



laetus in praesens

Alternative view of segmented documents via Kairos

9 May 2016 | Draft

Unquestioned Bias in Governance from Direction of Reading?

Political implications of reading from left-to-right, right-to-left, or top-down

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Introduction

The text on which much global governance is primarily dependent is written from left-to-write (top-down), following the pattern determined in the Greece from which democracy emerged. Text is written otherwise in other cultures, notably in Arabic and Hebrew (right-to-left), or in cultures of the East (vertically, whether left-to-right, or right-to-left).

Given the implications of "left" and "right" in politics, there is a case for exploring whether the direction of writing locks thinking into a particular mode which is restrictive in a period when there is a need for strategic nimbleness in navigating the [adaptive cycle](#). Is governance constrained by negligence of the global scope of what might be implied by the French term *grille de lecture*?

This argument is a development of an earlier exploration of directionality in reading musical scores, in the light of the possible significance of musical palindromes and reversing the directions of performance of a composition (*Reversing the Anthem of Europe to Signal Distress: transcending crises of governance via reverse music and reverse speech?* 2016).

It is noteworthy that major tensions in global governance are currently evident between those cultures with a preference for reading text differently -- namely from left-to-right or from right-to-left, to say nothing of those which have a preference for reading texts vertically (whether top-down, or even bottom-up). The issue is whether these preferences derive from particular cognitive biases as yet to be fruitfully explored, as might be suggested by the much-cited work of [George Lakoff](#) and [Mark Johnson](#) (*Metaphors We Live By*, 1980).

The question here is whether there is a case for an understanding of "post-chiral governance" within which such preferences could variously manifest as appropriate, if not as constituting [requisite variety](#) in cybernetic terms. The absence of any language enabling bottom-up reading is noted as being of particular relevance in a period challenged by populist pressures and recognition of its necessity from a management perspective.

Directionality in reading text

It is curious to recognize how little attention is given to directionality in reading any text or music score -- and performing the music in the latter case. Mozart even challenged this by composing a piece that can be played in either direction -- a [musical palindrome](#) -- a duet that can be played with one player reading the music right-side-up, and another reading from upside-down. Nicknamed the "Palindrome", Haydn's *Symphony No. 47*, the third movement is a musical palindrome; the second half of the piece is the same as the first but backwards. Other examples are indicated by *Wikipedia*. In classical music, a [crab canon](#) is a canon in which one line of the melody is reversed in time and pitch from the other. A large-scale musical palindrome covering more than one movement is called "chiasic"

It is therefore useful to consider the possible directions of reading, and especially the manner in which they are preferred in different cultures -- or at different periods of time. These variants may suggest significant strategic insights, especially since **so much is strongly associated with "left" and "right" in politics**, with those preferring one or the other seeking by every means to shift others to their sense of appropriate directionality. As the online encyclopedia of writing systems and languages, a checklist of writing/reading directions

for an extensive range of scripts is presented by Omniglot (*Writing Direction Index*).

A highly relevant focus on the matter has been provided by Anne Maass (*Living in an Asymmetrical World: how writing direction affects thought and action*, 2014). Bridging five decades of research on horizontal bias related to writing direction, this notes:

There has recently been a renewed interest in the role of spatial dimensions in social cognition, and how vertical and horizontal trajectories are used to represent social concepts such as power, agency, aggression, and dominance. Most of this work surrounds the idea that abstract concepts are intrinsically linked to our sensory and motor experiences, including habitual interactions with the environment such as reading and writing.

The pattern of **directionality in script reading** may well be summarized in **tabular form** (as below). Attention is primarily given to the 4 colored modalities in the table -- notably that coded red -- namely reading from left-to-right (LTR), starting from the top and reading down (as with Sanskrit). This is characteristic of many scripts dating from that of Greece. By contrast, **right-to-left, top-to-bottom** (RTL) script -- coded green in the table -- is characteristic of **Arabic script, Hebrew** and Persian (all written from top-to-bottom of the page). Books in such cases may then be said to be read from "back-to-front".

Many **East Asian scripts** (notably including Chinese and Japanese) can be written horizontally or vertically -- allowing for directional flexibility, be it horizontally from left-to-right, horizontally from right-to-left, vertically from right-to-left, and even vertically from bottom-to-top. These patterns are primarily associated with the other coded zones in the table.

Traditionally, Chinese was written in vertical columns with the text starting in the top right corner of the page, running down and then moving leftwards across the page. More recently Chinese is using the RTL direction pattern, written in rows starting from the top left corner of the page, from left to right and down the page. Chinese can therefore be written from right-to-left in vertical columns, left-to-right in horizontal lines, or occasionally right-to-left in horizontal lines. In Taiwan it is often written vertically, while in China and Singapore it is usually written horizontally.

The table includes the less common possibility of the **boustrophedon**, namely a pattern in which the direction of reading is reversed at the end of every line -- a form of bidirectionality. This was characteristic of some occasional writing in Ancient Greece and Latin (particularly in religious inscriptions) -- reading top-down. Clearly there is also the possibility of reverse directions, whether starting at the right, or starting at the bottom. This pattern could also be applied to vertical reading. **The table therefore offers 16 "reading modalities", potentially suggestive of preferences in governance and politics.**

		Page reading direction				
		Left to Right	Top to Bottom	Right to Left	Bottom to Top	
Line reading direction	Horizontal	"Both"				
		Left to Right				
		Right to Left				
	Vertical	Top to Bottom				
		Bottom to Top				
		"Both"				

Implications for reading in practice -- and in times of crisis

Political metaphors: In political discourse the table holds the distinction between the much-preferred "top-down" (hierarchical) mode of governance, currently challenged by the less favoured "bottom-up" discourse acclaimed by populists, through the social media, and from a management perspective (Carmen Nobel, *How IT Shapes Top-Down and Bottom-Up Decision Making*, *Working Knowledge*, 1 November 2010).

A useful way to reframe the possibilities in the table is through recognition of metaphorical use of the terms distinguishing those patterns:

- "read": as in *how to read a situation* (Charles Warren, *Smart advice from the streets of San Francisco: "Reading a situation"*, 2013; *Some people are masters in appropriately reading a situation*, *Enlightened Conflict*, 15 February 2016; Wolff-Michael Roth and Franz Breuer, *Reflexivity and Subjectivity: a possible road map for reading the special issues*, *Forum: Qualitative Social Research*, 4, 2003)
- "write": as in *the writing on the wall* -- notably recalling the creativity of graffiti

- "page": as in *being on the same page*, or reading from the same hymnsheet
- "line": as in *following a particular line*, or *toeing the line*

With respect to the left-right dimension, as noted by Dermot Lynott, et al. (*The Role of Body and Environment in Cognition*, 2014):

A common type of metaphorical concept is the orientational metaphor that represents concepts in a linear manner (Lakoff and Johnson, 1980). Examples are the up or down metaphor (up is power, positive, more), and the left or right metaphor (right is more, future, conservative). A difference between the up=down metaphor and the left-right metaphor is that the former has an experiential basis when it reflects power (a child looks up to an adult) or valence (cheering is up), whereas the left-right orientation is based on conventions such as the mental number line and the organization of political parties on a left-right dimension. The mental number line theory posits that smaller magnitudes are associated with a location on the left and larger magnitudes on the right of this line. The [left-right dimension in politics](#) originates from the spatial organization of the French Legislative Assembly of conservatives on the right and liberals on the left. If abstract concepts are activated as a result of concept-matching concrete experiences, it follows that left/right manipulations of bodily actions can activate the left/right metaphor associated with politics and consequently influence one's thinking about politics. (p. 38-39)

Left as "sinister": The table suggests how these metaphors might be variously, even creatively, comprehended -- possibly otherwise in different cultures. The table itself may be variously read. An extremely common association is between right as "good" and left as "evil" -- hence all the associations with sinister and suspicions regarding lefthandedness (discussed in *Wikipedia* as [Bias against left-handed people](#)). The latter notes [examples in different languages](#), seemingly irrespective of the direction of reading indicated in the table.

It is curious that any movement from right-to-left is deprecated in many contexts (possibly even framed as "evil"), in contrast to movement from left-to-right (indicative of the "good"). This is not the case in dance in which a full range of patterns is possible. The distinction is notably explored as significant in biology in terms of [chirality](#) (namely handedness), as well as in nanotechnology ([Exposing "evil twins"](#), *Research at University of Cambridge*, 16 May 2014).

Noting in passing the issue of handedness in politics, the phenomenon is reviewed in greater detail by James P. Riehl (*Exploring Mirror-Image Asymmetry: an introduction to the origin and consequences of chirality*, 2011).

Reading numbers: The mental number line theory has been the subject of various studies of potential relevance, notably framed in terms of the [Spatial-numerical association of response codes](#) (SNARC):

- Matthew R. Longo and Stella F. Lourenco: [Spatial Attention and the Mental Number Line: evidence for characteristic biases and compression](#) (*Neuropsychologia*, 45, 2007).
- Steven B. Jackson: [Why Left Is Less and Right Is More \(Sometimes\): a cross-cultural look at our spatial understanding of numbers](#) (*Psychology Today*, 4 April 2012)
- S. Hutchinson and M. M. Louwse: [Language Statistics Explain the Spatial-numerical Association of Response Codes](#) (*Psychonomic Bulletin and Review Journal*. 21, 2014)
- Stanislas Dehaene, et al.: [The Mental Representation of Parity and Number Magnitude](#) (*Journal of Experimental Psychology: General*, 122, 1993)
- Kevin J. Holmes and Stella F. Lourenco: [When Numbers Get Heavy: is the mental number line exclusively numerical?](#) (*PLOS One*, 6 March 2013)
- Tanja Link, et al.: [Unbounding the Mental Number Line: new evidence on children's spatial representation of numbers](#) (*Frontiers in Psychology*. 2013, 4)

Reading images: Of particular interest is the interpretation of the reading modalities in the table labelled "both", especially in relation to top-down or bottom-up. The table also implies a degree of relevance to how images are "read" or scanned. This is most notably evident in the case of the human body, when encountering an "other", especially one of the opposite sex. Reading "body language" involves such modalities. Feminists have framed concern with "elevator eyes", as when someone looks another person "up and down" (Robert Stacy McCain, [Civil Rights and "Elevator Eyes"](#), *The Other McCain*, 22 June 2011).

Much researched is the manner in which browser users "read" a page, wholly or partially composed of advertising ([Web pages are not read from left to right](#), Miratech). Hence the issue of where an ad is best positioned on a page, given reading tendencies. In the table "both" may be especially relevant to the complex manner in which any "page", as an image, is then scanned. A relevant French expression is the capacity to read ["en diagonal"](#) (seemingly in contrast to the modalities in the table above). Pages may be as readily scanned from bottom-up as from top-down.

It is now recognized that attention is enhanced by reversing habitual reading directions, as reported by James Bridle:

... the US army trains observers to "read" a landscape from right to left. The idea is that, as Anglophones accustomed to reading left to right, reversing the direction of attention brings more concentration to bear on the situation. Moving from right to left disrupts the soldier's instinctual recognition patterns, and so they are more likely to spot things. This skill has apparently migrated from soldiers to photographers ([Reading Right-to-Left](#), *booktwo.org*, 30 October 2015)

Reading bottom-up? There do not appear to be instances of languages written "bottom-to-top" (whether left-to-right, or right-to-left) with the expectation that they be so read. However there is continuing debate amongst educators faced with children who form their letters "bottom-up", even if they write down the page. Such preoccupations include correcting any tendency to "vertical reversal" of the letters. Reversal may be associated with left-handedness and give rise to [mirror writing](#) ability (G D Schott, *Mirror Writing: neurological*

reflections on an unusual phenomenon, *Journal of Neurology, Neurosurgery and Psychiatry*, 2007). Is it the case that some of the possible reading modalities are to be understood in pathological terms?

Vertical scanning in sexually framed encounters bears comparison with some governance preoccupations with questing for the "root cause" of crises -- *getting to the root of the matter* or *getting to the bottom of it*. The quest for radicals and extremists may however require a focus on both extreme left and extreme right.

Curiously, in contrast to the "bottom" with which any root cause may be associated, there is also the important sense of "top", especially in spiritual writings. There it is associated with "heaven" -- in contrast to the association of hell with "down". Presumably for related reasons, as an aid to *reading a situation*, the hexagrams of the *I Ching* of Chinese culture are read from the bottom up. Sanskrit offers the further insight by writing "below the line".

Importance may be particularly associated with being *at the top*, rather than *at the bottom*. Familiarity with accounting has however give rise to concern with the *bottom line* -- implying a form of reading from bottom-up. Computer applications may be designed in response to a need to read conventional text from the end of a file -- where amendments may have been most recently added.

It could prove highly significant that the absence of languages specifically adopting bottom-to-top reading styles is an indication that such **bottom-up styles may only be considered in response to the failure (in times of crisis) of the three conventional reading directions, whether left-to-right, right-to-left, or top-to-bottom**. Ironically the exponential development of surveillance of individuals for security and marketing purposes could be interpreted as a questionable effort at a bottom-up reading of society, notably to enable predictive simulation of global trends.

Is there a need to develop a new "bottom-up language" appropriate to the demands on governance at this time -- notably from a "bottom-up" populist perspective, and the related management concerns? There is notable evidence of this tendency in the anthropological literature on so-called bottom-up research methodologies. Ironically there is a possibility that some may develop the skill of reading spreadsheets and financial accounts upwards from the "bottom line".

Reading music versus reading text

Musical scores (notably in [modern staff notation](#)) are typically ordered in terms of notational signs written left-to-right (from top-to-bottom), following the pattern inherited from Greece (though the direction could be adapted as in certain Syriac manuscripts).

There are many forms of [music notation](#) and it continues to be characterized by considerable innovation and experiment -- as with the challenge of its comprehension (David Griffin, *Systematic Notations and the Relations between Paper and Music*; Susan Ella George, *Visual Perception of Music Notation: on-line and off-line recognition*, 2005). Notations may be configured spatially on a page.

Recognition of the variety of patterns is indicative of the ease with which the reversal of conventional modalities could now be explored. It is also indicative of the possibility of [superposition](#) of forward and reverse communication, with whatever this may come to imply. Available software to manage and represent musical scores, such as [hyperscore](#), could allow for a range of experiments in the light of the various patterns of directionality highlighted above. Could regular measures ([bars](#)) be played vertically on a score page, for example, and with what cognitive implications for governance?

Such flexibility cannot currently be said of text-dependent cultures, especially given the manner in which **so much of global governance is locked into a left-to-write, top-down sense of directionality -- a symbol and a symptom of the challenges of governance at this time**.

Comprehensive mapping of distinction dynamics in governance

Limits of tabular representation in 2D: As noted, the table above indicates 16 "reading modalities". Understood as pairs -- as evident from the table -- this offers 8 dimensions or axes.

Of interest here is whether these distinctive "dimensions" in two dimensions can be configured in other ways such as to offer further insight into the challenge of governance through this 8-fold set of 16 extremes. Polyhedra in three dimensions offer one approach, suggestive of how arenas of distinction could be configured together -- appropriately separated from each other as a reflection of the challenge of "reconciling" contrasting "reading styles" and the tensions between extremes. These tensions are significantly and fruitfully explored in music.

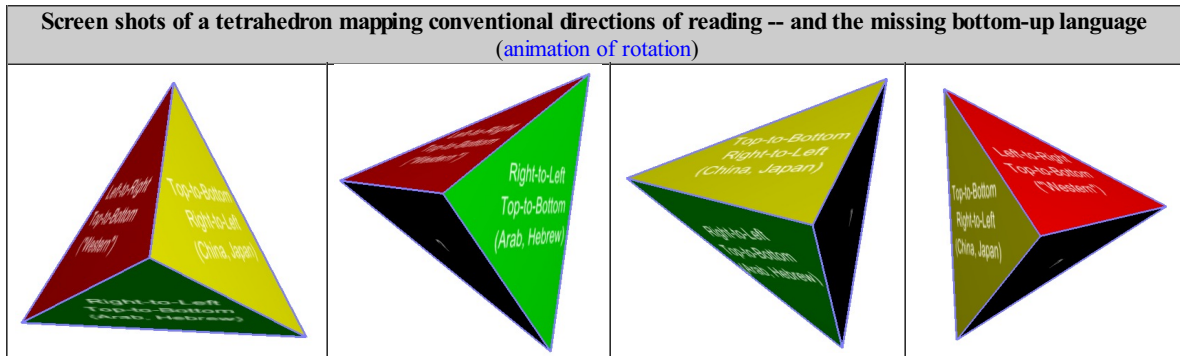
Given the preoccupations of governance, the merit of moving beyond a two-dimensional representation can be stressed otherwise. Much is made of the negotiation "table" with respect to resolving the challenges of governance and the manner by which they can be "contained". There is however good reason to consider that their complexities cannot be contained by a table -- from which they may "roll off" or be "designed off", especially when much is handled "under the table". In that context, metaphorically speaking, any 2D map bears an interesting resemblance to a "table cloth" of a particular design.

In considering a 3D container, reference can be usefully made to [Pandora's box](#) -- the mythical container of all the evils of the world, according to the Greek culture from which democracy derived. Purportedly this was a sealed "jar", rather than a closed "box", the latter resulting from a mistranslation. If the challenge of governance is to gather the problems of the world -- wicked and otherwise -- into a container. The cognitive and other implications of the design of that [container metaphor](#) merit careful attention in the light of the influential work of [George Lakoff](#) and [Mark Johnson](#) (*Metaphors We Live By*, 1980). What indeed is the design appropriate to the challenges of the times?

Simpler 3D mapping surfaces: The dimensions could be mapped as followed, using 3 of the 5 [Platonic solids](#):

- using the [cube](#) with its 8 vertices offers one memorable configuration
- using the [octahedron](#) with its 8 faces
- using the 4 faces and 4 edges of the [tetrahedron](#)

These are especially interesting if the purpose is to map only a sub-set of the 16 modalities, notably excluding the 8 characterized as "both", due to their use of the bidirectional pattern (the boustrophedon). The cube and octahedron are then suitable. Potentially more interesting, using the 4 faces of the tetrahedron, is the mapping of the three predominant modalities -- left-to-right, right-to-left and top-down -- respectively characteristic of "Western", Arabic and "Eastern" languages. This allows one face to hold the bottom-up language currently missing from conventional reading directions. The first image highlights the conventional assumption that only the conventional directions are recognized as necessary to global governance -- obscuring the necessity for the missing language, made evident in the other images to varying degrees. In strategic terms, "ISIS" might be questionably recognized as representing one such bottom-up "language".



However the argument can be taken further by suggesting that mapping "dimensions", such as left-right, does not hold in a sufficiently memorable manner the problematic dynamics of the necessity of choosing one or the other in practice. Such mappings are in a sense too abstract for the reality of governance.

The question is then whether the 16 reading modalities could be distinctively mapped onto some other polyhedron. Curiously this is not the case. The possibility is excluded by [Euler's polyhedron formula](#) governing the relation between the number of faces, edges and vertices.

Reduction from 16 to 14 reading modalities? It is intriguing to consider that -- reading in the light of a chosen reading modality -- **a mapping implies both a "reader" of the map and the consequent exclusion of a contrary reading modality**, obscured by the preference (or rendered "unconscious" thereby). These two modalities are necessarily not represented within the mapping. The second is effectively hidden "beneath" the map -- "on its other side".

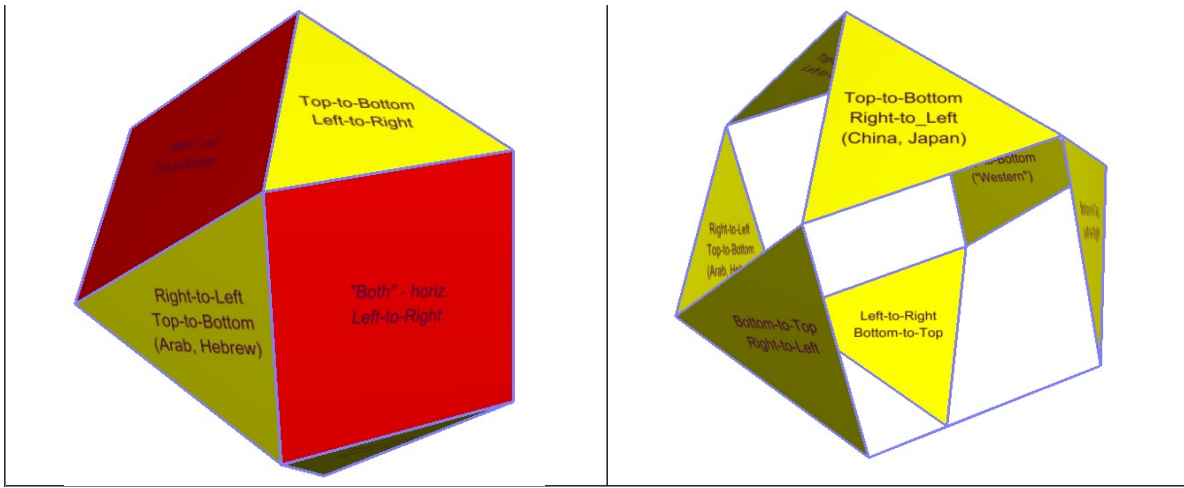
Although a seemingly questionable device, it is part of the reality of creation and use of maps. In this sense 2 modalities are necessarily excluded from any map of reading modalities (however that choice is made). This leaves 14 modalities which might then be mapped onto a suitable polyhedron.

The question is then how the process of choice of the reading modality is made -- "external" to the map -- in relation to the 16 in the table above. It could be suggested that any observation of a map (and its "repressed" complementary modality) become possible when:

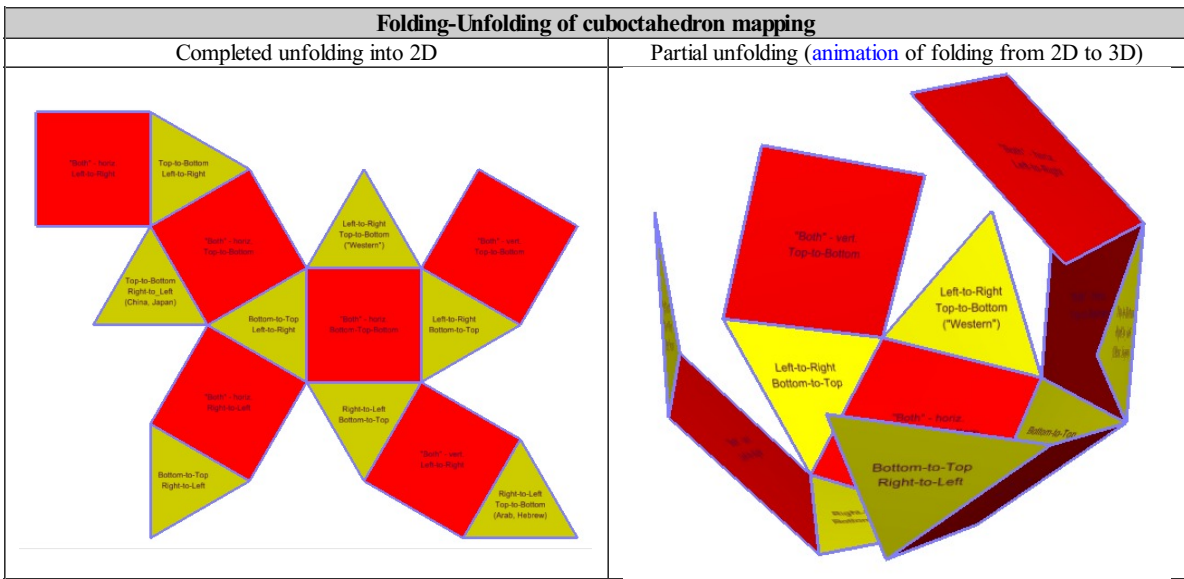
- any pair of two reading modalities are excluded -- namely by excluding a dimension
- or any two (complementary) pairs of reading modalities (in the table) are each "conflated", so that the distinction between their extremes is "lost" in each case. Alternatively this could be better understood as the "collapsing" of the two dimensions into one, namely an inability to distinguish between them.

Cuboctahedral mapping: One polyhedron that could be used for such a mapping is the [cuboctahedron](#) -- one of the 13 semi-regular [Archimedean polyhedra](#). Reduced from 16 to 14 -- two being implied -- the 14 directional modalities of reading can then be associated with its 14 faces (of 2 types), linked in pairs by 7 axes. That polyhedron has 12 faces and 24 edges.

Mapping of 14 reading modalities onto cuboctahedron faces	
Showing bidirectional reading faces (animation of rotation)	Hiding bidirectional reading faces (animation of rotation)



The following images show the cuboctahedron unfolding into a flat 2D representation. That on the right is potentially indicative of the challenge of global governance, namely to configure the reading directions together globally.



The cuboctahedron is especially interesting given the arguments made in that regard by [Buckminster Fuller](#) in relation to world resource management. It served as the basis for an initial version of his *Dymaxion map* (1946). Of particular interest is the manner in which any such unfolded 2D "map" is folded into a 3D global form. This suggests, as noted, that the challenge of global governance may include "folding" the pattern of potential reading modalities into a cognitively significant global form.

Mapping complexity consistent with the complex challenge of governance? However that choice is made to enable map reading, a quite different approach is possible. This would then be suggestive of the challenging problem of comprehending and governing the relationships between the set of dimensions -- appropriately honouring that complexity as a whole, to which reference is frequently made.

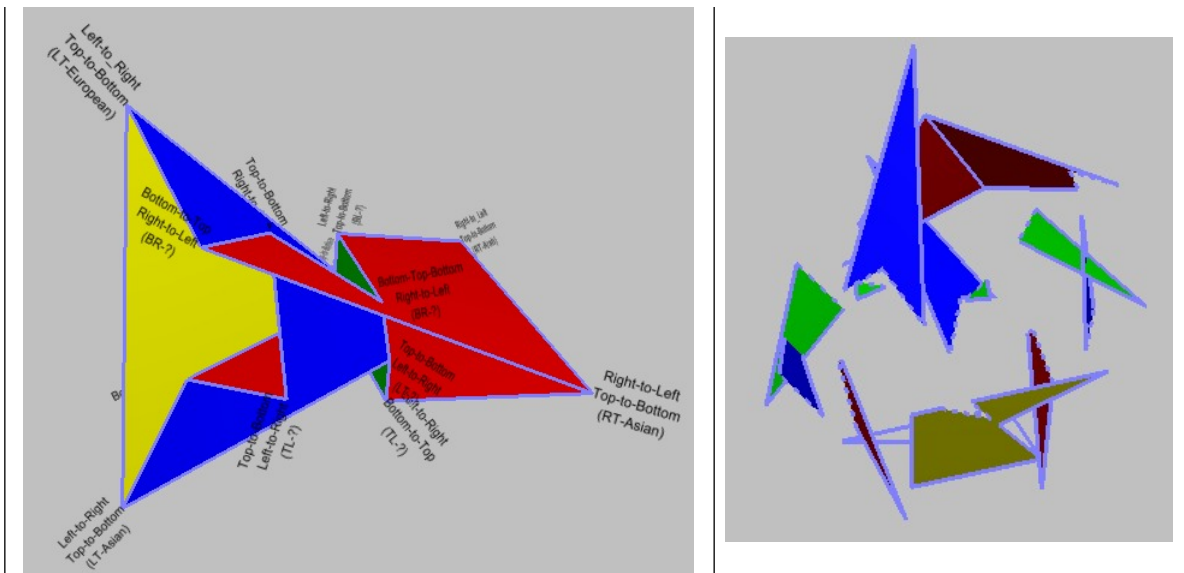
One possibility involves the use of the highly unusual [Szilassi polyhedron](#). It is unique in that each face of that polyhedron shares an edge with each other face. As a result, it requires seven colours to colour distinctively each adjacent face, providing the lower bound for the [seven colour theorem](#). The question is whether the complexity of that polyhedron is commensurate with that of global governance -- as is arguably required at this time.


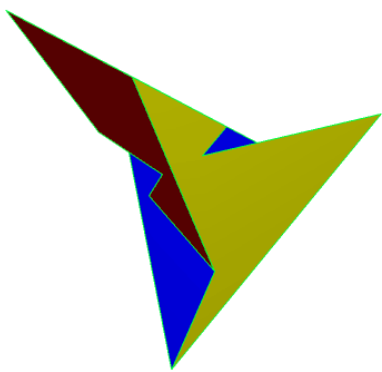
Use was made of that polyhedron in a previous exploration of the challenge of *Ways of Looking at Ways of Looking* (2014). This took as its point of departure the much-cited poem by [Wallace Stevens](#) -- *Thirteen Ways of Looking at a Blackbird* -- with its allusions to the Cubist painting tradition of observing subjects simultaneously from numerous viewpoints to present a novel perspective. In the current period, this reframes concern with direction of reading in terms of **how might a variety of ways of looking be elicited and juxtaposed** -- perhaps such that together their strange integrity rendered them meaningless to conventional observation.

"Blackbird" is then best understood generically as an alternative voice, transcending any conventional framework and therefore implying a degree of dissent through its challenge to conventional modes of comprehension. [Umberto Eco](#) might be said to offer an example (*Eternal Fascism: Fourteen Ways of Looking at a Blackshirt*, *New York Review of Books*, 22 June 1995, pp.12-15).

In this case it is the 14 vertices which can be used to hold the contrasting modes of reading -- linked by the 21 edges (of 7 contrasting types). The faces are of 4 distinct types -- possibly to be associated with particular modalities distinguished in the tabular representation.

Mapping reading directions using Szilassi polyhedron	



Animations of Szilassi polyhedron of 7 faces (4 types), 21 edges (12 types), 14 vertices (7 types) [totalling $42=2 \times 3 \times 7$; product= $2 \times 3^2 \times 7^3$] (paired shapes coloured identically; prepared using Stella Polyhedron Navigator)	
Folding together of the two complement nets	Rotation of polyhedron
	

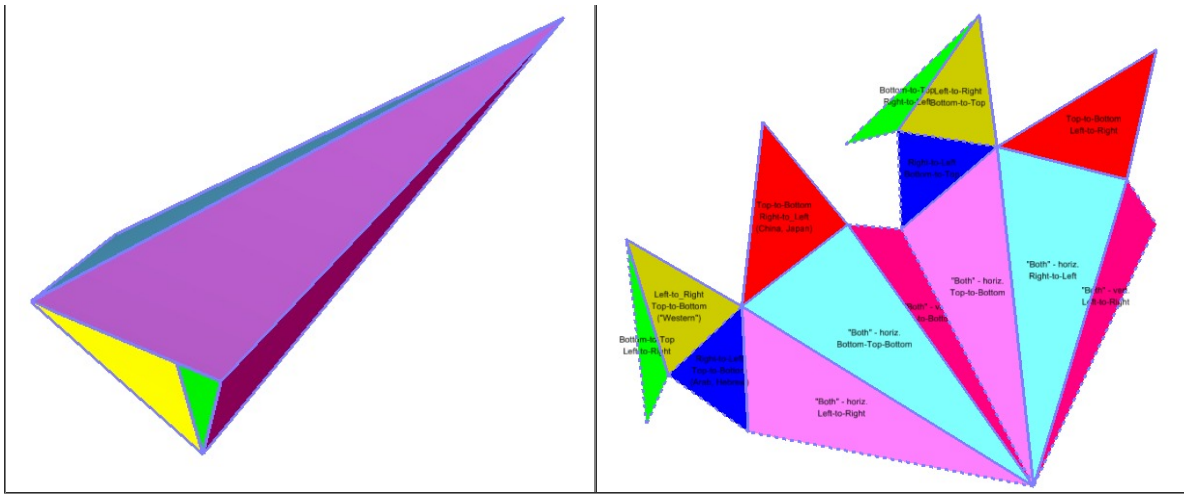
Further discussion of the Szilassi polyhedron is presented below. The previous exploration of its value to consideration of the variety of ways of looking formed part of an argument with respect to *Anticipating When Blackbirds Sing Chinese* (2014) -- in sections on:

- Post-modern challenge to simplistic binary framing of the other
- Imaginative composition of ways of looking or listening
- Embodying a multiverse of uncertainly ordered incongruity
- Thirteen ways of apprehending blackbird song
- Imagining future communication integrity enabled by aesthetics

The Szilassie polyhedron is complemented by its **dual**, the **Császár polyhedron**, necessarily of equivalent complexity and therefore lending itself to a complementary mapping approach. This polyhedron has no diagonals; every pair of the 7 vertices (topologically equivalent) is connected by an edge, together numbering 21. The **tetrahedron** and the Császár polyhedron are the only two known polyhedra (having a **manifold** boundary) without any diagonals.

Unfortunately, compared to the Szilassi polyhedron, Császár polyhedron is less visually interesting in its folded form and therefore less memorable as an organisation of the biases potentially significant to global governance.

Császár polyhedron Mapping reading directions using Császár polyhedron	



Both the Császár polyhedron and the Szilassi polyhedron have the topology of a torus -- allowing for further interpretation (*Spreadsheet to Torus*, 2004; *Comprehension of Requisite Variety for Sustainable Psychosocial Dynamics: transforming a matrix classification onto intertwined tori*, 2006; *Comprehension framed by "Torus"*, 2012; *Complexification of Globalization and Toroidal Transformation*, 2010).

In contrast to right-left, up-down thinking, are such depictions adequately representative of the non-trivial complexity of global governance?

Unexamined fundamental choice in mapping reading directionality

With regard to the initial choice of reading modality, a valuable clarification is offered by [Xavier Sallantin](#) (*L'épistémologie de l'arithmétique*, 1976) in terms of an *a priori* relational prerequisite to establishing agreement. He cites the familiar case of a referee tossing a coin for captains before a football match when -- depending on culture -- "yes" may be denoted by a "nod" or a "shake" of the head. The ambiguity is also recognized in the distinction between perceiving a glass as being "half-full" rather than "half-empty".

As noted separately (*Phenomenological implications of "Fundierung" for "Epi-thinking"*, 2013), such a fundamental cognitive prerequisite is discussed with regard to [Edmund Husserl's](#) understanding of *Fundierung* ([Gian-Carlo Rota](#), *Fundierung as a Logical Concept*, *The Monist*, 72, 1989; [Sonja Rinofner-Kreidl](#), *Husserl's Fundierungsmodell als Grundlage einer intentionalen Wertungsanalyse*, *Metodo. International Studies in Phenomenology and Philosophy*, 1, 2013, 2; [Fabrice Correia](#), *Husserl on Foundation*, *Dialectica*, 2004).

A related challenge to communication of insights into global coherence is associated with the assumption that it can be appropriately depicted on the flat surface typical of text -- or the presentation of any mathematical proof or tabular representation (as in an "atlas").

The plane as a surface of representation, in contrast with the torus, has become significant to the discussion of the relationship between form and medium in advanced theories of communication. As discussed in greater detail elsewhere (*Beyond the plane: form and medium in terms of the calculus of indications*, 2006; *Description, indication, depiction and form*, 2008), this notably featured in the work of [Niklas Luhmann](#) (*Die Gesellschaft der Gesellschaft*, 1997) and discussed by [Michael Schiltz](#) (*Form and Medium: a mathematical reconstruction*, *Image [and] Narrative*, 6, 2003) in relation to the calculus of indications of [George Spencer-Brown](#) (*Laws of Form*, 1969/1994).

Schiltz further notes that form/medium is "the image for systemic connectivity and concatenation", as described by [Humberto Maturana](#) and [Francesco Varela](#). Schiltz notes, that the notion of "space" is the key to reflexivity appropriate to any discussion of form and medium, citing Spencer-Brown as follows:

In all mathematics it becomes apparent, at some stage, that we have for some time been following a rule without being aware of it. This might be described as the use of a *covert convention*. [...] Its use can be considered as the presence of an arrangement in the absence of an agreement. For example, in the statement and theorem.... it is arranged (although not agreed) that we shall write on a plane surface. **If we write on the surface of a torus the theorem is not true** [...] The fact that men have for centuries used a plane surface for writing means that, at this point in the text, both author and reader are ready to be conned into the assumption of a plane writing surface without question. But, like any other assumption, it is not unquestionable, and the fact that we can question it here means that we can question it elsewhere [...]

More intriguing is the sense in which science can be understood as functioning as an extremely valuable mirror by reinforcing processes which mirror its dysfunctionality. As the embodiment of the antithesis of personally significant meaning, it claims the contrary, namely through claiming so effectively to be what it is not (echoing the insights of [George Spencer-Brown](#), *Laws of Form*, 1960). This invites insightful disagreement, such as that of [Claus Janew](#) (*Laws of Form: why Spencer-Brown is missing the point*).

Implications for directionality of reading from other frameworks

Hemispheric lateralization of the brain: There is clearly a complex of issues to be explored involving reading direction, cognition,

handedness and **lateralization of brain function** (M.K. Holder, *What does Handedness have to do with Brain Lateralization?* 2005). This has been explored in relation to bias in the spatial-numerical association of response codes (mentioned above).

Laterization -- especially given the sense of *which side is someone on* -- currently lends itself to exploration as a metaphor, given the manner in which global society is considered to be divided into hemispheres whose political economies it is variously sought to integrate for strategic purposes (*Engendering Viable Global Futures through Hemispheric Integration: a radical challenge to individual imagination*, 2014).

Axes of bias in reading: A 7-fold set of dimensions is especially interesting in the light of the recognition of 7 of axes of pre-logical bias in discourse, understood as together determining potential debating positions on any theme. The analysis was developed by the philosopher W. T. Jones, using the example of the long-standing academic dispute on the nature of the romantic period (*The Romantic Syndrome: toward a new method in cultural anthropology and history of ideas*, 1961), as discussed separately (*Systems of Categories Distinguishing Cultural Biases*, 1993).

The pattern of distinctions can be explored with respect to various domains (employment, dialogue, etc, ***).

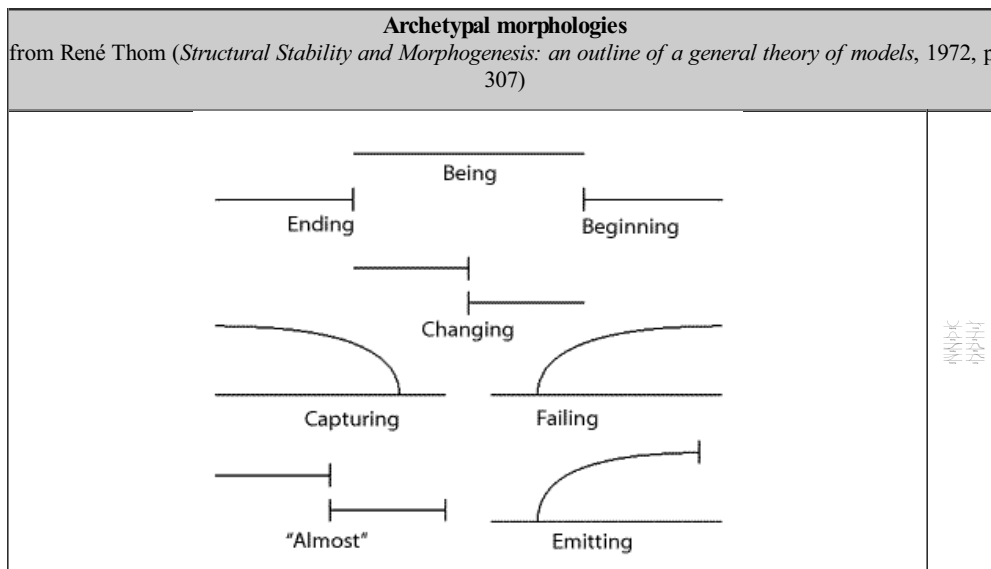
In summary, the preferential axes of methodological bias distinguished by Jones take the following form:

- *Order vs Disorder:* Namely the range between a preference for system, structure, conceptual clarity, etc. and a preference for fluidity, muddle chaos, etc.
- *Static vs Dynamic:* Namely the range between a preference for the changeless, eternal, etc. and a preference for movement, for explanation in genetic and process terms, etc.
- *Continuity vs Discreteness:* Namely the range between a preference for wholeness, unity, etc and a preference for discreteness, plurality, diversity, etc.
- *Inner vs Outer:* Namely the range between a preference for being able to project oneself into the objects of one's experience (to experience them as one experiences oneself), and a preference for a relatively external, objective relation to them.
- *Sharp focus vs Soft focus:* Namely the range between a preference for clear, direct experience and a preference for threshold experiences, felt to be saturated with more meaning than is immediately present.
- *This world vs Other world:* Namely the range between preference for belief in the spatio-temporal world as self-explanatory and preference for belief that it is not and can only be comprehended in terms of other frames.
- *Spontaneity vs Process:* Namely the range between a preference for chance, freedom, accident, etc and a preference for explanations subject to laws and definable processes.

Whatever the extreme, especially intriguing is the sense in which those favouring a particular style of "reading reality" will demonize the contrasting style -- reframing and reclaiming as its own the "positive" features (as they are understood).

Archetypal morphologies: Reverting to the 16 modalities, it is however striking to consider that they may be seen as constituting analogous functions to the distinctions provided by René Thom between "archetypal morphologies" -- notably for semiotic purposes (*Esquisse d'une Sémiophysique: physique aristotélicienne et théorie des catastrophes*, 1989).

Thom presents the set of 16 indicated below, as discussed separately (*Eliciting a Universe of Meaning -- within a global information society of fragmenting knowledge and relationships*, 2013). ****, of which 12 merit comparison with the functions indicated by the signs of the zodiac, and possibly even their forms. ***** The first 4 (top left, below) could be considered "primitives". Such a comparison is even more justified by Thom's subsequent consideration of the pattern below in terms of their cognitive implications as processes, following his semiotic generalization (*Esquisse d'une Sémiophysique: physique aristotélicienne et théorie des catastrophes*, 1989).



As noted by Thom with respect to his approach:

It may seem difficult to accept the idea that a sequence of stable transformations of our space-time could be directed or

programmed by an organizing center consisting of an algebraic structure outside space-time itself. The important point, as always, is to regard it as a language designed to aid the intuition of the global coordination of all the partial systems controlling these transformations. (1972, p. 119)

One of the basic postulates of my model is that there are coherent systems of catastrophe (**chreods**) organized in archetypes and that these structures exist as algebraic entities independent of any substrate, but it must not be forgotten that the substrate does have a part fundamental in the dynamic of these forms. (p. 316)

From where, then, does our feeling of beauty come? From the idea that the work of art is not arbitrary, and from the fact that, although unpredictable, it appears to us to have been directed by some organizing center of large **codimension**, far from the normal structures of ordinary thought, but still in resonance with the main emotional or genetic structures underlying our conscious thought. (p. 316)

So what I am offering here is not a scientific theory, but rather a method: the first step in the construction of a model is to describe the dynamical models compatible with an empirically given morphology, and this is also the first step in understanding the phenomena under consideration. It is from this point of view that these methods, too indeterminate in themselves, lead not to a once-and-for-all explicit standard technique, but rather to an art of models. (p. 323)

Many of my assertions depend on pure speculation and may be treated as day-dreams, and I accept this qualification -- is not a day-dream the virtual catastrophe in which knowledge is initiated? At a time when so many scholars in the world are calculating, is it not desirable that some, who can, dream? (p. 325)

The implications of Thom's work, notably in relation to psychological types, are discussed separately *Potential emergence of coherent transformational connectivity* (in the context of *In Quest of a Dynamic Pattern of Transformations: sensing the strange attractor of an emerging Rosetta Stone*, 2012). Thom is of course renowned for his work on **catastrophe theory**, to which the above morphologies are naturally related. This suggests that the creative process is a succession of elementary catastrophes -- phases which can be characterized and denoted by the zodiac signs. Cognitively these catastrophes are potentially related to questions, as discussed separately (*Conformality of 7 WH-questions to 7 Elementary Catastrophes: an exploration of potential psychosocial implications*, 2006).

Psychological typing: With respect to biases in reading directionality, there is arguably an interplay between **psychological types** (notably as developed by Carl Jung), and cultural types. Explorations of any such interplay are of course highly controversial, as summarized separately (*Systems of Categories Distinguishing Cultural Biases*, 1993)

With respect to the table above suggesting 16 reading modalities, this might be fruitfully explored in the light of 16-fold typing theories (notably the **16 Personality Factors of Raymond Cattell** and the **Myers-Briggs Type Indicator**).

Pattern language: Recognition that the set of reading directionalities effectively constitutes a **pattern language**, recalls the interest of **Christopher Alexander** as originator of the term (*A Pattern Language*, 1977). In contrast to the emphasis on a particular pattern of reading, the focus of that study was on the appropriate use of a variety patterns in any undertaking. The implications can be taken beyond his design concerns with the physical environment, as explored separately (*5-fold Pattern Language*, 1984; *Polyhedral Pattern Language: software facilitation of emergence, representation and transformation of psycho-social organization*, 2008).

Alexander's work has long been inspired by an interest in Middle Eastern carpet design, as separately discussed (*Harmony-Comprehension and Wholeness-Engendering: eliciting psychosocial transformational principles from design*, 2010). More fruitful understanding of any table of reading directionalities could be explored in that sense. As discussed there, in contrast to the concern above with 16-fold and 14-fold mappings, in Alexander's later work particular attention is made to the representation of 15 transformations (*Tentative adaptation of Alexander's 15 transformations to the psychosocial realm*, 2016).

Governance as a martial art? The strategic challenges of governance are currently intimately associated with "martial arts", possibly framed in religious terms as crusades or jihad. There is therefore a case for taking account of strategic options and clues from the martial arts of both West and East, as well as understandings of "spiritual combat" as variously framed by religions. This is especially relevant in a period in which "information warfare" and "memetic warfare" are increasingly considered (*Noopolitics and memetic warfare within the noosphere*, 2014; Brian J. Hancock, *Memetic Warfare: the future of war*, *Military Intelligence Professional Bulletin*, April-June 2010). Such an exploration can be framed in general terms, potentially to be associated with the pattern of reading modalities (*Navigating Alternative Conceptual Realities: clues to the dynamics of enacting new paradigms through movement*, 2002; *Ensuring Strategic Resilience through Haiku Patterns: reframing the scope of the "martial arts" in response to strategic threats*, 2008).

Direction of reading as implying fundamental questions of governance?

The number and organization of reading modalities, especially when any configurative mapping is considered, recall the question implicit in the study by George Lakoff and Rafael Núñez (*Where Mathematics Comes From: how the embodied mind brings mathematics into being*, 2000). How is the quest for a degree of comprehensible symmetry related to the human comprehension capacity and constraints - - as these affect governance, whether for the governors or the governed?

The unusual complexity and "irregularity" of the Szilassi polyhedron was indicated above as offering a mapping appropriate to the comprehension challenge -- in contrast with the questionable hopes for a simplistic mapping, as might be offered by more regular polyhedra.

As a speculative extension of the argument, it might then be asked whether the distinct reading modalities are especially related to distinct fundamental questions for governance. Following Lakoff, it could be argued that human minds and cultures may favour fundamental

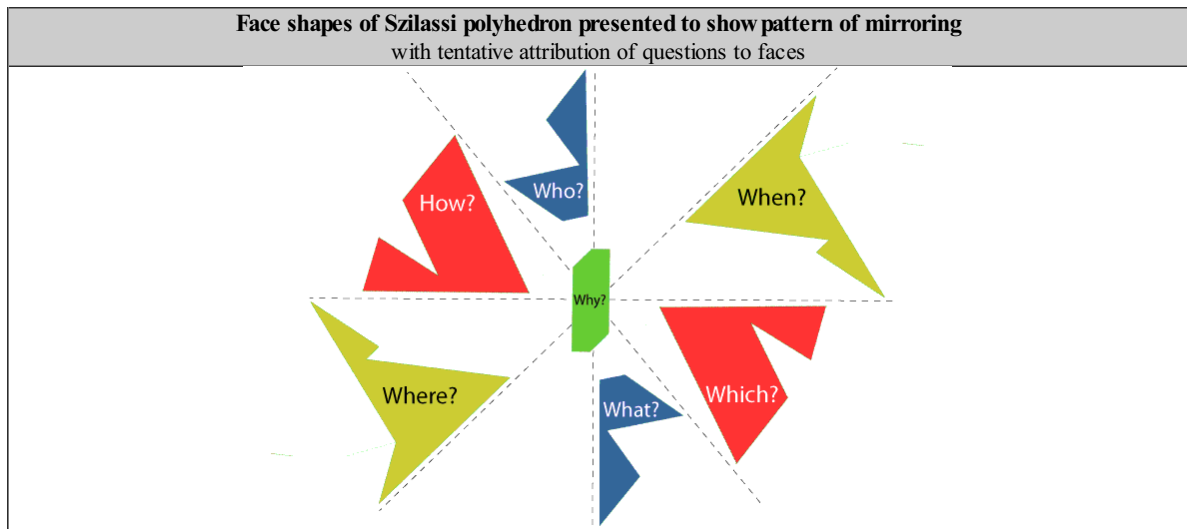
dimensions which emerge as analogues in different domains -- according to the early insights of general systems research. Hence the different frameworks of potential relevance noted above.

A radical approach to reading directions might then be to consider whether these imply distinctive styles of question of relevance to governance as a process of responding to potential catastrophes -- possibly to be identified in some way with the 7 elementary catastrophes highlighted in the work of René Thom (*Structural Stability and Morphogenesis: an outline of a general theory of models*, 1972). As noted, Thom's later concerns were with the semiotic implications (*Esquisse d'une Sémiophysique: physique aristotélicienne et théorie des catastrophes*, 1989).

The argument was developed separately relating those catastrophes to the classic pattern of so-called WH-questions: *which, where, when, who, what, why, how* (*Conformality of 7 WH-questions to 7 Elementary Catastrophes: an exploration of potential psychosocial implications*, 2006). In this sense, does each direction of reading imply what might be recognized as a "deadly question", as separately argued (*World Futures Conference as Catastrophic Question: from performance to morphogenesis and transformation*, 2013)? **Is each reading direction especially sensitive to particular questions, or especially vulnerable to those posed otherwise?**

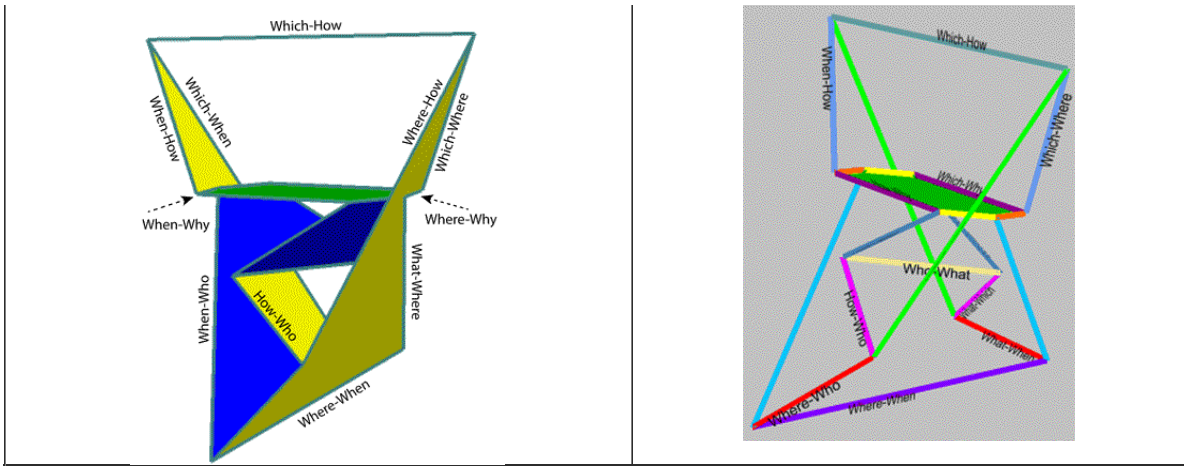
The question is then whether there is any basis for comparison of the 7 axes of reading direction (pairing the 14 modalities above) to the 7 WH-questions. A speculative mapping of these questions onto the Szilassi polyhedron was extensively discussed and illustrated separately (*Mapping of WH-questions with question-pairs onto the Szilassi polyhedron*, 2014). The discussion included the possible implications of a 4D mapping (*Potential insights into the Szilassi configuration of WH-questions from 4D*, 2014).

Mirror pairing: With respect to the hidden symmetry of the Szilassi polyhedron, facilitating its comprehension, this is evident from the image below through the manner in which the shapes of 6 faces are paired as mirror images. Only one of the 7 faces is unpaired. As a preliminary exercise, each of the WH-questions is arbitrarily mapped onto a face. The following images and animations (selected from that presentation) were prepared with the aid of the remarkable *Stella: Polyhedron Navigator* software, produced by Robert Webb (*Stella: Polyhedron Navigator, Culture and Science*, 2000). **The images are presented here to raise the question whether reading directionality is associated with particular questions -- whether singly or paired.**

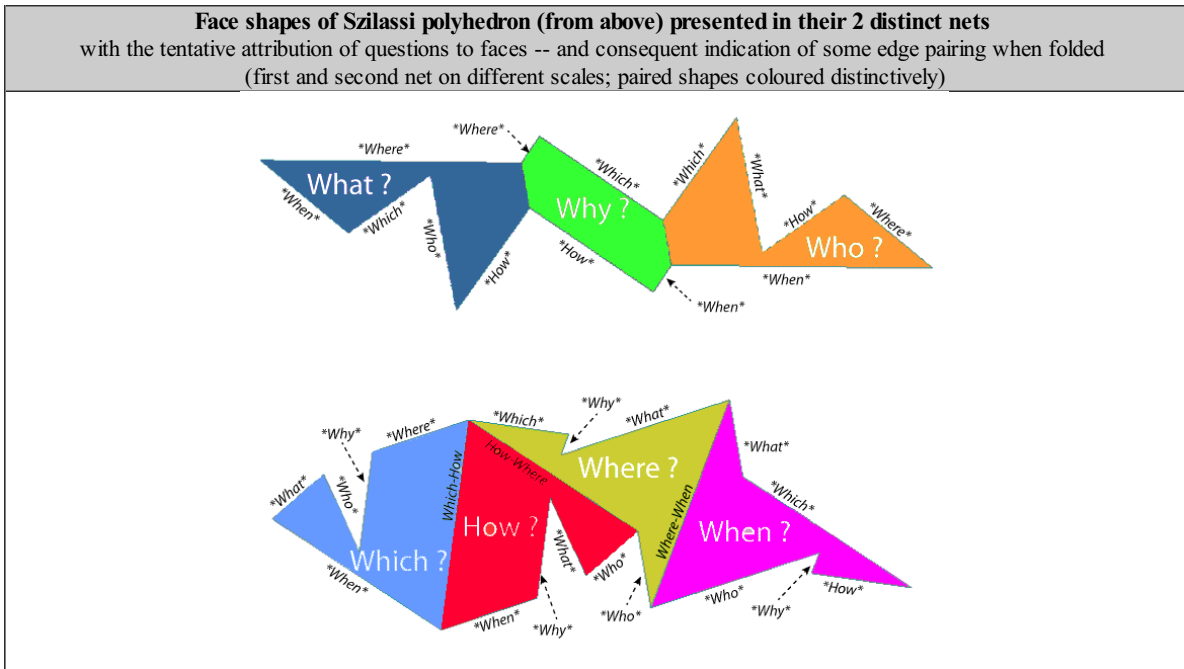


Question-pairs: The association of question-pairs with the edges of the configuration is somewhat clearer from the following image. Again the space-time dimension of physics can be considered as associated with the where-when question-pair. The other question-pairs can be explored as associated with a variety of intangibles fundamental to decision-making in the moment.

Selected views of an indicative mapping of question-pairs onto edges of Szilassi polyhedron (variously rotated; pairs of edge types are identically coloured)	
"How" and "Which" faces (in red above) rendered transparent	Only central face rendered visible



Nets and folding: The Szilassi polyhedron, when unfolded into 2-dimensions, can be understood as being composed of two distinct nets, as presented below. These offer a sense of how the 6-sides faces bind together when folded -- each face being in contact with each of the 6 other faces. Each edge is then a question-pair (as discussed above). These correspond to the contiguous faces. This is clearer in the case of each net separately. It is however vital to emphasize that, like the space-time of fundamental physics, each edge is a continuum. This may be more meaningful in experience in the moment than it is through any formal description. Association of the 3 umbilic catastrophes to the smaller net merits future reflection in the light of semiophysics.



A sense of how the two nets are folded separately into three dimensions is given in the following two sets of images. It is appropriate to note that the software by which these forms have been explored permits the 2-dimensional nets to be output on paper with tabs, permitting them to be folded and glued into 3-dimensional models. Paired shapes are coloured the same (below), in contrast to the distinct colouring of all shapes in the net presentation (above).

Stages in folding first net of the Szilassi polyhedron (images at various scales to facilitate representation; ; paired shapes coloured identically)			
Flat (as above)	Slightly folded 1	More folded	Completely folded

With the completed folding of the second net (final image below), it is then possible to get a sense of how the folded first net "fits" within it. This is of course much clearer in the animation which follows below.

Stages in folding second net of the Szilassi polyhedron (images at various scales; ; paired shapes coloured identically)			
Flat (as above)	Slightly folded	More folded	Completely folded

It is potentially significant that comprehension is facilitated through manipulation of the 3-dimensional form -- in contrast to the expectations and assumptions of what might be termed a "flat Earth" mentality dependent on a 2-dimensional representation. The point has been specifically argued with respect to a more complex polyhedron (Carlo H. Séquin and Jaron Lanier, *Hyperseeing the Regular Hendecachoron*). The need for "hypercomprehension" can be explored more generally (*Hyperaction through Hypercomprehension and Hyperdrive*, 2006).

Animations of Szilassi polyhedron (paired shapes coloured identically)	
Folding together of both nets indicated above (some phases illustrated in screen shots above)	Rotation of polyhedron (variation on version presented above)

Toroidal hole: As a toroidal structure, further insight may be obtained from consideration of the central "hole". Remembering that the attribution of questions to the surface of the structure has been basically arbitrary, associating "why?" with the central platform as the unpaired shape has a degree of justification.

Detailed views through the toroidal "hole" of the Szilassi polyhedron	
View from one side	View from second side

As being potentially indicative of the dynamic experience of "now":

- the hole is framed by 3 question **surfaces** (Who? What? Why?) , with 4 remaining WH-questions being "invisible" from within it - namely the pairs Where? / When? and How? / Which? (in the current mapping). This could be consistent with a sense in which the 3 framing the hole are those more complex, having been provisionally associated (above) with the umbilic catastrophes.
- the hole is bounded by 11 question-pairs as **edges**:
 - the 6 necessarily framing Why? (given the properties of the polyhedron): Where-Why, When-Why, How-Why, Which-Why, Who-Why, What-Why
 - the 5 not directly relating to Why?: Which-Who, What-Where, Who-When, How-What, Who-What
- the hole has 4 distant edges which meet it only in a **vertex point**: Which-Where, How-When, How-Who, What-Which
- the 6 edges **completely dissociated** from the hole are then: Where-When, Where-How, Where-Who, When-Which, When-What, Which-How

Of potential significance is the meaning of (in)visibility in this context, especially if it is suggestive of question-pairs whose nature is ignored or characterized by a unquestioning assumption. Being especially characteristic of (executive) decision, Where-When and Which-How (although notably orthogonal) may be deliberately or inadvertently dissociated from those potentially subtler questioning processes directly associated with the central hole.

The pattern of question-pairs is fruitfully suggestive of a system of cognitive decision processes whose integrative nature is lost when

mapped into the 2 dimensions of any systems diagram or semantic map. It can be understood as indicative of the flow of attention associated with the sense of "now" -- and sustaining it.

Of potential relevance is the sense in which the outer sphere relates to externalities (objective knowns) typical of conventional executive decision-making, whereas the inner sphere relates to questions otherwise held to be implicit or abstract (mysteriously subjective and paradoxically self-reflexive) -- a contrast between explication and implication.

Post-chiral governance -- beyond political handedness?

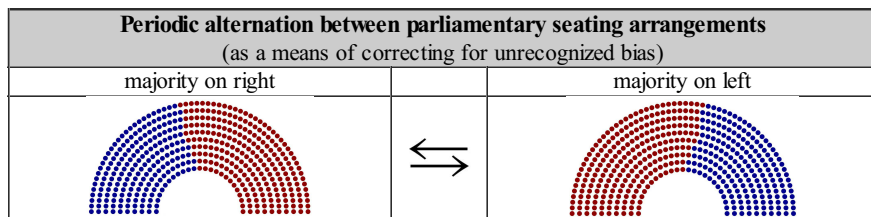
Chirality: It is curious that any movement from right-to-left is deprecated in many contexts (possibly even framed as "sinister" or "evil"), in contrast to movement from left-to-right (readily understood to be indicative of the "good"). This is not the case in dance in which a full range of patterns is explored (including up and down) -- with all that may imply cognitively for integrative expression of human potential.

The distinction is notably explored as significant in biology in terms of [chirality](#) (namely handedness), as well as in nanotechnology (*Exposing "evil twins"*, *Research at University of Cambridge*, 16 May 2014). Noting in passing the issue of handedness in politics, the phenomenon is reviewed in greater detail by James P. Riehl (*Exploring Mirror-Image Asymmetry: an introduction to the origin and consequences of chirality*, 2011).

The possibility of "post-chiral politics" is noted by Herbert Snorrason (*Chirality as a Fundamental Phenomenon*, 27 June 2012). Appropriate to this argument, this theme has now been explored with respect to sustainability in an extensive chapter devoted to *Underlying Disturbing Processes: asymmetries, coriolis and chirality*, by Pierre Massotte and Patrick Corsi (*Sustainability Calling: underpinning technologies*, 2015, pp. 47-82). Given the fundamental importance of handedness in the political framing strategies of governance, it might be asked why there are remarkably few references to chirality in that connection -- despite extensive study of it in the life sciences.

Seating arrangements in legislatures: An extremely modest step towards post-chiral governance could be enabled in those legislative assemblies in which the representatives of the ruling party are habitually seated on the right (or left), with those of the opposition seated on the left (or right) -- as in the famed "Mother of Parliaments". Where seating is in [hemicycle](#) form, some follow a strict left-right arrangement with, for example, a left wing governing party sitting on the left and the right wing opposition on the right (Felix Klingmueller, *A Small Typology of Parliamentary Seating Arrangements*, *Abitare*, 30 April 2013).

Any such conventional seating arrangement could be easily switched periodically as a simple challenge to the reinforcement of habitual thinking, inflexible perspectives and [implicit bias](#).

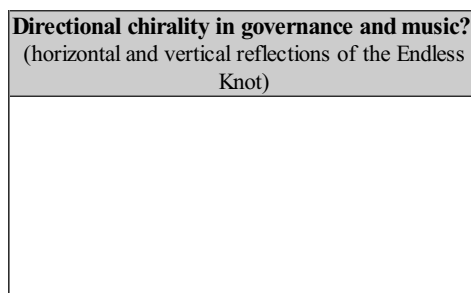


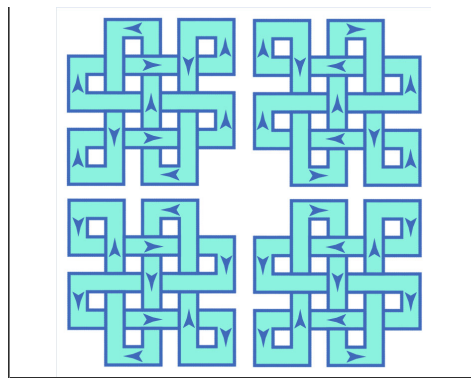
The suggestion is consistent with the practice in many 2-team sports (football, hockey, volley-ball, tennis, etc), in which teams "switch ends" at half-time to compensate for any unfair advantage from one end or the other. Of particular interest would be the arguments advanced resisting any such proposed change in parliamentary assemblies. How is "reading the legislative chamber" framed otherwise by such dynamics ([David Kantor](#), *Reading the Room: group dynamics for coaches and leaders*, 2012)?

There is some irony to the controversial movement of the European Parliament from Brussels to Strasbourg every month (at great cost in a period of austerity) -- whether or not this is associated with different seating arrangements (*The three places of work of the European Parliament; The farce of the EU travelling circus*, *The Telegraph*, 11 January 2014).

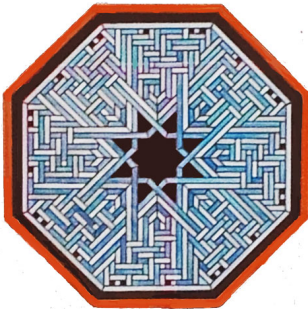
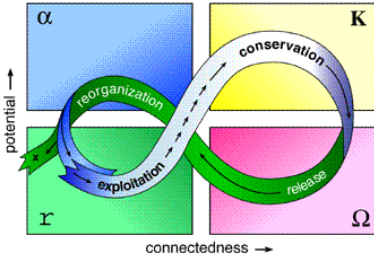
Governance in terms of Gordian knot?: Given the patterns in terms of which political and strategic dynamics might be "read", there is a strange resemblance of the set (in the schematic above) to the classic [Endless Knot](#). The challenge of governance could even be fruitfully explored as in the light of the [Gordian knot](#) to which a number of strategic studies refer, as discussed separately (*Mapping grossness: Gordian knot of governance as a Discordian mandala?* 2016).

This suggests the following a speculative exercise in chirality. The top right quadrant there is the vertical reflection of that on the top left. The bottom right is the horizontal reflection of that on the top left. The bottom right is the vertical reflection of that on the bottom left. The directions represented within each quadrant are then variously similar or inverted with respect to those in the other quadrant.





Individually, but especially when combined or superimposed, the quadrants are reminiscent of the famous [Gordian Knot](#) which features in discussions of governance, as summarized separately ([Mapping grossness: Gordian knot of governance as a Discordian mandala?](#) 2016). As might be expected, "Endless Knot" has been adopted as the name of a music group -- whose productions are readily available on the web. The following images suggest further insight. That on the (adapted from a variant of

Complementary clues to further implication?	
As discussed by Keith Critchlow (<i>Islamic Patterns: an analytical and cosmological approach</i> , 1983)	As discussed by Thomas Homer-Dixon (<i>The Upside of Down: catastrophe, creativity, and the renewal of civilization</i> , 2006)
	
8-fold Islamic pattern (complexification of the 4-fold variant above)	Connecting the directions (as reproduced from <i>Panarchy</i> , as described by The Sustainable Scale Project)

Reading arrays: Rather than the preoccupation with reading directionality, this may be understood as a particular instance of reading an array, namely how an array of indicators is scanned -- even images on a page, or details of a painting. This is evident to a degree in the manner in which voting in a legislative assembly may be presented on a panel reflecting the seating arrangement. Other examples implying a variety of understandings of governance include a chess (or go) board, a dynamic display of military battle (as in a control room), a stock quotation indicator board, and a control panel (factory, vehicle, etc). All elicit multi-directional "reading" skills critical to governance -- contrasting with the overly simplistic bidirectional left-right pattern. Of particular interest is how information in the array is then integrated. This is a focus of "cognitive fusion" research to enhance decision-making capacity of a fighter aircraft pilot faced with an instrument panel ([Cognitive Fusion and Groupthink](#), 2007; [Enactivating a Cognitive Fusion Reactor](#), 2006).

Bias in reading may also be introduced through the colours used in any array -- as exemplified in the simple case of the parliamentary seating arrangement above. As with directionality, the point to be stressed is the psychological association to one colour or another in different cultures, as highlighted by [Colin Cherry](#) (*On Human Communication*, 1966). He notes that whilst there is no difficulty in translating the colour "red" into and from Russian, the associations in the two languages are very different. In English: blood red, red in tooth and claw, red with anger, red light district, etc. In Russian the translation of "red" is synonymous with "beautiful" and has associations equivalent to the English "golden" - hence "Red Square" and the "Red Army" should be meaningfully translated as the "Golden Square" and the "Golden Army". There is little sense of how this plays out in the tensions between political parties, especially in the light of the primary colour with which they are associated -- and by which they may be appreciated or deprecated, as with the "Greens".

The issues can be framed in terms of defining reading comprehension, as argued with respect to text alone by [Catherine Snow](#) (*Reading Comprehension: reading for learning*, In: Vibeke Grøver Aukrust, *Learning and Cognition*, 2011):

The dilemmas posed by considering different levels of processing of this brief text are, of course, greatly expanded if we consider the comprehension of longer and more complex texts, from paragraphs to newspaper reports or scientific articles to entire novels, let alone trying to establish what constitutes comprehension when reading an array of texts -- reports of a political speech in right-wing versus left-wing newspapers, or scientific articles reporting conflicting results, or the entire oeuvre of a novelist -- in conjunction with one another. At some point between the simple sentence above and the several volumes of *Remembrance of Things Past*, the definition of comprehension shape-shifts from a simple representation of an event to deep understanding of a worldview, but fixing the boundary between those activities is not easy. (p. 192)

The argument with respect to text only implies the comprehension associated with patterns of relationships between elements of an array

as is more evident in the comprehension of a network in which points in the array are variously related by lines -- effectively a concept map or mind map of some kind. This is implicit in the appreciation of the "tensions" between the various pieces on a chess board at some stage in the game -- or between the "players" in any parliamentary assembly. It is especially evident in the capacity of those controlling movement, as displayed for air traffic, train movement, or factory processes.

The last examples further highlight the relevance to governance -- implicit in the capacity to read and intervene strategically in a game board. In this respect, much has recently been made of the success of artificial intelligence with respect to the game of go (*Artificial intelligence: Google's AlphaGo beats Go master Lee Se-dol*, *BBC News*, 12 March 2016). Of related interest is the current use of games to elicit new knowledge, as might be desirable in the decision-making arenas of governance (*Karen Schrier, Knowledge Games: how playing games can solve problems, create insight, and make change*, 2016). A review of the latter notes their potential relevance to the solution of the so-called **wicked problems** of governance:

Indeed, most social and political problems are "wicked": health issues that combine social and biological causes, such as heart disease; how to help children struggling at school; high rates of recidivism among prisoners. Can games help? Why not? Compared with other collective problem-solving activities, they unite people with different experiences in a uniquely structured and motivating way. (Douglas Heaven, *Can video games really create new knowledge?* *New Scientist*, 25 May 2016)

Pattern variation: The variety of patterns open to exploration is consistent with the variations explored in music. Given the importance attached to Beethoven's musical insight -- through its adoption as the **Anthem of Europe** -- the argument above invites attention to his capacity to generate the *32 Variations on an Original Theme in C minor* (1806) following the earlier initiative of **Johann Sebastian Bach** (*30 Goldberg Variations*, 1741). The latter were notably a feature of the study on self-reflexivity by **Douglas Hofstadter** (*Gödel, Escher, Bach: an eternal golden braid*, 1979).

As musical metaphors imply, rather than seeking to understand chirality in static structural terms, there is a case for exploring the dynamics of alternation between mirror images and complementaries (*Metaphors of Alternation: an exploration of their significance for development policy-making*, 1984). For governance, much remains to be learned from the supposedly well-known process of walking -- in contrast to current efforts to hop on one leg, limping, or stagger (*Transcending duality as the conceptual equivalent of learning to walk*, 1994; Rick Aster, *Walking is More than a Metaphor*, 2006; Forerunner Commentary, *Bible verses about Walking Metaphor*).

Does the current problematic coordination of global governance merit exploration in pathological terms -- as being "governance by spasm"? Is the global brain currently afflicted with an analogue to **cerebral palsy**, especially in the light of reports on the effect of the disease on the corpus callosum (*Corpus Callosum of the Global Brain? Locating the integrative function within the world wide web*, 2014)?

As separately discussed, given current difficulties with the "extremities" of the **political spectrum**, an even richer source of insight may be found in flying, rather than through deprecating one or other "political wing", or seeking desperately to "block" its use (*Counteracting Extremes Enabling Normal Flying: insights for global governance from birds on the wing and the dodo*, 2015). This explored the following themes:

- Underside of normality?
- Lost art of bird watching?
- Bird flight as offering a global transformation of systemic perspective
- Styles of flight as styles of governance
- Empowering democratic take-off through coordinated wing flapping
- Lift, banking and control as functions of radical extremes
- Reducing extremism by reduction of "wing length"?
- Speculative alternatives for global governance?
- Evolutionary possibilities for global governance?

The question is whether there is more to be imaginatively explored in relation to governance and the capacity of birds to fly than has been derived in the development of the helicopter and drones (*Engendering a Psychopter through Biomimicry and Technomimicry: insights from the process of helicopter development*, 2011). However, with respect to how insights might be mistakenly applied to forms of governance which already "fly of their own accord", a cautionary comment is offered by **Pablo Triana** (*Lecturing Birds on Flying: can mathematical theories destroy the financial markets?* 2009). Is there a larger systems perspective to be elicited which might be of relevance to enabling global governance to really take-off and fly?

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