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## **Rethinking Metaphor**

### 1) CONCEPTUAL MAPPINGS

The study of conceptual mappings, including metaphoric mappings, has produced great insights over the last several decades, not only for the study of language, but also for the study of such subjects as scientific discovery, design, mathematical thinking, and computer interfaces. This tradition of inquiry is fulfilling its promises, with new findings and new applications all the time. Looking for conceptual mappings and their properties proves to be a rich method for discovery.<sup>1</sup> To the initial studies that focused on cross-domain mappings and their most visible products have now been added many additional dimensions. Detailed studies have been carried out on topics such as compression, integration networks, and the principles and constraints that govern them.<sup>2</sup>

This blooming field of research has as one consequence the rethinking of metaphor. We

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<sup>1</sup> Lakoff and Johnson (1999), Coulson and Oakley (2000, 2005), Gentner, Holyoak, and Kokinov (2001), Hofstadter (1995).

<sup>2</sup> <http://blending.stanford.edu>, Fauconnier and Turner (2002), Coulson (2001).

have a richer and deeper understanding of the processes underlying metaphor than we did previously. In this article, we will illustrate the central areas of theoretical advance by looking in some detail at the often studied metaphor of TIME AS SPACE. The points we shall emphasize are the following:

- Integration networks. Conceptual products are never the result of a single mapping. What we have come to call "conceptual metaphors," like TIME IS MONEY or TIME IS SPACE, turn out to be mental constructions involving many spaces and many mappings in elaborate integration networks constructed by means of overarching general principles. These integration networks are far richer than the bundles of pairwise bindings considered in recent theories of metaphor.

- Cobbling and sculpting. Such integration networks are never built entirely on the fly nor are they pre-existing conventional structures. Integration networks underlying thought and action are always a mix. On the one hand, cultures build networks over long periods of time that get transmitted over generations. Techniques for building particular networks are also transmitted. People are capable of innovating in any particular context. The result is integration networks consisting of conventional parts, conventionally-structured parts, and novel mappings and compressions. This very general point is illustrated in section 5 of our paper, with the passage "Emily's diary."

- Compression. A remarkable conclusion of recent work which was overlooked by both early metaphor theory and early blending theory is that integration networks achieve systematic compressions. The ability to use standard techniques and patterns of compression and decompression enables us to work at once over elaborate integration networks. For example, a cause-effect relation connecting different mental spaces in the network may be compressed into a representation relation or an identity relation within the integration network. Well-known examples often discussed in the blending literature include *The Grim Reaper*, *Digging one's own*

*grave, Clinton and the Titanic*.<sup>3</sup> For TIME AS SPACE, watches, clocks, and other time-telling devices anchor *timepiece* blends with powerful built-in compressions.

- Inference. Inference transfer is not in itself the driving force behind metaphor. In fact, it is typical for "source-domain" inferences to be violated in the emergent blended space. This is because topologies in the multiple inputs may clash, so that not everything will project to the blended spaces.

- Emergent structure. The focus on single mapping and inference transfer in early metaphor theory left out many of the powers of integration networks, in particular the ability to develop emergent structure based on pre-existing conceptual structures and to achieve compressions across them. In fact, as we shall see below, the metaphorical mappings that seem most fundamental and observable, such as SPACE → TIME, can themselves be emergent in elaborate networks with successive blending.

- Various species of conceptual integration. What were previously regarded as separate phenomena and even separate mental operations—counterfactuals, framings, categorizations, metonymies, metaphors, etc.—are consequences of the same basic human ability for double-scope blending. More specifically, these phenomena are all the product of integration networks under the same general principles and overarching goals. They are separable neither in theory nor in practice: the majority of cases involve more than one kind of integration. The resulting products can belong simultaneously to any (or none) of the surface types "metaphors," "counterfactuals," "analogies," "framings," "categorizations," or "metonymies." The networks discussed below for the conception of time are a case in point. As shown below they yield

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<sup>3</sup> Fauconnier & Turner (2002, pp. 131-135), Coulson (2001)

surface metaphors, counterfactuals, metonymies, and frames.

## 2) TIME IS SPACE, AND THEN SOME

To illustrate how metaphor has been rethought within the broader perspective of integration networks and compression, we will revisit the classic metaphor of time as space, and show in some detail that much of what is going on in this metaphor has gone unnoticed and therefore unexplained.<sup>4</sup>

Time as space is a deep metaphor for all human beings. It is common across cultures, psychologically real, productive, and profoundly entrenched in thought and language.

Once recognized, the mapping seems non-problematic: the ordering of space is projected to the ordering of time, and inferences are obtained straightforwardly for the source domain and projected to the target domain. As established by metaphor theory, the new conceptualization of

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<sup>4</sup> Evans (2003) provides an insightful discussion of the conceptualisation of time as revealed through linguistic usage and points out many difficulties for Lakoff and Johnson's conceptual metaphor theory and Grady's (1997) approach in terms of primary metaphors. He proposes an approach in terms of multiple cognitive models which we believe does not capture the deeper unity of the phenomenon, explored in the present article. Núñez and Sweetser (in press) provide important (non-linguistic) evidence based on gesture in Aymara for space-time conceptual mappings and aspects of their cultural variation. Moore (to appear) emphasizes that temporal metaphor can be perspective-specific or perspective-neutral.

the domain of time is obtained through projection from space. For example, the fact that time is measurable and stable - inferences for which we do not have independent evidence - comes from the domain of space.<sup>5</sup>

But metaphors, this one included, involve more than mappings or bindings between two spaces. They involve many spaces, and they involve emergent structure in the network. The apparently unproblematic mapping by itself will not account for the complex emergent structure of the network and the data that express it.

To see this, let us start by looking informally at the full emergent structure that comes with this metaphor. Consider the following examples:

1. Three hours went by, and then he had dinner.
2. \*Three feet went by, and he was at the door.
3. Minutes are quick but hours are slow.
4. \*Inches go by faster than feet.
5. Those three hours went by slowly for me, but the same three hours went by quickly for him.
6. For me, the hours were minutes but for her the minutes were hours.
7. At the end of the three hours, you will have solved the problem, but at the end of the same three hours, he will have solved it and five more.
8. Time came to a halt.
9. Sure, it's Friday afternoon, but Monday morning is already staring us in the face.

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<sup>5</sup> *Philosophy in the Flesh*, pp. 139-161

10. Next week was an eternity away.
11. For me, the three hours were forever, but for her, they did not exist.
12. It'll go by faster if you stop thinking about it.
13. Our wedding was just yesterday.
14. Where have all those years disappeared?
15. Next week was an eternity away.
16. I didn't see those years go by.

Example 1 shows that we have not merely projected units of measurement onto time, but also turned those units into moving objects. This does not come from projecting units of measurement onto time. In the domain of space, a unit of measurement is not a moving object. These are incompatible sorts of elements. But in the blend, we project onto a temporal experience both unit of measurement *and* moving object from the domain of space. Incompatible elements in the domain for space are thus fused to identity for time in the blend. The notion of hours as simultaneously moving objects and units of measurement is emergent in the blended space.

Example 3 shows two things: that the emergent, moving temporal units have speed *and* that some have greater speed than others. But how could this be? The constituent parts of a moving object in space must all move at the same speed. Hours are composed of minutes. A straightforward “metaphoric” projection would require that minutes, hours, centuries, eons would all have the same speed. What has happened is that uncoupled objects that move at different speeds in space are projected onto constituent parts of a temporal interval in the blend.

There is a paradox in the standard metaphor analysis of time as space in having a source domain of moving objects that includes speed, since speed already seems to require time. This paradox is resolved in the standard analysis by assuming that motion is uniform, so that speed is irrelevant. But as we see, speed is relevant in the emergent conception of time. In fact, example 5

shows that not only can speed be different for different moving objects, but the same moving object can have different speeds. This is because we are also projecting to the temporal units in the blend our subjective experience of time and events. In our subjective, conscious experience, we have no reliable measure of time, but we do have strong feelings about the pace of events. In the blended structure, a "slow hour" is an hour to which we project our subjective experience of the events of that hour. That is why we can say "For me, the hours were minutes but for her, the minutes were hours." Some exceptionally fast hours can have the speed of "normal" minutes. Some very slow minutes can have the speed of "normal" hours.

And it is not just as if units of time can go fast or slowly, they can also stop altogether, as in "Time came to a halt."

And it's not just as if units of time can have variable speed. They can also have variable existence, as in "For me, the three hours were forever, but for her, they did not exist."

In the topology of the domain of objects moving in space, all moving objects must be in different locations and it is unusual (except e.g. in the case of trains) that they follow the identical path. But in the blend for time, we are all in the same spot and the very same times are moving past us on the same path.

In the topology of the domain of objects moving in space, the observers are typically at different locations, which is why they may experience the speed of the objects differently. But in the blend for time, all the observers are at the identical location. It is not their relative locations that account for the variation in perceived speed, but their attitudes towards the events that account for the variation in the speeds. The variation of speed for time is coming from the input mental space of felt experience, not from the domain of objects moving in space. The resulting emergent structure is actually incompatible with the physical space input.

In the topology of the domain of objects moving in space, distance is well-ordered. Space is continuous and objects have permanence, and neither stretches of space nor objects in them vanish. But salience of times can be blended with temporal units to such an extent that, in the blend, salient times whose onset we fear can be closer and move faster. If Monday is all-important and we are anxious about what happens on Monday, we can say "Monday is staring me in the face" even if there are several days between now and Monday. In the blend, salient times whose onset we welcome can be farther away and move more slowly, as in "It's eons until my birthday" or "My birthday never gets any closer."

To summarize, the topology of the blend for time is incompatible with the domain of objects moving in space in many fundamental ways:

- In the domain of space, units of measurement are not moving objects. In the blend, they are.

- In the domain of space, observers are not at the same location and are not looking in the same direction. In the blend, they are. Accordingly, in the blend, everyone sees the same moving objects (that is, sees the same temporal units).

- In the domain of space, not all moving objects are on the same path. In the blend, they are.

- In the domain of space, observers in the same location looking in the same direction would see not only the same moving objects but also the same speeds for those objects. But in the blend, observers are in the same location and looking in the same direction and seeing the same moving objects but they perceive (in principle) different speeds for those objects.

- In the domain of space, all the objects moving along a path exist, and the closer ones are perceived as closer. But in the blend, one more distant can seem closer, and some of the



objects can be non-existent.

- In the domain of space, you cannot speed up or slow down the speed of the moving object by the quality of your attention. But in the blend, varying your attention can change the speed of the moving object.

These various linguistic examples and the emergent structures that make them possible derive from a systematic but elaborate integration network that involves a number of input spaces, blended spaces, vital relations, and compressions. We will go through the relevant input spaces and intermediate blends.

**E:** E is the input of Events. Human beings are expert at parsing the world into events (selling shoes, solving math problems, dining) and objects. Here we take as given that people can think of events and objects and refer to them. This expertise includes understanding event shape, including ordering and event type, and categorizing different events as belonging to the same type or to different types. Event spaces can include subjective experience of those events. Under this parsing, a lecture is an event with many participants - the lecturer, the audience, the support staff - and each participant experiences the same event in a variety of different possible ways. So the lecture can be painful for me, pleasant for you, difficult for the lecturer, easy for the technician, challenging for the interpreter.

**X:** An important kind of event for human beings is motion through physical space from point A to point B, with corresponding objective and subjective experiences. We call this subset of E the input of experienced motion through physical space. Within X, we have a number of existing correlations. If we travel from A to B and then B to C, we know that the event of traveling from A to B is over before the event of traveling from A to C is over. This comes from

our ability to order events. So, all else being equal, relative length corresponds to ordering of events. AB is shorter than AC; the event <AB> is over before the event <AC>. In this space, the use of the notion of fast versus slow is not the one used in physics but correlates with the duration of events. So, in English, we say that going from A to B is "faster" than going from A to C, even if our speed in the technical sense is the same. In X, the event of traversing the path is connected with the path.

**E/X:** E and X are blended in routine ways to yield emergent structure. One consequence of this blending is to create the common notion that has sometimes been called the "Event Structure Metaphor."<sup>6</sup> According to this notion, we can "go through the lecture" just as we can "go through the park" because in the blend, the event is motion from one point to another. In the blend E/X, any event has length and experienced motion (including speed, in the everyday sense of fast and slow rather than in the technical sense of physics). In E/X, the traveler of input X is fused with the experiencer of input E. The event in E is fused with the event of traversing the path in X and with the path in X. By this means, in the blend, an event becomes a path, and completing the event is traversing the path. As we can say that one stretch of road is faster than another because the event of traveling the first is over before the event of traveling the other, just so, we can say that one event is faster than another. E/X is a blend of a quite diffuse domain of events with a rather specific human-scale sub-case of traversing a path, so that in the blend the perhaps diffuse event can be transformed to human scale. In fact, it seems from the data we have collected so far that however complicated our understanding of the domain of traversing paths (involving different terrain, vehicles, etc.), X takes into account only the lengths of the paths, so that for a given traveler, relative lengths of paths determines relative durations of traversal.

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<sup>6</sup> Espenson (unpublished), Lakoff and Johnson (1999), pp. 179-95

In the blended space, an event is an origin and a destination. Two travelers may begin at the same origin and arrive at the same destination, yet they might traverse different paths, so the event can be long for one but short for the other, and can be slow for one and fast for the other.

**M:** The socially (and technologically) constructed notion of time is then brought in independently as the blended domain **M** studied in *The Way We Think* (Fauconnier and Turner 2002), and in Williams (2004). For starters, analogous days that we experience through observation - of, say, sun, stars, color variation, etc., - are compressed under blending into a single cyclic day. (See Figure 1.)

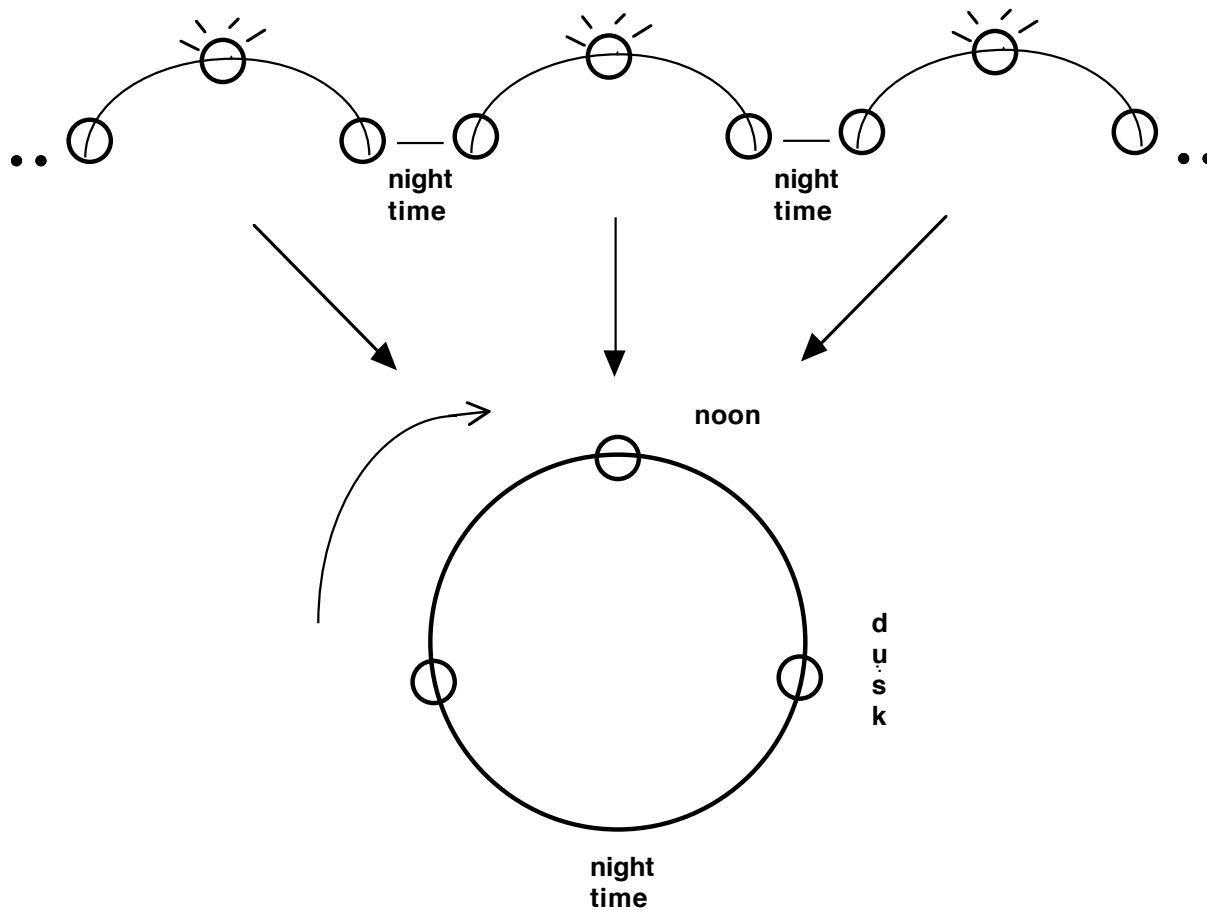
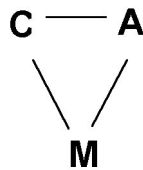


Figure 1: The blended cyclic day (C)

This blended cyclic day, *C*, serves as one input to yet another blended space, *M*. The other input to *M* is a natural or technical dynamic mechanism with structure that gets partially and systematically mapped onto the cyclic day. To give one example of the mapping between the "mechanism" input space and the "cyclic day" input space, we map the situation in which both rotating rods on the face of a "clock" point to twelve in the "mechanism" space onto the sun's being at its zenith in the cyclic day. In the blend, *M*, the cyclic day is integrated with the motion of the mechanism and we have additional shared events such as hours, minutes, seconds, years.



*M* is built on the basis of standard, normed, shared events such as "hands going around the clock." It yields emergent structure of *hours, minutes, seconds, years, . . .*, which do not exist before the creation of these compressions to ideal events. These are now, in *M*, standard shared events. The culturally constructed domain, *M*, is thus a subset of the general domain of events, *E*, and some inputs to the blend *M* may have motion in space, for technological or natural reason (hands on the clock, sand in the hourglass, sun across the sky, . . .)

The crucial feature of these material timepieces is that they have, within tolerance, matching onset and termination for the same constructed events (minute, hour, day, . . .). How they operate between onset and termination is unimportant for the mapping, as is how they mark onset and termination, so long as onset and termination stay invariant across timepieces. If they match, then for purposes of the *M* network, we can compress various timepieces to one ideal timepiece, because the particular onsets compress to the ideal onset and the particular terminations compress to the ideal termination. An analog clock works one way, with rods

sweeping out circles past numbers, while a digital clock works another way, flashing numbers on its screen, but we do not care: each indicates the onset and termination of the hour, and these indications are simultaneous when we set them side by side. The universal idealized timepiece defines universal events in which everything in the universe participates. The change from onset to termination defines, for example, an "hour." We conceive of everything in the universe as going through that hour. How do we in practice relate to this idealized universal event? The answer is, we relate to it because the compression guarantees that any local event involving motion of a tolerably accurate timepiece (watch, hourglass, sun) maps on consistently to the universal idealized event.

Notice that emergent in  $M$  we have universal events, but neither time nor measure. Since time is a measure of duration of events in general,  $M$  itself cannot give us time. It is instead a sophisticated system of emergent universal events. These universal events now have universal names - hour, minute, second.

**E/X/M:** Because  $M$  is a subset of  $E$ , it maps naturally onto  $E/X$ . This is the basis for an integration with inputs  $E/X$  on the one hand and  $M$  on the other, yielding the blended space  $E/X/M$ . In that blended space, universal events in  $M$  become particular local events in  $E/X$ . They are constrained to contain local events within their span, and any local event is contained in universal events projected from  $M$ . This gives any local event an additional dimension. Inescapably, you cannot go through the local event without going through the universal event that has the same beginning and end. In the emergent structure of the blended space, the universal event becomes a universal spatial length, and therefore a measure, analogous to yards, meters, and so on.<sup>7</sup> This is why any event has a length - it is an hour long, a minute long, etc.

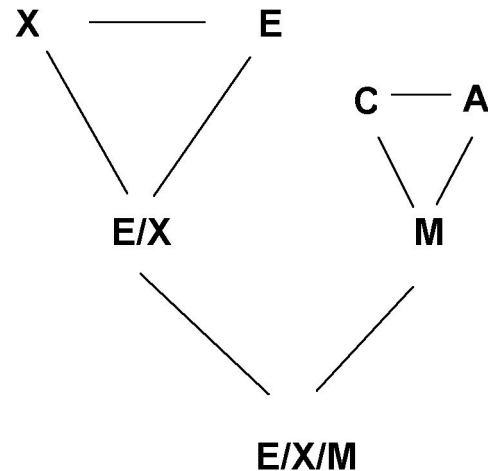
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<sup>7</sup>. This is the general feature of measure: for something to be a meter long means that extremities of the two objects map to each other preserving metric topology. This is coincidence of local

But, because of this containment, subjective experience of the local event is also for the experiencer experience of the projected universal event. So we can "go through an hour" just as we can go "through a lecture," and the hour can be painful just as the lecture can be painful. Because subjective experience varies, and going through the lecture can be pleasant for you but painful for me, so now, in E/X/M, going through the hour can be pleasant for you but painful for me, or fast for you but slow for me, because of the containment of the local event in the projected universal event. In M, the universal events are invariant. Their duration cannot vary, nor can they be painful or pleasant. But in E/X/M, those universal events become local events subjectively experienced, so they can vary according to the experience, not only for different experiencers, but also for the same experiencer depending on circumstances: "I went through the first hour much more quickly than the second hour." Mastery of the full network allows simultaneous access to objective length and subjective length. "It's amazing how the eight-hour work day is longer on Monday than it is on Friday." We understand "the eight hours" as lying in M, where the duration is invariant, but "longer" as lying in E/X/M, where it does vary; and so the statement is not self-contradictory.

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events. To say that something is a meter long is to fuse the local with the universal. In the space of physical space, before you had the universal yardstick, let's say, all you could do is compare: this is longer than that. Once you have a universal yardstick, now everything has a length. There is now a universal stuff (of course this is an emergent concept) just as there are universal events. The meter is made out of universal stuff conceptually, just as the hour is a universal event. Get rid of five pounds, take 10 minutes out of your lecture, how many square feet in your house?, etc.



Crucially, blending is not algorithmic, and there are two different conventional ways to blend  $E/X$  and  $M$ .  $M$  has events (rotating rods for the clock) that we are all, within significant tolerance, supposed to agree about. Subjective experience does not differ for the special kinds of events in  $M$ , and that is the main reason that they are chosen to serve in  $M$ . But in general, duration can vary in  $E$ . There is a mapping between the events in  $E/X$  and the events in  $M$ , and when we blend them, we can preserve the topology of  $M$  or the topology of  $E/X$ . If we preserve the topology of  $M$  in the blended space  $E/X/M$ , then we are all agreeing about the duration of the events that are correlated with the universal events. So, you ask how long it took me to go through the lecture, and I say, "I went on too long; it was an hour and five minutes long." I am using a compressed blend  $E/X/M$  in which  $M$  topology has been projected. But I can also use the topology of duration from  $E/X$ , and then in the second conventional blend, the duration can vary depending on subjective experience. I can say, "Centuries." There is hyperbole being added, but now you know we are in the  $E/X/M$  blend dominated by the topology from  $E/X$ .

Hereafter, we will label the blend dominated by  $E$  topology  $\underline{E}/X/M$  and the blend dominated by  $M$  topology  $E/X/\underline{M}$ . The full network at this point contains two crucial blended spaces,  $\underline{E}/X/M$  and  $E/X/\underline{M}$ , with different emergent notions of time. But conceptually, we have the ability to manipulate the full network with no contradiction, choosing to operate in one blend

when we need subjective time and choosing to operate in the other when we need objective time. The rich conceptual notion of time as having both objective and subjective dimensions is emergent in the entire network.  $E/X/\underline{M}$  has uniform durations for all experiencers: they are all on the same path, because of the universal event with invariant durations. But in  $\underline{E}/X/M$  blends, the separate experiencers can be on different paths, with different durations of traversal, as in "Remember that visiting your parents goes faster for me than it does for you."

The network we just described has many spaces, multiple projections, and hyperblends. Time in this network is not a primitive input but rather a notion that emerges from the full network. Once the entire network is achieved, it automatically contains as a byproduct correspondences between time and physical space that previous analyses had to postulate: Time itself and the Time-Space conceptual mapping are emergent in the network.

### 3) DUALS

Metaphor theory recognizes that motion of an ego through time as space has a dual, namely time as objects moving along a path past a stationary observer. This is a valid insight, but it, too, is a consequence of emergence in a full integration network that we will call the dual of  $E/X/M$ .

X has motion along a path. But motion is relative. Even though we know we are moving relative to the sun, it looks to us as if the sun is moving relative to us. When two trains are moving side-by-side, we can easily be in one and not know which one is moving. For any scene we inhabit, we can take ourselves as a point of reference, or something else as a point of reference. If we are in fact moving down the road, and take the tree as a point of reference, then



we are going by the tree. But if we are in fact moving down the road and take ourselves as the point of reference, then, relative to us, the tree is going by us. We will call the scene in which we take ourselves as the stationary point of reference the relative motion scene. In it, the tree is moving by us. We are not deluded by this framing. Relative motion is reflected straightforwardly in well-known examples like:

The old tollhouse went by.

The rough stretch of road went by.

The forest went by.

In relative motion, the path and all the things along it move, relative to you.  $X$  has its relative motion counterpart, call it  $X'$ .  $X'$  is accurately described with expressions like:

That stretch of road went by effortlessly.

The first five miles went by effortlessly.

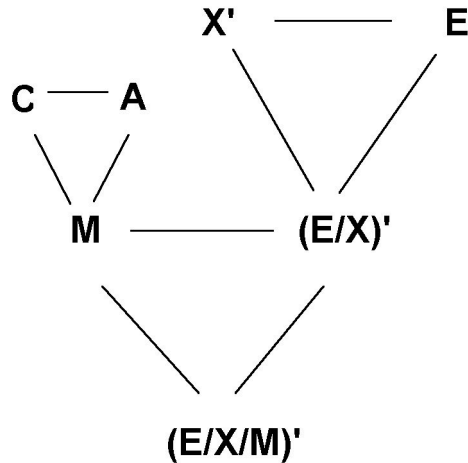
By projection, the blended space  $E/X$  has its relative motion counterpart,  $(E/X)'$ . In  $(E/X)'$ , path/events move relative to the experiencer, as in:

The lecture went by effortlessly.

The party went by pleasantly.

By projection, the blended space  $E/X/M$  has its relative motion counterpart,  $(E/X/M)'$ . In  $(E/X/M)'$ , the event paths also move relative to the experiencer, as in:

The first two hours went by effortlessly.



In the relative motion counterparts, relative speed is preserved. If you moved slowly through an event, then in the relative motion counterpart, the event moves slowly by you.

As the  $E/X/M$  blended space can be dominated by the topology of  $E$  or  $M$ , giving us alternatively  $\underline{E}/X/M$  or  $E/X/\underline{M}$ , so  $(E/X/M)'$  can be dominated by the topology of  $E$  or  $M$ , giving alternatively  $(\underline{E}/X/M)'$  or  $(E/X/\underline{M})'$ . In  $(E/X/\underline{M})'$ , all the universal events go by the same for all the experiencers. But in  $(\underline{E}/X/M)'$ , they can go by differently for different experiencers or even for the same experiencer. So, with respect to  $(\underline{E}/X/M)'$ :

- Friday always goes by faster than Monday.
- The hours sped by for him but dragged by for me.
- It took centuries for the hour to pass.
- Those three hours went by slowly for me, but the same three hours went by quickly for him.

With respect to  $(E/X/\underline{M})'$ , we have expressions like:

- Minutes go by faster than hours.
- The same hour will go by whether you are suffering or having fun.

In (E/X/M), the same hour has the same durational properties for everyone, regardless of the events the hour contains. But in (E/X/M), the "same" hour can have different properties depending on the particular experiencer.

Subjective experience can vary quickly for a single experiencer, vary depending on the focus, and even toggle back and forth like a Necker cube, as in the following attested piece of data

- *"Time goes by really slowly. At the same time, it goes by really fast."* (CNN, said by a man waiting for word on an American named "Michael" missing in the bomb detonations in London in July, 2005).

There are many ways to take this. In one, time is going by too slowly, because Michael is not showing up, but time is going by too fast, because the likelihood that Michael is dead increases with every passing minute.

Finally, it must be mentioned, although that is not the main focus of the present analysis, that the motion of events and times can be framed independently of an observer. This is especially true of universal times and planned events: *Tuesday follows Monday. The lecture will be followed by a reception.* Moore (to appear) discusses such framing in detail. Núñez et al. demonstrate its psychological reality.

#### 4) MORE NETWORKS

We have seen so far that analysis of metaphor requires analysis of elaborate integration networks producing what can seem like straightforward mappings between two domains taken as primitives. The ultimate conceptual correspondence between time (itself emergent) and physical space is real and especially visible, but it is a final product of emergent structure in the elaborate integration network, not something to postulate as a basic primitive of human understanding.

Conceptual work is never-ending, and we can and continue to bring more spaces and even networks into play with the elaborate integration network E/X/M. We can also use general conceptual techniques on that existing network.

One standard conceptual technique is to project agency into the occurrence of events, according to which, in the blend, the event is caused by the agent. In the blend with objective time (i.e., shared universal events, such as hours, minutes, etc.), all egos are constrained to move at the same rate. If we project agency to that causal constraint, all egos are moved through the shared universal events at the same rate by an agent, in this case often referred to as "Time," or, historically, "the hour." In this new blend, the emergent entity "Time" derives its motion from the network in which times move, but derives its landmark from the network in which Ego moves. Importantly, this new agent is not a projection from the network of moving shared events (hours, etc.). It is not a particular hour that drives us along, but the movement of Time: "Time marches on," "Time waits for no man," "Never fear: time will carry us along," and, from Macbeth:

Come what come may

Time and the hour runs through the roughest day

(Act one, scene three)

Provisioned with the blend in which Time the agent moves forward through objective

universal events, we can make an additional blend in which Time moving through universal events is also moving through specific events that are scheduled for those universal events. To say that your tooth extraction was scheduled from 3 to 4 is to say that Time moved through a universal event (a particular hour) and the scheduled event simultaneously.

Additionally, we can construct the blend in which Ego moves not only through universal events (hours etc.) but also actual events that correspond to the scheduled events in the schedule blend. Your actual tooth extraction corresponds to the scheduled tooth extraction, but might actually be a shorter or longer or interrupted event relative to the scheduled event. Actual and scheduled event need not coincide. Accordingly, Time may reach the end of the scheduled event before Ego reaches the end of the actual event. Moreover, Time may be closer to the end of the scheduled event than Ego is to the end of the actual event. In either case, Ego has fallen behind Time, when the comparison is between corresponding locations on the two paths. This makes other frames, such as racing, available, as in the examples from chapter one of *More than Cool Reason* (Lakoff and Turner 1989) like "We are ahead of time" and "We are racing against time." Expressions like "Time flies" or "Time stands still" can also be construed with respect to this blend, if the scheduled or expected events differ from the actual ones.

Consider as an additional network that can come into play our independent integration network involving memory and physical space. In memory, events can be "close" or "distant," "far apart," "hard to access." Relevant linguistic data indicating blends of memory and physical distance include "Calling up things from the depths of your memory," "Bringing a forgotten event to the surface." These blends of memory and physical distance can be blended with the E/X/M networks, to produce items like

- Our wedding was just yesterday.
- Where have all those years disappeared?

- The days of my youth are so close yet so far away.

For purposes of terminology, we will refer to the blend of memory and physical space as R/S (for Recall/Space). When we blend E/X/M with R/S, we get a new integration E/X/M/R/S, which puts a metric on memory that uses the notion of time that is emergent in the E/X/M networks. The subjective feeling in R/S that the wedding is very accessible, very close, is mapped onto the subjective feeling about the events of yesterday. So the blend endows R/S with a metric using the notion of time. Accordingly, in the E/X/M/R/S blend, the word "yesterday" provides an adequate indication of distance in memory. So in E/X/M itself, our wedding was not yesterday (assuming it was 18 years ago). But the memory of the wedding as experienced in R projects to yesterday in E/X/M/R/S, where the wedding of 18 years ago can now be "yesterday." In this case, the ordering topology of R/S dominates over the ordering topology in any version of E/X/M.

Now consider "Where have all those years disappeared?" Consider the reading in which this means that the speaker cannot remember the events over several years. The events in memory are gone, they map to corresponding years in E/X/M, and, accordingly, the years themselves are gone. But consider the alternative reading in which the speaker says, "My wedding was just yesterday. Where have all those years disappeared?" It is independently acknowledged that the objective distance of the wedding in E/X/M is eighteen years. There is a clash between the configuration in E/X/M and the configuration in E/X/M/R/S. If the wedding was just yesterday in E/X/M/R/S (subjective memory with a time-space-motion structure), then there is no space for the eighteen years that are right there in E/X/M (objective event reality with a time-space-motion structure), and those years must have disappeared. In this integration, subjective memory wins out over objective reality. Instead of objective reality's indicating that your memory is faulty, memory shows that the years must be missing. If the reasoning is carried out in objective reality, then we have examples like "My wedding seems like

just yesterday. I must be losing it (on drugs, have Alzheimer's)." In that case, objective reality wins over subjective memory. Examples like "Where have all those years disappeared?" and others below show that when different mental spaces are built in which there are clashes, then reasoning can follow about that clash. Reasoning can be conducted in one or another of the mental spaces.

Take the variant, "My wedding seems like yesterday. The years have really gone by fast." Again, the clash is between distance in subjective memory and objective reality. The reasoning is a very standard pattern imported from ordinary motion and speed in physical space. If the train departs city A and you are in city B before you know it, you can conclude either that B is close to A or that the train travels very fast. Then if you thought that A was close to B, and you are told that in reality it is far from B, you are forced to conclude that the train traveled fast. So in the same way, if your subjective memory tells you that your wedding and today are close, but reality informs you that they are in fact far apart, then you can resolve the clash by concluding that moving objects (here, times) have traveled fast.

But notice that variable speed of time is not a property within  $(E/X/\underline{M})'$  (invariant universal time events) or within  $(E/X/M/R/S)'$  (relative distance of events in memory). Variable speed of time is a property within  $(\underline{E}/X/M)'$ , the subjective construction of time. The reasoning that years must have gone by fast resolves the clash between subjective memory and objective reality by inferring a greater speed in  $(\underline{E}/X/M)'$ .

Time can fly, race, drag, or come to a complete halt, as in "time stands still" or "time froze." In all these cases, we need to be operating in more than one mental space, and there is some kind of clash between subjective experience and objective reality. For all of them, we can focus on  $(\underline{E}/X/M)'$  in order to resolve the clash. For example, if I think it is Saturday and I realize that it is really Monday, then the clash is resolved in  $(\underline{E}/X/M)'$  by assuming that the days must have traveled fast, and I can say "Time flies."

Other domains are covertly involved in such networks. Expectations are run parallel to experience and they can clash for all kinds of reasons. An extreme case is when we say that "Time has frozen" or "come to a halt." We expected or desired events to be taking place, but their onset has not occurred. In ( $\underline{E}/X/M$ ), times and events are blended and move together. Events not happening is the same as events not moving, and accordingly subjective time is not moving. The feeling can have many different causes. Suppose we are watching a play whose script we know well. At one point, an actor fails to deliver his line, either because he has forgotten, or tripped and needs to regain balance. Of course, events are going on, but not the expected events, and the expected events will take place, just not when we expected them. The delay between expectation and reality can be solved by recruiting from ( $\underline{E}/X/M$ ) a variable speed for time of zero. "Time froze while he tried to remember his line."

#### 5) COBBLING AND SCULPTING

Nathaniel Smith notes the following passage in a novel:

*"Remarkable -- when I am sitting on a cushion on the floor, busy with scissors and glue pot, the time just vanishes. Before I know it the latticed rectangle of pale autumn sunlight has moved from the left wall across the floor to the other wall and Mrs. O'Carolan is calling me for supper. Perhaps time is flowing faster up there in the attic. Perhaps the accumulated mass of the past gathered there is pulling time out of the future faster, like a weight on a line. Or perhaps, more mundanely, it is only that I am getting older every year and that it is the accumulated weight of time behind me that is unreeling the years with ever-increasing speed. What a horrible thing it must be to grow older and find that ever-decreasing number of years hurrying you*



*faster, faster toward your grave, as if time were impatient to be rid of you.*" (Ian McDonald, "Emily's Diary, November 5, 1913," in *King of Morning, Queen of Day*, pages 82-83.)

Although this may seem fanciful, it is easily understood exactly because it is exploiting the network for time that we have discussed above. A phrase like "time just vanishes" is standard and idiomatic, and as we saw, a result of resolving a clash between subjective experience and shared universal events. The pale autumn sunlight's moving across the room is a local timepiece that can be put into registration with other timepieces. As in the general case, subjective feelings of duration are blended with speed of motion. But now, the question arises, why would time be operating this way? The answer, again a standard derivative of the standard network, is that time has a variable speed and now a new blend is constructed according to which that motion is induced by standard physics. Weight is pulling the timeline along. Interestingly, this still preserves the registration of the timepieces. Even though the subjective speed of time when you are doing certain things in the attic is much greater than the subjective speed of time in the kitchen, the time in the attic will match the time in the kitchen whenever you go to the bother of checking, because that is a property of  $E/X/\underline{M}$ . This network allows us to get to a point with different speeds at different spots in the network, but the points will match with  $\underline{M}$ . The additional blending of "pulling time" is simply opportunistically exploiting a connection between objects and weight, and the fact that if you have more objects, you have more weight. The mass in the past is picking out events in the subjective space. This subjective space is much fuller of events from the past when you are in the attic, among all those souvenirs, than it is in the kitchen, where you are engaged in cooking sausage to eat immediately. So when you go down to the kitchen, your subjective space changes, and the weight of the past diminishes with each step as you go down, so by the time you get to the kitchen, time is running at its usual pace, no longer being pulled precipitously along.

The variant of years being pulled faster for older people because of the greater time behind them is another way of resolving the clash by blending the subjective space in (E/X/M)' with a concrete frame of the pull of gravity. In the new blend, the "time objects" are linked and the increasing weight of those behind pulls the present and future ones ever faster. It exploits the fact that in (E/X/M)', we know that the objects move differently for different experiencers.

Spectacularly, in fact, in the last variant, it follows that a small of years are now moving ever faster past you. In the relative motion dual of this scene, you are therefore moving faster toward the end, the grave. At this point, there is a blend with intentionality. How does this feel? Now subjective experience is restructured again to include desire for the speed on the part of time, and the cause of Time's increasing the speed is its impatience to get to be rid of you, i.e. to bring you to your end.

## CONCLUSION

Metaphoric mappings, theory of metaphor, and metaphor analysis need to be revised to include permanent features of cognition:

- Integration networks
- Cobbling and sculpting
- Emergent structure
- Compression

- Overarching goals other than projection of inference.

We have shown in some detail, with *TIME AS SPACE*, how to go about this revised and deeper form of metaphorical analysis, taking into account the aforementioned properties of cognition. As far as we can tell, the considerations we adduced apply quite generally to any metaphorical analysis. The message for all of us metaphor theorists is that we need to go far beyond the usual focus on cross-domain mapping and inference transfer. 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 (a child's learning of the elaborate interconnected integration networks). In the early days of contemporary linguistics, the realization that children mastered stunningly complex syntactic and phonological structures was often met with disbelief: how could toddlers possibly know so much? We know better today: the child's cognitive brain leaves in the dust our most powerful computers. So there is nothing surprising in the discovery that meaning construction is also supported and effected by highly elaborate dynamic systems. The challenge for the analyst is to delve rigorously into these remarkable constructions of the mind.

The permanent features of cognition that we have drawn attention to in the present work are part of metaphor because metaphor itself is one particularly important and salient manifestation of conceptual integration. Double-scope integration, which typically exploits clashes, is the hallmark of cognitively modern human beings. And metaphor is one of its most powerful products, one that often drives key aspects of art, science, religion, and technology.

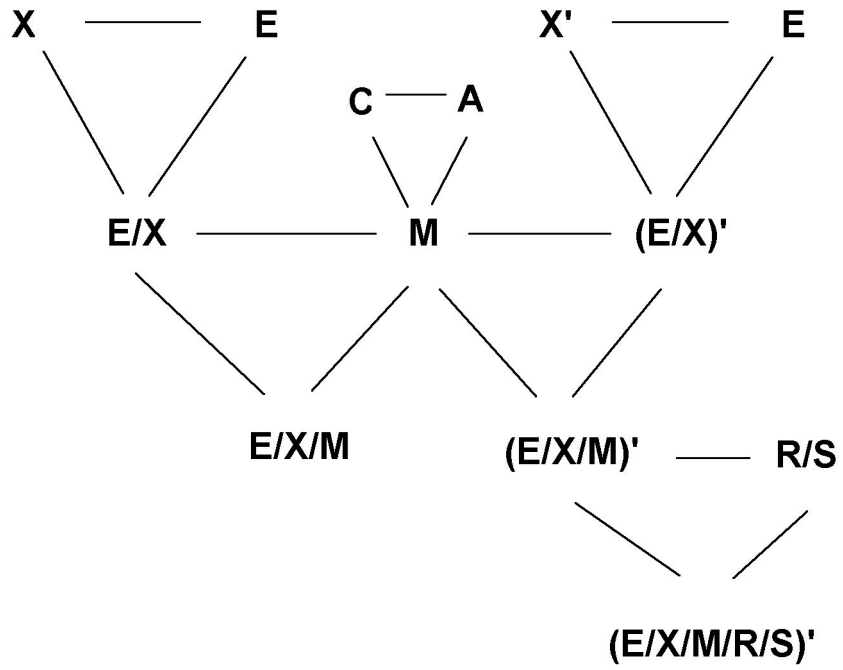


Fig. 2: Integration network for time as space, including dual

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