The Scope Of Human Thought

© Mark Turner, 2009

http://markturner.org

Institute Professor and Professor of Cognitive Science, Case Western Reserve University

Biologically, we resemble other animals, but mentally, we leave them in the dust. The scope of human thought is vast. Why are we so different?

Animals—including us—live, think, and feel in the here and now. Living, thinking, and feeling are biological events, existing only in the present. When we think about the past or the future, or anything distant or outside the situation we inhabit, the thinking and feeling are not distant—they are right here, right now, present, confined to our local, human-scale situation, conducted through here-and-now biological systems.

In this regard, we are like dogs, dolphins, corvids, chimpanzees. A human being may have been alive 10 years ago and may be alive 10 years hence, but our brain activity of 10 years ago or 10 years hence does not exist. The only systems for living, thinking, and feeling that human beings possess are run by their bodies here and now.

This picture was sketched by Sir Charles Sherrington, who described the brain as an “enchanted loom” where “millions of flashing shuttles weave a dissolving pattern, always a meaningful pattern, though never an abiding one” (Sherrington, [1941] 1964, p. 178).

Dissolving, never abiding. Yet our thought ranges over time and space, over long-range causal chains and possibilities, over present and potential absences, over mental stories we populate, in imagination, with thousands, billions, of human agents whose minds we imagine to be like ours—full of beliefs, desires, plans, decisions, and judgments, all with vast scope. The contents of our thoughts do not seem to us to be dissolvingly evanescent.

Scientists have meditated upon the scope of human thought and tried to explain its origins. Antonio Damasio, in The Feeling of What Happens (1999), offers a speculative theory of how neurobiological development could have made “extended consciousness” possible:

Extended consciousness still hinges on the same core “you,” but that “you” is now connected to the lived past and anticipated future that are part of your autobiographical record (page 196).

Endel Tulving (1985a and 1985b) emphasized our ability for mental time-travel, our capacity for episodic memory and autonoetic (“self-knowing”) consciousness. In autonoetic consciousness, we can recover the episode in which something occurred. “Autonoetic consciousness . . . allows an individual to become aware of his or her own identity and existence in subjective time that extends from the past through the present to the future” (1985b, page 388). Ulric Neisser drew attention to our remarkable capacities in his classic article, “Five Kinds of Self-Knowledge” (1988). Hundreds of other scientists have participated in the inquiry. Here is one of the most recent:

A self can feel such a singular fixture, hugging one’s here-and-now like a twenty-four-hour undergarment, but actually it’s a string, looping back and forwards in time to knit together our past and future moments. . . . A self is a Tardis, a time-machine: it can swallow you up and spit you out somewhere else. — Charles Fernyhough. 2008. A Thousand Days of Wonder: A scientist’s chronicle of his daughter’s developing mind. New York: Avery, p. 122.

Expressing astonishment at the vast scope of human thought invites objections.

Objection 1: What’s the big deal? How can it be so astonishing and difficult if everyone, even children, can do it?

This lay objection carries no weight within scientific communities. Cognitive science has shown repeatedly that seemingly simple human behaviors are far more complicated than we might have imagined and that our folk theories purporting to account for them are in many ways wrong from the start. The vast scope of human thought is a recognized major problem: it lies far beyond the abilities of other species and we have no scientific consensus on what makes it possible.

Objection 2: Doesn’t evolution build us so that our actions here-and-now have long-range consequences? Doesn’t instinct provide the connection between here-and-now and the rest of our lives?

It does: instinct makes the squirrel bury nuts and the human being lust after a member of the opposite sex without any need for thought about
hunger or cute great-grandchildren. But that’s not the issue. The question is, how can a human being think about a network of such vast connections, including past and future states of their own minds and the minds of other human beings?

Objection 3: What about memory? Doesn’t memory solve the problem of continuity over time, at least? Doesn’t memory bring the past into the present?

Not so fast. Memory is of course only in the present, and a particular memory is only in the present, even though it seems as if the detailed memory comes wending in from long ago, carried to our present minds on winds from yesteryear. Both our memory as a system and any particular memory we experience are present biological events. The universe does not bend back upon itself when we remember, to make two different times intersect in one time. This sense of the intersection of past and present—one of the basic mainstays of life and art, from Homer to Proust, from the witches in Macbeth to Dr. Who, is an adaptive delusion.

Objection 4: Are we really so special? Don’t other animals show signs of thinking beyond the here-and-now?

This objection is very serious and important. The studies on this topic are fascinating: Hints that dogs have some human-like social skills (Hare & Tomasello 2005); that rats have some recollection-like memory retrieval (Fortin, Wright, & Eichenbaum 2004); that scrub jays have some episodic-like memory (Clayton & Dickinson 1998); that chimpanzees have some understanding of conspecifics as possessed of goals, intentions, perceptions, and knowledge (Call & Tomasello 2008; Tomasello, Call, & Hare 2003); that Santino, the Swedish zoo chimpanzee, stores rocks as part of a plan to throw them at human visitors later (Osvath 2009); and so on. There is considerable evidence for the weak form of this objection, and science will presumably inch significantly here and there to extend our conception of what other species can do mentally. But the strong form of this objection does not have a leg to stand on. The highly impressive performances by members of other species have severe limits that human beings everywhere indisputably blow right past, effortlessly, from an early age, without help from a more advanced species.

What makes the vast scope of human thought possible? Elsewhere (Fauconnier & Turner 2002, Turner 2003-2009), it has been argued that nonhuman animals possess impressive rudimentary abilities for conceptual integration, but that human beings have an advanced form, called “double-scope blending.” It has been argued (Turner 2008, Turner 2004, e.g.) that double-scope blending makes the vast scope of human thought possible. Double-scope blending gives us the ability to conceive fully of other minds and to grasp extended conceptual networks that would otherwise lie beyond our cognition. These extended conceptual networks have elaborate “vital relations” running across the network—relations of time, space, cause-effect, representation, analogy and disanalogy, change, identity, uniqueness, and so on.

What follows is the tiniest gist of this hypothesis.

Human Scale

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. Human brains are built to conceive of scenes that are at human scale. At human scale

- We operate within limited ranges of space and time.
- We partition our sensory fields into objects and events.
- We interact with objects locally.
- We recognize some of those objects as agents.
- We interact with a few agents in patterned activity: eating, moving, fighting, mating.

That is pretty much what we are built for. In one sense, it is what we are.

For other species, this scale, or a similar one, seems to be pretty much the entire story of existence. No nonhuman animal, for example, seems to be able to understand that other animals hold beliefs, or what those beliefs might be. No nonhuman animal seems to be able to wonder what its life might be like if it had done something different ten years ago. No nonhuman animal seems to be able to wonder what will become of its as yet non-existent offspring.

Human beings, by contrast, have

- a conception of self 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 self 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 self and one’s personal identity as richly inhabiting both the past and the future.

It is a spectacular scientific puzzle that human beings are the sole species that seems to be able to think and feel beyond the limits of the scale for
their species. Human scale is fundamental for human thinking and feeling, but we go beyond our scale in ways so thoroughly different from members of other species as to place us in a different galaxy of thinking and feeling. We are like Dr. Who, the time lord of science fiction, who can use his Tardis to move across ranges of both time and space that go way beyond human scale. Human beings have a mental Tardis, an internal Tardis. Our mental Tardis is the subject here.

Network Scale

The hypothesis suggested here is that our ability for double-scope blending gives us the capacity to create vast conceptual networks with extended vital relations that are nonetheless anchored in scenes that are at human scale. Network scale can be vast even though human scale is not, because the network scale is anchored in the human scale. The human scale blend contained in the network provides us with a platform, a scaffold, a cognitively congenial basis from which to reach out, manage, manipulate, transform, develop, and handle the network. The human-scale anchor in the network can be achieved by blending conceptual elements of the network into a human-scale scene or by recruiting to the network some mental array that is already at human scale and blending the rest of the network with it. Importantly, once we have blended conceptual arrays to make a new blend that has human-scale properties, that blend is now, for us, at human scale, and can be used as an anchor for future networks. These new human-scale blends become second nature for us, and blending is recursive: packed, human-scale blends become inputs to new networks. What was once beyond human scale is now packed to human scale. What counts as human scale is repeatedly extended over the course of a lifetime. To give one example, the concept of writing is the result of repeated double-scope blending (Fauconnier & Turner 2002). Conceptual integration networks for writing seem to be at most 8,000 years old. It accordingly must have taken cultures tens of thousands of years to invent the networks necessary for writing, and today’s child, with elaborate cultural tutelage and support, must still spend considerable time and effort to build the relevant human-scale blend and its network. But once the network is acquired, it seems natural, inevitable, effortless. It becomes difficult if not impossible to look at appropriate marks and to see only marks, not words. The conceptual integration work required for understanding writing takes conceptual elements that are at network scale and creates a human-scale blend for the network, so we can hold onto that conceptual network.

The scope of human thought is network scale, even though we are built for human scale, because double-scope blending provides human-scale anchors for the vast conceptual integration networks.

Packing the Known Universe to Human Scale

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.

Gore prompts for vast conceptual integration networks that are at vast network scale: a distance of four billion miles, and all of human history plus the future. But, through double-scope blending, we can pack this network to human scale.

First, space is packed to human scale. 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 array. Gore also prompts for the conceptual array of the universe, with the Earth somewhere in it. The incompatibility of these conceptual arrays is evident. Just for starters, human beings cannot walk backward four billion miles from Earth to have a look. 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, subject to our action, evoking local responsibility.

Second, time is packed to human scale. Unborn descendents—billions of them—are talking to us, and we hear them. There are reasons we could not hear them: they do not exist; there are far too many of them; they are distributed around the entire Earth; they stretch across many generations; they do not all speak English; they might not be speaking at all, but rather writing or thinking; and so on. But now, in the packed blend that anchors the network, all the individuals of future generations are packed into 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 descendents, even if in fact some of us, in reality, have no children at all. And we hear their question now.

This conceptual miracle—anchoring vast network scale in human scale—is child’s play for human beings. This child’s play is what separates us from all other species. Every human child is born a genius.
Reference List


22 comments to The Scope of Human Thought

I teach English literature, and have found conceptual-blending theory a very useful way of thinking about poetry. This is perhaps not surprising, if blend-theory describes human imaginative life, and if poetry can be thought of, even perhaps defined, as an intensification of imaginative life.

(Here I follow the old critic Owen Barfield; if an utterance strikes you with aesthetically compelling strangeness of meaning, then, for you, it is poetry. Never mind about rhythm and rhyme, and what “verse” is, and how that may or may not relate to poetry).

The mysterious human ability that Mark Turner discusses in his post—the ability to bring the distant past and future together in the here-and-now, to commune imaginatively with the dead and with future generations, is one of the constant themes of Whitman’s poetry, something he not only mentions but as it were enacts, for instance in “Crossing Brooklyn Ferry” (http://www.bartleby.com/142/86.html), a casual conversation about the Manhattan sunset between Whitman and whatever reader may come along “A hundred years hence, or ever so many hundred years hence.”

Not only times but spaces are blended in Maura Stanton’s poem “Childhood.” The times are the poet/speaker’s childhood and adulthood; the spaces are her house and “A reverse house on the ceiling of my house/ Where I could walk around in empty rooms [with] a glass globe in the floor./And knee-high barriers at every door”: (http://matterpattern.blogspot.com/2008/02/childhood-by-maura-stanton.html). Stanton’s compressing times and spaces invites a complex emotional response; the reader, in sorting them out and supplying what’s unsaid, may feel quite suddenly and therefore acutely the temporal
and experiential distance between childhood and adulthood.

In his poem “The Thought Fox,” Ted Hughes’s strategy for handling something very abstract (a thought) is to blend it with something more concrete, if still elusive (a fox): (http://www.poemhunter.com/best-poems/ted-hughes/the-thought-fox/).

Emily Dickinson’s “I Dwell in Possibility” more or less overtly takes poetry as its subject (she calls it “a fairer house than Prose”), though she renames it “Possibility” and discusses it as if it were an excellent house—again, something rather abstract rendered temporarily concrete and “human scale” for easier handling. Mark Turner sums up the point of conceptual blending as “packing the known universe to human scale”; Dickinson calls poetry “The spreading wide my narrow Hands/ To gather Paradise”: (http://www.poetryfoundation.org/archive/poem.html?id=182904).

Mark Johnson
August 17th, 2009 at 11:34 pm

One of the greatest challenges to any naturalized theory of mind, thought, and language of the sort favored by Mark Turner is the problem of how abstraction is possible. How can an embodied, earthy creature like us accomplish fabulous imaginative achievements of abstract thought found in elementary algebra, the sonnets of John Donne, the theology of the Trinity, or the paintings of Elizabeth Murray? The answer, throughout virtually all of 20th century philosophy has been language—that it is language that makes abstract symbolic thought possible. But this is putting the cart before the horse. How is language itself first possible, when it most certainly depends on underlying cognitive processes that involve images, schemas, concepts, emotions, and a vast array of conceptual blending processes? Turner’s greatest contribution to our understanding of these marvels of human thought is to show us some of the ways in which basic structures already present in our sensory-motor processing can be recruited for abstract thought without presupposing separate systems allegedly unrelated to our bodily engagement with our environment. The trick to avoiding unwanted dualistic assumptions is an account of the emergence of complex functions from the interaction of more basic cognitive systems that are keyed, evolutionarily, to our capacity for getting on, and flourishing within, our physical and social world. Fauconnier and Turner’s “double-scope blending” is one of the grand cognitive strategies by which we are able to take what is most humanly and intimately meaningful to us and appropriate it for making sense of worlds both far away in time and whose significance is not physically perceivable. Given what we are learning from cognitive neuroscience about the bodily basis of human meaning, something like this multi-dimensional blending process is the only way to avoid the old dualistic picture of human mind and thought as miracles from the point of view of our material bodies.

Thomas Pavel
August 18th, 2009 at 10:32 pm

While Mark Turner’s subtle description of our double-scope blending is a beautiful contribution to the understanding of our cognitive power, I would like to raise two objections.

One concerns the use of the term “folk psychology” when referring to emotions, goals and beliefs. The use is unfortunate because it suggests a distinction between the poor folk who mistakenly assume their emotions, goals, and beliefs to be genuine and the smart set who really knows what is going on. Imagine a piano connoisseur who, while explaining how this marvelous instrument operates, would condescendingly speak of such “folk musical notions” as melody, harmony, and counterpoint.

Second, consider the propositions “It is in our human nature to live as groups under certain forms of leadership,” or “Human beings are naturally able to pursue ideals and obey norms.” Consider also a different way of formulating the same insight: “Human beings develop a second nature, involving the ability to live under certain forms of leadership, adopt certain ideals, and act according to certain norms.”

These kinds of propositions seem to me to point to what makes human life not just feasible, but also worth living. They remind us that our bio-psychological endowment generates a specifically human ability to live not just according to needs but also to norms and ideals. This ability allows us to decide what kind of leadership we want, discriminate between the various ideals we can pursue, and adhere to the norms that govern our actions.

I am convinced that Turner’s notion of double-scope blending deserves to be expanded and adapted to a more vivid sense of human nature. It would help explain how we, human beings, are capable to make the difference between right and wrong, justice and oppression, worthy and unworthy goals.

David Herman
August 19th, 2009 at 1:36 am

Networks as Niches: A Response to Mark Turner

Mark Turner’s “The Scope of Human Thought” is written with characteristic clarity, insightfulness, and panache. Turner draws on his and Gilles
Fauconnier’s work on blending theory, and more specifically their concept of “double-scope blends,” to develop an account of what Turner characterizes as distinctive attributes of the human mind—in particular, those bound up with its capacity to “think beyond the here-and-now.” In this brief response, I shall allude to some other strands of research on the mind that suggest how even thinking _within_ the here-and-now can be viewed as “networked,” i.e., decentralized and distributed, cutting across brain, body, and world in ways that ecological, externalist, and enactive approaches to cognition aim to explore. This work, stemming from early research by Vygotsky (1978) and Gibson (1966), among others, and further developed by theorists such as Clark (1997, 2008), Hurley (1998), Rowlands (2009), Torrance (2005), and Varela, Thompson, and Rosch (1991), provides warrant for the claim that human-scale thinking is in a sense already networked, and more generally that minds of all sorts, non-human as well as human, emerge from the interplay between intelligent agents and the material and social environments they seek to navigate. For their part, non-human networks are not only spatially distributed, as when a bird selects particular kind of tree or shrub as an external prop for the accomplishment of goals related to nesting; what is more, as Clark (2008: 61-2) points out, some non-human animals collectively build structures that persist beyond their own lifetime, shaping how successive generations of those animals engage with their environments. For example, beavers build dams and thereby alter selection pressures for their progeny, among whom offspring with particular kinds of navigational aptitudes will be selected for (see Laland et al. 2000).

In turn, if minds are by their nature situated in networks of internal representations and worldly affordances—and Clark (1997: 22-23) and (2008: 187-90) draws on research in robotics to argue that building networks of this kind can also help optimize artificial intelligence—then the claim for humans’ cognitive exceptionality loses some of its force. It is not the case that only humans can engage in network-scale cognition; rather, humans’ sensorimotor and representational capacities enable them to negotiate (“enact”) networks that are differently constituted, configured, and mediated than those traversed by non-human animals, thanks to their own sensorimotor make-up. As Jakob von Uexküll suggested a hundred years ago, the characteristics of these networks or _Umwelten_ vary, in accordance with variations in organismic structure, across different species of non-humans. Von Uexküll’s ideas provide grounds for viewing all forms of niche construction (Laland et al. 2000), both human and non-human, as ways of scaling and rescaling the networks that link together an organism’s brain, body, and world.

And if niches amount to networks, then it becomes more difficult to claim that we leave other animals in the dust mentally. An alternative formulation is this: one and the same environment can afford very different forms of cognitive scaffolding—or networking possibilities—for human versus non-human animals, just as it can for different sorts of non-humans. It is true that my immediate surroundings may trigger network-scale thinking, cuing me to project myself back into the remembered past or forward into an imagined future, decades or even centuries ahead. But in the very same setting, my cat’s visual and olfactory acuity situate her in an extended, superhuman field for sensation and action, far vaster in scope than my own. I don’t blow past her, cognitively, but rather traverse a different network, enact a different world.

**References**


very last sentence. Born a genius? Probably so. But I think our best chance of understanding how double-scope blending is possible is to look at how children develop in the first three years or so of life—how those innate endowments are stretched, enhanced, and thoroughly reconfigured by experience out here in the world. Zoom in on those years and some tantalising complexities emerge. Children’s understanding of the minds of others, for example, goes through a clear developmental progression in infancy and toddlerhood (speaking very broadly, from an understanding of intentional agents at around 14 months to a full understanding of mental agents at around age 4; see recent work by Tomasello and colleagues). Which kind of social understanding is most relevant here? Young children only really get going with future-oriented reasoning (choosing an outcome that will benefit them for the future, for example, as opposed to satisfying an immediate need) from around age 4. And yet, particularly when scaffolded by conversations with adults in which the topics are past and future events, much younger children show evidence of projecting their own selves back into the past and forward into the future.

My own guess is that the capacities Turner describes are best explained by children’s exposure to structured social relationships in the first few years. These interactions are mediated by sign systems, usually a spoken language, and are internalised to form a special kind of ‘dialogic thinking’ (e.g., Fernyhough, 2008, Developmental Review, 28, 225-262). As Vygotsky observed, thought and language come together to restructure what a human brain is capable of. For my money, it’s being able to think dialogically that extends the scope of human thought. The precise story of this emergence is a complex one, but that’s why we do developmental psychology.

Marcel Danesi
August 19th, 2009 at 2:37 pm
Response to Mark Turner

Marcel Danesi

There is very little to argue against in this yet another brilliant essay by Mark Turner, truly one of today’s leading cognitive scientists. I am writing simply to add a historical footnote to the question of the origins of human mentality that is often missing from the current debate—a footnote that hopefully will get people like Turner to take seriously into account the ideas of Italian philosopher Giambattista Vico (1688-1744). I do this not because I think that Vico’s ideas are superior or different from those of Turner, but rather because they predate many of the notions that cognitivists like Turner are now putting forth in exciting new terms. I will thus be brief.

For Vico, the human brain is a distinctive organ from that of other species because it possesses a faculty that he called poetic logic. In my view, this is the critical notion in his masterpiece, the New Science (edited and translated by Bergin and Fisch in 1948). This faculty is what has impelled Homo sapiens into becoming a “meaning-producing” species, rather than merely a “survival-seeking” one. However, because it is part of our human nature, we do not have direct access to it—we cannot use our brain to study itself. But, Vico claimed, we can certainly gain access to its workings by studying the origins of figurative mental products. In this way, we will be able to unravel the foundations of human inventions such as language, art, music, mathematics, and science, all of which are missing from other species. As the capacity to “figure things out,” poetic logic is a form of imaginative thinking that allows humans everywhere to understand the world on their own terms. And the most marvelous of all the forms of mind produced by poetic logic is metaphor. As remarkable as this insight was, it is only today that metaphor has finally started to catch the attention of linguists and psychologists in a serious fashion.

Poetic logic has a bodily basis. It is a form of “sense implication” that the human imagination translates into verbal and nonverbal forms (discussed in Vico, Metaphor and the Origin of Language, 1993). This notion is very similar to what Charles Peirce called abduction, and can be defined as the process of perceiving intrinsic connections among objects and then giving the process a formal structure through signs. This has been called the Sense Implication Hypothesis (SIH) by Sebeok and Danesi (in Modeling Systems Theory, 2000). Take the word blue in English. As a concrete concept, blue was probably extrapolated from observing a recurring pattern of hue found in natural phenomena such as the sky, the sea, etc. with they eyes. When this visual information is sent to the brain, our innate poetic logic starts to “figure things out,” by noting the occurrence of the same hue in other things. The specific “sense” of blue that comes to mind will, needless to say, be different from individual to individual. But all such “senses” will fall within a certain range of meaning. This is how originary semiosis (the ability to turn sense implications into sign constructs) appears to work—by having constructed the word blue through sensory imagining, speakers of English can then start figuring out how certain other things are interconnected with or through it.

I always like to give a personal example of how this faculty functions by default by referring to something my grandson uttered when he was barely 15-16 months of age. At the time, he had learned to refer to various objects in the house with appropriate words. However, he had not learned the English words for colors. One day he referred to the orange color of our household cat with the word juice—a word he had been using previously to refer to the orange juice he regularly drank at breakfast. My grandson had obviously extracted the sensory quality of “orangeness” from the liquid and applied it to a new referent—the cat’s hair. This anecdotal example is, to me, a perfect portrait of how poetic logic works. Incidentally, as the anthropologist Roger Wescott documented way back in 1980 (in his wonderful book Sound and Sense), color vocabularies likely originated through events that are similar to this one, that is, through sensory implication of hues with natural and human events.

The SIH provides a framework for understanding a host of conceptual subtleties that would otherwise go unexplained. In my view, it would also explain blending, as Turner and Fauconnier so aptly call it. Needless to say, metaphor is a primary trace to how sensory implication works. It is relevant to cite Vico on this issue:
It is noteworthy that in all languages the greater part of the expressions relating to inanimate things are formed by metaphor from the human body and its parts and from the human senses and passions...All of which is a consequence of our axiom...that man in his ignorance makes himself the rule of the universe, for in the examples cited he has made of himself an entire world. So that, as rational metaphysics teaches that man becomes all things by understanding them...this imaginative metaphysics shows that man becomes all things by not understanding them...and perhaps the latter proposition is truer than the former, for when man understands he extends his mind and takes in the things, but when he does not understand he makes the things out of himself and becomes them by transforming himself into them (Bergin and Fisch 1984, 129–130).

Concept-formation is an imaginative process based on sense-making. Blends are “conceptual particles” that can be deconstructed to show us what this process is capable of doing. Turner’s last sentence “Every human child is born a genius,” is exactly how Vico had himself put it, referring to this innate form of genius as the ingegno—the ability to turn sense into meaning. I end on a slightly skeptical note regarding the writings of scholars such as Damasio who are often cited as providing a neurological basis to the findings on metaphor and other figurative products. Don’t get me wrong. I find Damasio’s work very interesting, but, as Vico would put it, all it ends up showing is what we want to find in it. Other neurologists will no doubt see other meanings in it. My guess is that one cannot really pinpoint the locus and functioning of poetic logic through brain research, since the latter has to be interpreted and given a semiotic form. Because of this conundrum we find ourselves in, it is unlikely that we will ever know the truth about ourselves.

August 19th, 2009 at 4:15 pm
Cristóbal Pagán Cánovas

“What blending theory, done well, can do is to provide a systematic account of regularities and generalities in the kinds of compressions that show up again and again in language and other reflections of our semantic experience.”

I thought his point deserved repeating too.

The network model has shown a powerful descriptive power, which is no small asset at all, given the complexity of the phenomena it has set out to describe. Explanation, as Vera Tobin points out, is a different thing. The capacity of forgetting differences, of preserving identities and relations across mental spaces for their further manipulation, is elegantly exposed by blending theory. But a full account of what makes this process possible requires coordination and advancement of huge bodies of knowledge from biology to culture. Conceptual integration is an important piece in this puzzle, but of course there are many others. As I said, I believe it to be a significant step in the right direction, which, since we are dealing with what makes us the way we are, is no little thing.

I would also like to make a further claim: even in description, blending, though crucial, is again just one piece in the puzzle. If interesting generalities are to be found, a comparative approach and an alliance – or conflict— with other theories seems necessary. For example, a theory of the origin of language should take conceptual integration into account, but also other factors like the shared intentionality and cooperation proposed by Tomasello (2008: Origins of Human Communication). As Charles Fernyhough suggests, combining the acquisition of the first social abilities with conceptual integration can yield further insights. Interaction between double scope blending and other capacities and conditions is likely to provide a more powerful candidate for an explanation.

Just another example. If you take metaphor or verbal figuration in general, a question that seems reasonable is whether theories that do not or cannot include an intermediate space between inputs are compatible with the network model. In “Rethinking Metaphor” (2008), Fauconnier & Turner open a very interesting path for discussion. If these theories are incompatible, shouldn’t blending theory come up with predictions conflicting with theirs, and provide more alternative models for describing the same phenomena, like that complex network for TIME AS SPACE recently proposed?

Finally, a word about niches. Cultural, historical, and individual factors influence our integrations in a crucial way. Rather than merely exposing them, situating with detail the blends we describe is not only necessary for reaching a satisfactory description of isolated networks, but also for finding regularities and generalities across blends and blending procedures. For instance, spectacular examples of poetic imagery are not only the result of blending frames, schemata, and other elements in a particular way, but also in a particular context. Even if they seem unique, very complex patterns are likely to recur in similar conditions. Poets (and everyday speakers) striving to compress a diffuse meaning at human scale are likely to come up with combinations of mental spaces and integration patterns that are further constrained by the moment of discourse, the cultural background, rhetoric purposes, etc. Combining blending with these other factors in a systematic way will surely lead to richer descriptions that can both find generalities and point at individual creativity.

To describe really interesting regularities in meaning construction, blending theory needs to blend with other theories. I’m sure many new insights are going to result from such integrations.

August 19th, 2009 at 5:20 pm
Margaret H. Freeman
The blending analysis reveals the complexity of integrations underlying this metaphorical structure. The analysis of the respective conceptual networks, in other cultures there is no blending of these to produce an emergent structure and the linguistic realization equivalent to the metaphor culturally specific. Initial research suggests that despite the individual presence of the concepts relevant for the construction of this metaphoric Russian identity, this particular metaphor has been especially interesting for analysis within the conceptual integration framework because it is ‘werewolves in epaulettes’. This metaphoric structure emerged not long ago to reflect important aspects of the construction of post-Soviet identities and relations across mental spaces for their further manipulation, is elegantly exposed by blending theory. But a full account of what makes this process possible requires coordination and advancement of huge bodies of knowledge from biology to culture.

Mark Turner’s claim of human thought as a “conceptual miracle—anchoring vast network scale in human scale” through double scope blending suggests a revolution in the prevailing notion that the creative arts are a later and ancillary phenomenon to human thought (and thus dispensable). Since it is aesthetic experience—esthetic in the sense of being a science of sensory perception—that lies at the heart of all the arts (poetry, music, painting, etc.), could it not be that it was the developing ability for artistic expression in the human animal that led to our cognitive prowess? (Turner suggests as much in The Literary Mind.)

Thinking has to be about something. What we think about is our self in the world (or, to put that somewhat differently, our consciousness of the world and others in the world). Vast network scale, as the example of Al Gore’s depiction of the earth shows, may be anchored in human scale, but it is noteworthy that it also enables us to experience “the conceptual array of the universe.” It seems to me that that is what the arts do. Turner notes with respect to writing that “It becomes difficult if not impossible to look at appropriate marks and to see only marks, not words.” That’s because of the cognitive move toward abstraction that obscures the physical traces that go into making it. Art enables us to focus on the marks. By capturing experience at the primordial or precategorial level (before conceptualization kicks in), art, as many artists and writers have noted, expresses the inexpressible, makes visible the invisible (is this what is elsewhere called the “cognitive unconscious”?).

By creating what I call “an icon of reality,” the arts enable us to experience the presence of our selves in the world. What we call “science” is only one of the possible sciences that endow human knowledge. Art as the science of sensory perception is another. As Turner’s observation on the need for the human child to acquire the necessary network for writing suggests, isn’t experience of the arts crucial and necessary for all human beings to fully realize the possible scope of human cognition within our own individual consciousnesses?

Anna Pleshakova

August 20th, 2009 at 11:00 am

“Finally, a word about niches. Cultural, historical, and individual factors influence our integrations in a crucial way. Rather than merely exposing them, situating with detail the blends we describe is not only necessary for reaching a satisfactory description of isolated networks, but also for finding regularities and generalities across blends and blending procedures. For instance, spectacular examples of poetic imagery are not only the result of blending frames, schemata, and other elements in a particular way, but also in a particular context. Even if they seem unique, very complex patterns are likely to recur in similar conditions. Poets (and everyday speakers) striving to compress a diffuse meaning at human scale are likely to come up with combinations of mental spaces and integration patterns that are further constrained by the moment of discourse, the cultural background, rhetoric purposes, etc. Combining blending with these other factors in a systematic way will surely lead to richer descriptions that can both find generalities and point at individual creativity.

To describe really interesting regularities in meaning construction, blending theory needs to blend with other theories. I’m sure many new insights are going to result from such integrations.”

This point deserves repeating.

No doubt that cultural, historical factors as well as discourse and rhetoric purposes should be taken into consideration while constructing conceptual integration networks. This point has already been raised in, e.g. Fauconnier and Turner 2002, 2008; Coulson 2001, 2006; Oakley 1998; Lukes, 2007. “We need to face squarely the far greater complexity of integrations that lie behind observable metaphorical conceptual systems, we need to take into account their cultural history, and we need to account explicitly for the emergent structures they produce, both over cultural time and over individual time … ” (Fauconnier and Turner. 2008. Rethinking Metaphor).

No doubt that accounting for all the factors and purposes mentioned above will lead to richer descriptions and more profound understanding of regularities and generalities. However, I think that being a very productive research method conceptual integration should provide a basis for interdisciplinary research rather than “blend with other theories”. Conceptual Integration describes and explores a basic mental operation inherent only to human beings, a ubiquitous form of cognition, and offers a powerful theoretical framework for investigation of meaning construction and understanding. Conceptual integration offers research tools for the study of backstage cognition, reason, choice, meaning, concept formation and change. Since such tools are vital for exploring world cultures and societies, conceptual integration is viewed as forming an essential part of studies in the social sciences and thus as a theory which can provide a basis for their unification (Turner, 2001) as well as interdisciplinary research.

Cristóbal Pagán Cánovas says: “Explanation, as Vera Tobin points out, is a different thing. The capacity of forgetting differences, of preserving identities and relations across mental spaces for their further manipulation, is elegantly exposed by blending theory. But a full account of what makes this process possible requires coordination and advancement of huge bodies of knowledge from biology to culture”.

I am not in a position to say anything here about bodies of knowledge from biology; however, I believe that conceptual integration can be successfully employed for the analysis of language, cognition and culture in their interrelation. My recent case study of Russian novel metaphors has provided an illustration of the utility of conceptual blending as a tool for cultural analysis through the construction of the multi-scope network ‘werewolves in epaulettes’. This metaphoric structure emerged not long ago to reflect important aspects of the construction of post-Soviet Russian identity. This particular metaphor has been especially interesting for analysis within the conceptual integration framework because it is culturally specific. Initial research suggests that despite the individual presence of the concepts relevant for the construction of this metaphoric network, in other cultures there is no blending of these to produce an emergent structure and the linguistic realization equivalent to the metaphor ‘werewolves in epaulettes’.

The blending analysis reveals the complexity of integrations underlying this metaphorical structure. The analysis of the respective conceptual
integration network elucidates the metaphor’s cultural specificity, its rhetorical capacity, its potential in motivating secondary metaphorical structures, the relation of metaphor to past cultural and ideological traditions, and the ideological implications of its usage in the contemporary Russian mass-media discourse. The conceptual blending analysis makes it evident that this metaphorical network becomes a new Russian national construal of the post-Soviet mythologized concept of enemy.

The study of this culturally-specific and highly creative metaphorical structure reveals the significance of accounting for both permanent features of cognition and metaphor’s cultural and discourse history in the construction of metaphorical integration networks. The cultural specificity of input spaces and cultural models’ motivational and ‘adaptation’ capacity have a crucial influence on the cross-space mappings and projections in the network. The case study has demonstrated that in the construction of such culturally specific conceptual integration networks as ‘werewolves in epaulettes’, the overarching goal ‘Achieve Human Scale’ is complemented by a noteworthy sub goal ‘Achieve Cultural Scale’.

The principles of conceptual integration behind the construction of the meaning of ‘werewolves in epaulettes-mythologized enemy’ conspire to achieve the overarching goal ‘Achieve Human Scale’ and its noteworthy sub goals: compress what is diffuse; obtain global insight; strengthen vital relations; come up with a story; go from many to one (Fauconnier and Turner, 2002). My analysis of the Russian culturally specific metaphors suggests the existence of an additional sub goal – ‘achieving a cultural scale’. This sub goal, in my opinion, ensures the activation of inputs and selection of mappings and projections which make the blend culture-friendly. Making the blend more intelligible, blazing and memorable, and useful to us as human beings thinking in culture, this sub goal contributes to the goal ‘Achieve Human Scale’. The importance of this sub goal must not be underestimated, since accounting for ‘achieving cultural scale’ helps to elucidate the metaphor in its full capacity.

The analysis has shown that human-friendly and perfectly suited to Russian culture, the concept of ‘werewolf in epaulettes’ is unlikely to be constructed in other cultures, even assuming that they have concepts of werewolf, crime, corruption, etc.

I would like to emphasize that central to the application of conceptual blending as a tool for cultural research is the analysis of cultural models and their capacities. The concept of ‘cultural model’ (discussed in e.g. Sweetser, 1987; Shore, 1996; Coulson, 2001, 2006; see also a related concept of conceptual pattern (frame) in Luken, 2007) presents a technique based on the analysis of textual evidence or linguistic triggers for various conceptual structures, which accounts explicitly for the cultural, historical and discourse dimensions of the conceptual blending analysis. Cristóbal Pagán Cánovas points out “Conceptual integration is an important piece in this puzzle, but of course there are many others”. May be it is a key piece in this puzzle after all?

William Deal
August 20th, 2009 at 4:11 pm

Mark Turner’s discussion of ways in which human beings deal with network scale by grounding it in human scale holds some intriguing possibilities for theorizing religion. As someone whose disciplinary home is religious studies, but who has come to see the significance of cognitive scientific perspectives for understanding human religiosity, the signs of double-scope blending are everywhere to be found in religious language across times and cultures. Religious worlds are often imaginative worlds that otherwise do not exist “naturally” (e.g., Buddhist Pure Lands or eternal heavens). Religious language conceives of vast imaginative expanses of space and time, scales so utterly beyond the human (e.g., kalpas of time or multiple, concurrently existing unenlightened worlds). Yet these large-scale conceptualizations are rendered meaningful—and powerful—through their “packing” to human scale. Could this thing we call “religion” even exist without the ability to double-scope blend? If the arts, literature, and Al Gore’s blue dot are possible only as a result of double-scope blending, then I would argue that this must also be true of religion.

What is in some ways more amazing to me is our apparent comfort in residing in these religious worlds, of our willingness to live and die in them—and for them. If double-scope blending is “a plausible model of the way that cognition behaves” (see Vera Tobin’s comment), then religious cognition cannot be exempt from this model. Yet if, for instance, religion and literature are both produced at least in part through a process of double-scope blending, what is the mechanism whereby religious worlds engender real, palpable actions in the world, in a way that literature does not? We might choose to die for the glory of God, but I know of no one who has chosen to die in the name of Great Expectations. How does double-scope blending lead us toward an answer to this question? Or, will we need to look elsewhere? One thought is that double-scope blending is rhetorically powerful in ways that human-scale only ways of thinking are not. Al Gore’s blue dot is rhetorically powerful, and may spur some on to environmental activism, in ways that an image of an endangered fish is not. At least with Gore’s blue dot, there is something majestic about the large scale packed down to human scale. Is there also something emotionally powerful here?

I am admittedly a relative newcomer to the literature on conceptual blending and other aspects of cognitive semantics. But the questions raised by cognitive science cannot be usefully ignored by religious studies. My hope is that we are at the start of a new field of “experimental” or “naturalized” religious studies that will have an impact similar to experimental philosophy on traditional philosophy.

Fox Harrell
August 20th, 2009 at 4:23 pm

Imaginative cognition processes, though often subtle and unnoticed, are astonishing. Dr. Mark Turner’s article conveys a sense of wonder at that fact, while highlighting the human ability to integrate concepts from quite different, even clashing frames (Turner, 2003). The results of this ability, he asserts, separates humans from other animals, highlighting essential aspects of the ontological nature of humanness:
our personal identities, the persona identities of others, psychological elements of the self and others, and a sense of the self and others in time. Personal identity is a central feat of human cognition. The fallout from this perspective is striking in at least two ways: (1) if our identities are largely imaginative, what are the implications for social scientists, humanists, and technologists grappling with the everyday lived reality of human identity categories (stereotypes, ideals, salient examples, etc.) (Lakoff, 1987), and (2) how can conceptual blending aid in elucidating the types of ideologies, social relationships, political configurations, and global conflicts that result in our everyday lived experience as humans?

In stating that "no nonhuman animal, for example, seems to be able to understand that other animals hold beliefs, or what those beliefs might be. No nonhuman animal seems to be able to wonder what its life might be like if it had done something different ten years ago...." the article begins with an implicit counterfactual. Just as Fauconnier and Turner assert that understanding the phrase "the beach is safe" arises in relation to the abstract frame for 'danger' (we must imagine an alternative beach perhaps with stingrays, reptiles, or jellyfish) (Fauconnier & Turner, 2002), in asserting that human cognition is different than animal cognition, we can truly only understand the former in light of a fictitious conceptualization of the latter. Through disanalogy, we are to think: animal epistemologies are not like our own — otherwise we would see animals with all of the human characteristics like the personal identities phenomena noted above, and more. And it is our cognitive apparatuses for integrating concepts, categorizing, etc., that allow us to envision Turner’s counterfactual regretful animal ten years down the line. This ability has political consequences, even involving animals. In highlighting their nonhumaness, we may invoke other abstract frames to understand animals: they can be construed as material resources, perhaps spurring some toward conceptualizing notions of conservation, while others toward mass production and consumption. Animals may be construed as symbolic, taken up in some cultures as characters in trickster tales, while in others as national symbols.

This takes us to the final point of this note. The implications of what the article describes as double-scope bending are cultural, ideological, and technical, the ability to see humans as special and distinct from animals relies on the same as the ability to see one group of humans as different from others. And there are similar political consequences. All of the social ills of stigma, and the phenomenon of celebrating multicultural and gender diversity, or the ability to view other humans as resources and to then exploit those resources, are all imaginative cognitive feats as well — albeit with dire consequences (Harrell, 2009; Santa Ana, 2002). Recognizing cognitive patterns on the basis of linguistic patterns, can help to reveal the imaginative quality of many of the categories that are reified in classification structures, institutional structures, and lived human experience of navigating them (Bowker & Star, 1999). If we see that substantial aspects of our personal identities and divisive human categories are not real in the world, but are instead cognitive feats, the implications are profound. We can construct newer, equitable, empowering, and equally well-grounded alternative conceptions of ourselves others, these new blends can also become socially entrenched. While we may be hardwired for some types of categorization, as the article’s discussion of the entrenchment of writing conceptual systems illustrates, culturally esteemed knowledge structures can be broadly disseminated in society.

A humanistic focus leads to a charge for conceptual blending theory. We can look at the imaginative construction of fundamental problems of human conflict, at the human condition (Turner, 2001). We can see if conceptual blending theory’s constructs such as vital relations, selective projection, double-scope networks, optimality principles, and compression render those problems more human scale and help us to better apprehend them (Fauconnier, 2000; Fauconnier & Turner, 2000). Given Dr. Turner’s argument for the immense power of our double-scope blending ability, one would hope that we could learn to avoid some of our more grave human (double-scoped) conflicts — billions of humans, more alike than different, fighting over subdivisions and privileges, on the pale fiery blue dot that is our home.


Frederik Stjernfelt
August 20th, 2009 at 4:45 pm

Two important observations stand out in Mark’s paper. An account for the special abilities of man as compared to higher animals is
meaningful distinction between the temporal structure of the world represented in the imagery and the temporal structure of the music itself. The represented world is quasi-abstract: the moving imagery doesn’t provide cues about a temporal structure inherent in that world. There is thus no representation of moving toward or away from anything. Motion just happens. It’s a world with form and dimensionality but no scale and no orientation.

But all the motion is synchronized with the music, from beats, to measures, to phrases, to the structure of the whole composition. Because the represented world is quasi-abstract, the moving imagery doesn’t provide cues about a temporal structure inherent in that world. There is thus no meaningful distinction between the temporal structure of the world represented in the imagery and the temporal structure of the music itself.

### Bill Benzon
August 20th, 2009 at 6:44 pm

This business of scale interests me a great deal. It is important in my work on music, which Per Aage Brandt was kind enough to mention. The central idea is that critical events in the nervous system happen on the same time scale(s) as critical events in musical sound thus making it possible to comprehend musical rhythm without having to represent it. This comprehension can take place through the entrainment of the neural process to the rhythms (in amplitude and frequency) in the stream of mechanical vibrations that is the music. This can be understood, so I argue, as a purely physical process. So, here’s a case where processes in the brain operate on the same scale as processes outside the brain (music, of course, is produced when the brain directs the muscles to do this and that as required).

Now let’s consider the case of Walt Disney’s Fantasia, a film created to provide visual interpretations of well-known pieces of Western art music. In particular, I’m interested in the first segment, based on Bach’s “Toccata and Fugue in D Minor” and the fourth, based on Stravinsky’s “The Rite of Spring.” As is the case with all the segments, the visual imagery is precisely synchronized to the music. The music itself provides the “human scale” of temporal action in the film.

The imagery for the first segment is of two kinds. For the opening toccata, which is in free time, we see silhouettes and colored shadows of the performing musicians. Let’s just set that aside. It’s the fugue imagery that interests me. This imagery is quasi-abstract. Much of it is just lines and colors and forms in motion. But here and there we see representational imagery, e.g. violin bows, highly stylized mountains, clouds. But the representational imagery is so decontextualized that we cannot attribute any particular scale to it; the only scale evoked by the non-representational imagery is that of the physical scale of the imagery itself. Further, while the imagery appears to exist in 3D space, that space does not have a well-defined structure. Things move in the space and the virtual camera moves as well, but there’s no sense of direction, of moving toward or away from anything. Motion just happens. It’s a world with form and dimensionality but no scale and no orientation.

But all the motion is synchronized with the music, from beats, to measures, to phrases, to the structure of the whole composition. Because the represented world is quasi-abstract, the moving imagery doesn’t provide cues about a temporal structure inherent in that world. There is thus no meaningful distinction between the temporal structure of the world represented in the imagery and the temporal structure of the music itself.
The fourth episode is quite different. Rather than using Stravinsky’s own program for the music, Disney provides one of his own, quite different from Stravinsky’s. He chose to represent events occurring in a span of time running from before the origins of life on earth through the extinction of the dinosaurs, all synchronized to roughly a half-hour of music. The visual objects on the screen now represent things in the natural world, and at a wide range of scales. The opening shots move through billions of miles of space; no human eye has ever been at a vantage point from which to see the Milky Way galaxy, which we see in the opening shot. A bit later we’re under water observing the actions of unicellular objects, objects that would be invisible to the naked eye. Most of the action, however, takes place at human scale: cataclysmic weather, dinosaurs moving about and, in the dramatic climax, fighting.

Temporality is complex. Of course there is the music itself, which is, by definition, at human scale. It lasts roughly 30 minutes, while the temporal span that is represented spans a billion or two years. Two techniques are used to “project” that vast span into the 30 minutes of music. My sense is that most of that temporal expanse is simply dropped from view. We get brief scenes of represented action that unfolds on the same scale as the music itself; these brief scenes are presented one after the other, but the instantaneous transitions from one scene to the next skip over unspecified but often quite large intervals of time. The other technique is simply to speed up events without actually dropping any out; this happens in the opening pan and zoom from a POV somewhere out in space to a POV just above the surface of a volcano-covered earth.

Somewhere more or less in the middle of this segment there is a short segment that’s different from the anything else. Every other image in the segment is to be taken more or less literally: had you been in the proper place at the proper time, this is what you could have seen. This short segment is not to be taken literally. It is a metaphor, or whatever.

It runs roughly 3 seconds or so; takes place under water; and shows a creature moving from lower left to upper right. The image we see is of human scale, but . . . At the beginning of the segment the creature is a fish swimming in open water; at the end of the segment the creature has four legs and is walking up an underwater bank. Then the virtual camera assumes a POV that’s just above the surface of the water and we see an amphibian of some sort break the surface. What’s going on?

In a different context one might think of the creature as a shape-shifter. But that interpretation is not available in this context. In the bit of narration that introduces “The Rite of Spring” we’re told: “Science, not art, wrote the scenario of this picture. . . . Finally, after about a billion years, certain fish, more ambitious than the rest, crawled up on land and became the first amphibians.” So, we’re asked to give the entire “Rite of Spring” a naturalistic interpretation. OK. But what naturalistic interpretation do we assign to this three-second sequence in which a fish changes into an amphibian? If you don’t know about biological evolution, you may have a problem producing a suitable interpretation.

If you do know about it, then one interpretation becomes obvious: We’re seeing the evolution of fish into amphibians. In this interpretation, millions of years of evolutionary time has been compressed into roughly three seconds of real time. And a complicated process involving genes, phenotypes, reproduction, and living-in-the-world has become projected onto the plastic deformation of an image moving along a certain trajectory on the screen.

I’ve not attempted to analyze this in terms of blending theory, but I suspect that one critical bit concerns self-identity. On the one had we have the identity that exists among the successive images of the moving creature. What we see on the screen is one object that changes form from one moment to the next, not a succession of different objects that happen lie along the same trajectory on the screen. Just how that identity happens, just how those different forms are fused into one object, that is to be accounted for through the processes of the perceptual system. We need to conceptualize that identity as a particular cognitive object, however, because it corresponds to a rather more abstract identity in the evolutionary process, namely the identity of the process with itself over the evolutionary time scale. The emergent blend of those two identities is very abstract indeed, but that does seem to be what this 3-second segment of film is bringing to awareness.

So, where are we?

In one case we have imagery set to the fugue section of Bach’s “Tocatta and Fugue in D Minor.” Because that imagery is quasi-abstract it lacks any meaningful scale other than the physical scale of the images themselves. The temporal scale is that of the music itself. In the other case we have extensive representational imagery set to Stravinsky’s “The Rite of Spring.” Because that imagery is representational it evokes the spatial and temporal scales appropriate to the world being represented. In some cases those scales are commensurate with those of the sound and the images themselves while in other cases the scales are disparate. That scale information is somehow encoded in the image schemas and the semantic and episodic memory systems where that world knowledge is encoded. As that world knowledge is summoned into mental spaces by the film’s unfolding imagery, the scale information will either match or fail to match perceived physical scale of the imagery and music itself.

And then we have the special case of that 3-second evolution segment, where an interpretive mismatch between a piece of human-scale imagery and the overall interpretive frame forces a conceptual blend the evokes a body of knowledge – evolutionary theory – that is otherwise irrelevant. This is a very sophisticated conceptual trick, and one of a kind well-suited for analysis through blending theory.

And that’s what I find most interesting about the blending model, its use in the close analysis of a particular example.
I'm somewhat more skeptical about the broad claims for “vast conceptual integration networks” that Turner invokes in his discussion of Al Gore’s pale blue dot. It’s not that I doubt the existence of vast networks of conceptual knowledge, not at all. But it’s not clear to me what blending theory says about how they work. In particular, it seems to me that blending theory is rather opaque on the distinction between what happens “on-line” within mental spaces (taken as time-limited constructs) and what exists “off-line” in the more or less permanent structures of the mind. Most of the networked vastness is in those off-line structures fragments of which are “written in” to on-line mental spaces only as needed. Much of the integration is encoded off-line as well.

The nature of those off-line structures is both taken for granted and unexamined in conceptual blending theory. This complaint seems rather similar to Tim Rohrer’s complaint that “conceptual integration theory doesn’t yet have a well worked out theory of how embodied sensorimotor mechanisms are projected into or provide the basis for the mental simulations that underlie conceptual integrations.” It thus seems to me that blending theory is in a situation a bit like that of the cartoon character who walks off the edge of a cliff and keeps on going, walking on nothing but air. What happens when you look down?

---

**References**


In early days, I described blending theory as embryonic. By now, hundreds of people have participated in its development. The commentators in this Forum have suggested further lines of development. It would be an excellent outcome of the Forum if the research community would take up some of these suggestions.

Johnson hits the nail on the head in describing conceptual integration theory as, among other things, an attempt to account for our capacity for abstract thought “without presupposing separate systems allegedly unrelated to our bodily engagement with our environment.” Stjernfelt agrees with the need for an account of abstraction. Danesi reminds us that other thinkers, such as Vico, sought to account for such human mental singularity and, in doing so, offered ideas potentially useful to blending theory. Booth shows us compelling poetic blends and makes the case for poetry as an intensification of imaginative life, in which compressed blends take form. Freeman observes that, in conceptual integration theory, there is every reason to view the arts as having a primary place in the descent of cognitively modern human beings. Yes: art is a great flowering of our species-wide ability for double-scope blending and demonstrates the ways in which advanced blending abilities have endowed us with the capacity to evolve culturally, in cultural time rather than evolutionary time. Human mental operations seem not to have evolved significantly during the last fifty, sixty, seventy thousand years or so, but during that time most of what we regard as marking our humanity has been invented, art often leading the way. Ferynhough indicates the need for better understanding of the ontogenetic development of double-scope ability and remarks that he doubts that I want to strike a nativist note in saying “every human child is born a genius.” “Born a genius?” asks Ferynhough. “Probably so. But I think our best chance of understanding how double-scope blending is possible is to look at how children develop in the first three years or so of life—how those innate endowments are stretched, enhanced, and thoroughly reconfigured by experience out here in the world.” The child is born a genius in entering life with the capacity for advanced blending, but not yet its cultural products. The child deploys the capacity; culture stands ready to feed the child, interactively, the particular conceptual integration networks it has developed. Conceptual integration networks build up—it’s blends all the way down. Often, as in learning numbers, building advanced blends depends upon building others first, with one blend serving as an input to a later blend. The child needs time to progress through such developmental suites. Pavel remarks, correctly, that it would be unfortunate—as we delve into the way we think—to dismiss everyday understanding of the mind as negligible. “Folk psychology,” sometimes called “commonsense psychology,” is a term of art in cognitive science. It refers to our understanding of human beings as having beliefs, desires, and goals. Perhaps a different term would be better. While there are cognitive scientists and philosophers, such as Paul Churchland, who do argue that folk psychology is profoundly mistaken, folk psychology is already an amazing conceptual achievement—one restricted to human beings, and highly dependent upon double-scope blending in the conceiving of other minds and even one’s own mind. At present, there is no consensus on how to cash folk psychology out into other more sophisticated scientific explanations. Both Herman and Pleshakova, in supplementary ways, emphasize the importance of networks as niches. Because human beings are able to do double-scope integration, they are able to create culture—concepts, artefacts, and behaviors that are not species-wide and not simply induced by variable environmental features but rather conceived in cultural time in certain communities and transmitted to others in the community, chiefly descendents, in ways that can be sustained and developed rapidly even though the earlier members of the community die off. Human beings create and transform robust cultural niches at lightning speed. This is a human singularity: for other species, if there is any culture in this sense at all, it is extremely sparse, fragile, and narrowly tied to basic mental scaffolding. When we cannot get a sure footing with each other mentally, it is not because we do not share the same basic mental operations, but because we do not share all the necessary cultural networks. Luckily, since we are all double-scopers, there is hope even late in life of acquiring cross-niche understanding, by blending. Herman additionally and importantly emphasizes the way in which human thought about the here-and-now involves elaborate conceptual integration networks. Deal is eloquent in discussing the ways in which blending theory and its analysis of conceptual packing and unpacking offer instruments for analyzing conceptual networks in religion. Harrell makes a crucial observation about future research on such cultural networks and niches: if our identities are imaginative, the result of conceptual blending, then blending theory could presumably help “elucidate the types of ideologies, social relationships, political configurations, and global conflicts that result in our everyday lived experience as humans.” I am particularly grateful for his observation that in imagining the minds of nonhuman animals, we rely on counterfactuality and disanalogy: conceiving of those minds always involves a conceptual integration network that has as one of its inputs our conception of our own mind, with vital relations of counterfactuality and disanalogy helping to structure the network.

Harrell’s proposal to use blending theory to analyze our understanding of identities of other people, other animals, and machines is attractive. Stjernfelt offers a perceptive reminder that the study of double-scope blending must be carried out simultaneously within the frame of human singularity and within the frame of evolutionary descent, and that these two frames are only superficially at odds. The capacity for double-scope blending seems to be species-wide. Its emergence was a fully evolutionary event. That it provided us with the mental capacity for extraordinary discontinuity with other species does not make it any less evolutionary. Stjernfelt also emphasizes that double-scope blending, to be possible, must rely upon a great range of animal capacities that lie in our line of descent. That is a fundamental point: human singularity—in this case, the capacity for double-scope blending—is a small extra step following two billion years of evolutionary descent. But what a difference that small step makes: it gives us the ability to develop robust and inventive conceptual worlds in cultural time, and this is the source of our discontinuity with other species.

Cienki points out a rich area for the study of blending, one that has developed impressively in the last several years—co-speech gesture: "One thing I find fascinating is how not only cultural artefacts (writing, clocks, and other examples discussed in Fauconnier and Turner 2002) reflect
conceptual integrations which we employ when we use them, but we ourselves are visibly performing blends any time we use spoken or signed languages.” His survey of the current work on gesture, sign, and blending is an invaluable small introduction. I recommend co-speech gesture as a laboratory to any interested student in cognitive science seeking an area of specialization. It provides many potential dissertation topics—free to a good home.

The commentators raised several topics often discussed in blending theory, and it is good to see them again in the Forum. I comment on a few of them here.

Other animals, “specialness,” hubris, teleology (Rohrer, Herman, and others). When I teach and lecture, I often include riffs about the amazing abilities of other animals. I am frequently cast in the role at conferences and on panels of reminding participants of how weak we are in various ways, mentally, compared to other species and how we simply lack some of their abilities. I explain how, even for mental abilities at which we are superb, we lie on a gradient with other animals, not in a separate galaxy. My sole use of the word “special” in the target article was in my caricature of the cliché objection, “Are we really so special?” “Different” is a better word. The word used in the National Humanities Center initiative underlying On the Human is “singularity,” and that’s the best word, I think, except that it is a technical term. Different people may like different vocabulary, but the facts are not controversial. We have extremely robust culture; cultural evolution is much faster than biological evolution; we are immensely creative in the sense that we invent new concepts and activities that are not species-wide; we conceive over vast scope. These are facts. Blending theory has been explicit from the beginning in reminding audiences that discussion about higher-order human singularities seems to elicit teleological misconceptions about our evolutionary status, and even triumphal misconceptions, dressed up in purple prose, but that these misconceptions must be stopped on the beaches. The capacity for double-scope blending is an evolutionary development. It seems to have been adaptive. Blending theory rejects any triumphal or teleological framing. Indeed, there are many who think that the evolutionary experiment that produced cognitively modern human beings—probably not even a hundred thousand years ago, a blink of the eye in evolutionary time—is doomed to crash and burn, not only for us, but with considerable collateral damage for other species.

The question here is not triumph or teleology but rather our singularities, and it is important to remember that researching human singularities presents special technical challenges, some of which have to do with the place of other animals in comparative research. We are often willing to take drugs because they have been tested on animals. Our reasoning depends upon our belief that, for the relevant systems, the test animals have biology analogous to ours. No doubt, throughout the scientific study of human beings, it is good to look for robust “animal models.” But it is crucial to remember that for higher-order human cognition—art, religion, grammar, mathematical insight, creativity, scientific inquiry, etc.—there are no robust animal models. Beavers, border collies, and barn owls do amazing things, things important to understand, but they do not present us with models for human singularities. All animals exist in networked ecologies in which their actions have long-range consequences, simply in virtue of their having metabolism, reproduction, and local habitation. The beaver’s dam-building is only a particularly visible and memorable instance of such ecological consequentiality. But there isn’t any evidence, for example, that beavers think about and design those extensive and cross-generational networks of consequentiality, or are aware of them mentally as networks, and it’s indisputable that they do not conceive, contemplate, plan, and install inventively different networks in cultural time. We do not have all the abilities that other animals have, and the networks that nonhuman animals inhabit are not fully or even in some cases largely available to our human abilities, but those animals do not have human higher-order cognition. Cats are a great animal model for studying human vision, but they don’t paint, and they don’t think at network scale. We do indeed blow entirely past other animals on the scope of thought.

Neurobiological substrate (Brandt, Benzon, Rohrer). One string of responses to commentaries asks about the neurobiological substrate of blending. I have previously published some stretch speculations about that substrate: (1) Antonio Damasio, in Descartes’ Error, puts forward the notion of “broker neurons,” which might connect up what we think of as disparate neuronal groups subdending clashing conceptual arrays. (2) What is now referred to as the “mirror-neuron craze” has naturally led to notions that mirror neurons (and maybe canonical neurons) subdend blends of self and other. (3) Conceptual integration could be a hypertrophy of perceptual integration: the neural mechanisms of perceptual integration might have been recruited and expanded by biological evolution, resulting in a computational ability that made double-scope blending possible. Perceptual integration, called the “binding problem,” is perhaps the major open scientific question in neuroscience. (4) Synaesthesia, or more generally cross-wiring, could provide neurobiology useful for blending. V. S. Ramachandran, Edward Hubbard, and others have worked on the neurobiology of synaesthesia and considered its contribution to conceptual integrations involving metaporphic links. Stephen Mithen, in The Prehistory of the Mind, has also considered cross-wiring. Synaesthesia is a kind of neural binding in restricted domains. Perhaps it could have evolved into an ability that is not restricted to particular conceptual domains. (5) There are other restricted-domain abilities that look as if they involve integration, such as chase play, a kind of simulation of aggression, which evidently is common throughout the mammalian world for species involved in predation. During chase play, parent and offspring simultaneously activate motor patterns, attention patterns, and motivational structures that belong to two clashing domains, such as parent-offspring and predator-prey. Maybe the neural circuitry subdending binding, synaesthesia, or special-purpose blending of the sort we find in chase play got the ball rolling in the run-up to full cognitive modernity.

Behind the comments about the neurobiological substrate seems to lie an assumption that I do not share, namely that our technology for brain imaging is even remotely close to allowing us to detect double-scope blending as such. I love brain imaging: I am spending this year as part of a three-co-PI team designing and running a set of behavioral experiments, and the entire team has worked hard to force the experiments to conform to the practical limitations on ERP and the extremely severe limitations on fMRI (functional Magnetic Resonance Imaging). We will be running some of those fMRI experiments through the Center for Neuroeconomic Studies. Naturally, we will do what we can, and hope springs
eternal. But it’s best in cognitive science not to be carried away with enthusiasm about the latest methods. Non-invasive brain imaging on neurotypicals is only a couple of decades old, and extremely crude. What would we need in the way of brain imaging to be able to detect blending as opposed to other neuronal activity? Consider that blending appears to operate throughout all conceptual domains, and constantly. I take it that very few of the brain’s blending attempts ever advance past the initial stage, very few of those actually conform to the constitutive or optimality principles, very few of those have effect on thought, very few of those have access to action, and only the tiniest fraction are ever accessible to consciousness. The very seductive fMRI images we see in grant proposals are seductive partly because most readers are unaware of how they are produced. They are crude measures of the paramagnetism of relatively deoxygenated hemoglobin. fMRI is a BOLD response. BOLD stands for “Blood-oxygen-level dependent.” Two of the scientists who helped develop MRI were awarded the Nobel Prize, and it’s fantastic for detecting what part of the shoulder the weekend warrior blew out lunging for the tennis ball. But when applied to the brain, it’s still a measure of blood flow, not neuronal activity. It has low signal-to-noise ratios. The results presented in those colored images derive from many repetitions and then statistical averaging and smoothing, often involving wholesale subtraction. There are claims that fMRI correlates better with input than output. At present, fMRI has many exceptionally severe limitations and uncertainties. If we ask, “where does conceptual integration happen in the parts of the neocortex in which fMRI can detect activity?”, the off-the-cuff guess would be “everywhere.” And if we ask, “when does conceptual integration happen in the parts of neocortex in which fMRI can detect activity?”, the off-the-cuff guess would be “all the time.” It is difficult to see, then, how current fMRI techniques could offer any insight into conceptual blending.

Rohrer is on the right track, I expect, in calling for advances in cognitive neurophysiology rather than cognitive neuroanatomy. The neurophysiological processes will be very important; it’s not yet clear to what extent techniques of anatomical localization, even better ones, could help. To be sure, I was delighted when fMRI was developed; it is a useful addition to the arsenal of indirect approaches to mental activity; and we all hope that new and better methods will be invented all the time. In particular, ecologically valid fMRI would be brilliant—measurements taken when people are vibrant in ecologically valid activity, rather than still, silent, alone, supine in a claustrophobic tube, following a white-room experimental protocol, often restrained by soft pads and biting a bar to eliminate motion—but it isn’t easy to be optimistic that new kinds of brain imaging will give us insight into the neuronal substrate of blending any time in the next few decades.

Plus ça change, plus c’est la même chose: When I was studying neurobiology as an undergraduate, back in the early 1970s, the attitude seemed to be that if we learned enough about the plumbing, somehow a theory of thought would precipitate. So we studied ion pumps, myelination, thresholds, and axonal spikes, not to mention neuroanatomy, but never anything like invention, consciousness, the conception of personal identity, the understanding of other minds, or even language. Of course, theory of thought did not easily precipitate from this nuts-and-bolts research, and the vanguard of cognitive neuroscience turned to theorists of mind to learn what neuroscientists should be looking for in all those nuts and bolts. So far, the contributions have been mostly asymmetric, from theory of mental activity (like language) to neuroscience. What would be most welcome would be an avenue along which neuroscience could contribute to the development of blending theory and to specifying the neurobiological evolution that made it possible.

Rohrer writes, “So it might be true that human beings have evolved to be unique in the capacity for double-scope conceptual integration, but if so I want to know how and why primate, dolphin, and other mammalian brains and social structures are not capable of supporting and fostering such integrations, and I want to have a clear story from comparative neurophysiology about how the tree of life yields first something like image schemas, then something like single-scope blends, then full scale double-scope blends.” That would be great, if it exists. But this call reminds me of a passage from Henry IV, Part One:

Glendower: I can call spirits from the vasty deep.
Hotspur: Why, so can I, or so can any man;
But will they come when you do call for them?

Not having the necessary neuroscience, the effective monitoring techniques, or a time machine, it’s not clear yet how we could call such vasty spirits from the evolutionary depths, or even, if we could, what that knowledge would tell us about the operation of conceptual blending.

Explanation and prediction (Cánovas, Rohrer, Brandt, Tobin). The literature in philosophy of science on the nature of explanation and prediction is vast. It is impossible here to say more than a few words. (But see Fauconnier, Gilles, “Methods and Generalizations, in T. Janssen and G. Redeker, editors, Cognitive Linguistics: Foundations, Scope and Methodology. The Hague: Mouton De Gruyter, 1999, pages 95-127.)

The central method of scientific explanation is generalization over data: theory—in the form of efficient generalizations—is put forward and is then tested for its broad application to data that were not part of the set used to conceive of the theory. Newton’s laws of motion, for example, fit this characterization of theory, explanation, and prediction. Conceptual integration theory also fits this characterization. For example, in “Rethinking Metaphor,” Fauconnier and I make assertions derived from blending theory, that for the relevant (very large) communities, there is an extensive conceptual integration network for understanding time, and that it contains certain smaller conceptual integration networks organized by certain vital relations, projections, and compressions following the lines of the principles of blending that our theory lays out. We assert that our set of generalizations applies very broadly, efficiently, and usefully to the data. We assert that this theory captures great ranges of conceptions, expressions, and actions by human beings, and that it is a basis for understanding each other, and that human beings will continue to use it in the future very widely for conceptions, expressions, actions, and understandings. We also show that for large categories of
these conceptions and expressions, rival theories that do not include blending (e.g., basic metaphor theory for TIME IS SPACE) fail to capture the kinds of data that we have captured. Our theory offers scientific generalizations that are broader and more integrated and that make better predictions over the data. Our theory is better, where better and worse are to be judged according to the standard expectations of application to data. I offered an analogous demonstration in the chapter on “Analogy” in Cognitive Dimensions of Social Science, in which I asserted that for analogy theories that do not include blending, even the examples adduced as the best support for the theories will fail to capture central inferences, and I showed, I believe, that this is true, by taking seriatim any major chestnut examples I could find that analogy theorists had used to support their theories, and showing their inadequacies. This is how science works. Of course, blending is not algorithmic or deterministic. Given that theory must preserve phenomena, a theory that proposes to make algorithmic or deterministic predictions of blending should be shunned.

In the time since Fauconnier and I published The Way We Think, many of the types of conceptual integration networks we put forward—and indeed many of the specific blends—have shown up repeatedly in data that did not even exist at the time. Scientific theory of this sort generalizes but is not reductive in the sense of eliminating one level of phenomena by redescribing it in another—Newton’s laws of motion, for example, do not attempt to reduce motion to some underlying substrate that is not motion. In cognitive science, there are explicit attempts at reduction, such as eliminative materialism. The debate over the wisdom or meaning of such reduction is extensive. Just for starters, although we are all keenly interested in the neurobiological substrate of cognition, it is not clear that finding such substrates constitutes either reduction or explanation. We know, for example, a great deal about the electrochemistry of neurons, but that does not mean that we understand the role of the neuron in thought. It would a splendid advance in scientific knowledge to discover neurophysiology widely underlying blending—indeed, perhaps science has already discovered much of it, but doesn’t understand how that neurophysiology makes blending possible—but it is not clear that this wonderful new knowledge would at present give us insight into the nuanced operations of blending. Maybe, maybe not.

The Human Condition (Pavel, Freeman). Blending theory is not triumphal. It’s easy when reviewing art, poetry, complex numbers, and institutions for decision-making, law, and politics to wax rhapsodic. But human beings seem to suffer greatly from the mental arrays they can construct. They also feel responsibilities, frustrations, and ambitions that are possible only because of the scope of human thought. “Who has twisted us like this?” asks Rilke. “Wer hat uns also umgedreht?”

... the shrewd animals
notice that we’re not very much at home
in the world we’ve expounded.
und die findigen Tiere merken es schon,
daß wir nich sehr verläßlich zu Haus sind
in der gedeuteten Welt.

No person, thing, idiosyncratic culture, or local event has twisted us like this, but rather our common phylogenetic development for a mental capacity that brings unprecedented power but no guarantee of pleasure—double-scope blending. Even as it brings the capacity for a sense of responsibility and purpose, guilt and redemption, meaning and value, it also brings a capacity for deliberating over what to do, what to be, how to behave. Pavel emphasizes that we want human life to be not only feasible, but also worth living. “... our bio-psychological endowment generates a specifically human ability to live not just according to needs but also to norms and ideals. This ability allows us to decide what kind of leadership we want, discriminate between the various ideals we can pursue, and adhere to the norms that govern our actions. I am convinced that Turner’s notion of double-scope blending deserves to be expanded and adapted to a more vivid sense of human nature. It would help explain how we, human beings, are capable to make the difference between right and wrong, justice and oppression, worthy and unworthy goals.” Freeman equally emphasizes the way in which double-scope blending makes possible systems like the arts, which are “crucial and necessary for all human beings to fully realize the possible scope of human cognition within our own individual consciousnesses.” The human condition is not simple: evolution did not so much make us human as provide us with the mental abilities we need to make ourselves human, an on-going and dynamic process, with hope and uncertainty stretching over the vast scope of human thought.

Gary Comstock
August 26th, 2009 at 1:10 pm
Regretting to see this intriguing conversation end, we cordially invite you to rejoin it in our Facebook group,

Per Aage Brandt
August 18th, 2009 at 1:13 am
Mental space theory and blending theory are just descriptive modeling devices for semantic phenomena and of course do not
explain how abstraction comes about; as all other semantic theories, they are dualistic, and have to stay dualistic, in the sense of admitting a
categorical difference between mental content and neural wiring, until the relation between phenomenology and neurology has been elucidated.
That we are using ‘human scale’ representations for out-of-human-scale phenomena is not going to let us believe that we have understood
abstraction. Embodiment does not so far explain the phenomenology-neurology relation: how do neurons do meaning. So far, just hand waving
and anti-cartesianism. In current research on music and cognition the most interesting suggestion as to the origina of abstraction is in the
specifically human capacity to attune intersubjectively to rhythm – sharing temporal structures that thereby become ‘abstract’ like notes and
melodic soundbites (proper names included). William Benzon: Beethoven’s Anvil, 2001, is a fine contribution from this angle.
There is nothing wrong with dualism, by the way, as long as monism fails to grasp the problems.

I've been having some intellectual difficulties with Turner and Fauconnier’s notion of conceptual integration ever since they advanced a theory of
its interaction with evolution and sociobiology in The Way We Think. My reservations center less around the jump between conceptual
integration theory as descriptive phenomenology and the science of the neural embodiment per se that I see that Per Aage Brandt and others
have raised, particularly when what emerges is another chapter in the incessant monism v. dualism debate. I actually think that as a real-time
theory of cognition, conceptual integration theory is a plausible high-level account of mental simulation.

Instead, I am more concerned that this emphasis on the “specialness” of human cognition (and proffering conceptual integration theory as
“specialness” par excellence) implies a teleological (and not stochastic) understanding of evolution and its selection mechanisms. By contrast, I
think we need to examine more closely the continuity of human cognition with animal cognition–and in my mind this is why it is a serious
problem that conceptual integration theory doesn’t yet have a well worked out theory of how embodied sensorimotor mechanisms are projected
into or provide the basis for the mental simulations that underlie conceptual integrations. To make such claims carry evolutionary weight, we will
need to look at differences in (for example) the neural arbor growth patterns both across time in a single individual, across the species, and
across different species using comparative neurophysiological methods— all the while remembering that the environments and practical problems
different species are afforded vary.

Right now, I think we have a better evolutionary cross-neurophysiological story about how image schemas evolved and work than a story about
how conceptual integration works. For example, Donald Knudsen’s research team has put “glasses” on juvenile v. adult barn owls and then
tracked not only the behavioral components (e.g. successful striking the target) across time, but also examined the resulting neural arbor
differences in the visual striate cortex. The behavioral component suggests that young juvenile owls can learn to hunt accurately both with and
without their spectacles, while older juvenile and adult owls cannot. Their neuroanatomical studies showed overlapping “dual” neural
arborizations in the visual striate cortex of the young juvenile owls, suggesting to me that owls have something like a neurally embodied source-
path-goal image schema that feeds information from the visual system forward for integration with motor action.

When I compared Knudsen’s findings with other neuroanatomical and neuroimaging studies on primates and humans in my chapter on “Image
Schemas in the Brain”, it was clear that primates and humans have evolved similar but even more malleable abilities for dynamic neural
reorganization—one major difference being that the “dual” or multiple neural arborizations seem to either be latent or grow through the organism’s
entire life. I’d like to be able generalize from such evidence as to how conceptual integration might tap into these multiple neural arborizations,
but I can’t—yet. I have high hopes that we will be able to do this in the future; but when we do I think we will be showing that yet another
supposedly unique human trait isn’t quite as unique as we once believed.

So it might be true that human beings have evolved to be unique in the capacity for double-scope conceptual integration, but if so I want to
know how and why primate, dolphin, and other mammalian brains and social structures are not capable of supporting and fostering such
integrations, and I want to have a clear story from comparative neurophysiology about how the tree of life yields first something like image
schemas, then something like single-scope blends, then full scale double-scope blends.

I began this comment on a cosmic scale; I’d like to end it on an evolutionary time scale. In Galapagos, Kurt Vonnegut’s futuristic narrator is a
member of a new species that is descended from homo sapiens, who is struggling to tell the story of how our species died out due to the fact
that our “big brains” were ultimately not a successful adaption—they led to poisoning the planet, climate change, etc. So forgive me if the part of
me that is a humanist as well as a scientist thinks that there’s a bit of hubris in Mark Turner’s views that double-scope conceptual integration
networks are what make humans so “different.” Taken at an this vast time scale, and even if it is true that this capability is part or much of what
makes us uniquely human, Vonnegut reminds us not only that we may one day evolve into something else but that we humans are always
evolutionarily continuous with the animal kingdom. In other words, we ain’t so special after all.
Embodyment does not so far explain the phenomenology-neurology relation: how do neurons do meaning.

Yes.

It seems to me that we’ve got two notions of embodiment. On the one hand cognitive linguistics offers mechanisms (cognitive metaphor and conceptual blending) for grounding abstract concepts in concrete physical situations. But, as you say, these are descriptive modeling devices which do not themselves speak to neural embodiment, which is about how any concept or perception, concrete or abstract, is implemented in neural tissue. That’s a different issue and, if anything, rather more mysterious.

With respect to the neural embodiment of language, Syd Lamb has perhaps the most sustained conceptual effort going and, while I certainly have reservations about it, I do think it worth considering.

Further, some years ago David Hays and I published a rather speculative paper on the neural substrate of metaphor. At the time either conceptual blending had not been hatched, or Hays and I knew nothing about it. If we had, we might have framed our argument as being a proposal for a neural mechanism for a two-input conceptual blend, as our proposal is about meaning that emerges from a temporal construct (like interacting mental spaces). That paper thus takes a step in the direction of neural embodiment.

Mental space theory and blending theory are just descriptive modeling devices for semantic phenomena and of course do not explain how abstraction comes about (at least in the sense of “how do neurons do meaning”).

This point deserves repeating.

It’s all too easy to confuse descriptions with explanations, and to feel that we’ve explained what human cognition is made of as soon as we’ve built a plausible model of the way that cognition behaves. This is a real danger, I think, for those of us who are trying to learn something about “the way we think” by looking at the way we talk, write, build, and behave.

Still, descriptive models of semantic phenomena can be relevant to the more elusive questions of how meaning and conceptualization arise from neural activity.

The notion that the human capacity for abstract thought arises crucially from an ability to compress diffuse experience to “human scale” is compelling and suggestive. The human-scale claim by itself, as Per Aage Brandt observes, doesn’t get us very close to a neurally embodied theory of meaning. Blending theory lives entirely on the level of describing mental content, though it tries at least to be neurally plausible in doing so. But insightful generalizations about how our thoughts manifest can, I hope, inform our investigations into how these manifestations come about.

What blending theory, done well, can do is to provide a systematic account of regularities and generalities in the kinds of compressions that show up again and again in language and other reflections of our semantic experience. If the theory is right, then we have some new angles to investigate. “How do humans do abstraction?” is not a very neuroscientifically tractable question as it stands. Part of what’s so tantalizing about the descriptive models, I think, is the prospect of generating more specific, well motivated “how” questions to ask instead.

Whoops! Here’s the metaphor paper that Hays and I wrote.