



laetus in praesens

Alternative view of segmented documents via Kairos

12 March 2018 | Draft

Symbolizing Collective Remembering Otherwise

Encompassing the "headless hearts" and "heartless heads" through their dynamic entanglement

- / -

Introduction

Ring, loop and Ouroboros

Breaching the "circle of trust": contemporary tragedy of the "broken ring"

Misleading triadic approximations of ring dynamics

Heart symbol as articulation of ring symbol

Possibilities of interrelating ring and heart curve

Aesthetic dimensions of the heart?

Fragmented psychosocial systemic dynamics in quest of an elusive integrative pattern

Interpretation of the heart pattern via the coaction cardioid

Relating the heart pattern to the magic square and the BaGua mirror

Implied dynamics of the heart symbol -- the "cardiac cycle" otherwise interpreted

Systemic understanding of "Cupid's arrows" as binary cyclic triggers?

Heart symbol as a standing wave pattern of feedback loops

Cognitive engagement with complexity through articulation of the heart pattern in playing cards

Implications of a 3D heart symbol

Remembering as rediscovering or reinventing the wheel

References

Introduction

There is increasing concern with [collective memory](#) -- with how the past is remembered. This has renewed debate about how history is remembered and variously rewritten to further particular agendas (Ludmila Isurin, *Collective Remembering: memory in the world and in the mind*, 2017; Michelle L. Meade, et al, *Collaborative Remembering: theories, research, and applications*, 2017; Alin Coman, et al., *Collective Memory from a Psychological Perspective, International Journal of Politics, Culture, and Society*, 22, 2009).

One striking current example is new legislation in Poland penalizing any declaration that Poland was directly responsible for the tragedies there during the period of Nazi occupation (*Poland is trying to rewrite history with this controversial new holocaust law, The Conversation*, 16 February 2018). The events in the Middle East are variously remembered and assertively described (J. C. Goldfarb, *Resistance and Creativity in Social Interaction: for and against memory in Poland, Israel-Palestine and the United States, International Journal of Politics, Culture, and Society*, 22, 2009, 2). Australia is a continuing focus of what are described as the "history wars" relating to the massacres of indigenous peoples in centuries past under colonial auspices. Similar issues are evident in other countries with indigenous populations subjugated by colonizing peoples. The new government in France is explicit in its determination to reframe the history curriculum to cultivate a positive appreciation of France -- thereby diminishing recognition of questionable responsibilities in times past (Chiziwiso Pswarayi, *The Rewriting of History in Action: President's Macron's Africa narrative, Global Public Policy Watch*, 8 September 2017).

The concern here is with the symbols through which collective memory is enabled, notably in the light of insights into the manner in which this has been achieved in civilizations of the past (Lynne Kelly, *The Memory Code*, 2016). The question is how to frame the quest for approaches of relevance to the present and the future, as separately argued (*In Quest of Mnemonic Catalysts -- for comprehension of complex psychosocial dynamics*, 2007). This follows from earlier concern with erosion of collective memory (*Societal Learning and the Erosion of Collective Memory*, 1980).

The exploration here exploits the metaphors through which two contrasting modes of comprehension are frequently framed -- namely those of the "head" and those of the "heart". Those of the "head" are most evident in the mode of rational argument typical of the

academic, political, military and business worlds -- caricatured as "talking heads". These are a feature of the optimistic logic of ever greater integrative globalization, most readily symbolized as a sphere and commonly depicted in two dimensions as a circle. Those of the "heart" are most evident in discourse emphasizing lived experience and the associated feelings -- especially of traumatic events of the past. The coherence of these feelings, especially with respect to interpersonal relations, is widely depicted with the symbol of a heart. Those identifying with that modality are typically caricatured in their turn as "bleeding hearts" -- in contrast to those deprecated as being "hard hearted" in priding themselves on being "hard headed".

These two extremes are a challenge to each other which can be usefully caricatured as a continuing battle between the "headless hearts" and the "heartless heads". Proponents of the "head modality" deplore their lack of credibility in the eyes of those attaching far greater weight to the "heart modality". Proponents of the heart modality regret the heartlessness and impersonality characteristic of the models and policies of those of the head modality. Arguably each modality reflects a partial insight whose limitations undermine any more integrative comprehension.

Central to that comprehension might be the nature of care as it is understood within each modality -- compassion for the one, vigilance for the other. These would be matched by the nature of carelessness in each case -- a blindspot with regard to the future and negligence of systemic issues beyond those which attract immediate attention, whether from a head or heart perspective.

It is of course the case that the "heads" may well experience empathy/sympathy and antipathy/animosity for each other to a degree which may be fundamental to their relationships -- and giving rise to epic disputes (*Knowledge Processes Neglected by Science: insights from the crisis of science and belief*, 2012). Similarly the "hearts" may be called upon to "use their heads" -- notably in navigating romantic affinities. The question is through what richer symbolism the two modalities might be related to enable a more fruitful mode of understanding.

The epic battle between them is now epitomized by their respective approaches to the [refugee crisis](#), most notably in Europe. The "hearts" advocate an open-armed response -- at any cost to the cultures receiving them. The "heads" express caution and increasing resistance -- expressed through [populism](#) -- setting aside their economic benefits from the sale of arms to countries engendering such displacement. Curiously both avoid the the long-term implications of unconstrained flow of desperate people from countries with ever increasing populations. Both are careless in that respect.

The question is whether the perspectives with which the contrasting values are associated can be encompassed by some form of "collective re-remembering" of their preferred symbols -- perhaps dynamically rather than statically, as can be variously argued (*From Statics to Dynamics in Sustainable Community*, 1998; *Dynamic Interrelationship of Symbols of Coherent Experiential Representation of Nonduality*, 2008; *Dynamic Transformation of Static Reporting of Global Processes*, 2013). Is there a minimal memorable articulation to be recognized which could serve a symbolic function meaningful to both the heads and the hearts?

As an exercise in symbolism, the approach taken here is to reconcile the geometry of the circle/sphere with that of the heart. This has been a feature of geometric exploration as a [cardioid](#). One of the [several forms of "heart curve"](#) is indeed generated dynamically by rolling a circle around another of the same radius -- although this does not give rise to the preferred form of the heart as so widely depicted. A framework for the approach is provided through previous consideration of [polyamory](#) -- itself necessarily controversial as a fundamental challenge to binary traditions (*Global Civilization through Interweaving Polyamory and Polyanimosity? Loving/Hating the world otherwise through contractual bonding with any significant other*, 2018). The symbol preferred by the proponents of polyamory is a heart through which is intertwined an [infinity symbol](#) -- possibly to be recognized more significantly as a [Möbius strip](#) in three dimensions, given the paradoxes implied.

The reconciliation of the contrasting symbols through the dynamics associated with the cardioid offers a means of highlighting a fourfold set of processes deemed fundamental to group dynamics and psychosocial cohesion -- as exemplified by [flocking behaviour](#) and simulation of "boids", as increasingly evident on social media (*Dynamically Gated Conceptual Communities*, 2004). As framed by [Jamie Davies](#) (*Life Unfolding: how the human body creates itself*, 2014), these are: attraction (promising), repulsion (divorcing/alienation), searching/researching, and alignment (compromise),

Ring, loop and Ouroboros

An appropriate symbol of relevance to this argument -- the ring -- is curiously shared by the "heads" and the "hearts".

For the heads, it features extensively in mathematics in the form of the circle and its transformations. It implies various forms of closure in argument. It is the basis of the dynamics of the ring structure of the [benzene molecule](#) -- as a [resonance hybrid](#) -- so fundamental to organic life. In the form of the dynamics of a [feedback loop](#), the ring is vital to the design and operation of process control systems. As a consequence, social policy is variously concerned with [vicious loops](#) (and cycles of violence) and the possibility of virtuous loops.

For the hearts, a ring naturally complements the heart as a symbol of mutual engagement -- variously extended through ritual to imply fealty and obedience. It can be held to embody the highest values, whether alone or as enhanced by precious stones. The intimacy of some groups -- even the secrecy of the bond they share -- is readily defined in terms of a ring. This may of course extend to patterns of ritualised handshake agreements defining cartels and secret societies. Related forms, which may be worn, of course include bracelets, necklaces, circlets of beads, formal sashes, and the like (*Designing Cultural Rosaries and Meaning Malas to Sustain Associations within the Pattern that Connects*, 2000; *Engaging with Globality through Cognitive Circlets -- 2nd Dimension: Learning/Action cycles*, 2009).

The [Ouroboros](#) of various mythical traditions, and recently valued by cosmologists, can be seen as the most cognitively charged form of circle, as separately argued (*Complementary visual patterns: Ouroboros, Möbius strip, Klein bottle*, 2017). The Ouroboros was central to a recent exhibition on *Never Ending Stories: the loop in art, film, architecture, music and cultural history* (Kunstmuseum Wolfsburg) as summarized and illustrated by [Joobin Bekhrad](#) (*The Symbol that Spanned Millennia*, BBC: *Art History*, 4 December 2017).

For [Jamie Davies](#) (*A Closed Loop*, *Aeon*, September 2014):

Beyond Earth, life without DNA is just about thinkable.... Life without feedback loops, though? I have never met any biologist who can imagine that. The helix is too well-established an icon to be deposed any time soon. And yet, a simple loop would be a much more universal symbol of how life works at all of its scales and levels. Perhaps the Ouroboros, beloved of gnostics and alchemists, has been an ideal symbol waiting in the wings for centuries: there can surely be no more evocative symbol of feedback than a snake growing by devouring its own tail.

It is for such reasons that the possibility of designing instructive animations has been separately considered (*Experimental animations in 3D of the ouroboros pattern*, 2017).

Breaching the "circle of trust": contemporary tragedy of the "broken ring"

The widely noted breakdown of social relationships can be usefully characterized in terms of "broken ring" symbolism. This could imply that it is increasingly less feasible to "circle the wagons" -- other than in the most limited and defensive manner. The implications are of course evident in the increasing incidence of divorce, given the manner in which the ring symbolizes the marital bond. They are of course evident in the loss of credibility of ritual use of circlets of prayer beads.

The argument could be extended to the preoccupations of the "talking heads" with various forms of closure, most notably in policy determination. Clearly closure remains elusive with respect to theory, most evidently that of an interdisciplinary nature. It is even more tragically elusive in the case of interrelating the religions so fundamental to the justification of violence in this period, as in the past. Such points lends themselves to speculative exploration (*The-O ring: Theory, Theorem, Theology, Theosophy? a playful intercultural quest for fruitful complementarity*, 2014; *The-O Ring and The Bull Ring as Spectacular Archetypes: dramatic correlation of theatre, theory, theorem, theology, and theosophy*, 2014).

Problematic dynamics imagined in symbolic terms in relation to a ring are a feature of recent myth-making, whether by [J. R. R. Tolkien](#) (*The Lord of the Rings*, 1949) or by [Richard Wagner](#) (*The Ring of the Nibelung*, 1876). Provocatively it could be said that the first appeals primarily to the "hearts" whereas the latter appeals primarily to the "heads". Both could be said to hold insights into the functioning of cycles vital to the psychosocial system (*Cognitive Cycles Vital to Sustainable Self-Governance: The Lord of the Rings as an emergent integrative dynamic*, 2009; *Relevance of Mythopoeic Insights to Global Challenges: cognitive integration implied by the Lord of the Rings*, 2009).

The tragedy in terms of global policy making, and the popular credibility it aspires to engender, is that critical feedback loops could readily be understood as "broken", neglected or completely unrecognized, as separately argued (*Variety of System Failures Engendered by Negligent Distinctions*, 2016; *Neglect of systemic imbalance*, 2004; *Neglected implicit cognitive cycles in viable complex systems*, 2017). The tragic condition of the global environment could be readily framed in terms of a "broken ring" of systemic feedback loops -- from a policy perspective and collective care. Rather than being "re-membered", the whole has been widely "forgotten". In mythological terms such loops can also be understood as vulnerable to exploitation (*The "Dark Riders" of Social Change: a challenge for any Fellowship of the Ring*, 2002).

More specifically this can be understood in terms of negligence with regard to [negative feedback](#) ([William T. Powers](#), *The Neglected Phenomenon of Negative Feedback Control, Living Control Systems*, March 2004). It can also be explored in terms of constrained ability to recognize vulnerability to failure (*Variety of System Failures Engendered by Negligent Distinctions*, 2016). Both the "heads" and the "hearts", for similar reasons, have an understandable preference for the avoidance of self-critical thinking methodologies which may call into question the nature of their comfort zones (*Question Avoidance, Evasion, Aversion and Phobia: why we are unable to escape from traps*, 2006).

The inability to engage effectively with this potential for failure is a feature of attraction to utopias. It is usefully summarized in a description of the psychosocial preoccupation of [Félix Guatteri](#):

No matter how communal the initial struggle, sooner or later the collective will dissolved into a competition between individual desires - with one person eventually emerging as the leader, at the expense of the others. Why do collaborations always collapse into hierarchies, he asked himself? Why does the group get atomised, rather than retaining a unified voice? ([Edward Thornton](#), *Two's a Crowd*, *Aeon*).

The challenge of any such collective ideal condition -- currently framed as sustainability -- is otherwise called into question by [Michael Shermer](#) (*Utopia is a dangerous ideal: we should aim for 'protopia'*, *Aeon*, March 2018; *Heavens on Earth: the scientific search for the afterlife, immortality, and utopia*, 2018).

Such "negative" conclusions raise the question whether the current preoccupation with the "positive" detracts from a more healthy comprehension of the "negative" -- as remarkably illustrated through their role in electricity. This suggests that there is a dynamic between "positive" and "negative" which has as yet to be rendered comprehensible in psychosocial system dynamics. The beating heart, if only as an electromechanical system, offers clues in that respect.

It is in this respect that there is considerable irony to use of the heart symbol on the cover of a special issue of *New Philosopher* -- a symbol to which the many contributors make no reference. The editorial does however highlight the challenge of the "heartbroken".

Encaging life through unintegrated formalisms -- only too obviously characterized by "holes"	
	<p><i>What is the meaning of life?</i> (<i>New Philosopher</i>, 19, 2017)</p> <p>Pondering the meaning of life is not just the domain of Pythons and philosophers. Curious eight-year-olds, heartbroken teens, and expiring octogenarians alike reflect on life's meaning, if only in difficult or dull moments. And, much like the legions of thinkers before them, they can't agree on an answer. Some say it's 'love'; others 'learning how to die'; or 'flourishing'; or, one that's particularly popular among teens and philosophers, 'there is no meaning'.</p> <p><i>(Editorial extract; emphasis added)</i></p>

Whether in cybernetic or symbolic terms, it can be usefully asked "what flows" through an unbroken ring that is variously understood to be so vital. From a cybernetic perspective this can be readily seen as the information characteristic of feedback loops. In symbolic terms, as "circulation of the light", this has been explored more fundamentally by [Carl Jung](#) and [Richard Wilhelm](#) with respect to a Chinese classic, *The Secret of the Golden Flower* (*Tai Yi Jin Hua Zong Zhi*). This is discussed separately with respect to its current implications (*Circulation of the Light: essential metaphor of global sustainability?* 2010). Much can also be made of the hole in the ring in symbolic terms.

If the ring -- in the form of the loop or Ouroboros -- is the ultimate symbol, it clearly suffers from the disadvantage of being too abstract for comprehension in systemically grounded practice. Through its simplicity it is indeed memorable and valid for what it implies -- but at a level of abstraction which renders its significance elusive (however necessarily so). Ironically it might well be said that it is difficult to "get one's head around it". Clearly the use of the rosary and other circlets of [prayer beads](#) are a challenge to such an assertion. They offer one sense of what "flows around the ring", although seemingly less meaningfully for many than in the past.

How then might the significance of the ring now be "articulated" to render it memorable and meaningful in an experiential manner -- especially to those valuing modalities of the "heart"? Could circlets of prayer beads (and [worry beads](#)) indeed be rethought as symbols in terms of their systemic significance, as previously explored (*Designing Cultural Rosaries and Meaning Malas to Sustain Associations within the Pattern that Connects*, 2000)? As mnemonic aids, use of such circlets can indeed be understood as the essence of "re-membrance".

At the time of writing, the nature of the "broken ring" has been highlighted by a major global scandal resulting from the exploitation of personal data given to Facebook and other social media (*Facebook gave researcher anonymized data on 57 billion friendships*, *Engadget*, 22 March 2018). The founder of Facebook, [Mark Zuckerberg](#), has variously admitted that there was a "breach of trust" (*Facebook's Zuckerberg speaks out over Cambridge Analytica 'breach'*, *BBC News*, 22 March 2018). In the light of the following image, which at one stage accompanied BBC reporting on the matter, the issue can be recognized as a breach of the "circle of trust" which Facebook had cultivated with billions of users.



There is clearly the sense that any elusive "ring holders" are failing to perform their "ring binding" function -- strangely echoing features of the modern myth-making of *Lord of the Rings*. This is especially curious in that social media like Facebook offer a sense of intertwining the modalities of the head and the heart.

Misleading triadic approximations of ring dynamics

It is appropriate to note the enthusiasm of the "head modality" for triangular representations of the most fundamental cognitive dynamics. This can be variously summarized (*Triangulation of Incommensurable Concepts for Global Configuration*, 2011). The latter notes the focus on [triadic logic?](#), [triadic dialectics](#), [triadic strategic applications](#), [triadic conceptualization](#), and [triadic education and learning](#).

As illustrated below, the arrangement also echoes that of various much-cited patterns of significance to the study of cognition and associated experience, as separately discussed (*Visualization in 3D of a trinity of connotations as a cognitive pill*, 2017). The relevant controversies, presumably predictable, are usefully reviewed by Maurizio Meloni (*A Triangle of Thoughts: Girard, Freud, Lacan, Psychomedia*, 14, 2002). That of Jacques Lacan is a version of the triangulated Oedipus complex (mother-child-father) combining

Freud's theory with structural linguistics, developed from the theories of Saussure, Levi-Strauss and Jakobson (John Phillips, *Lacan and Language*).

The image of Ron Atkin is used to illustrate the challenge of integration beyond any binary clash using the mathematics of **q-analysis** (*Multidimensional Man; can man live in 3-dimensional space?*, 1981), as separately summarized (*Comprehension: Social organization determined by incommunicability of insights*). Using the geometry of a triangle, Atkin illustrates the challenge of comprehension in relation to experience "within" -- especially with regard to the perspective necessary to comprehend the geometry of the triangle as a whole -- namely the trinity. The perceptual significance of this approach is well-illustrated by visual sensitivity to colours resulting from the three primary hues (red, green and blue). These are represented on a simple triangle (below). Here the vertices (O-simplexes) represent the primary hues, the sides are twofold combinations (1-simplexes), and the combination of the three hues makes the central white (2-simplex).

Semiotic triangle of meaning (Charles Ogden)	Triangulated Oedipus complex (Jacques Lacan)	Triangle of comprehension (Ron Atkin)	Triadic depiction indicative of omitted/implicit curvature

As illustrated by the schematic above-right, there is a sense in which such representation is a radical form of reductionism in which the "cognitive curvature" with which comprehensions is associated is conflated with the "cognitive linearity" of a highly questionable form of simplification, itself usefully illustrated compared with those which follow. Typically an "explanation" of each line is offered separately, notably using a curve as a form of "meta-explanation" to offer comprehensible meaning to the relations between the points of that triangle -- considered to be especially fundamental. That meta-relationship may be especially challenging as in the case of the Christian Trinity.

Roeirich Pax Cultura	Borromean rings and knots	Phenomenological epoché (Francisco Varela)	Phenomenological epoché (remapped on Borromean rings)

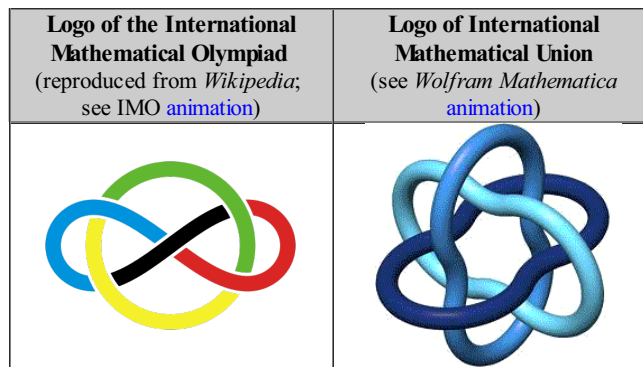
Especially striking is an unusual depiction of the Christian Trinity (below-left) from long before the formal recognition of the Borromean rings. Such depiction could be explored further in the light of the recent declaration by the UN Secretary-General (*UN must reform to defend enlightenment values, secretary-general says, The Guardian*, 10 May 2017) pointing to the three separate pillars of the UN: peace and security, human rights and sustainable development. He asked whether these could continue to be addressed separately, calling for them to be combined into a single program -- one central to any strategy of of reform.

In an earlier argument the suggestion was made that these could indeed be understood as "value pills", anticipating discussion of their necessary three-dimensionality (*Psychosocial Transformation by "Pill Pushing"? Model-making, strategic advocacy and the myth of the "red pill"*, 2017). It could then be argued that this implies a "multi-pill" complex as being fundamental to the UN, if it is to be recognized as the "big pill" through which the ills of global civilization are to be remedied. Speculatively, since these are otherwise in no way comprehended as integrated, adaptations (below) of the depiction of the Christian Trinity are presented below (*Cognitive Cycles Vital to Sustainable Self-Governance*, 2009).

Depiction of Christian Trinity	Interwoven metrics of relevance to global governance ?	Three-fold "pill" of enlightenment values?	Triskelion (traditional Celtic knot pattern)
<p>Illustration from a 13th-century French manuscript, as reproduced in from Wikipedia</p>	<p>Adaptations of the image on the left</p>		<p>See variants in <i>Wikipedia</i></p>

Of relevance to the development of this argument, the traditional Celtic image (above) takes the complexification of the triadic even

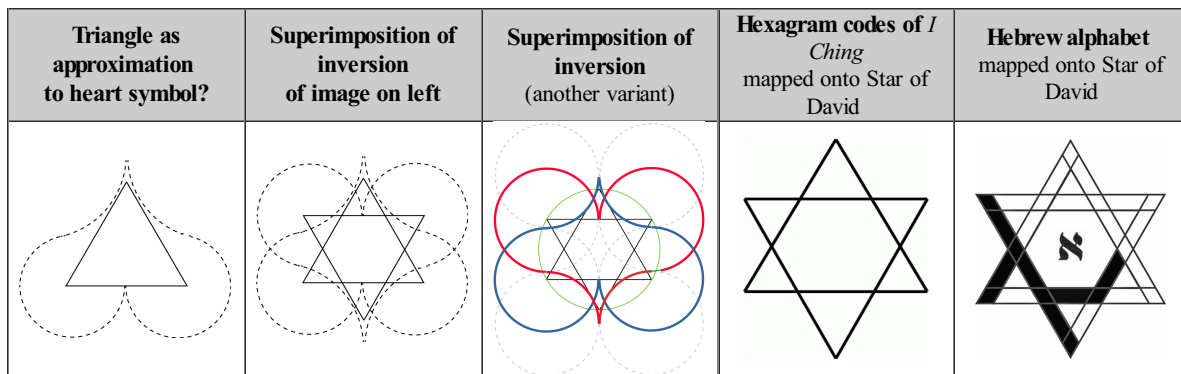
further. Anticipating further discussion regarding three-dimensionality, this was the catalyst for a more general discussion (*Cognitive Implications in 3D of Triadic Symbols Valued in 2D: representations of the triskelion in virtual reality and implications for quantum consciousness*, 2017). A 3D variant of the set of Borromean rings (above) is itself significant in this respect -- especially given its value as the logo of the International Mathematical Union. Highly appropriate to the geometric imagery of the argument above is its logo (on left below). Similarly relevant, with respect to the pattern of interlocking circles (on right below).



Rather than a two-dimensional emphasis on the cognitive merits of the triangle -- as a potentially misleading approximation to a 2D ring -- its geometry can be used to explore triangulation as an approximation to a 3D sphere, most notably through spherically regular polyhedra (*Interrelating disparate threefold cognitive patterns as a polyhedron*, 2017; *Triangulation of Incommensurable Concepts for Global Configuration*, 2011).

To the extent that dynamics imply forms of curvature, anticipating discussion below of the curves of the heart symbol (and their dynamics), another approach is to use the 2D triangle as an encoding template for significance that is typically only implied by the linearity of its form -- if at all. Can the triangle -- favoured by the "head modality" -- be considered an approximation to the heart symbol -- as favoured by the "heart modality"? The question is relevant to reframing the triadic forms presented above.

The nature of that potentially misleading approximation to the ring -- or to the heart symbol -- is evident from the image below-left. When its inversion is superimposed, as also illustrated below, it is suggestive of a need for comprehension which is primarily implicit -- and of potential significance to any interpretation of the *Star of David*. A speculative exploration of the dynamics inherent in that symbol in 2D is offered by its use as a template for encoding the 64 transformation conditions of the *I Ching*, as discussed separately -- from which the animations are reproduced (*Mapping of I Ching hexagram coding onto Star of David*, 2008; *Star of David as reinforcing dangerous cognitive reductionism?* 2017).



Reference to the Star of David featured in an earlier discussion of its polyhedral complexification and its embedding within a spherical configuration of cycles -- of some relevance to aspects of the argument below with respect to dynamics in 3D (*Framing Global Transformation through the Polyhedral Merkabah: neglected implicit cognitive cycles in viable complex systems*, 2017).

Reference to both the heart and depictions of the Christian Trinity also recalls the great importance attached to their association with the *Sacred Heart* -- one of the most widely practiced and well-known Roman Catholic devotions.

Heart symbol as articulation of ring symbol

It is of course the case that affection is widely expressed and remembered through representations of the *heart symbol* -- most obviously through communications worldwide on *Valentine's Day*. In 1962 the art historian *Erwin Panofsky* noted that the Valentine heart shape has been used since prehistoric times and was seen in Palaeolithic cave paintings in Spain. Note however the elimination of the hole from the heart symbol (despite its profound significance). A "hole in the heart" is then highly problematic. Curiously the symbol is unexpectedly featured in one of the main financial journals (Marilyn Yalom, *The Mysterious Origins of the Enduring Heart Symbol*, *The Wall Street Journal*, 26 January 2018).

As noted by *Wikipedia* in introducing commentary on the [symbolism of the heart](#):

As one of the vital organs, the heart was long identified as the center of the entire body, the seat of life, or emotion, or reason, will, intellect, purpose or the mind. The heart is an emblematic symbol in many religions, signifying truth, conscience or moral

courage in many religions - the temple or throne of God in Islamic and Judeo-Christian thought; the divine centre, or atman, and the third eye of transcendent wisdom in Hinduism; the diamond of purity and essence of the Buddha; the Taoist centre of understanding

As a source of energy, there is some symbolic irony in that the technology for achieving such circulation is the focus of the major investment in the toroidal [International Thermonuclear Experimental Reactor](#) (ITER). Its ring design offers a range of metaphors of relevance to this argument (*Enactivating a Cognitive Fusion Reactor: Imaginal Transformation of Energy Resourcing (ITER-8)*, 2008). The design challenge to achieving successful operation could even be understood in terms of "re-membering a broken ring" to ensure appropriate flow of nuclear plasma to enable fusion to take place in a sustainable manner. Of potentially greater significance to this argument, from a symbolic perspective, is the promotional focus of that project on *Bringing the Power of the Sun to Earth (A £7bn dream to catch the power of the Sun, The Telegraph, 22 November 2006)*. The symbolic interplay between the toroidal ring structure of ITER and the Sun merits exploration (*Cognitive Fusion through Myth and Symbol Making: archetypal dimensions*, 2006; *Psychosocial Implication of Without Within: enjoying going solar for oneself*, 2013).

Somewhat ironically, given its other connotations, another kind of significance has been attributed to the symbolism of the ring through the promotion by Oxfam of "doughnut economics" (Kate Raworth, *Doughnut Economics: seven ways to think like a 21st-Century economist*, 2017). The cognitive mysteries of this metaphor are however a challenge (*Exploring the Hidden Mysteries of Oxfam's Doughnut*, 2012). Is this also, despite its intentions, too abstract to engage people in contrast to what might be termed an "economics of the heart" (Theresa M. Kelley, *The Economics of the Heart: Wordsworth's sublime and beautiful, Romanticism Past and Present*, 1981; Rick Salutin, *Time for an Economics of the Heart, Toronto Star*, 20 August 2005)?

One clue to any more fruitful articulation of the ring is offered by "re-membering" the otherwise disparate and distinctive phases of various cycles -- of which feedback loops are one form. It is of course the case that the viability of the human body is dependent on the distinctive phases of the beating heart in the [cardiac cycle](#) -- of which there are a number of dynamic representations. Their symbolic significance is discussed further below. Further insights are probably to be found in the preoccupations of the [HeartMath Institute](#), notably their program of [Global Coherence Research](#) as the "Science of Interconnectivity" and their concern with [heart intelligence](#).

It has long been recognized that those of the "head" can be comically ignorant of "matters of the heart" -- just as those of the "heart" find the preoccupations of the "head" to be totally mysterious, if not completely alienating and irrelevant to their daily lives. Whether identified with the head or the heart, it would be appropriate to assert that most humans spend their lives in "vehicles" about whose operation they are essentially clueless -- and are happy to remain so, as with their use of an automobile or aircraft. Arguably this is true of global civilization as a whole, in the light of the arguments of [John Ralston Saul](#) (*Unconscious Civilization*, 1995).

The challenge can be seen otherwise in that intelligence is currently most typically associated with the "head" in contrast to emotion -- most typically associated with the heart. The work of [Daniel Goleman](#) has contributed significantly to reframing this distinction and development of insight into [emotional intelligence](#) in contrast with IQ (*Emotional Intelligence: why it can matter more than IQ*, 1995). Appropriately this has enabled recognition of [social intelligence](#) (*Social Intelligence: the new science of human relationships*, 2006). What consideration is given to either of these forms of intelligence in elaborating global strategic initiatives?

Such concerns are being taken seriously by academia with the recent establishment of a [Collaborative Research Center "Affective Societies"](#) by the German Research Foundation (DFG). In recognizing that *Affect and emotion are not at the margins of societal affairs, but at the heart of civilization itself*, its preoccupations are clearly of relevance to this argument:

[It] aims at developing a new understanding of societies as Affective Societies that in its essence accounts for the fundamental importance of affect and emotion for human social coexistence in the mobile and networked worlds of the 21st century. The title Affective Societies signifies the fact that societal processes are intimately linked to the complex and often antagonistic feelings of groups and individuals. Only a sound understanding of the affective dynamics of societal and communal coexistence will allow societies to utilize the cohesive forces of affect and emotion and to recognize their disruptive potential at an early stage.... They can produce new forms of communal affective bonds that transcend national and geographical boundaries, but may likewise create disintegrative tensions, frictions and conflict between social groups.

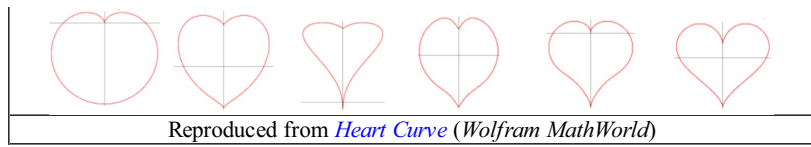
Such explicit recognition of the "heart of civilization" highlights the irony of the current status of [Mesopotamia](#), long claimed as the historical heart (Curtis Ford, *Mesopotamia: the heart of civilization*, 2017). How indeed will the future appreciate the degree of systematic destruction wrecked upon the cradle of civilization in the past decades by the societies which arose from it? Engendering a "hole in the heart"?

Possibilities of interrelating ring and heart curve

Is the challenge of articulating the ring usefully to be seen as one of deconstructing the ring into its geometric elements and recombining them in ways which distinguish distinctive cognitive phases? Their distinctiveness could then be seen as a cognitive reflection of the contrasting dynamics within a viable pumping heart.

As defined by mathematical equations, there are [several forms of "heart curve"](#), as noted above and reproduced below from *Heart Curve* (*Wolfram MathWorld*) where their respective equations are indicated.

Varieties of heart curve

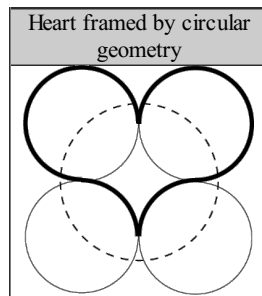


Rolling cycle: One is indeed generated dynamically by rolling a circle around another of the same radius as shown below -- although this does not give rise to the preferred form of the heart as so widely depicted.

Cardioid generated by a rolling circle on a circle with the same radius	Cardioid as envelope of a pencil of circles

Reproduced from *Wikipedia*

Heart pattern from fourfold configuration of circles: Geometry offers perhaps the simplest static alternative to representing a relation between a heart curve and a ring, as shown below.



Heart pattern from lauburu as a fourfold configuration of circles: A more complex method of eliciting a heart curve is indicated below in relation to the geometric construction of the Basque symbol of the [lauburu](#).

Versions of lauburu and their superposition		Eliciting the heart pattern from geometry of lauburu (rotated 45 degrees, with superposition of both variants)
Left-facing (symbolizing death)	Right-facing (symbolizing life)	

The symbolism in relation to the lauburu is variously discussed separately (*Improvisation in Multivocal Poetic Discourse: Basque lauburu and bertsolaritza as catalysts of global significance*, 2016; *Evoking Castalia as Envisaged, Entoned and Embodied: the great game informed by the bertsolaritza cultural process?* 2016; *Cross, Swastika variants and Lauburu*, 2008)

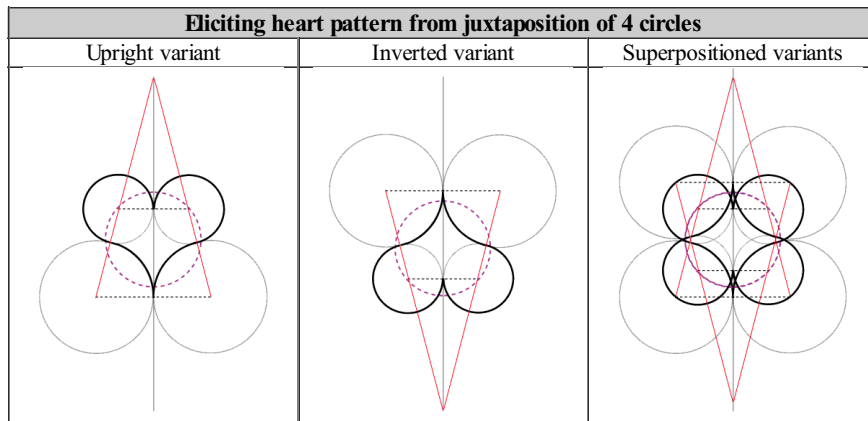
Aesthetic dimensions of the heart?

Arguably the preference for any specific form of the heart curve as a symbol would be influenced to a relatively high degree by aesthetic proportions. This would be especially the case if that symbol is recognized as reconciling divisive perspective, as argued separately (*Requisite attributes of a mandala relating concord and discord?* 2016).

It is therefore intriguing to recognize that the aesthetic proportions of the [golden ratio](#) could be seen as a feature of the construction of

one form of heart pattern -- as elicited through the construction of the lauburu. As depicted above, the dashed lines which are a feature of that construction are in golden ratio proportion, widely denoted by the Greek letter *phi*. In mathematics, two quantities are in the golden ratio if their ratio is the same as the ratio of their sum to the larger of the two quantities. (Eric W. Weisstein, *Golden Ratio, MathWorld*; Keith Devlin, *The Myth That Will Not Go Away*, May 2007). The appeal of those proportions has been fundamental to art and architecture down the centuries and is the topic of extensive commentary. [NB: A more precise mode of construction is required to confirm the manner in which the pattern is apparently "locked", as shown above]

Rather than associating that proportion with the construction of the lauburu, the golden ratio can be used to elicit a form of the heart pattern from the juxtaposition of four circles. The process is indicated by the image on the left below where the centres of two upper circles are positioned on a central (coloured) circle. The length of the dashed line separating them is used to determine a second (longer) dashed line below in terms of the golden ratio. The extremities of that line are used as the centres of a pair of two circles of larger diameter which are then tangential to the smaller circles above. This elicits a heart pattern relating the four circles as highlighted with a line in bold. The image can of course be reversed as shown in the central image. The two images can also be superimposed as shown on the right. As discussed further below, the pairs of circles can be understood as the cross section of a torus in 3D -- the juxtaposition of the two tori forming a heart pattern in 3D.



Fragmented psychosocial systemic dynamics in quest of an elusive integrative pattern

The constructions above can be used to provide a potentially valuable "story" of the quest for systemic integration of feedback loops. This is partially illustrated by the following screen shots which form part of the more extensive animation on the right. The animation indicates a variety of assumptions and approximations to such integration -- the different curves to be understood as portions of feedback loops which variously "fail to loop", namely forms of "broken ring".

Schematic representation of broken feedback loops in quest of systemic completion						
Integrative ideal	Selected screen shots from the animation					Animation

The animation suggests that the significance of the ring symbol is inherently elusive, other than through intuited implication, whereas the heart pattern is inherently more comprehensible -- despite its requisite complexity (discussed further below).

Ironically some phases in the animation suggest that the curves nested within the circle of the traditional [symbol of the Tao](#) may well prove to be a succinct integration of the circle/sphere and the heart symbol. Given the abstraction associated with that traditional symbol, again the challenge would still remain to offer a degree of articulation to the heart symbol. Mention of this possibility anticipates later discussion below regarding speculative 3D depiction of the Double Möbius / Tao / Helix / Hydrogen Atom sketch of [Erwin Schrödinger](#) from his Notebook (see Walter Moore, *Schrödinger: Life and Thought*, 1992, p. 193; Doug Renselle, *Schrödinger's Lissajous to Tao and Mobius Morph, Quantonics*, 2015).

With respect to any such spherical reconciliation of "head" and "heart" in 3D, the point to be stressed is that "globalization" is readily to be recognized as an imagination "of the head" with which "the heart" is much challenged to identify in some way in order to give credibility to global remedial strategies in this period. The imagination "of the heart" has yet to be widely enabled in stretching to that comprehension. Some relevant arguments are indicated separately ([Engendering Invagination and Gastrulation of Globalization: reconstructive insights from the sciences and the humanities](#), 2010).

Interpretation of the heart pattern via the coaction cardioid

Such configuration opens the possibility of exploring how the features of the heart pattern might be interpreted in more detail in ways of

relevance to domains and conditions in which feedback loops are of vital to system viability.

One valuable approach is understanding of the coaction cardioid, as discussed separately (*Cardioid Attractor Fundamental to Sustainability: 8 transactional games forming the heart of sustainable relationship*, 2005). This interpretation of the cardioid derives from the work of Edward Haskell (*Generalization of the structure of Mendeleev's periodic table*, 1972), as introduced by Harold Cassidy in the following terms:

In the cybernetic analysis of the more complex and organized systems we recognize two distinct kinds of factors. There is the work component or components, which we shall designate X, and the governor, or controller, which we shall designate Y [see table below]. Of course, the governor does work too (the strategic work), and we have simplified the relationships very greatly. There will be cases of a system made up of sub-systems, one controlling in some respects, not in others, and so on. Let us stay with the simpler case. Now, the processes that characterize X may, in the interaction with Y, be accelerated or in some way enhanced (+), or may be unaffected (O), or may be decreased (-). Similarly, the processes that Y undergoes. When the possibilities are cross-tabulated, it becomes evident that there are nine and only nine of these qualitatively different 'coactions.'

[glossary]

Haskell applies this insight to a range of systems, most notably those in the natural environment, but also in the social environment. In the case of the different kinds of relations between animals in an ecosystem, the following patterns then emerge -- of which 8 of the 9 are non-neutral. Note that there are variations in the terminology of biological interaction, notably differing from Haskell's usage [more | more]. The dynamics of each of the 8 relationships might be described as a "game", however asymmetrical or predictable the outcome (as with the "cat-and-mouse" game of predation).

Possible 8-fold positive-negative hybrid conditions				
		Y = "Control component"		
		Negative	Neutral	Positive
X = "Work component"	Positive	<i>predation</i> (- +) (positive negativity)	<i>allotrophy</i> (0 +) (positive neutrality)	<i>symbiosis</i> (+ +) (positive positivity)
	Neutral	<i>amensalism</i> (- 0) (neutral negativity)	(0 0) (neutral neutrality)	<i>commensalism</i> (+ 0) (neutral positivity)
	Negative	<i>synnecrosis</i> (- -) (negative negativity)	<i>allopathy</i> (0 -) (negative neutrality)	<i>parasitism</i> (+ -) (negative positivity)

This articulation allows distinctions to be made between forms of "being positive" such as "symbiosis" in which there is indeed mutual enhancement. This contrasts with one such as "predation" in which one party (the controlling one) in a transaction prides itself on achieving a "positive" outcome at the expense of the other -- namely "feeding off" the other. This is distinct from the situation of "parasitism" where it is the latter party (the subordinated one) which successfully feeds off the former.

The point about such a table is its merit in avoiding confusion between different forms of "being positive", some of which may be quite problematic because their "negative" aspects are camouflaged by appearing to borrow some of the desirable qualities of the mutuality of "symbiosis". Parasitism and predation are not relationships of mutually beneficial mutuality. One party effectively benefits at the expense of the other.

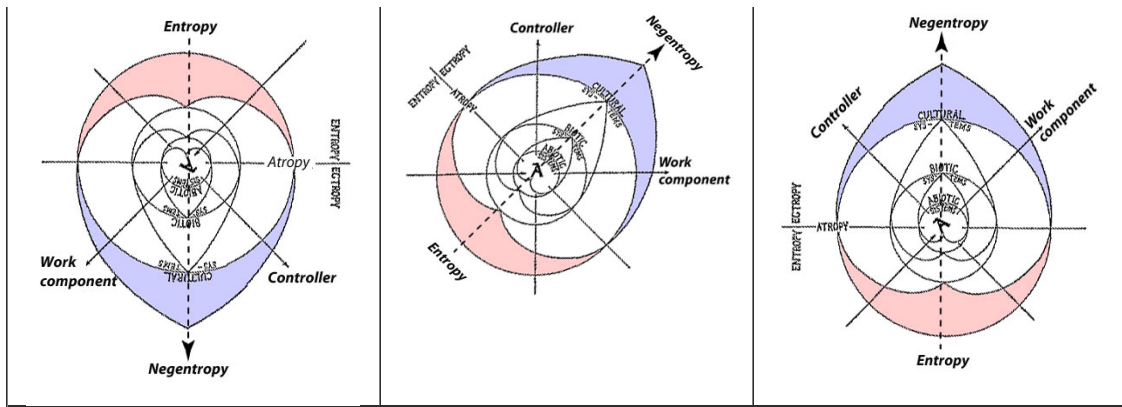
Haskell introduced the neologisms indicated in the above figure:

- allotrophy (derived from the Greek for "feeding the other"), namely one in which the activity of the system's work is not affected while that of the controller is unaffected
- allopathy (derived from the Greek for "making the other sick"), namely in which the activity of the system's work component is unaffected, but that of its controller is decreased

Similarly what might be considered most problematic is a form of (double) "negativity", typical of "synnecrosis" in the table, in which both parties lose energy through the interaction to the point of mutual destruction. But again this should not be confused with other hybrid conditions in which one or other may benefit unequally from the interaction. The table is an indication of the possible range of interactions between positive and negative as a form of psycho-social cybernetic system.

The table is particularly significant in that, as with environmental systems, it is not the case that all "parasitism" or "predation" should be eliminated from the pattern of psycho-social interactions -- however much there is an expectation that the "Lion will lie down with the Lamb" in an ideal form of symbiosis. There are in fact conditions under which even synnecrosis would appear to be appropriate -- as in decay processes necessary as precursors to regeneration. The real challenge is to ensure an appropriate systemic balance between the various forms of interaction - and, metaphorically, to avoid "throwing the baby out with the bathwater".

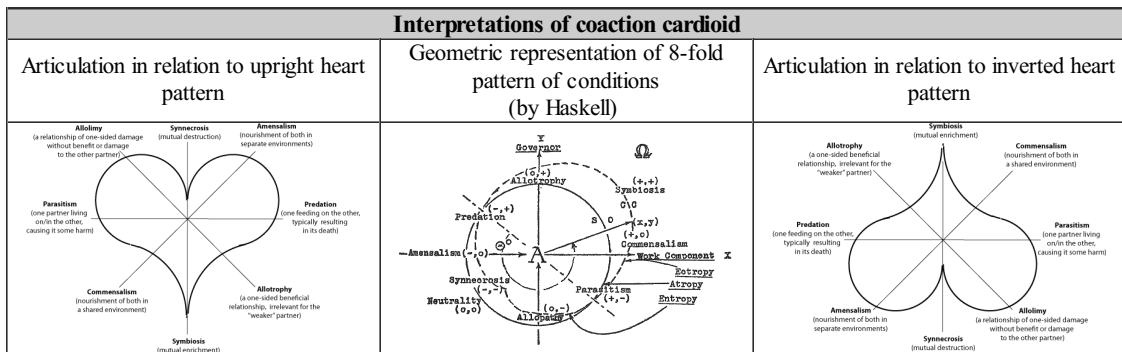
Coaction cardioid variously oriented		
Upright heart pattern	Haskell's Cartesian orientation	Inverted heart pattern



Edward Haskell's insights have been very usefully (and extensively) adapted by Timothy Wilken (*The Relationship Continuum*, 2002) to an ordering of the spectrum of personal relationships: adversity -- neutrality -- synergy. Wilken equates "synergy" with "positive" and "adversity" with "negative" therefore pointing to the relevance of his adaptation to the preoccupation of this paper. Wilken's study reframes Haskell's above ordering in the following table, where "win" equates with "positive" and "lose" with "negative"

8-fold Pattern of Non-Neutral Relationships (Timothy Wilken, <i>The Relationship Continuum</i> , 2002)			
	Y	X	
	Win	Draw	Lose
Win	Win, Win True Synergy	Draw, Win Net Synergy	Lose, Win Net Neutrality
Draw	Win, Draw Net Synergy	Draw, Draw True Neutrality	Lose, Draw Net Adversity
Lose	Win, Lose Net Neutrality	Draw, Lose	Lose, Lose True Adversity

These interpretations may be represented otherwise as follows.



Relating the heart pattern to the magic square and the BaGua mirror

This exploration was triggered by the question of how to articulate the integrative ring -- the heart pattern being a possibility to which many can relate. As a potential source of insight into such articulation, two other patterns can be explored, especially to the extent that they themselves can be related to the heart pattern. They are the [magic square](#) -- long a focus of mathematical interest -- and the *BaGua* "mirror", fundamental to Chinese culture. As with the experience of completing a [sudoku pattern](#) or solving [Rubik's Cube](#), both offer a particular cognitive sense of integrity. These examples offer a valuable reminder that -- whether for those of a "heart modality" or of a "head modality" -- the challenges of the heart may indeed require puzzle-solving of the highest order (as romantic relationships have always made evident). Global sustainability merits recognition in just such terms.

Magic squares: Of particular interest is the 3x3 magic square, especially as a means of relating that pattern to the [Millennium Development Goals](#) of the United Nations, as discussed separately with respect to: *Elusive requisite "magic" for sustainability?* and *Mapping 8 Millennium Development Goals onto the 3x3x3 surfaces of Rubik's Cube (Interplay of Sustainable Development Goals through Rubik Cube Variations: engaging otherwise with what people find meaningful*, 2017).

With respect to any relation to the heart pattern, is "sustainability" as much a matter of the "heart" as it is of the "head"? Could the 3x3 magic square, namely of the lowest non-trivial form, be explored in the light of a heart pattern?

Would a magic square offer an approach to more systemic ordering of the 8 otherwise asystemic set of Millennium Goals as exemplifying the functional operation of the "heart" of global civilization? Their disparate appreciation through functionally uncoordinated agencies could indeed be considered as exemplifying a form of "broken heart" due to lack of recognition of the feedback loops interrelating them. The irony is that this failure is as much a failure of the "head" as of the "heart" -- a form of carelessness, as indicated above. There is little systemic preoccupation with those goals by the disciplines which might otherwise be responsible for such considerations.

It was on this basis that the 8 goals were tentatively arrayed in a 3x3 pattern in the earlier exercise. The obvious question being how best to order them to suggest and enhance their meaningful interplay. They are indicated here in relation to the BaGua pattern discussed below.

3x3 Magic square (originally described by Lo Shu)	Towards an arrangement of Millennium Development Goals (adjusting their official numeric identifiers around an empty centre)			Schematic representation of 8-fold Ba Gua (Pa Kua) Mirror (with corresponding Lo Shu numbering)		
	no change	change to 9	no change	4	9	2
		5			0	
	no change	add 5	change to 7	3	5	7
change to 8	no change	change to 6	8	1	6	

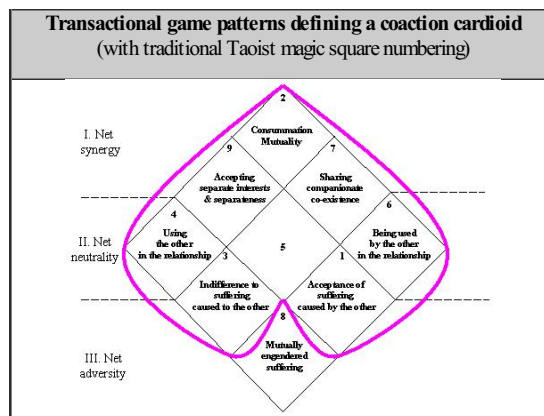
As illustrated, as an exercise, the pattern of 8 MDGs could indeed be ordered in an array corresponding to the numbering of the magic square on the left. Clearly this fails because the numbering does not extend to 9. Some such ordering would be possible if the MDGs were renumbered and particular significance was attributed to the central role of 5 in the pattern. In the case of the reframing by the UN of the 8 MDGs into the 16 Sustainable Development Goals, this distinctive significance is evident with regard to the 17th SDG. Is a higher order of integrity engendered by use of such a pattern? How is such a set to be recognized as a viable whole?

BaGua mirror: The pattern of 8 symbols, with an empty centre, is highly reminiscent of the evocative *BaGua* arrangement of 8 symbols -- whether denoted by trigrams or idiograms. Framed as a "BaGua mirror" (as arrayed above, right), it is traditionally associated with the "magic" of *feng shui*, predating the association of those symbols with the *I Ching*. It has a particular advantage in relation to value-goals in that it has strong qualitative connotations with personal implications. Some implications of that pattern are discussed further below.

The following correspondences feature in an extensive discussion by Quincy Robinson and Paul Martyn-Smith (*Evidence of Modern Physical Knowledge from Asiatic Antiquity: Re-integration: Nine Realms of Middle Earth*, 2015).

Correspondences between Lo Shu, Ba Gua and magic square patterns	
Classic <i>Ba Gua</i> arrangements ("earlier heaven" below, and "later heaven" above).	Correspondences

Speculatively, the coaction cardioid, magic square considerations and the Taoist *BaGua* perspective could be related in the following.



Implied dynamics of the heart symbol -- the "cardiac cycle" otherwise interpreted

Whereas little recognition of the ring symbol as such is accorded by politics and economics, much is made of the dynamics of economic

cycles. These can be recognized as frozen rings or standing waves. Conversely claims are variously made in rhetorical terms with respect to the "heart of civilization", but with little explicit sense of what this symbolism may imply.

It could be considered remarkably curious that the heart symbol is so widely depicted in static form when the relationships with which it is associated are dynamic -- and typically dramatically so. The cover illustration of the *New Philosopher* (indicated above) highlights the irony of a static symbol in relation to the dynamics implied by that special issue on *What is the meaning of life?*

Cardiac arrest? Given the moment-by-moment dynamics of the heart, so essential to the living body in the **cardiac cycle**, this is even more curious. Framing the symbolic heart in static terms, given the values with which it is associated, could even be considered symbolic of the challenging carelessness of global civilization at this time (*Human Values as Strange Attractors*, 1993; *Freedom, Democracy, Justice: Isolated Nouns or Interwoven Verbs? Illusory quest for qualities and principles dynamically disguised*, 2011).

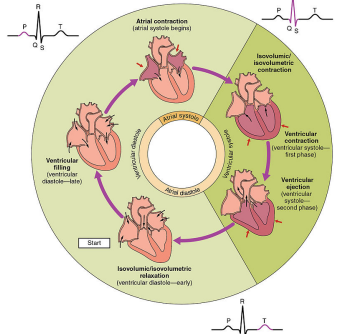
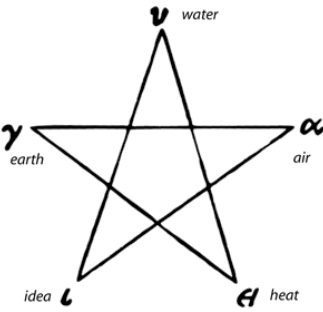
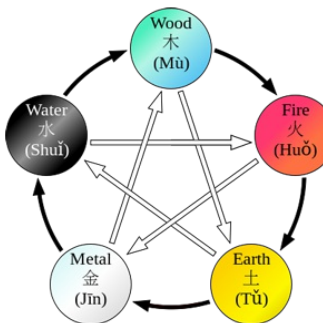
Given the implications of cessation of the dynamics of the heart -- **cardiac arrest** -- it could even be inferred that there is a perverse investment in an "arrested" heart at a time when there much speculation on the collapse of global civilization through one or other process (*Spontaneous Initiation of Armageddon: a heartfelt response to systemic negligence*, 2004; *Mind Map of Global Civilizational Collapse: why nothing is happening in response to global challenges*, 2011).

As with the ring symbol, the argument can be made that the dynamics are necessarily implicit in the static heart symbol, if not elusively so. As noted above, there is then a case for exploring the dynamics in relation to a symbol considered to be so fundamental (*From Statics to Dynamics in Sustainable Community*, 1998; *Dynamic Interrelationship of Symbols of Coherent Experiential Representation of Nonduality*, 2008; *Dynamic Transformation of Static Reporting of Global Processes*, 2013).

Health as a verb? As implied by the cyclic emphasis, whether physical or otherwise, it would indeed seem appropriate that "health" should be understood through a verb -- rather than through a noun or static quality as previously argued with respect to other values (*Happiness as a verb -- en-joying as a dynamic?* 2011).

The argument is consistent with that relating to the collective health of a society -- as implied by the quest for "sustainability". This could indeed be understood as "collective health" engendered by collective "cognitive health" (*Wholth as Sustaining Dynamic of Health and Wealth: cognitive dynamics sustaining the meta-pattern that connects*, 2013). Somewhat clumsily, the phrase *mens sana in corpore sano* could be usefully reframed and inverted as a "healthy global environment within a healthy global knowledge-based society".

Traditional insights: It is appropriate to confront the cyclic phases of the cardiac cycle with insights offered by 5-fold patterns of other cultures and earlier times as shown below (*Memorable dynamics of living and dying: Hygeia and Wu Xing*, 2014).

Phases of the cardiac cycle	Hygieia Pentagram of Pythagoreans	Chinese 5-phase Wu Xing cycle
		
<p>Reproduced from Wikipedia with further details and animations</p>	<p>Reproduced from Hygieia entry in Wikipedia (G. J. Allman Greek Geometry From Thales to Euclid, 1889, p.26) with labels added</p>	<p>Adapted from Wu Xing entry in Wikipedia Interaction arrows: black=generating; white=overcoming</p>

The two classical health patterns above are based on use of the pentagram in Western and Eastern cultures:

- Hygieia:** The **Pythagoreans** developed an understanding of health which they associated with the form of the **pentagram** and the Greek goddess Hygieia (also Hygieia or Hygeia) -- the personification of health, cleanliness and sanitation, and the origin of the term "hygiene" [more]. The name of the goddess is alleged to have been used as their primary greeting (perhaps, speculatively, to be considered an origin for "hug"). The snake encircled **Bowl of Hygieia** has long been used as one of the symbols of pharmacy. *Hygieia Internationalis* is now the official journal of the International Network for the History of Public Health.
- Wu Xing:** This ancient Chinese mnemonic pattern in the form of a pentagram of five phases, or five elements, is widely known in East Asia. It is traditionally associated with **Chinese medicine**, **acupuncture**, **feng shui**, and **Taoism**. The pattern is recognized as highlighting a cyclic relationship between the five constituent elements: fire, earth, metal, water and wood. It is the vectors of the "overcoming" or "controlling" cycle which are typically represented as a pentagram. Generative and destructive cycles are shown as clockwise and counter-clockwise circular motion:

Perhaps appropriately at this time, it is the Chinese insights into the *Wu Xing*, expressed in metaphorical terms, which are of greater relevance in interpreting the psychosocial implications of the implicit dynamics of the heart symbol.

Pumping system: The following table is adapted from the phases identified in the *Wikipedia* description of that cycle.

--	--	--	--	--

		Stage	Atrioventricular valves (tricuspid valve; mitral valve)	Semilunar valves (pulmonary valve; aortic valve)	Status of ventricles and atria; and blood flow
Diastole (filling)	1	Isovolumic relaxation	closed	closed	semilunar (pulmonary and aortic) valves close at end of ejection stage; blood flow stops.
	2	Inflow: a. Ventricular filling b. Ventricular filling with Atrial systole	open	closed	a. ventricles and atria together relax and expand; blood flows to the heart during ventricular and atrial diastole. b. ventricles relaxed and expanded; atrial contraction (systole) forces blood under pressure into ventricles during <i>ventricular diastole-late</i> .
Systole (pumping)	3	Isovolumic contraction	closed	closed	Atrioventricular valves close at end of ventricular diastole; blood flow stops; ventricles begin to contract.
	4	Ejection: Ventricular ejection	closed	open	ventricles contract (ventricular systole); blood flows from the heart -- to the lungs and to rest of body during ventricular ejection.

As a source of metaphorical insight, a related indication is offered by the thermodynamics of the four phases of the [Carnot work cycle](#) described in the following terms:

1. Reversible [isothermal](#) expansion of the gas at the "hot" temperature (isothermal heat addition or absorption).
2. [Isentropic \(reversible adiabatic\)](#) expansion of the gas (isentropic work output).
3. Reversible isothermal compression of the gas at the "cold" temperature (isothermal heat rejection)
4. Isentropic compression of the gas (isentropic work input).

Given frequent metaphorical reference to the economic "stomach" (Ryan Detrick, *Economy strong enough to stomach a trade war*, *Reuters*, 1 March 2018), again it might be asked what equivalent insights are offered by the metaphorical "heart". Again, use is of course frequently made of the "heart of a country" or region, but with little sense of what gets "pumped" and how. A number of cities regularly claim to be "The Heart of Europe", for example. Does this reflect anything more than superficial insight for public relations rhetorical purposes?

Electrical system: It is readily forgotten that the heart is an electrical system and the heartbeat is triggered and sustained by a pattern of electrical signals, as extensively described and illustrated by *Wikipedia (Electrical conduction system of the heart)*. This is expressed otherwise by the [Heart Rhythm Society](#):

First, the atrium contracts. Like a pebble dropped into a pool of water, the electrical signal from the sinus node spreads through the atria. Next, the signal travels to the area that connects the atria with the ventricles, the atrioventricular node (AV node). This electrical connection is critical. Without it, the signal would never reach the ventricles, the major pumping chambers of the heart. As the signal continues and crosses to the ventricles, it passes through another bundle of special electrical tissue called the Bundle of His. The Bundle then divides into thin, wire-like structures called the right and left bundle branches which extend into the right and left ventricles. The electrical signal next travels down the bundle branches to thin electrical fibers. Lastly, these fibers send out the signal to the muscles of the ventricles, causing them to contract and pump blood into the arteries. At rest, in a normal heart, this coordinated series of electrical signals occurs about once every second, maintaining the steady, rhythmic pattern of the heart's beat and causing a normal pulse rate of 60 beats per minute. (*Electrical System*)

The detailed understanding of this electrical system suggests that it could offer insights into how the dynamics of the psychosocial heart are triggered and sustained -- especially in relation to the necessary feedback loops. The heart could then be usefully understood as a complex of feedback loops. Many songs are specifically entitled "heartbeat", suggesting some intuitive recognition of this process. The metaphor is also used globally (*Tracking the World's Economic Heartbeat*, *World Policy Journal*, Summer 2014; *The Heartbeat of Social Media*, *Social Media Today*, 26 January 2012; *Heartbeat of Social Media*, *MarketingNutz*).

Systemic understanding of "Cupid's arrows" as binary cyclic triggers?

Positive and negative arrows: The argument can be taken further through the reminder offered by the symbol frequently associated with depiction of the heart symbol, namely the arrow. Especially intriguing is that the original Greek myth indicates that [Cupid](#) has two arrows at his disposal -- not only the one most commonly associated with his role (the other being frequently ignored for reasons which might well be understood as predictable):

One was cast of shining gold, and with its barbed point, Cupid inflicted wounds of love. The other arrow was made of soft silver, and its tip had the power to create hate. (*Cupid's Arrows*)

The myth has featured widely in many contexts down the centuries -- notably through the challenge it offers to the Apollonian perspective (as an archetypal "heartless head"). The tale by [Rudyard Kipling \(Cupid's Arrows](#), 1888) is frequently cited as a strange combination of close observation of matters of love and marriage, some mild satire of the strangeness of social conventions, and an acceptance of their strangeness. His tale has featured as *The Short Story of the Day* (6 August 2016).

The contrasting operation of the two arrows is consistent with the previously mentioned argument which provided the context for this exploration (*Global Civilization through Interweaving Polyamory and Polyanimosity? Loving/Hating the world otherwise through contractual bonding with any significant other*, 2018). There is a related case for exploring the symbolism of the martyrdom of [Saint Sebastian](#) -- typically depicted as bound to a stake and variously pierced by arrows.

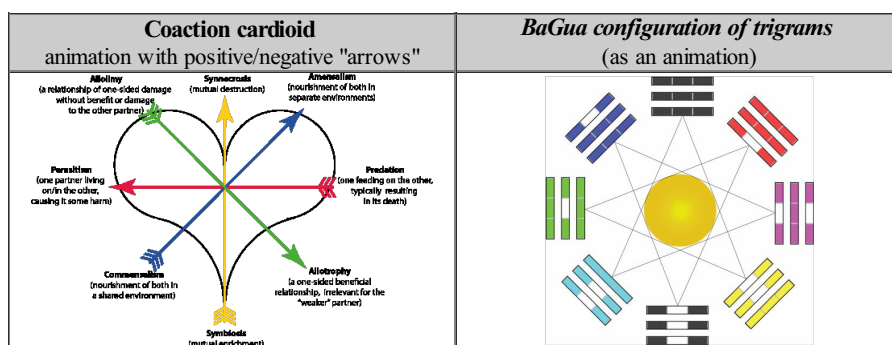
The articulation of the coaction cardioid does indeed imply "co-action" but its representation in tabular or graphical form has reinforced the sense of a static configuration of categories. Each of those 8 categories calls for the dynamic emphasis it implies, and possibly dramatically so: predation, parasitism, etc. Given their systemic role in the integrity of ecosystems, as emphasized by Haskell, much more attention could be appropriately given to their role in psychosocial systems -- perhaps usefully clarified by interpersonal relationships as [transactional games](#):

- "predation", given preoccupation with predatory males and predatory females
- "parasitism", given concerns with problematic parasitical relationships between individuals
- "commensalism", given the symbolic value associated with "eating at the same table"
- "amensalism", given the implications of "eating at separate tables" (in separate locations)
- "allolimy/allotrophy", given the situations in which a relationship is damaging to one partner (even "poisonous") but with effects to which the other is indifferent
- "allopathy", given situations in which a relationship is of benefit to one but with effects to which the other is indifferent
- "synnecrosis", namely a situation in which a relationship is mutually damaging
- "symbiosis", namely a situation in which a relationship is mutually beneficial

The complementarity of these transactions can of course be readily challenged if it is believed possible to have a system free of the painful processes typical of (romantic) relationships -- rather than "no pain, no gain". Each transaction calls for reframing in cognitive terms to avoid the pretence that some are not required in a [viable system](#). The challenge in this respect is that each is inherently ambiguous in its interpretation, as best illustrated by:

- "predation" is the most common accusation against capitalism, whilst the latter is widely promoted as vital to economic development
- "parasitism" is a common qualification of social security entitlements, whilst the latter are widely defended as essential charity vital to the survival of the disadvantaged
- "symbiosis" may well be beneficial in daily life to both partners for a time, but this contrasts with how it is imagined by both as being "for all eternity" (given the incidence of divorce)
- "synnecrosis" may well be characteristic of a mutually destructive relationship (even life threatening), however it gives meaning to the sense of "until death do us part", reframed as necessary in order for both parties to "move on" (as the counterpart to conventional contractual commitments to symbiosis)

"Electrical arrows": The axes in Haskell's depiction, and its adaptation, can then be usefully explored in terms of the binary opposition between their extremes -- as metaphorical "arrows" triggering feedback cycles. The positive (attractive love) and negative (alienating hate) characteristics can then be explored with respect to those dynamics, as tentatively indicated schematically in the animation on the left below. Given the electrical interpretation above, the "arrows" can be explored as "electrical arrows", strategic dilemmas, or systemic contradictions. As argued above, the animation lends itself to comparison with the dynamics relating the conditions of the *BaGua* mirror, as tentatively indicated on the right below.



As a tentative exercise, the emphasis in the above animations is on a degree of visual comparability. Both patterns have fundamental systemic dimensions which merit far greater attention in order to improve the comparability of the two animations. Both in borrowing the use of "arrow" on the left, their color coding and directionality, and the colour coding of the *BaGua* pattern on the right, the argument is that further exploration is required to justify any such comparability.

Especially interesting is the interpretation of the binary distinction of "positive" versus "negative" which is handled in a far more subtle manner in the *BaGua* encoding. There is considerable reflection on the significance which can be associated with the various conditions in the latter pattern -- of which the encoding is suggestive. This contrasts fruitfully with that so assiduously cultivated in Western societies ([Barbara Ehrenreich](#), *Bright-sided: How Positive Thinking Is Undermining America*, 2010)

Implication of inversion: The potential challenges of such a pattern language can be taken further by exploiting the significance of the inversion of the heart symbol -- recognizing that the "upright" depiction above is already a 45 degree rotation from the conventions of the Cartesian orientation that feature in Haskell's argument. As with other quadrant depictions, that of Haskell privileges the upper right quadrant as the zone of symbiosis -- thereby readily framed as an ideal whilst effectively ignoring the potentially questionable dynamics

associated with the other quadrants which enable that preferred condition.

In the variant above the desirable condition of symbiosis (mutual enhancement) is depicted in the lower position, whereas the undesirable condition of synnecrosis (mutual destruction) features in the upper position. This orientation challenges preferences for the "good" to be in a superior position and the "inferior" to be in a subordinate position. Whilst this can indeed be significant, by also using the inversion as depicted earlier -- in a more complex animation -- there is a case for understanding the variant above otherwise. Such considerations are potentially highly controversial, as discussed separately (*Unquestioned Bias in Governance from Direction of Reading? Political implications of reading from left-to-right, right-to-left, or top-down*, 2016). Relevant argument is also presented in terms of conceptual metaphor (Luca Chan, et al, *Positioning Rationality and Emotion: rationality is up and emotion is down*, *Journal of Consumer Research*, 42, 2015).

For example, if the horizontal axis is understood to be the interface between life in its material sense and that in its imagined sense, then "symbiosis" is indicative of the capacity for mutual enrichment in daily life. The condition of "synnecrosis" is then indicative of the sense in which barriers of cognitive separation are then destroyed -- as in the ideal of consummation.

If the heart symbol is inverted, "symbiosis" in the superior position can be interpreted more conventionally as the ideal of that consummation -- whereas "synnecrosis" can be understood as the kinds of painful destruction of social structures typical of what is advocated as a prerequisite of psychosocial revolution. The necessity for destruction of outmoded patterns is also recognized in the process of individuation. The challenge is to embody these various systemic conditions and perspectives into a single dynamic symbol.

Heart symbol as a standing wave pattern of feedback loops

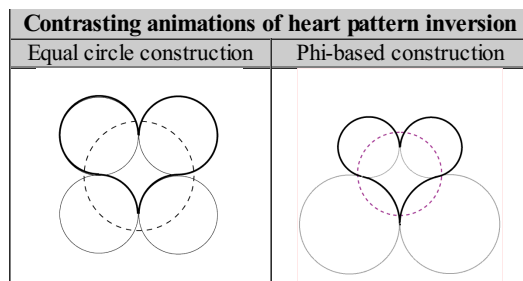
Superimposition of lauburu and BaGua mirror: Given the manner in which the heart pattern was elicited from the construction of the lauburu above, and the suggested correspondence with the *BaGua* mirror, there is a case for exploring the indications they offer with respect to feedback loops from the animations below.

Experimental rotation of alternative Lauburu patterns over alternative BaGua patterns (reproduced from <i>Transformation pathways in multivocal discourse</i> , 2016)	
Anti-clockwise over King Wen pattern	Clockwise over Fuxi pattern

Toroidal dynamics: As mentioned earlier, there is a case for recognizing that the heart symbol (however inverted) can also be fruitfully understood in 3D. The upper and lower pairs of circles are then each to be recognized as cross-sections of a torus -- again recalling the ring with which it was argued that the "heart" should be reconciled or entangled in some way. Useful depictions of this (below) were elaborated in previous arguments. The animation on the left can be interpreted in terms of variously activated feedback loops or pathways.

Heart-pattern using juxtapositioned cross-sections of two 3D tori (Reproduced from <i>Cognitive heart dynamics framed by two tori in 3D</i> , 2016)		
Dynamics defining 4 conditions	2 horn tori of major radius in proportion of ϕ	Embedding within 2 contiguous tori
	Adaptation, with permission, of animation by Wolfgang Daeumler (<i>Horn Torus</i>)	

Interpretation in terms of inflation-deflation: The functioning of the heart -- its pumping action as noted above -- can also be understood in terms of the phases of "filling" and "emptying" of the four ventricles. Animations which highlight the inversion of the heart symbol can then be understood as filling or emptying the upper or lower sets of circles -- then to be understood as spheres rather than cross-sections of a torus.



The animations above are also useful to the extent that they recall the arguments of quantum physicist [David Bohm](#) with respect to the [explicit and implicit order](#) and the associated [holomovement](#) (*Wholeness and the Implicate Order*, 1980). In that sense, the strongly outlined circles above are indicative of an explicit "filling" or "emptying", whereas those more faintly outlined are suggestive of a corresponding -- but implicit -- "filling" or "emptying". The latter offers an interesting depiction of the much-valued aesthetics of "negative space" as well as a reflection on the necessary dynamic between "re-remembering" as "filling" and "forgetting" as "emptying".

The contrast between the extremes also invites consideration in terms of the extremes of [depression](#) and elevated mood, whether or not these take pathological form as [bipolar disorder](#). Comparison could similarly be made between extremes of optimism and pessimism, notably in the contrasts in public discourse between "hope-mongering" and "doom-mongering".

Freudian implications of the heart pattern and its inversion? Marilyn Yalom argues that the symbol of the heart reveals a tension between love as romantic and sexual on the one hand, and as religious and spiritual on the other (*The Amorous Heart: an unconventional history of love*, 2018). Ultimately, the heart symbol is a guide to the astonishing variety of human affections, from the erotic to the chaste and from the unrequited to the conjugal. Yalom makes the point that Medieval artisans, without the benefit of Freud, knew exactly what they were doing when they used such sexually suggestive symbols.

From a Freudian perspective, the animations above are indeed suggestive in a number of respects, whether with respect to fantasies associated with breasts, cleavage, buttocks or intercourse. Psychologist Galdino Pranzarone is variously cited as asserting that the origin of the heart symbol was probably the shape of human female buttocks seen from the rear, and not an actual heart (*Getting to the Bottom of Valentine's Day*, *Fox News*, 16 February 2006). Thus the Greek goddess of beauty, Aphrodite, was beautiful all over, but was unique in that her buttocks were especially beautiful: *Her shapely, rounded hemispheres were so appreciated by the Greeks that they built a special temple to Aphrodite Kallipygos, which literally meant, 'Goddess with the Beautiful Buttocks'.*

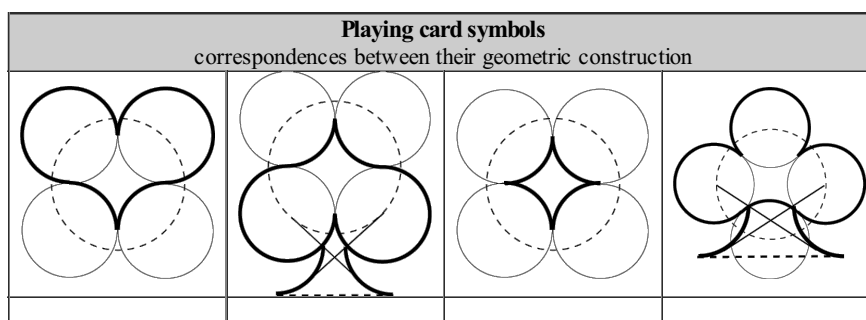
In this light, all the environmentally oriented interpretations of Haskell's cardioid invite interpretations in experiential terms of sexual relations. The peak experience of consummation in intercourse can be readily compared with that of symbiosis, whilst the complementary synnecrosis can be compared with the "little death" (*la petite mort*). The other transactions lend themselves to similar interpretation with respect to phases or possibilities in the process of intercourse.

Cognitive engagement with complexity through articulation of the heart pattern in playing cards

The geometrical approach above can be taken further in the quest for engaging symbols. The emphasis here being on symbols which clearly engage the imagination worldwide, it is in this sense that the role of the heart symbol in relation to its complements in the [suite of playing cards](#) is of particular interest. The forms of the symbols on such cards have clearly proven to be of continuing importance over centuries -- perhaps to be seen as indicative of "cognitive sustainability".

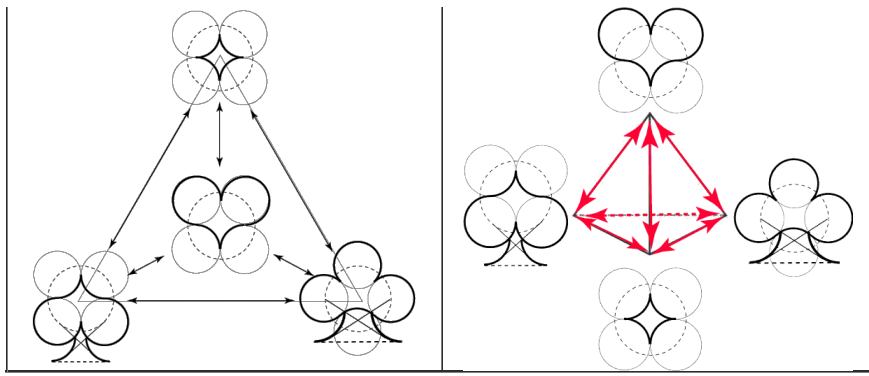
The relevance of playing card symbols, through their familiarity, has been argued separately (*Radical Localization in a Global Systemic Context: distinguishing normality using playing card suits as a pattern language*, 2015). In addition to various animations, that paper included a section on *Systemic interpretations of playing card patterns*.

It is therefore intriguing to note the transformations which interrelate the four seemingly quite disparate forms: hearts, clubs, spades and diamonds. Arguably the contrasts between them have proven viable precisely because of the differences they imply.



The symbols might then be arrayed as follows, with the image on the right anticipating further discussion of 3D.

Arrays of playing card symbols in 2D and 3D	
2D array	tetrahedral 3D array



Implications of a 3D heart symbol

The earlier argument with respect to the heart symbol noted efforts to construct a heart pattern in 3D (*Cardioid Attractor Fundamental to Sustainability: 8 transactional games forming the heart of sustainable relationship*, 2005). Beyond the arguments in relation to juxtaposition of two tori, of particular interest is the manner in which the patterns could take 3-dimensional form, with all that that might imply cognitively. Each of the basic patterns (heart, diamond, spade, clubs) could for example be rotated on the vertical axis (possibly when inverted). Some would then be strikingly reminiscent of the architecture of domed buildings, like mosques, the White House, or St Peters (Rome).

Heart surfaces: There are various approaches to generation of 3D heart shapes. Least relevant are those which give depth to the 2D image (*Four Ways to 3D Hearts*, *Graphicssoft.about.com*). The **Bonne map projection** has the globe projected onto a heart-like shape. Of greater relevance is the work of **Gabriel Taubin** and Eric W. Weisstein, as variously noted (*Heart Surface*, *MathWorld*; Ivars Peterson, *Algebraic Hearts*, *ScienceNews*, 6 February 2002). Recalling the comments above on the relevance to catastrophe theory, the latter notes that a heart surface has several singularities, including a sharp point at the bottom and a deep indentation at the top. Images are presented by **Michael Trott** of a heart surface coloured according to Gaussian curvature and direction.

Heart surfaces indicative of radical location of "significant others"?
 Screen shots of [interactive demonstration](#) of 3D heart shapes based on different equations
Equations for Valentines from the Wolfram Demonstrations Project, by Michael Croucher after work by Eric W. Weisstein and Michael Trott

Kuska formula	Nordstrand formula	Taubin formula	Trott formula
$\left[2x^2 + y^2 + z^2 - 1\right]^2 - \frac{1}{10} \left(x^2 + y^2 - z^2\right) = 0$	$\left[\frac{32x^2}{9} + 2y^2 + z^2 - 1\right]^2 - \frac{8}{45} \left(x^2 + y^2 - z^2\right) = 0$	$\left[x^2 + \frac{9y^2}{4} + z^2 - 1\right]^2 - x^2 z^2 - \frac{9y^2 z^2}{80} = 0$	$32x \left[\left(x^2 + \frac{9y^2}{4} + z^2 - 1\right)^2 - x^2 z^2 - \frac{9y^2 z^2}{80} \right] = 0$

Framing the heart pattern dynamically in 3D using the lauburu: Extending the exploration of the lauburu into 3D, screenshots of preliminary animations in virtual reality are tentatively presented separately (*24-fold Pattern Implied by Dynamics of the Lauburu in 3D*, 2016).

Toroidal reconciliation of symbols of head and heart? The earlier discussion of *Cognitive heart dynamics framed by two tori in 3D* (2016) drew attention to Wolfgang Daeumler's comments on the presentation of **Lissajous curves** on the surface of the horn torus (featured above), as illustrated by the animation below. The visual form of these curves is often suggestive of a three-dimensional knot, and indeed many kinds of knots, including those known as **Lissajous knots**, project to the plane as Lissajous figures.

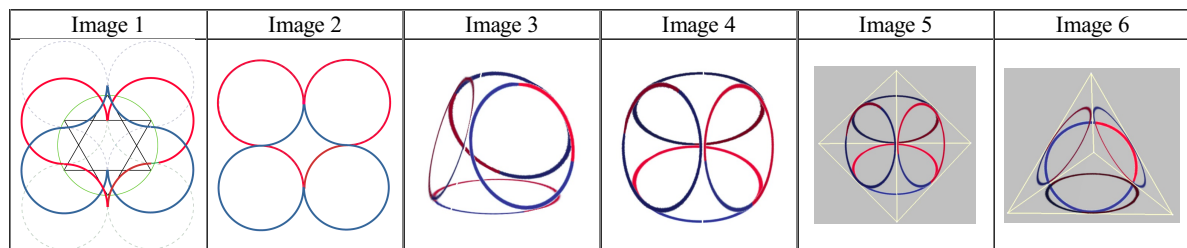
Animation of Lissajous curves on horn torus	
Single Lissajous curve	Two complementary curves engendering upright and inverted heart symbols
Reproduced, with permission, from Wolfgang Daeumler (Horn Torus)	Adaptation of animation on left
NB: Whilst potentially interesting in its own right, the otherwise annoying flicker in the animation on the right is a consequence of the simplistic method of its development. With	

greater effort the blue and green curves could be presented in the same frame rather than in successive frames

As noted above with respect to some phases in a 2D animation, the curves nested within the circle of the traditional [symbol of the Tao](#) may well prove to be a succinct 2D integration of the sphere and the heart symbol -- possibly as might be imagined from the aesthetic perspective of [cubism](#). The animation above-left takes the possibility further in that some phases are indeed suggestive of a projection of the heart symbol onto the torus as a Lissajous curve -- even more apparent with the emergence of both upright and inverted heart symbols in the animation above-right (using two complementary Lissajous curves). Other phases offer a suggestive relation to a Möbius strip, as mentioned with respect to the Double Möbius / Tao / Helix / Hydrogen Atom sketch of [Erwin Schrödinger](#) from his Notebook (see Walter Moore, *Schrödinger: Life and Thought*, 1992, p. 193; Doug Renselle, *Schrödinger's Lissajous to Tao and Mobius Morph*, *Quantonics*, 2015).

The animation is also somewhat reminiscent of the hypersphere animations suggestive of higher-dimensional brain functioning, as presented with respect to [Transforming vehicles of identity between global and toroidal forms](#) (2016). It is also useful in challenging misleading impressions reinforced by depiction of the heart symbol as "flat". In particular the distinctive curves of which it is composed might be better understood as helical in nature, possibly twisting around the edges of any triangle -- with all that that may imply in terms of (paradoxical) "cognitive twists" between their extremities.

Eliciting heart patterns from tetrahedral configuration of circles: A potentially significant approach can be explored by taking the configuration of upright and inverted heart patterns elaborated above (Image 1), pulling the two hearts together to form four circles (Image 2), configuring the circles in tetrahedral form (Image 3), rotating the configuration to indicate how heart patterns might variously emerge from the configuration (Image 4), highlighting the tetrahedral framework (Images 5 and 6). The approach offers a degree of reconciliation between the ring and heart symbols -- the preoccupation of this argument.



Images 3-6 were generated using [Stella Polyhedron Navigator](#). This permits the tetrahedron to be variously rotated to explore how heart patterns might be perceived in the configuration (although the lighting is such that red appears as brown at some angles, as in the images above). The challenge was how best to position the images on the faces given that the two patterns, wrapped around the tetrahedron, are effectively twisted together in an unusual way with unexpected reversals. A solution was not immediately found, suggesting that the elements of the configuration may alternate dynamically between two complementary configurations.

The necessary twist recalls the challenge with respect to two Möbius strips. In effect the reconciliation of ring and heart symbol can seemingly only be achieved at a price, namely that associated with the paradoxical form of a Möbius strip in which the circle is twisted. Image 2 is thus also suggestive, if it is assumed that it is "not flat" but can be recognized as constituted by 2 paired Möbius strips interlinking elements of the pattern -- as illustrated by the animations below. As a visual puzzle, Image 2 then recalls the perceptual challenge of the [Necker cube](#). The requisite complexity, in terms of Möbius strips is usefully highlighted by the following, produced for related purposes.

2 Möbius strips on Image 2	3 Möbius strips triangularly entangled	3 Mutually orthogonal Möbius strips
Presented for illustrative purposes in relation to images on right	Reproduced from <i>Visualization in 3D of a trinity of connotations as a cognitive pill</i> (2017)	Reproduced from <i>Mapping the cognitive dynamics of the begging moment</i> (2015)

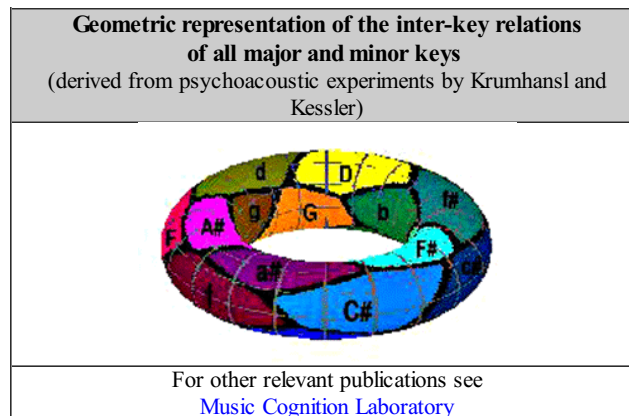
Consideration was given to the significance of also working with a [spherical tetrahedron](#) in virtual reality, but no such 3D model was readily to be found. Of potential relevance to such an approach is the spherical pentagram -- the [Pentagramma Mirificum](#) of mathematical renown -- as discussed separately with animations ([Global Psychosocial Implication in the Pentagramma Mirificum: clues from spherical geometry to "getting around" and circumnavigating imaginatively](#), 2015). Although reconciling ring and heart symbols was not the purpose, the argument can be extended by considering the emergence of heart patterns in the double tetrahedron -- the stellated octahedron, also with animations of ring movement ([Framing Global Transformation through the Polyhedral Merkabah: neglected implicit cognitive cycles in viable complex systems](#), 2017).

Remembering as rediscovering or reinventing the wheel

The quest in this argument, as indicated by the title, is for symbols to function as catalysts to enable collective "re-membering" (*In Quest of Mnemonic Catalysts -- or comprehension of complex psychosocial dynamics*, 2007).

Music and orbifolds: Especially provocative with respect to the relationship between head and heart are the emerging insights regarding comprehension of music readily recognized as performing a bridging function intimately related to the process of remembering and triggering a heartfelt response. It is in this sense that explorations of the organization of music by the brain is especially valuable (Dmitri Tymoczko, *The Geometry of Musical Chords*. *Science*, 313, 5783, 7 July 2006, pp. 72-74; *A Geometry of Music: harmony and counterpoint in the extended common practice*, 2011). This is discussed separately (*Engaging creatively with hyperreality through music*, 2016).

With respect to the ring symbol, it is therefore of considerable interest to note the results of psychoacoustic experiments by C L Krumhansl and E J Kessler (*Tracing the dynamic changes in perceived tonal organization in a spatial representation of musical keys*, *Psychological Review*, 1982) of the inter-key relations of all major and minor keys can be represented geometrically on a torus -- as shown by Benjamin Blankertz, Hendrik Purwins and Klaus Obermayer (*Constant Q Profiles and Toroidal Models of Inter-Key Relations -- ToMIR*, 1999) in the following image.



Memorials "in stone": One exploration of relevance is through the extent to which collective memory and remembrance may be a matter of variously "writing in stone" (*Transforming and Interweaving the Ways of Being Stoned: imagination, promise, rocks, memorials, petrification*, 2012). Given the interplay of love/hate dynamics suggested by the intervention of Cupid, another approach is a degree of recognition of the extent to which the heart calls for recognition of the daemonic (*Interweaving Demonic and Daimonic Associations in Collective Memory*, 2008).

Mandalas and spokes: The interplay between the ring and the heart is usefully "regulated" by what can be seen as "arrows" (whether electrical or otherwise), or as the spokes of a wheel. The latter obviously recalls the challenge of discovering or inventing the wheel. In this context, in a knowledge-based civilization variously challenged by comprehension -- whether for an individual or a group -- this may well be a case of "rediscovering the wheel" or "reinventing the wheel". The point stressed above, with regard to the tragedy of the "broken ring", suggests that it may indeed need to be rediscovered or reinvented in some way -- with the implication that this may imply the need to comprehend it anew. In cognitive terms, any such "wheel" has long been suggested by mandala-type structures. However the above argument suggests that the quest for a "three-dimensional wheel" might prove more fruitful (*Concordian Mandala as a Symbolic Nexus*, 2016; *Use of Concordian Mandala for a 3D ordering of value polarities*, 2016; *Speculation on Potential Symbolic Relevance of the Concordian Mandala*, 2016).


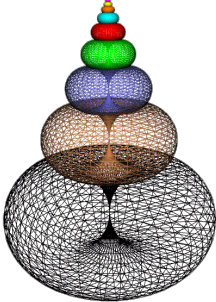
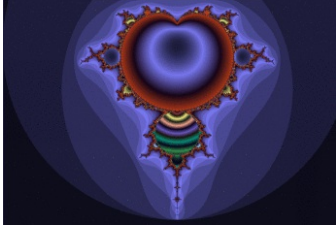
Cognitive wheels and spokes: In the sense of their functioning systemically as "arrows", spokes offer an interesting way of framing that process of comprehension and discovery. Beyond the solid wheel of yore, can the wheel function with 2 spokes, with 3, with 4, or more? Of interest in that respect is the history of the design of wheeled war chariots which at their peak had 15 spokes -- reminiscent of the 16 Sustainable Development Goals. A delightful caricature can be explored with respect to the effective use of square wheels (*Reframing the Square Wheels of Global Governance: transcending vain hopes of squaring the circle in global decision-making*, 2017). This includes a commentary on the possibility of *Governance "locomotion" enabled by loopwheels, telescopic spokes and multipedal legs?*

Rotation of magnetic fields: With respect to the functional relationship between spokes and arrows in interrelating ring and heart, of particular interest is the well-studied manner in which spokes are alternatively under compression or tension as a consequence of parts of the wheel being in contact with the ground and then having to bear a greater proportion of the load. A richer metaphor is offered by the highly innovative work by Nikola Tesla on the relation between positive and negative in electromechanical systems, as discussed separately with animations (*Potential implications of alternation and rotation in psychosocial fields*, 2014).

Ring, heart and ouroboros: Part of the challenge of this exercise, as implied above, is to indicate interesting relationships between the ring, the heart and the ouroboros -- for the reasons mentioned. One such possibility is presented below-left, further to animations presented previously (*Experimental animations in 3D of the ouroboros pattern*, 2017). It follows from an earlier demonstration of the possibility of "stacking" 3D heart patterns using horn tori, as shown below-centre (*Cognitive heart dynamics framed by two tori in 3D*, 2016). That stacking is reminiscent of the architecture of stepped temples. With greater effort, the 2D animation on the left could be presented in 3D using the toroidal elements from the centre. Whilst the direction of rotation of the ouroboros is provocatively consistent

with the traditional presentation of the "serpent eating its tail", it can of course be asked what the reverse rotation would imply -- especially in relation to the symbolism of the heart.

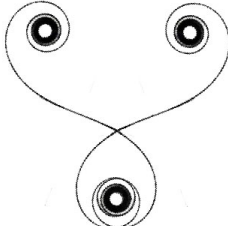
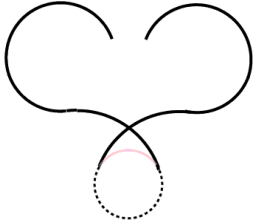
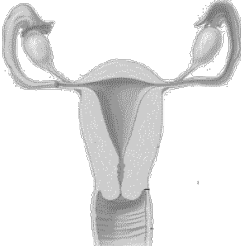

Potentially more suggestive is possible equivalence between a rendering of the [Mandelbrot set](#) (oriented otherwise) and the heart pattern. Different colouring conventions can then be used to indicate different conditions "within the heart", as in the animation below-right. The renderings were produced using the remarkable [Xaos](#) application -- an interactive [fractal zoomer program](#). The images were previously presented in *Imagination, Resolution, Emergence, Realization and Embodiment: iterative comprehension ordered via the dynamics of the Mandelbrot set* (2005) in support of various arguments relating to that rendering (*Sustainability through the Dynamics of Strategic Dilemmas -- in the light of the coherence and visual form of the Mandelbrot set*, 2005; *Psycho-social Significance of the Mandelbrot Set a sustainable boundary between chaos and order*, 2005; *Understanding the Monster through the Mandelbrot set -- Moonshine connectivity?* 2007)

Interrelating ring, heart and ouroboros (animation rotating right)	Stacking 3D heart patterns (based on horn tori)	Mandelbrot set (entamind) docs00s/cardrep3.php (animation of different colouring conventions)
		

The sequence of images in the animation on the right could of course be presented in a circle -- as an Ouroboros -- as with the animation on the left.

A case can be made that patterns suggestive of the mysterious nature of the relation between head and heart can be variously found, if only speculatively. Contrasting examples are presented below. The [clothoid](#) (or Euler spiral) is for example valuable in clarifying the transition between linearity and curvature. Shown with a reflection this is potentially significant to communication more generally (*Reframing communication relationships*, 2012; *Clothoid as a psychosocial transition curve: from linear to circular*, 2012). The geometry of the heart pattern may be further transformed, as shown, in order to engender a ring (proportioned again by ϕ). Given their role in affairs of the heart, the human ovaries offer a strange resemblance to the heart pattern, especially given the powerful circular attractor of the vagina.

With the widespread significance attached to [bull symbolism](#), especially in the past, the head can also be recognized as recalling the heart pattern -- strangely extended by the ring, so frequently inserted in its nose as a means of control. This invites a variety of considerations (*Theatre: spectator, spectacle of the feminine and the Bull Ring*, 2014; *Game-playing, bull-leaping and laurel wreaths*, 2014). Also strangely relevant is the particular sense in which very extensive use is made of "bull" in relation to the ever increasing incidence of spin and fake news. With respect to this argument, such usage could be considered a typical response of those of the head modality to those of heart modality -- and vice versa. Hence the curious challenge of "bullfighting" at this time (*Viable Global Governance through Bullfighting: challenge of transcendence*, 2009; *Transformation of Global Governance through Bullfighting: visual symbols and geometric metaphors*, 2009).

Mnemonic catalysts for reflection on the relation between head and heart symbols?			
Clothoid transition curves	Heart pattern geometrically transformed	Human ovaries and vagina	Bull head with a ring in its nose
			

Such images raise the question as to whether their potential equivalence merits exploration in terms of various approaches to symbolic equivalence, notably in the light of the [Symbolic Equivalence Test](#) developed by [Frank Barron](#) (*Putting Creativity to Work*, 1988), as discussed by Joseph Glicksohn, et al (*A Note on Metaphoric Thinking and Ideational Fluency*, *Metaphor and Symbolic Activity*, 8, 1993, 1). Equivalence between symbols is necessarily a feature of pattern recognition and can also be explored in terms of correspondences (*Theories of Correspondences -- and potential equivalences between them in correlative thinking*, 2007).

The test features in a study by the US Department of Defense (*Cognitive Agility Measurement in a Complex Environment*, April 2017) concerned with levels of military decision makers in order to support the Army's line-of-effort in quest of "cognitive dominance" -- an

aspect of [full-spectrum dominance](#). This can be imagined otherwise (*Embodying Global Hegemony through a Sustaining Pattern of Discourse: cognitive challenge of dominion over all one surveys*, 2015).

In a global civilization readily characterized as faced with fundamental communication problems, it is appropriate to explore resources creatively developed by those responding to the implications of systemic nonsense -- as discussed separately (*Nonsense commensurate with dysfunctionality* (2014). Reference was made there to one of the widely known "nonsense poems" by [Edward Lear](#) (*The Owl and the Pussycat*, 1871). In relation to this argument, this can in fact be read as a relatively unique description of the possibility of a distinctly improbable "marriage" between the head modality and the heart modality -- with a prescient environmental sensitivity. Their marriage is sealed with a ring acquired with an appropriate measure of "nonsense" from any conventional perspective.

Aside from more obvious sexual connotations, one remarkable no-nonsense commentary on the possible hidden significance of the poem is offered by David Cowles (*Owl and Pussycat*, *Aletheia*, 26 March 2014). With respect to the ring he wonders:

Could it be that the ring was actually a Möbius strip, a one sided, 2 dimensional object? A Möbius strip is 'non-orientable', a topology in which there is no fixed beginning or end and no fixed orientation. Many eschatological cosmologies, for example Dante's in the Divine Comedy, include a non-orientable topology. A Möbius strip has the unique property that allows you to travel around it continuously, always coming back to the starting point; however, each time you return to the starting point, your orientation is reversed.

Further insight is offered to the effect that:

Three dimensional objects that contain a Möbius strip are called "[Klein Bottles](#)". In our world of 3 spatial dimensions, Klein Bottles are not physically realizable, but if they were, they could hold no liquid. Why? Because like all non-orientable objects, they are one sided and therefore have no inside or outside. In this admittedly speculative interpretation, the "runcible spoon" [*a feature of the marriage celebration*] is the three dimensional correlate of the Piggy-wig's two dimensional ring. It suggests that there is a consistently non-orientable topology in the eschatological kingdom, "the land where the Bong-tree grows" [*the place where the marriage proved possible*].

The current psychosocial significance of the Klein bottle is central to the work of [Steven Rosen](#) (*Topologies of the Flesh: a multidimensional exploration of the lifeworld*, 2006).

The mysterious interplay between head and heart modalities, in a period in which the "circle of trust" has been breached, is curiously symbolized by the widespread use of so-called [awareness ribbons](#) (*List of awareness of ribbons*).

Symbol of mourning



The form of the many such ribbons echoes both that of a broken Möbius strip and an inversion of the heart symbol -- with ring -- as variously indicated above.

We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know it for the first time.
(T. S. Eliot, *Little Gidding*, 1942).

References

Jan Assmann. Religion and Cultural Memory: Ten Studies, Stanford University Press, 2005

Arpan K Banerjee. The Shape of the Heart. *British Medical Journal*, 322, 2001, 7279 [[summary](#)]

Jeffrey Andrew Barash. Collective Memory and the Historical Past. University of Chicago Press, 2016.

Frank Barron. Putting Creativity to Work. In: R. J. Sternberg (Ed.), The nature of creativity. Cambridge University Press, 1988, pp. 76-98

Catherine Beyer. Geometric Shapes and Their Symbolic Meanings. *ThoughtCo*, October 2017 [[text](#)]

David Bohm. Wholeness and the Implicate Order. Routledge, 1980

Adam D. Brown, Yifat Gutman, Lindsey Freeman, Amy Sodaro and Alin Coman. Introduction: Is an Interdisciplinary Field of Memory Studies Possible? *International Journal of Politics, Culture, and Society*, 22, 2009, 2, pp 117-124 [text]

Alin Coman, Adam D. Brown, Jonathan Koppel and William Hirst. Collective Memory from a Psychological Perspective. *International Journal of Politics, Culture, and Society*, 22, 2009, pp. 125-141 [text]

Amy Corning and Howard Schuman. Generations and Collective Memory. University of Chicago Press, 2015.

Jamie Davies. Life Unfolding: how the human body creates itself. Oxford University Press, 2014 [summary]

Sandra Easter. Jung and the Ancestors: beyond biography, mending the ancestral web. Muswell Hill Press, 2016

Derek Edwards. Educational Knowledge and Collective Memory. *Quarterly Newsletter of the Laboratory of Comparative Human Cognition* (Center for Human Information Processing, University of California, San Diego), 9, 1987, 1

Barbara Ehrenreich:

- Smile or Die: how positive thinking fooled America and the world. Granta Books, 2010
- Bright-sided: How Positive Thinking Is Undermining America. Picador, 2010

Thierry Gaillard and Pierre Ramaut. Shamanism Ancestors and Transgenerational Integration. Ecodition, 2016

J. C. Goldfarb. Resistance and Creativity in Social Interaction: for and against memory in Poland, Israel-Palestine and the United States. *International Journal of Politics, Culture, and Society*, 22, 2009, 2 [text]

Daniel Goleman:

- Emotional Intelligence: why it can matter more than IQ. Bantam, 1995
- Social Intelligence: the new science of human relationships. Bantam, 2007

Maurice Halbwachs. On Collective Memory. University of Chicago Press, 1992 [text]

Edward Haskell. Generalization of the structure of Mendeleev's periodic table. In: E. Haskell (Ed.), Full Circle: The Moral Force of Unified Science. New York, Gordon and Breach, 1972 [text]

W. Hirst and D. Manier. Towards a psychology of collective memory. *Memory*, 16, 2008, pp. 183-200. [text]

Ludmila Isurin. Collective Remembering: memory in the world and in the mind. Cambridge University Press, 2017

E. Keightley and M. Pickering. The Mnemonic Imagination: remembering as creative practice. Springer, 2012

Lynne Kelly:

- The Memory Code. Pegasus Books, 2017
- This ancient mnemonic technique builds a palace of memory. *Aeon* [text],

Orrin Klapp. Opening and closing: Strategies of information adaptation in society. Cambridge University Press, 1978

Gary Lachman. Lost Knowledge of Imagination. Floris Books, 2017 [summary]

Michelle L. Meade, Celia B. Harris, Penny Van Bergen, John Sutton, and Amanda J. Barnier. Collaborative Remembering: theories, research, and applications. Oxford University Press, 2017

David Middleton and S. D. Brown. The Social Psychology of Experience: studies in remembering and forgetting. Sage, 2005

David Middleton and Derek Edwards. Collective Remembering. Sage, 1990 [summary]

Walter J. Moore. Schrödinger: Life and Thought. Cambridge University Press, 1992

Dario R. Paez and James Hou-Fu Liu. Collective Memory of Conflicts. In: Daniel Bar-Tal (Ed.), Intergroup Conflicts and Their Resolution: a social psychological perspective. Psychology Press, 2011, pp. 105-124

James W. Pennebaker, Dario Paez and Bernard Rime. Collective Memory of Political Events: social psychological perspectives. Lawrence Erlbaum Associates, 1997.

R. Poole. Enacting Oblivion. *International Journal of Politics, Culture, and Society*, 22, 2009, 2 [text].

W. T. Powers. Making Sense of Behavior. Benchmark, 1999

Kate Raworth. Doughnut Economics: seven ways to think like a 21st-Century economist. Chelsea Green Publishing, 2017

E. Reese and R. Fivush. The Development of Collective Remembering. *Memory*, 16, 2008, 3, pp. 201-212. doi

Craig Reynolds. Boids: Background and Update. 2007 [text]

Steven M. Rosen. Topologies of the Flesh: a multidimensional exploration of the lifeworld, Ohio University Press, 2006

John Ralston Saul. Unconscious Civilization. Free Press, 1995 [summary]

Michael Shermer. Heavens on Earth: the scientific search for the afterlife, immortality, and utopia, 2018 [summary]

Michael Schudson. Preservation of the Past in Mental Life. *Quarterly Newsletter of the Laboratory of Comparative Human Cognition* (Center for Human Information Processing, University of California, San Diego), 9, 1987, 1

John Shotter. Remembering and Forgetting as Social Institutions. *Quarterly Newsletter of the Laboratory of Comparative Human Cognition* (Center for Human Information Processing, University of California, San Diego), 9, 1987, 1

Orana Velarde. The Meaning of Shapes and How to Use Them Creatively in Your Designs. *Visme*, 1 October 2017 [[text](#)]

James V. Wertsch:

- Voices of Collective Remembering. Cambridge University Press, 2002
- Collective Memory: Issues from a Sociohistorical Perspective. *Quarterly Newsletter of the Laboratory of Comparative Human Cognition* (Center for Human Information Processing, University of California, San Diego), 9, 1987, 1

Timothy Wilken The Relationship Continuum. *SynEarth*, 2002 [[text](#)]

Marilyn Yalom. The Amorous Heart: history of love. Basic Books, 2018

Frances Yates. The Art of Memory. Routledge and Kegan Paul, 1966



This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](#).

For further updates on this site, [subscribe here](#)