore’s poem “Poetry” as “the one scarred by all those revisions” (Tobin 171; Kenner 1432).

In this conceptualization, the many variations published under the title “Poetry” are compressed (Fauconnier and Turner 2002) into a single, concrete entity that the poet has altered many times. This entity is also metaphorically characterized as a living body, and the alterations that remove material from that body as violent mutilations. In this way, even a new, intact printing of an earlier version can be “scarred” by the publication of shorter variations. (Tobin 171-172)

There are many products of our double-scope blending capacity to create identity out of disparate scenarios connected by analogy and disanalogy. Roles, especially roles in frames constituting social ontology, are one of those
conceptual products. While nonhuman animals appear to recognize differences across individuals that we might label with close evolutionary status such as offspring, conspecific, sibling, mother, alpha male, or predator, they do not appear to conceive of conceptual entities such as The Supreme Court, Chief Justice of the United States, prophet, or priest. Such roles depend upon conceptual integration networks compressing across disparate elements. Nor should we assume, even in the case of close evolutionary roles such as mother or predator, that the animal conceives of the role mentally with any of the rich complexity extending over time that the human being perceives for the animals themselves.

The rich human conception of the self also depends upon compressions. The baby born of the mother, the 18-month old learning language, the toddler, the lad in short pants, the adolescent, the young man, the worker, the husband, the father, and the old man inhabit quite different conceptual frames, with great disanalogies between them. But the analogical connections across them are also strong. These disparate scenes reside within conceptual integration networks that offer a unique self in the blend, a self that undergoes change. This is not to say that the concept of the self is an abstraction over whatever specific local events take place. On the contrary, the personal identity established in the blend can be exceptionally powerful, residing more generically as a stable character in the generic space above all the specific inputs, so much so that when the individual moves to a radically unfamiliar scene with entirely new conditions and agents, the compressed concept of personal identity can be causal for the specific events. This self is imbued, in virtue of the conceptual integration network, with stable but variable beliefs, goals, and personal dispositions. The result is a full agent. The mental existence of such a full agent derives from double-scope blending and greatly advances narrative cognition.

Culture deploys the tools of advanced conceptual integration to support, maintain, and enforce a rich blended conception of an abiding self. A culture may invest a great deal of language – itself a product of double-scope blending – in providing proper names attached to the personal identity in the blend. The grammatical construct that is the proper name counts as a linguistic invariant – however pronounced, declined, or drawn – to indicate the culture’s insistence that there is a stable referent. This proper name attaches to a newborn, a parent, an agent of action and inaction, someone healthy and someone sick, someone speaking English and someone speaking Chinese, usually over scores of years. Strong rituals may be created to increase the analogical connections over time, such as birthdays, to aid the conceptual connection of this local moment, this particular cycle of time, to all the others lying before and after. The birthday celebration, for example, fits a frame – with friends, cake, presents – creating frame analogies all along the sequence, allowing only secondary details in the ritual to differ – one more candle on the cake, slightly different presents.
The existence of the blend and its personal identity does not obliterate the rest of the network. On the contrary, the human-scale blend makes it possible for us to manage the diffuse array of conceptual structure in the rest of the network, which otherwise would lie beyond our cognitive powers to grasp, explore, and manipulate. The blend may contain a unified personal identity while two of the inputs contain quite different selves, even aggressively opposed selves, with a time relation of many years between them. All of these conceptual structures can be activated in a particular scene, as when someone, drawing on the blend, feels in one way a strong and continuous personal identity, and yet, looking in the mirror, is sensible of the quite different selves she has been, and what one of them might think of the other. When her face in the mirror resembles a picture of herself from years ago – perhaps because of a hat, flip of the hair, lighting, blouse, or smile – she may conceive the scene as one in which the self from years ago now addresses the self looking in the mirror. She may speak, and her voice may in the little story attach not to the body speaking but to the younger person, saying to the older person, “you’ve done all right.” Or the same voice, with a different inflection, may attach conceptually to the older person, saying, “I failed you, didn’t I?” The woman in this moment is not deluded or insane. On the contrary, her ability to range conceptually over the integration network is a sign of her mature understanding, a sign of the human capacity for advanced narrative cognition.

Remembrance of Things Past

A human being in the local, present moment has, like any mammal, a brain in a certain state of activation, with integrated systems for affect, perception, inference, and construal. No scientist imagines that when a brain goes into a state of activation corresponding to what we would call “a memory” that the so-called “memory” comes with its own separate systems for affect, perception, and thought. On the contrary, for the memory to make sense to us, we must activate our present cognitive systems for it. Everything involved in memory is a matter of present brain activation, but at the level of content, understanding, and reaction, we are blending elements that we take as referring to the past with our present cognitive self and its abilities, including its abilities to take perspectives of various kinds, form judgments, experience reactions, make choices.

We blend elements of our present self with elements taken as belonging to a former self so as to make a blend that contains a former self with full cognitive abilities, including emotions. If we ask a man whether he has ever been embarrassed, and he responds instantly, “yes,” on the principle that all human beings undergo embarrassment, and so syllogistically the answer must be “yes,” or says “yes” as a conditioned vocal response without inference, and in either case says “yes” without recalling a past scene of embarrass-
ment, that is one kind of experience. But it is quite a different feeling to recall the past scene of embarrassment sufficiently to sense in the present the twinge of that embarrassment.

When we recall the scene, we are creating a former self in the blend by projecting capacities and elements of the present self into the blend. This projection of present self provides an intentional stance toward our former self. Metaphorically, it is cognitive time travel, putting elements and abilities of oneself into the past. Accordingly, any narrative cognition involving our former self as an agent, including any narrative cognition that produces a continuous narrative that reaches to the present, depends upon double-scope blending. No nonhuman animal appears to have any such advanced narrative cognition.

It is an open problem in cognitive science why human beings should have a memory that operates as ours does. As Arthur Glenberg writes in “What Memory Is For,”

To avoid hallucination, conceptualization would normally be driven by the environment, and patterns of action from memory would play a supporting, but automatic, role. (1)

But as Glenberg astutely observes, for human beings, it is often the case that memory takes the upper hand in conceptualizing the narrative one is inhabiting:

A significant human skill is learning to suppress the overriding contribution of the environment to conceptualization, thereby allowing memory to guide conceptualization. (1)

There is flexibility in blending present self with past conditions suggested by memory, because selective projection in blending is flexible if constrained. Consider the following range of blends that involve blends of present self with former self:

1. One remembers a moment from the past. The memory includes the knowledge that the moment was recognized at the time as embarrassing. Projecting some of one’s present psychological abilities into the blend, one experiences in the present a twinge of the embarrassment taken as an analog of the original experience of the embarrassment.

2. One remembers a moment from the past. The memory includes the knowledge that the moment was recognized at the time as embarrassing. Projecting some of one’s present psychological abilities into the blend, one analyzes the embarrassment as merely fear of evaluation by peers, shame in their eyes, and not as essentially embarrassing at all. On the contrary, remembering the scene, one now feels pride rather than embarrassment even though one remembers that the moment was regarded at the time as embarrassing.

3. One remembers a moment from the past. The memory includes the knowledge that the moment was recognized at the time as embarrassing. But one does not feel on first pass embarrassed. The memory is then
cultivated actively, bringing in more aspects of the past event, context, and personal situation, until the feeling of embarrassment becomes recognizable.

4. One performs an action in the present that seems to have a certain significance, but then, a separate action from the past surfaces in memory, and there seems to be an analogy. The analogy results in a compression, bringing a new significance to the action in the present.

All of these, and many more cases as well, are instances of projection of self from the present into a blend that receives input from the past, or rather, memory, for a double-scope blend of self that provides an agent for advanced narrative cognition.

Fauconnier and I (The Way We Think) consider, for example, a case in which a man has troubles with his girlfriend, named “Angela.” He remembers how, when he was little, he was so intent upon hiding his treasures that he hid them too well and usually could not find them again. He remembers in particular the loss of his new penny when he was four, hidden so well he never found it again. And it seems to him that this is what he has done with his love for Angela. The projection of present self into the past makes the memory intelligible and sensible; the analogical connections across his many selves provide the basis of a pattern; the compression of those analogies into the blend provides a character not only for his present understanding of his relationship with Angela but also for the generic space that influences the entire network.

Double-scope blendings of self provide agents for advanced narrative cognition. There is no evidence that they are available to members of other species.

In The Time Machine, H. G. Wells presents time as a dimension one can move through. The Time Machine has a lever, which, if turned one way, carries the passenger at a speed proportional to the angle of the lever through sequential moments of time, ever farther back in time, and moved the other way, carries the passenger similarly through sequential moments ever farther into the future. The sign of the angle gives the direction in time and the absolute value of the angle gives the speed.

I drew a breath, set my teeth, gripped the starting lever with both hands, and went off with a thud. The laboratory got hazy and went dark. Mrs. Watchett came in and walked, apparently without seeing me, towards the garden door. I suppose it took her a minute or so to traverse the place, but to me she seemed to shoot across the room like a rocket. I pressed the lever over to its extreme position. The night came like the turning out of a lamp, and in another moment came to-morrow. The laboratory grew faint and hazy, then fainter and ever fainter. To-morrow night came black, then day again, night again, day again, faster and faster still. (H. G. Wells, The Time Machine)

This seems familiar, given our folk conception of time, and is not so different from some scientific conceptions of time as a linearly ordered succession of events.
Human memory is not constrained to move in the fashion of H. G. Wells’ Time Machine. Like the Tardis in *Dr. Who*, it can drop anywhere into the past, or, if one prefers the dual, any moment from the past can intrude via memory into the present. Val Cunningham, in his contribution to this volume, quotes George Eliot on this aspect of memory:

Our moods are apt to bring with them images which succeed each other like the magic lantern pictures of a doze; and in certain states of dull forlornness Dorothea all her life continued to see the vastness of St. Peter’s, the huge bronze canopy, the excited intention in the attitudes and garments of the prophets and evangelists in the mosaics above, and the red drapery which was being hung for Christmas spreading itself everywhere like a disease of the retina. (George Eliot, *Middlemarch: A Study of Provincial Life* (1871-2), chapter 20)

Fauconnier and I (*The Way We Think*) observe that “from an objective viewpoint of time and space, the activities of human memory are bizarre. Why do our memories work in these strange ways?” We hypothesize as follows:

One possible answer to this puzzling question is that memory and conceptual integration evolved to support each other. To do advanced conceptual integration, we need the ability to integrate and compress over inputs that are often very different and highly separated in time and space. We cannot predict which inputs will turn out to be useful, but we do know that useful inputs from many sources need to be activated simultaneously and linked by vital relations. Human memory appears to be superb at giving simultaneous activation of quite different inputs, and at offering good provisional connections. Running apparently on autopilot, it often delivers up inputs and connections that have no apparent reason for being activated simultaneously or being connected at all, except that they lead us to quite useful blends. (317)

There are many familiar phenomena that result from the blending of present self and memories of past self. Consider the case in which one recognizes a present scene as analogous to a past scene that ultimately carried a negative emotion. It is presumably useful not to have to work all decisions, evaluations, and reactions up from scratch in every scene of our experience. An item of memory seems to be able to evoke for the present self a reaction analogous to the original reaction. When the old self and the present self are blended, and the analogy compressed, the result is a direct indication to the present self of how to react. In this case, the blending of present self and past self provides wisdom, or at least quick disposition and choice, to the present self. The present self is a richer present self in narrative cognition for its blending with the past self.

I note that the Mac operating system numbered 10.5 includes a backup utility called “Time Machine” that relies upon both our conception of time as a linear succession and our conception of memory as able to insert us into any point in that succession. When you “enter” the “Time Machine,” there is a vertical linear scale running up the right hand of the screen, with times and dates on the scale, higher being longer ago. The windows representing the previous states of the file structure are displayed in succession, stretching
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away from the viewer, back toward what seems to be the big bang at the
dawn of time. You can select any spot in the history to drop into. I assume
that, behind this amazing representation of a blend, the backup utility in fact
works by making new copies on the external hard drive of only those items
that have been changed since the last backup copy, but the blend does not
include the projection of that structure: the indication is that each of those
windows carries the full file structure as of the date and time with which it is
labeled. It looks like this:

Future Selves

The mental construction of a future self is in one way unlike the mental con-
struction of a past self: the future has not happened. It is inevitably the case
that conceptual structure blended into the future self draws on past and pre-
sent knowledge, as when we imagine ourselves next year sitting in the house
that we own today and that we have inhabited for some years, but that future
scene is not time-marked as lying in the past.

Otherwise, the future self is like the past self, to the extent that no scientist
presumes the imagined future self created when a brain goes into a state of
activation corresponding to what we would call an imagined hypothetical
future to come with its own separate systems for affect, perception, and
thought. On the contrary, for the hypothetical future self to make sense to us,
we must project onto it our present mental apparatus.

If we ask a man whether he will invest in real estate next year, or go to
Paris, or subscribe to a newspaper, and he responds instantly “yes,” on the
principle that these are invariant, that is one kind of experience. But it is quite
a different feeling to create a blend for the future into which he projects his present psychological dispositions and systems, so that, e.g., he now richly imagines the local conditions of the investing, or traveling, or subscribing, and activates his inferencing and affect.

Think of this as bringing the future into the present, making it present so that present systems can play a role. It can also be thought of as the mental equivalent of H. G. Wells’ time machine, now moving us into the future. The result of putting present and future together might be that his various abilities for judgment in local scenes can come into play and make a difference in his conceiving of the future, and so influence his present choices leading to that imagined future. In our environments of evolutionary adaptation, only that which is contained within our local scenes of time and space can affect us, and we can affect only that. Absent technologies that bring distant locations into range - such as telephones, intercontinental ballistic missiles, lieutenants garrisoned faraway to do our will - and technologies that bring distant times into range - such as writing and multiyear agricultural systems -, we are built to operate in the present, with what lies within the horizon of our spatial and temporal situation. To make good choices in the present about future situations, we may need to have access to the feeling that would be elicited by those situations, but we are not actually in them; they do not lie within the horizon in which we are built to operate. So how can we operate, how can we decide and choose? Double-scope blending makes it possible to bring the future into the present, or to project present embodied cognition of the sort we are built to run into the future, and so to think now with present feeling about the future, because the present feeling is projected into the blend that contains the future. Again, double-scope blending in this case provides functionality to narrative cognition that nonhuman animals do not seem to be able to achieve.

This blending of present and future can also be used to manage the self in the present: blending our present embodied cognition with a future self in a preferred moment (winning the lottery) can activate feelings that we would like to have in the present situation but find difficult to achieve when immersed in the present. So we can daydream about the future, and consequently feel different in the present.

Conversely, such advanced narrative cognition about a future scene can create in the actual present consequences we do not want. For example, blending our present embodied cognition with a future self in a situation that we fear might come to pass, such as the loss of a loved one, may be upsetting to us in the present. This can provide incentive to us to avoid the rich activation of that blend (unless, of course, as in acting, there is benefit in looking genuinely upset).

Someone who routinely fails in a particular kind of present scene to do their duty or avoid temptation may, when not in that kind of present scene, try to avoid thinking about it richly, avoid the mental time travel, avoid the bringing of the imagined future into the actual present, in order not to be
sapped in the present of the strength needed to take an action that they fear a future self in a different present will fail to take. People may cut up their credit cards now so they will not be able to use them later, at a future time when the present is different and the mental state of the chooser is also different. People may elect to have large monthly tax withholding as a kind of forced savings, not because they do not understand that this is not financially the best return they could get, but because their present embodied cognition can make the choice to save but they doubt that their future self would in certain conditions make the same choice. Nonhuman animals do not have these concerns: since they lack double-scope blending, they do not have credit cards, tax withholding, or lotteries to begin with.

**The Present is Part of Human-Scale**

Mammals are built to think, act, and feel in present embodied moments. The effect of evolutionary adaptive mechanisms is often to create systems built to work in present embodied cognition in ways that produce on average adaptive long-term consequences that the mammals do not need to recognize, contemplate, or understand in order for their present embodied cognition to work to long-term adaptive effect. Appetite, attraction, and disgust work in present embodied cognition without the mammals’ needing to contemplate or even conceive of physical energy, grandchildren, or infection.

The human being is a mammal, and its systems are built to work in the present scene. As we explain in *The Way We Think*, there is one overarching principle of conceptual integration that drives all the others:

- **Achieve Human Scale**
  
  Present, embodied cognition is an indispensable part of human-scale conception. Our present, embodied cognition is built to work within a human-scale limited scene of human-scale distances of space and time; limited arrays of other agents, objects, and events; a particular viewpoint, focus, and perspective and local ways of changing them; and the capacities for perception, attention, inference, and memory that we possess in the present scene.

  Human beings, through projection of self into the past or the future – that is, blending memory or imagination of distant times with present embodied cognition – are able to transform scenes that were not at human scale (because they were not in the present) into human-scale scenes in the blend. By double-scope blending, we have rich present embodied cognition in the blend to use in thinking about scenes that, as inputs to the blend, lacked present embodied cognition since we are not actually inhabiting them in the present. In the blend, our present embodied cognition is inhabiting scenes that we are not actually inhabiting in the present.

  This projection of the present self into the blend provides to advanced narrative cognition the capacity for rich, human-scale, personal agency in scenarios that are not present.
Human individuals and cultures develop mechanisms for managing the consequences of this advanced narrative cognition. Interestingly, one of those mechanisms is the use of language – another product of double-scope blending – to create spoken or written expressions – that is, particular stories – whose purpose is to prompt the audience to preferred narrative cognition.

**Blending the Present Self and the Future**

In *The Way We Think* Fauconnier and I analyze ways in which we can project present embodied human-scale cognition to create a future self in the blend. In the section titled “The Bypass,” we analyzed an advertisement with the caption “Joey, Katie, and Todd Will Be Performing Your Bypass.” The advertisement shows a patient lying on an operating table in a surgery room. Three surgeons, dressed in surgical gowns, are on the other side of the patient. The one in the middle, holding a scalpel, is about to cut. All three of them are looking out of the frame at the reader. In appearance and height, these surgeons look about 8 years old. They look like schoolchildren, and that is the point.

The purpose of the ad is to induce the viewer to think not in the abstract about the consequences of failing to educate present-day schoolchildren, but to project the present self into a distant prospect, so as to weigh the consequences as if they were in one’s immediate field of interaction, to bring the future to immediate human scale. This kind of blending supplies narrative cognition with a way to assist present choices: we can construct narratives connecting our present to felt futures, indeed we can construct alternative narratives leading to different felt futures, and make our choice now on the basis of those outcomes, weighed not in the abstract but in a human-scale embodied present (in the blend) that happens to be taking place in the future.

Toward the end of the film version of his slide-show presentation on global warming, Al Gore posts a picture of Earth, the pale blue dot photographed from 4 billion miles out in space. He explains,

> Everything that has ever happened in all of human history has happened on that dot. All the triumphs and tragedies, all the wars and all the famines, all the major advances. That is what is at stake – our ability to live on planet Earth, to have a future as a civilization.

Concluding, Gore states,

> Future generations may well have occasion to ask themselves, “What were our parents thinking? Why didn’t they wake up when they had the chance?” We have to hear that question from them now.

In this example, for both space and time, we have diffuse conceptual arrays that are not at human scale: a distance of four billion miles, and all of human history plus the future. But, through double-scope blending, we can pack these arrays to human scale.
First, let us take the spatial packing. We have a bodily notion of vision, at human scale, taken from our local visual experience, according to which, the farther we back up from an object, the smaller the angle it subtends in our field of vision. This is a human-scale conceptual input. We also have the input of the universe, with the Earth somewhere in it. The incompatibility of these conceptual arrays is evident. For starters, human beings cannot walk backward four billion miles from Earth to have a look. It could also be that vision from four billion miles does not work quite the way it does in your front yard. Imaginatively, it might have been that sight across the universe works differently at great distances. Many aspects of physical reality at great spans of distance and time do not fit human intuitions, and there are science fiction books in which it does work differently. But we can project our local visual intuitions to the packed blend, and in the blend, we can see the Earth from four billion miles the way we might see a bird in a tree. In the blend, Earth becomes one small, fragile thing. In the blend, everything human is contained in a dot that is hard to see. In the packed blend, we have an understandable scene in which the entire Earth subtends a small angle in the field of our vision. It is just a pale blue dot. In the packed blend, the conception of viewing the Earth from four billion miles has inherited the human scale of the input with the actual human being, who has human motion and human vision.

There are further selective projections from the input space with the human being that can contribute to the human scale of the packed blend in which we are looking at a pale blue dot that is the Earth. In the natural scene of vision, without technological aids or representations, what is in our visual field is local. We have a local relationship to what we see and for the most part can act upon it. It can also act upon us. When we think of the vast Earth and all its human history and future, it is so far from human scale as to seem quite beyond us, insusceptible to our individual actions. But the packed blend has an Earth that is small and in our visual field and accordingly subject to our actions. This can stimulate a feeling of human-scale power, responsibility, and duty, which is exactly the rhetorical effect Gore is trying to achieve.

The Earth over all of human history can seem much too complex and diffuse to comprehend. But in the blend, it is unitary and visually homogenous. To be sure, there is diversity on Earth, as Gore describes, but it is nonetheless unitary and comprehensible when considered as our home, and the home of our children. There is great diversity in a home, but a home is nonetheless a human-scale concept. And we are responsible for our home.

The Earth can seem much too large and vast to be vulnerable to our actions. How could any one of us have any effect on Earth, as opposed to, say, our yard, or at most our street? But in the human-scale, packed blend, Earth is a very small thing, which we are powerful enough to affect; it is small, and vulnerable, in much the way our home is vulnerable.
One purpose of Gore’s presentation is to lead us to perform a mental packing on space, so that we will carry around a new packed concept, of Earth. His hope is that we will carry that new packed concept with us from situation to situation, and unpack it to hook up to new situations, with the result that we will think and act differently in those situations. Our actions and decisions in this or that local spot, at the hardware store or the gas station, will be connected to this packed concept, making the local global and the global local.

Gore’s “pale blue dot” also invites us to perform a temporal packing to human scale. There are the conventional (but no less marvelous) temporal packings that go with phrases like “history” and “Everything that has ever happened.” In just the same way in which the vast spatial expanse of Earth is packed into a pale blue dot contained in our field of vision, the vast temporal expanse of human action is packed into one chunked unit. But the temporal packing that leaps out at us is the one in which unborn descendants are talking to us, and we hear them. The scene in which we are talking with people and they ask us questions is one we understand immediately. It is quintessentially at human scale. There are other conceptual inputs to this packed blend, but those are hypothetical, diffuse, stretching across generations of individuals. There are many reasons we cannot hear the people in those inputs. First, they do not exist. Second, there are far too many of them. Third, they are not in one human-scale auditory field, but rather distributed around the entire Earth. Fourth, they are not in a human-scale temporal interval but instead stretched across many generations, so their comment is longer even than our individual lives: if we listened to them all our lives, we would never hear everything they had to say on the subject, because the conversation goes on for generations. Fifth, they do not all speak in languages we understand. Sixth, they might not be speaking at all, but instead only writing, or even thinking. And so on.

But that diffuse, complex, hypothetical, unknowable future, so very far from human scale, can be blended with the basic scene of human questioning. Now, in the packed blend, all the individuals of future generations are packed into the perspective of one human voice, the voice of our child. The emergent structure in the packed blend is amazing: now, in the blend, each of us can hear voices of our descendants, even if some of us, in reality, have no children at all. And we hear their question now. Our present embodied cognition, at human scale, is in this advanced narrative blend.

Such an example of advanced narrative cognition, in which we have a human scale scene, involving ourselves and the children in an embodied blended present that has input from non-present times and scenes, is like the cartoon about the “world food crisis” with which we began. Now we see that the kinds of agents – self and others – and the kinds of scenes – temporal and spatial – and the kinds of thought and feeling in this narrative cognition are not available except via the advanced mental operation of double-scope blending.
I could have made the same point by analyzing an example from the high canon, such as Shakespeare’s Sonnet 3:

Look in thy glass and tell the face thou viewest
Now is the time that face should form another;
Whose fresh repair if now thou not renewest,
Thou dost beguile the world, unbless some mother.

The blend of present, human-scale thought with alternative future conditions produces two narratives leading from two alternative choices in the present to two distant alternative future selves – one a father, one not. In the first future, there is a mother of the child, too. In the other, there is the same woman, but that woman does not hold the role of mother of the child, for there is no such child. This counterfactual relationship between the two alternative futures – fatherhood or not – and between the two alternative choices – procreation or not – creates emergent structure for the present, in the following way. At first, the present is just the present. But when the hypothetical scene of procreation is imagined, there comes with it a counterfactual relationship to the present. The present and the hypothetical are blended, and their counterfactual relationship is compressed into the blend, which gives a new conception of the present: now, in the present, there is a lack of procreation, an absence. In retrospect, it may seem as if the present always had that structure, but not so: there is always an infinity of objects and events that are not in our actual present, but that does not mean we actively conceive of our present as containing an infinity of such absences. It is only the activation of the possible space of procreation and the creation of the counterfactual relationship to the present that provides the basis for the compression that creates the absence in the blend. Next, the counterfactual relationship between the futures is compressed back into the present: where before, the present did not involve structure related to the woman, and there was no question of the young man’s treatment of her, now in the present blend there is an action of unblessing that woman. She counts as blessed up there in one future, and consequently blessed in the scene with the choice of procreation. Compressing the counterfactual relationship between the scene of procreation and the present produces a conception of the present that now has a woman in it and the action of unblessing by the man. Not only the existence of the action of unblessing but even the kind of action is a result of compressing to the present relations that hold between alternative scenes of future selves.

Other Minds

In The Literary Mind, I observed, as many others have over two and a half millennia, that we do not have access to the mental states of others, only to the mental states of ourselves. I remarked that since Aristotle, and now as analyzed in cognitive scientific research, it has been recognized that attribu-
tion of animacy and agency depend on perception of what we take to be self-movement and reaction to sensory data. I analyzed the ways in which the recognition of other minds results from blending the appearances of others and their actions with our understanding of our own mental states correlated with such appearances and actions, so as to create in the blend the concept of other minds. Proposals that human beings have a “theory of mind” that allows them to recognize the mental states of others, to adopt an intentional stance toward them, to attribute to them a folk psychology of beliefs, goals, and desires, are a black box, a theoretical stipulation, a magic wand, unless we indicate where, in cognition, we find the source of such an understanding of mental states to begin with. The source of that understanding is our own experience and understanding of ourselves. A rich understanding of another mind is a double-scope blend in which one of the inputs is our own conception of mental self. I discussed the ways in which variable projection and emergent structure in the blend produces a concept of another mind that is much like ourselves, but not exactly like ourselves.

Consider as an example Julius Caesar’s assessment in the eponymous Shakespeare play:

Let me have men about me that are fat;
Sleek-headed men and such as sleep o’ nights:
Yon Cassius has a lean and hungry look;
He thinks too much: such men are dangerous.

We see a similar conception of another mind when Othello watches Cassio in conversation with Iago. Cassio’s appearance drives Othello mad because he is construing from Cassio’s appearance the kind of knowledge Cassio could have that would result in that appearance. In fact, Othello’s construal is wrong. Iago knows Othello is wrong, because cunning Iago has worked to elicit action and appearance from Cassio that will provide just the right inputs to the integration network that will induce Othello to make just the right projections to the blend in Othello’s mind that will produce there another mind – Cassio’s – who has sexual knowledge of Othello’s wife, Desdemona. As Shakespeare observes, “To hear with eyes belongs to love’s fine wit” (Sonnet 23). Alan Palmer, in this volume, reminds us that Oscar Wilde observed, astutely, “It is only shallow people who do not judge by appearances.” Such judgment of others is part of advanced narrative cognition: double-scope blending provides such agents to story.

When we see what we take to be another human being, all we have from them are perceptions, images, sounds. We form analogical connections between them and us, and, on the basis of those analogical connections, create double-scope blends containing other minds, with mental states largely projected from our understanding of our own mental states. Over time, we develop and learn more sophisticated double-scope integration networks, according to which the other minds in the blend differ in content and cast from our own minds. Of course, as has often been suggested, there may be evolu-
tionary adaptation to dispose us to immediate projection of some very basic mental states such as happiness, sadness, fear, anger, surprise, and disgust (Ekman; Damasio), but this is quite a limited set of recognitions, and even then the projection might be based on how we feel in the presence of certain appearances in a few basic mammalian scenes: e.g., we feel fear and vulnerability in the presence of an organism and so project a threatening state of mind to that organism.

I also analyzed in *The Literary Mind* how this double-scope blending creates conceptions of other minds that are not limited to conspecifics. Via double-scope blending, we create minds for nonhuman animals, and indeed, for inanimate objects such as trains, balloons, flora, even cars, buildings, and nations. This kind of conception of other minds via double-scope blending has been analyzed in a range of studies (see e.g. Turner, “The origin of sel-kies”). Note, for example, that even though I know that rattlesnakes are beneficial to human beings for the rodents they eat, and although I know of no philosopher, biologist, or cognitive scientist who maintains that a rattlesnake intends to be mean to you, proud of its dominance, and dismissive of your fear, yet my own memory is that, if you are inexperienced, it is impossible to avoid projecting such mental states to the Southern Pacific rattlesnake whom you just surprised in the dry and stony riverbed. In the instant, you want to blow your evil, bloody-minded, murderous enemy to smithereens. Later, with more experience and dispassion, you can moderate and perhaps overcome such projections, to produce a different blend from the same prompts. Such double-scope blending is not even limited to animals: the gloomy graveyard can seem malevolent, as if it desires to suck the life out of us.

We take it for granted that robust other agents are directly available to narrative cognition. Instead, those robust other agents are a product of double-scope blending, a contribution to advanced narrative thinking. There is no evidence that nonhuman animals have these advanced capacities for narrative cognition.

The range of projections possible in conceptual integration networks for creating conceptions of other minds is vast. We can project not only varieties of intentionality, but also viewpoint, perspective, focus, differential attention, joint attention. Fauconnier & Turner (*The Way We Think*) give a suggestive survey of different selective projections for a phrase such as “If I were you, I’d quit my job.” The agent in the blend can have your public identity and your job but my insight, or your great wealth but my public identity and job, or your inability to deal with someone like my tyrant boss, or . . . Fauconnier (*Mappings in Thought and Language*) surveys the variability of selective projection to a blended agent for Charles Fillmore’s example, “If I were your father, I’d spank you,” and other examples such as “If I were you, I’d hire me.”
Double-scope blending provides to advanced narrative cognition not only a sense of unique self as agent but also theories of the nature of the human self. Cognitive science has shown that human beings are mentally much more complicated and diffuse than our folk theories of mind suggest. For example, there is no controversy in vision science or language science that the mechanisms of vision and language are extraordinarily complex, quite unlike commonsense conceptions of how they work, and mostly invisible to human beings, who see and talk and offer folk theories such as “I just open my eyes and the scene comes in” or “Words have meanings so I say what I mean.”

Great ranges of backstage cognition make vision and language happen. There is no scientific dispute over this matter, although the secondary and tertiary details make for enjoyable scientific controversies. The principal reason that human beings think that sight and language happen in fairly simple ways, with fairly simple principles, and with intelligible, human-scale frames, is that vision and language do produce some small, integrated, useful packages and deliver them into consciousness, and these little packages do seem to us to be fairly simple, with simple principles and with intelligible, human-scale frames. Although human beings are not built to grasp actual mental functioning scientifically, they are built to grasp these little human-scale packages of consciousness, and to blend the frame for the scientific question with the conscious experience, and so to produce, in the blend, human-scale folk theories of who we are and what we do.

For example, for centuries, scientific notions of perception depended on the “Cartesian theater.” The Cartesian theater is the implicit idea that there is a little perceiver in the head, a kind of attentive homunculus, who pretty much watches a representation of what we are watching in the world, and who figures it out. In the simple human-scale frame that we can hold in consciousness of the Perceiving Self, each of us is an attentive self looking at the world and figuring it out. To answer the question, what is the mind doing?, we blend the simple, conscious frame of the Perceiving Self with our frame for the scientific question and so create a folk-theory of mind in which there is an attentive mental agent looking not at the world but at a mental representation of the world. In the double-scope blend, there is a watchful little perceiving guy looking at sensory representations of the world. This watchful little perceiving guy is the audience of the Cartesian theater. The notion of the watchful internal homunculus in his Cartesian theater had influential scientific standing for centuries. But it turns out that vision works nothing like that. Vision is far more complicated, there is no attentive homunculus in the mind, and there is no anatomical spot where sensory data are assembled into a unified representation of the sort we imagine, much less on a big screen with surround-sound and supplements for olfactory, gustatory, and tactile perception. Indeed, it is a deep scientific problem to explain how something like a coffee cup – with its hue, saturation, reflectance, shape,
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smell, handle for grasping, topology, temperature, and so on – can seem in consciousness like one unified object. In neuroscience, this problem is called “the binding problem” or “the integration problem.” We are built to think that the reason we can see a coffee cup as one unified object is simply that the coffee cup is one unified object whose inherent unity shoots straight through our senses onto the big screen in the conscious mind, where the unity is manifest, unmistakable, no problem. It is natural to hold such a belief, but the belief turns out just to be a folk theory, another case in which we blend the simple, conscious frame with the frame for the scientific question itself to produce a folk theory that we mistake for a scientific explanation. It does not seem to us in consciousness that we are doing any work at all when we parse the world into objects and events and attribute permanence to some of those objects, but explaining how we do this presents a major open scientific problem. In consciousness, typically, we frame experience as consisting of little stories: our basic story frame includes a perceiving self who is an agent interacting with the world and with other agents. Despite the detail in which we are embedded, and the manifest discontinuities in our lives, we manufacture small conscious narratives of ourselves as agents with stable personal identities, and these small narratives are at human scale and easily intelligible.

In these narratives, we possess straightforward powers of decision, judgment, and choice. Consciousness is equipped for just such little stories of choice: we encounter two paths, or a few fruits, or a few people, and we evaluate, decide, choose. We act so as to move in the direction of one of the possibilities. We say, “I’ll have an espresso.” We are not set up to see the great range of invisible backstage cognition that subtends what we take to be evaluation, decision, and choice, any more than we are set up to see the work of vision or language. But we are set up to make a blend of (1) the human-scale conscious experience of a chooser choosing and (2) the scientific question of how the mind decides. The result is homo economicus – a folk theory of a rational actor in the head, with preferences, choices, and actions. Homo economicus is a homunculus much like the little mental guy in the Cartesian theater. The Cartesian homunculus looks at the screen and perceives; homo economicus looks at choices and chooses. In the homo economicus blend, each of us is a stable chooser with interests, living a narrative moment as an agent with a personal identity, encountering other such agents. This human-scale narrative blend of the self as a stable identity with preferences that drive choice toward outcomes is marvelously useful, instrumental in action, motivation, and persuasion. It is a worthy fiction that helps us grasp ranges of reality that are diffuse and complicated.

Because of double-scope blending, human beings are able to invent technologies. For the most part, we are built to understand these personal technologies. Speech, for example, is a personal technology developed for communication. It is at human scale. It operates in the present, within congenial human dimensions, with pleasing proportions. We have a simple conceptual frame for speech in consciousness. In this frame of Speech, one person uses
speech to communicate with another person, and they take turns. When we ask ourselves how we really work and what we really are, it is easy for us to blend the scientific matter with the human-scale conscious experience of speech. The result is a conception of self as a Converser. This is a blend of self with communications technology. Once we have this blend, we can use it as an input for further blending. Thought can be conceived of as a colloquium, either informally, as in our notion of thought as an internal debate or internal conversation, or scientifically, as when we imagine that different aspects or even anatomical locations of the brain are “talking” to each other, “communicating.” So it turns out that one of our most basic conceptions of self derives from blending our concept of self with our most basic communications technology, speech.

Writing systems are another communications technology, only several thousand years old, and not widespread until quite recently in our history. Many conceptions of self derive from blending our mental activity with writing systems. These conceptions range from the notion of the tabula rasa to Hamlet’s promise to the ghost:

> Yea, from the table of my memory
> I’ll wipe away all trivial fond records,
> All saws of books, all forms, all pressures past,
> That youth and observation copied there;
> And thy commandment all alone shall live
> Within the book and volume of my brain,
> Unmix’d with baser matter. (Act 1, Scene 5)

The invention of each new communications technology has brought new opportunities for understanding the self by blending our vague, diffuse notions of self over time with our notion of self as a user of the technology. These technologies include semaphore signaling systems, sign language, telegraphy, personal letter writing, telephony, radio, television, e-mail, and chat rooms. We know our technologies better than we know ourselves. Our communication technologies are designed to operate at human scale and are therefore at the center of what we know best. Accordingly, we think of ourselves in terms of them, by blending our general concept of ourselves with our understanding of how the communications technology works.

Perhaps the next big platform in telecommunications is the 3D web, as exemplified in massively multiple online synthetic worlds such as Second Life. Second Life presents many opportunities for blending self with telecommunications technology so as to produce folk theories of the self that can play a role in advanced narrative cognition.
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The Mind is a Pack, a Troupe, a Self-Organizing Cyclone, an Autocatalytic Vortex

This chapter has argued that although it is easy to notice blending of fully-formed particular narratives, blending is not subsequent to advanced narrative cognition. Rather, advanced narrative notions of self and others stretching across time derive from double-scope blending in the first instance. It is common in psychology to portray the modern mind as a Swiss Army Knife, consisting of modular tools, each designed for a separate task, not working together. It is also common for theorists to select one or another of these tools as having made the big difference in the evolution of human beings. Social cognition is often selected as the big blade in the knife. But human higher-order cognition is not a Swiss Army Knife of separate, modular, independently arisen tools. On the contrary, double-scope blending made this range of advanced tools possible - language, advanced social cognition, mathematical invention, scientific discovery, art, religion, music, advanced tool use and advanced technology, dance, fashions of dress, sign systems.

Because I have focused here on how double-scope blending advances narrative cognition - which includes the self and others as interactive intentional agents over time - I should be careful to preclude the misinterpretation that I am proposing that social cognition provided the great leap forward. On the contrary, social cognition, indispensable to human beings as it undoubtedly is, manifests only one of a set of mental abilities and behaviors made possible by double-scope blending. These double-scope blending abilities are a coordinated pack: they share a derivation and they work together evolutionarily and developmentally. Social cognition is absolutely crucial, as a member of that pack, but it does not per se explain human abilities in the realms of music, mathematics, technology, and so on. Social cognition may provide a better ratchet to hold onto creative achievements, but theory of human evolution and developments requires an explanation of the great improvement in creative and innovative capacities in the first instance. Absent those abilities, the ratchet effect has little to hold onto.

Around the globe, there are millions of Cub Scouts. They all repeat, in unison, at every meeting the “Law of the Pack,” whose opening is:

- The Cub Scout follows Akela.
- The Cub Scout helps the pack go.
- The pack helps the Cub Scout grow.

Think of Akela as double-scope blending. This Pack of higher-order human cognitive abilities follows double-scope blending; double-scope blending made the Pack possible. Each of our higher-order cognitive abilities is part of a Pack and contributes to the power and achievement of the Pack, and the Pack helps each of the abilities operate and develop.

The problem with this blend - the Pack blend of human cognition - is that, misunderstood, it might look as if it is projecting into the blend the very higher-order human capacities that we want to explain, just as the Swiss
Army Knife blend does, because the Swiss Army Knife of course accomplishes nothing unless a human being is using it, and it has none of the understanding or cognition of a human being. All of the cognition and understanding reside with the whittler.

Modern cognitive science is working toward new models that (1) do not presuppose the human higher-order cognitive abilities we want to explain, and (2) do not assert a black box or a magic wand supposed to provide the power of human cognition but whose actual processes in human-scale embodied cognition are left unexplained. We seek models according to which higher-order human cognition can derive from processes that are not themselves at their level, models in which the mind is a self-organizing system, a self-feeding cyclone, an autocatalytic vortex.

Works Cited


