Creative Technologies for Multidisciplinary Applications

Andy M. Connor
Auckland University of Technology, New Zealand

Stefan Marks
Auckland University of Technology, New Zealand

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Chapter 9

The Holon/Parton Theory of the Unit of Culture (or the Meme, and Narreme): In Science, Media, Entertainment, and the Arts

J. T. Velikovsky
University of Newcastle, Australia

ABSTRACT

A universal problem in the disciplines of communication, creativity, philosophy, biology, psychology, sociology, anthropology, archaeology, history, linguistics, information science, cultural studies, literature, media and other domains of knowledge in both the arts and sciences has been the definition of ‘culture’ (see Kroeber & Kluckhohn, 1952; Baldwin et al., 2006), including the specification of ‘the unit of culture’, and, mechanisms of culture. This chapter proposes a theory of the unit of culture, or, the ‘meme’ (Dawkins, 1976; Dennett, 1995; Blackmore, 1999), a unit which is also the narreme (Barthes, 1966), or ‘unit of story’, or ‘unit of narrative’. The holon/parton theory of the unit of culture (Velikovsky, 2014) is a consilient (Wilson, 1998) synthesis of (Koestler, 1964, 1967, 1978) and Feynman (1975, 2005) and also the Evolutionary Systems Theory model of creativity (Csikszentmihalyi, 1988-2014; Simonton, 1984-2014). This theory of the unit of culture potentially has applications across all creative cultural domains and disciplines in the sciences, arts and communication media.

INTRODUCTION

This chapter proposes a formal structure for the unit of culture, also known as the meme (Dawkins, 1976), namely: the holon/parton (Velikovsky, 2013b), synthesizing concepts from (Koestler 1967) and Feynman (2005).

Previously, an unsolved problem across media, the arts, entertainment and science has been defining ‘the unit of culture’, resulting in over three hundred varying definitions of culture (Baldwin et al 2006), and no consensus (van Peer et al 2007). Given also that stories (or, narratives) in any media are ‘units
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of culture’, this proposed unit of culture, the holon/parton, also applies to the narreme, or, the ‘unit of story’ namely the whole and its composite parts. This holon/parton structure is suggested for analyzing media, and transmedia, including: movies, novels, television series, videogames, plays, songs, poems, jokes, religions, and also knowledge in science (i.e., scientific ideas, processes, and products).

An Evolutionary Systems Theory approach to Creativity in the discipline of Mass Communication Studies (aka Communication) illuminates why bioculture is structured hierarchically, as a holon/parton, or a holarchy. The aim here is to provide a universal unit of culture, spanning communication, the arts and humanities, media, languages and science, in order to facilitate commensurate empirical analyses of culture across disciplines, and also to enable structural, functional and behavioral comparisons between biocultural artifacts, to aid in the tracking and understanding of culture (and, its units) including within Creative Technologies and the Digital Humanities. For example, a better understanding of culture at the genre level may also benefit cultural curators and cultural theorists.

In short, the unit of culture (as: the holon-parton) is a conceptual, theoretical, practical and scientific tool (namely, a piece of creative technology), for identifying and analyzing units within: any - and all - creative media (including films, novels, videogames, television programs, scientific theories, songs, tweets, sentences, words, and so on, namely: any symbol system in culture.) This theoretical tool is thus potentially of direct practical use to anyone who has anything to do with culture: specifically - creators, students, scholars, critics, analysts, academics, practitioners, curators, and audiences. This Evolutionary Systems Theory approach is part of Applied Evolutionary Epistemology (see Gontier 2012), ideally enabling an understanding of the growth and evolution of both biology and culture.

BACKGROUND TO THE PROBLEM

A long-standing (unsolved, and universal) problem in the disciplines of Communication, Creativity Studies, Philosophy, Biology, Psychology, Sociology, Anthropology, Archaeology, History, Linguistics, Information Science, Mathematics, Cultural Studies, Literature, Media, the Digital Humanities - and other domains and disciplines of knowledge in the arts, media and the sciences - has been the definition of ‘culture’, including a practical specification of the unit of culture. ‘Culture’ has long been a problematic term as there is currently no consensus across all of the various domains and disciplines on ‘culture’. In 1952, 164 extant definitions of culture were extant (Kroeber & Kluckhohn, 1952), and more recently in 2006 the list was extended to over 300 extant definitions (see Baldwin, Faulkner, Hecht, & Lindsley, 2006, pp. 139-226). Summarizing the contemporary state of knowledge about the problem of culture in Muses and Measures: Empirical Research Methods for the Humanities, van Peer et al concluded ‘As far as can be seen, there is no consensus on the notion of culture anywhere to be found’ (van Peer, Hakemulder, & Zyngier, 2007, p. 30). Similarly, in a recent survey of contemporary knowledge in the domain of Memetics (1976-2009) - a discipline which aims to identify and track ‘units of culture’ - in the article ‘Evolution of Culture, Memetics’ in the Encyclopedia of Complexity and Systems Science, it is noted that ‘The lack of a universally accepted meme definition and the vagueness of meme boundaries… indeed make empirical studies less evident’ (Heylighen & Chielens, 2009, p. 3217).

The following proposal for the unit of culture (aka, the meme), and also the narreme (or, the unit of narrative), namely the holon/parton, aims to provide a possible solution to these problems, in defining, and/or creating, and/or analyzing culture, and therefore with many multidisciplinary applications.
Theoretical Perspective

The theoretical perspective adopted in this chapter is Evolutionary Systems Theory. In *Introduction to Systems Philosophy: Toward a New Paradigm of Contemporary Thought*, Laszlo (1972) incorporates Living Systems Theory (Miller, 1968) and also Bunge’s hierarchical structures (Bunge, 1969) to provide a framework for understanding universal structures, spanning from subatomic physics, through biology, chemistry, organisms, and social systems, to the cosmos (Laszlo, 1972, pp. 29, 177-180). An illustration of this view is shown in Figure 1.

In this view, the ‘largest-to-smallest’ levels of structural hierarchical organization include: Multiverse / Universe / Filament / Supercluster / Cluster / Galaxy / Star system (Heliosphere) / Planet (Biosphere) / Continent / Nation / State or Province / City, Town or Village / Neighborhood / Residence / Family / Person (organism) / Organ system / Organ / Tissue / Cell / Organelle / Molecule / Atom / Subatomic Particles (or, Waves).

Laszlo (1972) also employs Koestler’s holon theory in systems (Laszlo, 1972, pp. 55-118, 252, 255, 272-114), as Koestler had previously extended General Systems Theory (Koestler, [1978] 1979, pp. 31-32; von Bertalanffy, 1950) from biological systems, to social holarchies (i.e., hierarchies of social holon/partons) and also to linguistic hierarchies (Koestler, [1964] 1989, pp. 287-290; [1967] 1989, pp. 103, 198-109; [1978] 1979, pp. 27-62). As noted in the Definitions section (below), in simplest terms, the three laws of holarchies, or key behaviors of holon/partons, may be summarized as follows.

As units, holon/partons:

- **Compete, and/or, Co-Operate (and/or Engage in Co-Opetition) ‘Sideways’:** With other holon/partons on the same level;
- **Integrate ‘Upwards’:** Into the larger holon/parton ‘above’; and
- **Control and Command:** Their component holon/partons, on the level ‘below’

This basic concept of ‘the three laws of holarchies’ is illustrated in Figure 2.

These three laws also appear to be laws of physics (and, of systems), applying both to biology and also bioculture (aka ‘culture’), a possibility that is also suggested in *Consilience: The Unity of Knowledge* (Wilson, [1998] 1999, pp. 60, 291, 293).

A Tripartite Evolutionary Systems Theory Meta-Model of Biocultural Creativity

Knowledge emerges from biocultural human systems at an exponential rate. As examples, research in the Digital Humanities demonstrates that the number of published scientific papers doubles every nine years (Bornmann & Mutz, 2014), and the number of new books published each year (approximately 700,000 per year in the U.S.) doubled in the five years from 2008 to 2012 (Bowker, 2013).

The Evolutionary Systems Theory view of biocultural creativity adopted here to explain the growth in - and evolution of - the number and type - of discrete biocultural artifacts (e.g., books, movies, songs, words, and so on) combines three ‘nested’ Evolutionary Creativity Theories. These three theories are:

1. Karl Popper’s (1978-1999) ‘Three Worlds’ Evolutionary Epistemology model of culture (namely, at the ‘global’ level);
2. Mihaly Csikszentmihalyi’s (1988-2014) DPFi (Domain, Person, Field interaction)
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Figure 1. The evolutionary systems view, from the multiverse through to subatomic particles
Derived from Laszlo, 1972.

systems model of creativity (namely, at the macro, biocultural level); and finally (3) D K Simonton’s (1984-2014) BVSR Evolutionary Theory of creativity (at the micro, or individual human level, namely, inside the human mind).

These three nested theories, which thus form one single integrated metamodel of biocultural creativity, are each briefly summarized below. It should also be noted that in this view, there is nothing in
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Figure 2. The three laws of holon/partons, or, holarchies

bioculture that is not, either: an idea, or a process, or a product - or two, or three, of these at once; this
view would apply in the domains of Communication, Creativity Studies, Philosophy, Biology, Psychol-
ogy, Sociology, Anthropology, Archaeology, History, Linguistics, Information Science, Mathematics,
Cultural Studies, Literature, Media, Digital Humanities, and Creative Technologies.


Popper’s ‘Three Worlds’ model (1978-1999) delineates three ‘worlds’: ‘World One’ (of physical and
biological objects, products, and events); ‘World Two’ (of mental and psychological states, processes,
perceptions, observations, and subjective feelings); and, ‘World Three’ (of ideas, or the products of hu-
man minds; i.e., in Popper’s 1978 words):

… Languages; tales and stories and religious myths; scientific conjectures or theories, and mathematical
constructions; songs and symphonies; paintings and sculptures. But also aeroplanes and airports and
other feats of engineering’ (Popper, 1978b, pp. 143-144).

In short, these three worlds are, the (1) physical, (2) mental, and (3) conceptual domains. Notably,
Popper also suggested that World Three might also be subdivided further, into ‘World Three’ (i.e, sci-
ence), and World ‘Four’ (i.e., the world of the arts, music, languages, metaphysics, and so on). This ‘two
cultures’ divide (namely the ‘World Three’ of science, versus the ‘World Four’ of non-scientific cultural
artifacts) is in fact sometimes a convenient and useful distinction, although it is also worth noting that
if the process of the creation, and selection (the Blind Variation and Selective Retention or BVSR) of
biocultural creative artifacts is indeed the same process in both the arts and sciences, then the process of
creativity itself unifies both the domains of the sciences and the arts (Csikszentmihalyi 1996).
It is also important to note that the characteristic (if not, compulsory) ‘scientific method’ is a three-step, algorithmic process (paraphrased from Popper 1972, 1979, as an algorithm, below):

1. Expectation (or: a theory, or, conjecture);
2. Trial - and possibly: success (i.e., satisficing), or, falsification (i.e. error);
3. If error is encountered (i.e., if expectation/s are falsified), then do Error-correction (i.e. Go to #2 above, with: a new trial).

This same algorithmic ‘problem-solving’ process is both consciously (and/or unconsciously) undertaken by organisms. If it is successful, they avoid falsification (problems of task or goal failure – or, injury, or death). Creative thinking (and the creation of artifacts in any media, in science or the arts) can also thus be viewed as problem-solving (see Weisberg, 2006, pp. 577-581). Lovelock also likewise (1995) states problem-solving (goal attainment) is a systems – that is, cybernetic - process:

*One of the most characteristic properties of all living organisms, from the smallest to the largest, is their capacity to develop, operate and maintain systems which set a goal and then strive to achieve it through the cybernetic process of trial and error. (Lovelock, 1995, pp. 45-46)*

This is the systems cybernetic view of learning, or, of knowledge acquisition, or BVSR (Blind Variation and Selective Retention). The evocritic Brian Boyd (2009) likewise notes:

*Biologically we can see all organisms as problem-solvers, each action or process as an attempt to solve a problem, however minor or routine. Evolution generates problems and solutions as it generates life. (Boyd, 2009, p. 324)*

In Sir Karl Popper’s Evolutionary Epistemology, also further developed by D. T. Campbell (1974), D. K. Simonton (1984-2014) and others, *memes* (or, units of culture - or, ideas, processes, products) that are less-suited (less ‘adapted’) to their geo-physical-chemical-bio-psycho-socio-cultural environment are deselected (or, are ‘falsified’). Popper notes that with regard to knowledge, organisms also have knowledge, as they have ‘theories’, or expectations (about how to survive, or, what to avoid, in order to avoid being falsified, i.e., getting injured, or dead) although obviously other organisms are not as conscious of this, as humans are (Popper, 1999, pp. 32-39); these organismic instincts are thus like ‘IF > THEN > ELSE’ algorithms. Munz (2001) extends this view further, to suggest that ‘organisms are “embodied theories,” and, theories are “disembodied organisms.”’ (Gontier, 2014, online).

In summary, in this Evolutionary Systems Theory view, Popper’s Evolutionary Epistemology, and also ‘Three Worlds’ theory applies to: ideas, processes, and products in bioculture, which also links directly to the Systems Model of Creativity (1988-2014), outlined below.

### 2. Csikszentmihalyi’s ‘DPFi’ Systems Model of Biocultural Creativity (1988-2014)

Csikszentmihalyi’s *Domain, Person, Field interaction* model (or DPF model, aka, *Domain, Individual, Field interaction*, or DIFi systems model) is also an explicitly evolutionary, *natural selection* model of cultural creativity (Csikszentmihalyi & Wolfe, 2000, pp. 83-84), where the individual (i.e., the person, or, group) creates a new artifact (an idea, and/or a process, and/or a product), and subsequently, a consensus
in the relevant field (or, audience) for that domain of culture (e.g., in science, and/or in the arts - such as in the domains of movies, or popular music, or in the case of a new soft drink, the general public) judges this new cultural artifact, and it is thus either selected (or, conversely, deselected – or, falsified) in its environment, an environment which also includes the field itself (Csikszentmihalyi, 1988, 1995, 1996a, 1996b, 1999, 2006, 2014; Csikszentmihalyi & Nakamura, 2006; Csikszentmihalyi & Wolfe, 2000).

The selection (and also de-selection) criteria for biocultural artifacts can be complex, multifactorial, and domain-context-dependent. However there are two simple factors that appear to play a large part in the selection of artifacts by consensus; one factor is ‘flow’ theory (Csikszentmihalyi 1996) - and by extension, for narrative media, ‘Narrative Transportation’ theory - and another relevant factor is the Anna Karenina principle (Bornmann & Marx, 2012; Diamond. [1997] 1999, p. 157; Simonton, 2007, p. 145).

With regard to flow, in the article ‘On The Psychological Selection Of Bio-Cultural Information’ the authors note that individuals tend to select cultural artifacts that put them in the ‘flow’ state, and tend to deselect those that do not (see Csikszentmihalyi & Massimini, 1985). The ‘flow’ state has nine characteristics, and may be simplified as ‘task enjoyment’, for example, being satisfied by the experience of a media artifact, namely: a movie, or play, novel, song, or videogame, and so on (Csikszentmihalyi, 1996b, pp. 111-113). Importantly, ‘flow’ theory also correlates with, and has been adapted to, the ‘Narrative Transportation’ Theory of audience immersion (Gerrig, 1993; Green & Brock, 2000; 2002, p. 236; Green & Carpenter, 2011; Green, Chatham, & Sestir, 2012; Van Laer, De Ruyter, Visconti, & Wetzels, 2014).

On this view, an entertainment artifact (a novel, movie, song, and so on) that ‘transports’ the audience member enables immersion in the narrative, and is therefore ‘liked’ - or enjoyed - and thus subsequently ‘selected’ (rather than falsified, or ignored, or, harshly criticized), and thus may become popular and/or canonical, due to ‘word-of-mouth’ recommendations. Those that fail to do so by consensus are falsified, or, deselected en masse. This results in knowledge (or, memes, or units of culture) that Moretti categorizes as ‘canon’, versus ‘archive’ (Moretti 2000, 2007).

Additionally, the Anna Karenina principle (sensu Diamond 1997) is a partial antidote to the ‘single-cause fallacy’ of success – or, of failure - in the domain of movies, or science, for example. As outlined in Guns, Germs and Steel (Diamond, 1997, pp. 157-175), this is the principle whereby: failure (or, falsification) of an artifact in a domain may be caused by an inadequacy in any number of a unit’s/agent’s/individual’s component-elements (and/or, skills), while success in that domain also requires that each and all of those same possible inadequacies be avoided. Others who note this same principle (albeit without the Tolstoy allusion) include Aristotle in Nicomachean Ethics (c335 BCE), and also Richard Dawkins (1986), who notes ‘However many ways there are of being alive, it is certain that there are vastly more ways of being dead, or rather not alive.’ (Dawkins, 1986, p. 9). The Anna Karenina principle has been used to understand success in biology (Diamond 1997), in movies (Simonton, 2007), in scientific excellence, and in a number of other research domains (see Bornmann & Marx, 2012).

Csikszentmihalyi’s DPF systems model of creativity describes systems in which ideas, processes, products (or memes) are inputs; creative individuals constantly recombine these ‘old’ (existing) ideas, processes and products to create newer ones; and these new artifacts are then judged by the field, or audience. There are therefore three sub-systems (domain, person, and field) which interact as one whole (DPF) system, and the outputs (or creative artifacts) of the system can also recursively become new inputs.

This constant selection (and also, de-selection) process also leads to the ‘Less-Than-One-Percent’ Problem in various cultural domains (in novels, movies, songs, and so on), whereby less than one percent of the artifacts produced, tend to become canonical (Moretti, 2000), or are ultimately judged ‘creative’ (or ‘original and useful’) by a consensus in the field (or, the audience) for each domain in culture (e.g.
mathematics, physics, chemistry, biology, movies, television, novels, songs, and so on). This iterative and recursive ‘recombination spiral’ described by the systems model of creativity (Csikszentmihalyi 1988-2014) is also isomorphic to Koestler’s description of the evolutionary spiral of knowledge (or, of units of culture) in domains over time, a la Garstang 1922 (Koestler, [1967] 1989, pp. 168-169, 178-169). As an interesting parallel of falsification (or, deselection) in Evolutionary Biology to falsification in Evolutionary Bioculture: in biology, 99.99 percent of evolutionary lines (or, species) have also gone extinct over time (Mayr, 2002, p. 155). It can be seen that Popper’s ‘Three Worlds’ (ideas, processes, products) and Evolutionary Epistemology (natural selection) model of biocultural creativity equates to Csikszentmihalyi’s (1988-2014) DPF systems model of creativity, noting that Csikszentmihalyi also refers to units of culture - or ideas, processes and products – as ‘memes’ (Csikszentmihalyi, 1996b, pp. 7, 8, 41, 318, 319, 321, 372). These two synthesized evolutionary ‘natural selection’ models of culture (namely Popper / Campbell, and, Csikszentmihalyi) may be integrated with a third theory, the BVSR evolutionary theory of creativity (1984-2014), which is briefly outlined below.

3. Simonton’s BVSR (Evolutionary Epistemology) Theory of Creativity in Bioculture (1984-2014)

Psychologist D. K. Simonton has developed an evolutionary theory of creativity from 1984 to 2014; The Cambridge Handbook of Creativity (2010) also notes that Simonton’s BVSR evolutionary theory of creativity (1984, 1988, 1997, 1999, 2003, 2004) is, most likely, the most comprehensive extant theory of creativity (Kozbelt, Beghetto, & Runco, 2010, pp. 35-37). In this view, ideas (or, potential creative problem-solutions) are selected by an individual, and then varied ‘blindly’ i.e., without accurate foresight about the idea’s future success (and thus are rather, guesses - or expectations, or the ‘hopeful theories’ of individuals) and are thus recombined; then, tested (mentally); and elaborated to a presented solution which is then judged by the field (as also in the DPF model of creativity, 1988-2014), and if these memes (ideas, processes, products) are not falsified, they are thus selectively retained by the field (Simonton, 2012a). This individual (person) level of creative process can therefore be seen to be a ‘micro’ element of the larger, ‘macro’ DPF evolutionary process of cultural creativity, and also incorporates ideas, processes and products, as it is explicitly derived from Campbell and Popper’s Evolutionary Epistemology (D. T. Campbell, 1960, 1974; see also Popper, 1963, 1978a, 1999, [1972] 1979; Radnitzky, Bartley, & Popper, 1987).

Popper’s (1963-1999), Csikszentmihalyi’s (1988-2014) and Simonton’s (1984-2014) three major creativity theories may thus be integrated, or, ‘nested’, one within the other (i.e. with Popper’s model as the superset; then Csikszentmihalyi’s as a subset of that model; then with Simonton’s as a subset within that model) as a holistic Evolutionary Systems view of biocultural creativity. Popper’s ideas, processes, and products (correlating with Worlds One, Two and Three) are also considered as units, within this synthesized evolutionary creativity metamodel.

Thus it may be seen that, despite the ongoing exponential growth of bioculture, only around one percent of culture ultimately is judged ‘creative’ and thus retained as canonical (in both the arts, and the sciences). For all ideas, processes and products, there is a continuum of creativity, ranging from ‘everyday’ (or ‘personal’ creativity) through ‘mini-c’ and ‘pro-c’, to what is known as ‘big-C’ (or historical) Creativity, the latter being for example, famous works by Darwin, Einstein, Mozart, Picasso, Stanley Kubrick, and so on (see Kaufman & Beghetto, 2009, 2013; see also Boden 2004).
This Evolutionary Systems Theory metamodel, showing memes (or, units of culture), and the Domain, Field and Person relationship as a systems process is illustrated in Figure 3.

As is obvious, working from the micro, out to the macro scales in the above model, the point at which Simonton’s BVSR Evolutionary Creativity model overlaps with Csikszentmihalyi’s DPF systems model of creativity is the point at which the individual (or group) presents their newly-produced tangible creative artifact to the field (audience) - an artifact (meme, or holon/parton, or idea, process or product) which the field then judges as ‘creative’ (i.e. ‘original and useful’), or not. If the field judges the meme (idea, process or product, e.g., a new movie) as not creative, the meme does not become canonical, and is thus, in effect falsified. The meme (idea, process, product) usually continues to exist (or, is archived) in some form, but does not spread widely among the minds of the field through ‘information cascades’.

In such biocultural domains of popular entertainment as movies, music, novels, television shows, comics (aka graphic novels) and so on, the ‘word-of-mouth’ communication process (or phenomenon) whereby a specific meme (or unit of culture) spreads, and thus becomes regarded as popular (e.g. a ‘hit’ movie; a ‘best-selling’ novel; a ‘viral’ YouTube video; a well-known joke) is known by various names, including: positive high-volume (and conversely, negative), or ‘social contagion’, ‘recursive nonlinear demand dynamics’, ‘information cascades’ (see: De Vany & Walls, 2004, p. 1036). Any output (for example, a movie, or a scientific theory) may therefore become a new input, when it is absorbed by (and, influences) other persons in the field. However the creative (and thus, canonical) memes are likely to be more influential and fecund.

With this ‘natural selection’ Evolutionary Epistemology (or, Evolutionary Systems Theory) approach to biocultural creativity outlined as a theoretical perspective, turning now to the specific structure of the unit of culture (or, ideas, processes, products), which are some of the inputs - and outputs - of these biocultural systems.

*Figure 3. The systems model of bioculture, showing the Person, Field, Domain process; black memes are ‘creative’ (canonical); white are not. Derived from Csikszentmihalyi, 1988-2014.*
THE UNIT OF CULTURE: THE HOLON/PARTON

The holon/parton structure of the unit of culture (or, meme; i.e. idea, process, product) may be viewed conceptually as in Figure 4.

It should be noted that this model is also fractal (or, self-similar on smaller scales). This is not to imply that all units of culture can (nor, should be) be divided into exactly two parts infinitely; the number of components on each lower (smaller) level of the holarchy may increase exponentially. As an example, in one single novel, there may be around 100,000 words; in a 90-minute movie (at 24 frames per second), around 130,000 still-image frames.

The Holon/Parton as ‘The Unit of Culture’ in Various Communication Media

With the above holon/parton schema in mind, below are hierarchical templates for different media as units of culture, and also their component units (on the levels below), all considered as holon/partons. The three laws of holarchies (namely: (1) integrate upwards; (2) compete and co-operate sideways, (3) control and command downwards) also apply to the units, on each level.

- Novel:
  - Genre;
  - Novel;
  - Chapter;
  - Paragraph;
  - Sentence;
  - Word;
  - Letter (and punctuation mark, including spaces);
  - Idea.

As an example, individual novels compete with other individual novels for reader attention, for canonical status, and for both library and retail shelf-space in the field (Boyd, 2009; Van Peer, 1997); as do entire literary genres, and sub-genres; the specific words, sentences, paragraphs and chapters (and

Figure 4. The holon/parton structure of the unit of culture (or, meme - or, idea, process, product)
possibly also, images) that have survived the creation and editing process are those contained in the published work; in the completed work they also co-operate (or, operate together) to convey information and meaning to (and, to evoke emotion in) the reader, or audience (Boyd, Carroll, & Gottschall, 2010).

- **Movie:**
  - Genre;
  - Movie;
  - Act;
  - Sequence;
  - Scene;
  - Shot;
  - Action, and Dialog (line);
  - Single (still image) frame;
  - Idea.

As with the ‘Novels’ example above, each unit (or holon/parton) on the same holarchic level of a movie integrates ‘upwards’; competes/co-operates ‘sideways’; and also controls (i.e., provides organizing principles, or sets of ‘rules’ for) the units on the level ‘below’ it.

- **Videogame:**
  - Genre;
  - Videogame;
  - Game Level;
  - Environment;
  - Building;
  - Room;
  - Puzzle/Hazard;
  - Game event;
  - Idea.

- **Theatre (Play):**
  - Genre;
  - Play;
  - Act;
  - Scene;
  - (Dramatic) Beat;
  - Moment;
  - Idea.

- **Popular Song:**
  - Genre;
  - Song;
  - Intro/Verse/Chorus/Bridge/Coda;
  - Word/Chord;
  - Letter/Musical note;
  - Idea.
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- **Poem:**
  - Genre;
  - Poem;
  - Stanza;
  - Word;
  - Letter;
  - Idea.

- **Joke:**
  - Genre;
  - Joke;
  - Setup/Feed/Punchline;
  - Word;
  - Idea.

- **Spoken Language:**
  - Phrase/Sentence;
  - Word;
  - Morpheme;
  - Phoneme.

- **Science:**
  - Domain;
  - Discipline;
  - Paradigm;
  - Metatheory;
  - Theory (possibly: Law);
  - Phenomena;
  - Fact;
  - Idea.

- **Religion:**
  - Religion;
  - Faith;
  - Metaphysics;
  - Scripture;
  - Idea.

Bioculture is composed of symbol systems (e.g., written and spoken language, mathematics, musical notation, paintings, drawings, and so on). This holon/parton (and, holarchy) structural tendency of symbolic biocultural artifacts, as outlined above, has also been noted in passing by many prior commentators, including Herbert Simon (1996):

Symbolic Systems… systems of human symbolic production. A book is a hierarchy in the sense in which I am using that term. It is generally divided into chapters, the chapters into sections, the sections into paragraphs, the paragraphs into sentences, the sentences into clauses and phrases, the clauses and phrases into words. We may take the words as our elementary units, or further subdivide them, as the
linguist often does, into smaller units. If the book is narrative in character, it may divide into "episodes" instead of sections, but divisions there will be. The hierarchic structure of music, based on such units as movements, parts, themes, phrases, is well known. (Simon, 1996, pp. 187-188)

This holon/parton structure which Simon refers to above (though without Simon labelling it as such) may also be viewed as in Figure 5.

A transmedia narrative (i.e., a transmedia story universe)10 is also structured - and thus, may also be analyzed - as a holon/parton (Velikovsky, 2014a).

A Transmedia Narrative as a Holon/Parton (and, a Holarchy)

In This Will Change Everything: Ideas That Will Shape The Future (2010) Sampson writes:

The numerous and dramatic increases in complexity, it turns out, have been achieved largely through a process of integration, with smaller wholes becoming parts of larger wholes. Again and again, we see the progressive development of multipart individuals from simpler forms. Thus, for example, atoms become integrated into molecules, molecules into cells, and cells into organisms. At each higher, emergent stage, older forms are enveloped and incorporated into newer forms, with the end result being a nested, multi-level hierarchy… the epic of evolution has been guided by counterbalancing trends of complexification and unification. (Sampson in Brockman, 2010, pp. 1-2)

As with biology, so too with bioculture. For example, it is characteristic of a transmedia narrative – or, a meta-story that spans more than one media - that it also follows this same evolutionary growth pattern, of complexification ‘downwards’, and simultaneous unification ‘upwards’. A transmedia movie story contains certain narrative events, characters, themes, settings and dialog, while a novel, videogame, comics (or narratives in other transmedia) will also share some of these same narrative events, characters, themes, settings and dialog while also containing new additions (or, ‘extensions’) to the same (unified)

Figure 5. A diagrammatic analysis of the holon/parton structure of three paragraphs of text
story. As the narrative universe is further *extended* (or, ‘grows’) into other (trans)media over time, additional characters, settings, events and dialog are added, and yet the overall narrative (or, story) universe remains a single integrated (unified) whole. This concept is illustrated in Figure 6, and correlates with Popper’s (1963) observations on the growth of scientific knowledge.

Classic examples of such transmedia narrative universes include: *Twin Peaks, Star Wars, Harry Potter, Dexter, LOST, The Blair Witch Project,* and *The Matrix* (Velikovsky, 2013a).

**On the Increasing Complexity of Emergent Systems**

Koestler discusses the phenomenon of anamorphosis in evolution, in *The Ghost in the Machine* (1967):

*The German biologist Woltereck coined the term ‘anamorphosis’ for the primary and ubiquitous trend in Nature towards the emergence of more complex forms.* (Koestler, [1967] 1989, p. 200)

In the Systems (and therefore, the Complexity) worldview, one key problem is (increasing) complexity, or that precision in the measurement of a cultural phenomenon is inverse to its complexity. Ward (1898) also comments on Comte’s hierarchical taxonomy of the sciences, which was arrived at:

… *by taking as the criterion of the position of each the degree of what he called “positivity,” which is simply the degree to which the phenomena can be exactly determined. This, as may be readily seen, is also a measure of their relative complexity, since the exactness of a science is in inverse proportion to its complexity* (Ward, [1898] 1913, p. 7).

*Figure 6. A transmedia story universe as a holon/parton, and a holarchy*
Comte’s hierarchy of the sciences\textsuperscript{11} (namely mathematics, astronomy, physics, chemistry, biology, psychology, sociology, and anthropology) can be seen as increasing in complexity (and thus, also decreasing in predictability) to the right, as represented in Figure 7, to which has been added another science, here called ‘Culturology’:

In *Darwin’s Bridge: Uniting the Sciences and Humanities*, Carroll (in press) writes:

> Good explanations at any level of emergent complexity are likely to identify causal relations among forces at that level and link them with causal forces at lower levels in the causal hierarchy. Good explanations take account of the causal interactions among emergent phenomena, but valid conceptions of emergent phenomena depend on correctly identifying the elements that make up the emergent phenomena (Pinker 2005). Ignoring principles of natural selection, for instance, produces false conceptions of the way populations interact with each other and with individual organisms (Carroll 2001; Easterlin 2004).

*(Carroll in Carroll, McAdams, & Wilson, in press)*

Obviously many complex systems obtain in any human individual (i.e., person), given the overlapping systems of their individual biology, psychology, sociology, anthropology, culture(s) and physical environment - let alone the related, interacting, and evolving systems of systems - and most with multiple causes, effects, and variables. We might thus assume it impossible to predict anything in bioculture, as a result of overwhelming complexity. Yet regardless, some laws of physics in evolution (namely, the three laws of holarchies) appear to apply to the growth of bioculture, whether in the arts, media, languages, or the sciences. While there are also exceptions (e.g. ‘experimental’ artistic works), these tend not to become canonical; they tend not to satisfy the ‘appropriate’ requirement within the ‘novel and appropriate’ criterion, for artifacts that are judged ‘creative’ by the field in a domain.

**Consilience**

The phrase ‘a consilience of inductions’ was coined in by William Whewell in 1840 to denote when a theory is verified via different methods in different disciplines (Vol. 2 of Whewell, 1840, p. 65). However the term ‘consilience’ is used with a different meaning in the more recent *Consilience: The Unity of Knowledge* (Wilson, [1998] 1999), to denote the unification (or, synthesis) of knowledge between the ‘two cultures’ of the Sciences and the Arts/Humanities, with the aim of solving the ‘Two Cultures’ problem (or the ‘separation’ of the Sciences and Arts/Humanities), famously articulated in C.P. Snow’s *The Two Cultures and the Scientific Revolution* (Snow, 1959). The conference proceedings *Creating Consilience: Integrating the Sciences and the Humanities* explains how the project of consilience is also known as ‘vertical integration’, whereby extant scientific findings from (evolutionary) biology, psychol-

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*Figure 7. Hierarchy of the sciences*

*Adapted from Comte, 1855 and Simonton, 2004, 2012.*
The Holon/Parton Theory of the Unit of Culture (or the Meme, and Narreme)

ogy, sociology and anthropology are used in examining, analyzing and explaining culture (i.e., science, and the arts/humanities) (see Slingerland and Collard, 2012, p. 3). Figure 7 can be termed ‘horizontal integration of knowledge’ as it is the same concept of consilience, or, transdisciplinary consistency, or ‘vertical integration of knowledge’, simply viewed on another axis.

Mass Communication research spans the two domains of Science, and also the Arts/Humanities since Mass Communication research is generally considered a branch of Social Science, and is often multi-disciplinary, incorporating the other major social sciences including ‘psychology, sociology, anthropology, economics and political science’ (Halloran, 1998, p. 12). As also stated in the introduction to Theories and Models of Communication (2013):

Communication study seems inherently multi-disciplinary, drawing theory and sharing concepts from psychology, sociology, political science and other social sciences (Eadie and Goret in Cobley & Schulz, 2013, p. 17).

A significant body of consilient literature has emerged since 1995 in the domain of Evocriticism, also known as Darwinian Literary Studies, or Biopoetics. Some key works in this transdisciplinary domain of knowledge include: Evolution and Literary Theory (Carroll, 1995; Gottschall, 2008), Biopoetics: Evolutionary Explorations in the Arts (Cooke & Turner, 1999), Literature, Science and a New Humanities (Gottschall, 2008), On The Origin of Stories: Evolution, Cognition, Fiction (Boyd, 2009), Evolution, Literature and Film: A Reader (Boyd, et al., 2010), with a recent survey of the key Evocriticism literature appearing in ‘Applied Evolutionary Criticism’ (Cooke & Machann, 2012).

Evocriticism scholars use Evolutionary Theory, including Evolutionary Psychology (Buss, 2012), Evolutionary Sociology (Barkow, 2006) and Evolutionary Anthropology (Gibson & Lawson, 2014) to examine, explain, understand and analyze bioculture. Boyd (2009) in particular makes extensive use of Simonton’s BVSR Evolutionary Theory of biocultural creativity (1984-2008) in explaining life, bioculture, and also creative genius, as ‘Darwin Machines’ (Boyd, 2009, pp. 120-121, 211, 351-122, 366). However it appears the evolutionary ‘holarchies’ approach to analyzing bioculture within an Evolutionary Systems Theory framework is relatively new, as is The Complexity Turn (or the widespread use of Systems Theory and Systems Science) in the social sciences (Blaikie, 2007, pp. 206-214). Systems theory, including cybernetics (Lovelock, 1995, pp. 45-46; Wiener, 1948) thus appears ever more relevant to the study of consciousness, human nature, and human bioculture. The key founders of the domain of Evolutionary Psychology, Tooby and Cosmides (2005) state that:

The brain evolved as a control system, designed to generate action. From this perspective, there is not just a cognitive science of areas such as language, intuitive physics and number, but also a cognitive science of parenting, eating, kinship, friendship, alliance, groups, mating, status, fighting, tools, minds, foraging, natural history and scores of other ancient realms of human action. Separating knowledge acquisition from motivation has placed the study of motivation in cognitive eclipse and diverted cognitive scientists from studying conceptual structure, motivation and action as a single integrated system (which they seem likely to be).’ (Tooby & Cosmides, 2005, p. 51)

Recalling that Popper noted that all organisms (plants, animals - even amoebas) have knowledge, biocultural symbolically-encoded information-packets (or, memes) allow information to be communicated by humans extrasomatically. This evolutionary ‘cost/benefit ratio’ (or, adaptive utility) conception of
“knowledge” is far removed from alternative philosophical conceptions of knowledge such as ‘justified true belief’, but rather, knowledge (or culture) as ‘useful information’ - even where that information/knowledge ‘use’ is purely for entertainment purposes. Csikszentmihalyi notes:

Knowledge mediated by symbols is extrasomatic; it is not transmitted through the chemical codes inscribed in our chromosomes but must be intentionally passed on and learned. It is this extrasomatic information that makes up what we call a culture. And the knowledge conveyed by symbols is bundled up in discrete domains - geometry, music, religion, legal systems, and so on. Each domain is made up of its own symbolic elements, its own rules, and generally has its own system of notation... The existence of domains is perhaps the best evidence of human creativity... The fact that calculus and Gregorian chants exist means that we can experience patterns of order that were not programmed into our genes by biological evolution. By learning the rules of a domain, we immediately step beyond the boundaries of biology and enter the realm of cultural evolution. Each domain expands the limitations of individuality and enlarges our sensitivity and ability to relate to the world. (Csikszentmihalyi, 1996b, p. 37)

In this Evolutionary Systems Theory view, all bioculture (the arts, science, language, metaphysics, religion) is an evolutionary adaptation, or, solutions to the problems of life, encountered by humans (see also Boyd 2009).

Creative Practice Theory

In order to understand the process of creation (or, emergence) of artifacts (or, memes) from biocultural systems over time within this Evolutionary Systems model, the synthesized evolutionary metamodel of creativity explained above (combining the key creativity theories of Popper, Csikszentmihalyi, and Simonton) may also be synthesized with aspects of social theorists’ Anthony Giddens’ structuration theory (Giddens 1984) and Pierre Bourdieu’s ‘practice theory’ (1993), resulting in what is here called Creative Practice Theory.

Creative Practice Theory (Velikovsky 2012) is a synthesis of the evolutionary systems metamodel of creativity (Popper, Csikszentmihalyi, Simonton), and Bourdieu’s ‘practice theory’ of cultural production (Bourdieu & Johnson, 1993). These theories intersect, and also partially overlap, in such a way that they complement each other to describe holistically how creativity can occur over time.

The Creative Practice Theory model aims to explain the key ten (and apparently, irreducible) stages of the bio-socio-cultural process of creativity in biocultural production from the point of view of an individual person, or ‘agent’ (e.g.: a novelist, a filmmaker, scientist, musician, and so on), from prior to their birth, to their eventual acquisition of symbolic capital (i.e.: awards, status or recognition) for their creative artifacts (or their memes – namely, ideas, and/or processes, and/or products). This Creative Practice Theory model, once all ten (sequential) elements of the model are in place for an individual creative person, is presented in Figure 8.

The examples used below are here (for the purpose of illustration) focused on a filmmaker, but can also apply to most complex creative domains (e.g., painting, dance, theatre, videogames, novels, television, music, fashion design, sculpture, graphic arts, science, maths, philosophy, history, and so on).

As a result of the above configuration (or synthesis), it may be seen that the ten sequential stages of Creative Practice Theory - over time - are, as follows:
1. Prior to the person’s/individual’s/agent’s birth (or, emergence into the physical domain), Social and Cultural systems pre-exist (namely, everyone is currently conceived as a result of two parents - male and female - at a certain place, and time). In short, they are a random combination of their parents’ DNA.

2. The person is born - with certain biological predispositions (which may also become further developed over time, as talents).

3. Over time, the person acquires a Bio-Psycho-Socio-Cultural history. The overlapping social and cultural systems into which they are born and raised from childhood to adulthood (and beyond) are also a complex system of nested and/or overlapping sub-systems (or, polysystems).

4. Over time, the person acquires (and/or inherits) economic capital (finance) and/or access to it. This economic capital is required to acquire training, practice and expertise in a domain (e.g.: screenwriting, and/or filmmaking), and later, say, to finance the production of a movie (for example, access to producers and/or film financiers in the field).
5. Over time, by engaging with the Field (e.g. in cinema: the film industry, film audiences, and industry gatekeepers such as film producers, distributors, and critics) the person develops a habitus (or a ‘feel for the game’) in the domain/s they have chosen (e.g.: filmmaking, and/or screenwriting, or novels). In cinema, this may include: movie story (screen idea) creation skills, movie pitching skills, writing skills, personal and business negotiation and conflict-resolution skills, technical filmmaking skills, and also their personal, idiosyncratic, story and movie perceptions, opinions, tastes and preferences.

6. Over time, the person may acquire social capital in the Field, via valuable contacts and film industry social networks. This process also gives rise to the cliché: “It’s who you know, in the business.”

7. Over around ten years of learning, study, practice and correcting mistakes (on average), the person internalizes the domain (e.g.: of movie-making, of which, screenwriting is just one of many sub-domains). This is known as the ‘ten-year rule’ (Simonton, 2011, p. 119; Weisberg, 2006, pp. 173, 213-174, 222).

8. During this time, the person can also have been iteratively and recursively acquiring cultural capital, or knowledge, including film domain and screenwriting knowledge - and knowledge of the wider culture(s); also sometimes called “life experience”.

9. After around ten years, on average (and in screenwriting or movies: perhaps, around ten screenplays, and/or ten movies) possibly in collaboration with others, a person may create an artifact or meme (screenplay, or movie - or both) that the field then judges creative (‘original and useful’). There are, very broadly, two different types of ‘creativity’ recognized by the field in film: namely commercial and critical success although generally, as Simonton (2011) has noted, these two types of movie (or the two types of judgment by the field) rarely overlap (see also the ‘Categories of Canon’ section below for detail).

10. If and when one (or many) of the person’s creative works are judged creative by the Field (in cinema: either by audience-reach/box office - or critical acclaim/awards, and possibly even both, in rare circumstances), the person may also finally acquire symbolic capital (awards, titles or recognition, based on prestige or status, including membership in exclusive organizations). An example of symbolic capital may be a film writer, director, producer or actor winning an Oscar® for a movie; or say, senior membership of a guild, or membership of an exclusive official film/screenplay judging panel, and so forth. (The person may well repeat these stages, from Step 3 above, for subsequent projects, or creative artifacts, i.e. units of culture, or, memes.)

Creative Practice Theory suggests that if any person (say, a film writer-hyphenate) aspires to realize their potential creativity, in terms of both: the evolutionary systems model, and also Bourdieu’s economic / social / cultural / symbolic capital model, (including also acquiring habitus, and internalizing the specific creative domain) then they also must pass through all these above ten stages, over time.

There are thus ten key sequential steps in this systems process model, all of which are necessary-but-not-sufficient steps for creativity by an individual; that is to say, the ten steps in this algorithm may well be executed by an individual, and yet the artifact(s) they create may - or may not - be judged ‘creative’ by the field. It is only if, and after, the artifact (or, meme, or ‘unit of culture’) is judged ‘creative’ (or ‘original and useful’) by consensus in the field, that the individual (and/or, group) who created it is subsequently labelled, or viewed as, ‘creative’.
When examined as a linear chain of multiple co-causal systems factors and events - *over time* - for an individual movie screenwriter in the field, certain major emergent stages in the DPF nonlinear dynamical systems model process of creativity in movies - when also correlated and synthesized with aspects of Bourdieu’s practice theory of cultural production (Bourdieu 1976-1993) - may, in simplified terms, be examined as a linear ‘process-stage’ or ‘step’ model over time, as depicted in Figure 9.

In the model shown in Figure 9 - subjectively (from their point of view) - a Person enters the system at ‘[Start]’; while objectively, all the other systems (including the Domain and Field in culture) pre-exist the Person. Times 1,2,3, (and so on) represent finite successive moments in linear time. The Domain pre-exists as knowledge in the Field, as discrete cultural artifacts (memes); the Domain of Cinema includes all canonical and also non-canonical memes (movies, books, websites, word-of-mouth, received wisdom, doxa, etc). Constantly throughout each recursive loop (at Times: #2 through #9, above), the cultural Domain also increases exponentially in content and thus size (as, more movies are released to the field; as more publications about movies emerge, and so on); habitus (or ‘feel for the game’) is

*Figure 9. Creative Practice Theory systems model of creativity (in movies) as an algorithmic, iterative, recursive, confluence systems process - for an individual (a person, or a group) over time*
also constantly developed by the Person throughout their lifespan, and throughout these iterative and recursive loops; *internalizing the domain* likewise occurs continually for the Person throughout these systems loops; *navigating the field* also continues throughout these loops and over the Person’s lifespan. However, which category (or, categories) of canon the cultural artifact enters, depends on the audience that is attracted to it, in the Field.

### Categories of Canon

While bioculture (i.e., science and the arts) may be divided into a binary of ‘canonical’ and ‘non-canonical’ (or, the widely-accepted scientific theories, and those that are not; or, say, movies that are ‘liked’ or judged as: ‘good’ by consensus, and those that are not), within the canon of any biocultural domain (such as painting, photography, comics, songs, movies, novels and so on), there are many different types of audiences (Sawyer, 2012, pp. 218-219). One way to sub-categorize the canon (or works judged ‘creative’) is illustrated in Figure 10.

Once again, the *selection criteria* may vary across each biocultural domain (and, sub-domain); the criteria for judging (and falsifying) a scientific theory clearly differs from that of the aesthetic criteria of a narrative in the domains of movies and novels; while poetry, painting and photography do not even require a narrative (though in specific instances, may well include one). This is also not to assume that the most canonical (i.e., creative) works in artistic and mass media domains are necessarily, empirically ‘the best’; as is often noted, great artists are not always successful, and successful artists are not always great.

Over time, the content of the canon in a domain also fluctuates (and, evolves), as the consensus in the field re-selects some, and also de-selects other, specific artifacts as canon; one example is the movie *Vertigo* (1958) replacing *Citizen Kane* (1941) in 2012 as ‘the greatest film of all time’ as judged by 846 international movie experts (Kemp, 2012).

*Figure 10. Seven categories of canon in a biocultural domain*
Evolution: Selection, Variation, and Transmission-with-Heredity

On the ‘micro’ scale in this Evolutionary Systems Theory view, individuals (persons) are constantly exposed to cultural artifacts (memes: ideas, processes, products), via reading texts, viewing media, word-of-mouth, and via their own imagination - and those memes (ideas, processes, products) that are retained in memory may thus be selected in their mind, and then combined with other memes (and thus: each ‘old’ meme is varied) to create a new artifact (a new idea, process, or product), and this new artifact may be transmitted to the domain (recorded, published, transmitted) and thus, transmitted to other persons in the field. This process is the selection, variation, and transmission-with-heredity evolutionary algorithm. This ‘selection, then variation’ step includes the process of ‘combinatorial creativity’ (Boden, 2004, pp. 3-10), or ‘bisociation’ (Koestler, [1967] 1989, p. 181), or ‘conceptual blending’ (Fauconnier & Turner, 2002). The meme (idea, process, product) has thus already undergone variation (via: a recombination with other ideas - mentally / psychologically by the person), and when later transmitted on a wider bio-socio-cultural level, also undergoes selection by individuals in the field (or, natural selection), and may then be further transmitted to others (during which, the meme may also undergo further variation, due to errors in transmission). This second, wider (‘macro’, or socio-cultural) process is the variation, selection and transmission evolutionary algorithm in action (Csikszentmihalyi & Wolfe, 2000, p. 83).

The book chapter Memes, Minds and Imagination (Blackmore, 2007) likewise argues for creativity as the evolutionary algorithm, working on memes (in bioculture), rather than on genes (in biology), overtly noting that the evolutionary mechanism is identical:

All human creativity results from memetic evolution: from the reiterative process of recombination and selective imitation of behaviors and artefacts… those of us who are the most creative are those who are best at accurately copying and storing the memes we come across, recombining them in novel ways, and selecting appropriately from the myriad new combinations created… Everything was, and still is, designed by the power of that familiar mindless process, the evolutionary algorithm. This is a beautiful, if daunting, view of our place in the world. (Blackmore 2007, online)

This same holon/parton evolutionary view of ‘units of culture’ may also be applied to narratives, in any media, and not simply cinema.

The Holon/Parton as the Unit of Story (or, the Narreme)

The unit of story (or, unit of narrative) has been discussed by Barthes (1966) (Barthes, [1966] 1975), Dorfman 1969 (Dorfman, 1969) and other researchers, however it is clear that the narreme was not satisfactorily defined by Barthes in 1966, nor has it been since (Baikadi & Cardona-Rivera, 2012). Since stories are part of bioculture, and since stories are composed of ideas, words, phrases, (and/or, cinema shots, images, sounds) and so on, ‘the unit of culture’ (as holon/parton) may also be applied to the unit of story, or, narreme. This unit (and structure) of story may also have closer parallels to human cognition than alternative analytical schemas such as Barthes (1967), given Evolutionary Cognitive Psychology (Buss, 2012) and the systems view of biology and culture (Capra & Luisi, 2014).
Story

The definition of story (or, narrative) adopted herein is: A problem-situation, involving an agent/s (or, character/s) in an environment/s, including an attempt by the agent/s at problem-solution, and/or problem avoidance, communicated in any media in culture (movies, novels, short prose, videogames, oral storytelling, and so on). This definition is isomorphic to Gottschall’s (2012) definition of: ‘Story = Character + Problem + Attempted Extrication’ (Gottschall, 2012, p. 52), and in a more extended form, as Branigan (1992) notes:

‘Nearly all researchers agree that a narrative schema has the following format:

1. Introduction of setting and characters;
2. Explanation of a state of affairs;
3. Initiating event;
4. Emotional response or statement of a goal by a protagonist;
5. Complicating actions;
6. Outcome;
7. Reactions to the outcome.’ (Branigan, 1992, p. 14)

This same schema (i.e., Agent + Problem (thus: Conflict) + Result) can also be seen to apply to Propp’s morphology of the Russian folk tale (Propp, 1958), Campbell’s monomyth in international panchural myths (J. Campbell, 1949), and Vogler’s ‘hero’s journey’ in movies and other media (Vogler, 1992, see also Velikovsky, 2014b). In this view, stories are ‘about’ problem-solving, and indeed may be viewed as case-studies in problem-solving.

This evolutionary view of story is influenced by Popper’s All Life Is Problem Solving (Popper, 1999), ‘problem-situations’ in Boyd’s On The Origin of Stories: Evolution, Cognition, Fiction (Boyd, 2009, p. 211), Boyd (2010) (Boyd, 2010, p. 438), and also Weisberg (2006) on creativity as problem-solving (Weisberg, 2006, pp. 577-581). In this view, the (fictional) characters (or, agents) in narratives are also holon/partons, as are the scenes and the sequences that comprise the narrative. When a screen idea (or, movie story) is created, the three laws of holarchies act on each level of the movie story, through the stages of (1) screenwriting and story editing, (2) shooting (production), and (3) editing (post-production) of the movie story. A movie story as a whole unit may be viewed as follows:

- The Movie (including the parts of: The Movie Title, Movie Poster, and Trailer);
- Opening Credits / the story ‘Acts’ / the End Credits (including credits music);
- Sequences (as parts of Acts);
- Scenes (as parts of Sequences);
- Shots (as parts of Scenes);
- Dramatic Beats (as parts of shots);
- Action and Dialog;
- Still frames;
- Ideas.
During the process of the selection of specific scenes to include in the movie (in the stages of writing, shooting, and editing), each movie scene *competes, and also co-operates* (or, *operates in conjunction with*, all the scenes before and also after it). The scenes (and, shots) that successfully win this ‘competition’ are those that appear in the completed movie. In evolutionary terms, *selection pressure* on each individual scene (and, shot) exists in the form of: whether or not that scene (or, shot) is deemed necessary, given the ‘whole’ story or narrative. So too, this same selection process occurs in writing novels, where potential ‘alternate’ scenes, sentences, and words compete for selection by their creator, on their relevant levels of the holarchy; if a potential scene does not integrate well into the whole story, it may be de-selected by the creator/s. On the level of words (in a novel, song or poem), some synonyms also ‘win out’ (including during the conceiving, writing, and editing process), and are selected over (i.e., at the expense of) others. So too with shots (and, with different *takes* of shots) in the final edited version of movies, television, videogames, and other screen media. In the evolutionary view, *selection, variation* and *transmission* occurs where the chosen variation is then transmitted into the final work, which an audience then receives, and judges. At this point, the audience also selects (or, deselects) whole completed works, as units of culture. Furthermore, when participatory (fan) culture takes over, this process also continues; for example, in fan remixes, some of which may go ‘viral’.

The holon/parton structure of units of culture (or memes) thus applies to prior suggestions for the definition and structure of ‘the meme’, including (but not limited to) the various categories of: tropes, patterns, themes, configurations, complexes, ideas, beliefs, values, rules, principles, symbols, and concepts (see: Chick, 1999). Although each of these individual entities, when compared literally to each other are not all exactly the same thing (which would be a conflation, and thus a category error), each of those entities (i.e., tropes, themes, motifs, ideas, and so on) is: a meme; a memeplex; a holon/parton; a holarchy; and each may be examined as one unit of bioculture. This is important for measuring and tracking specific units of culture (relative to, competing units of culture), for example, in the Digital Humanities. For example, why are some stories (films, novels, jokes) more viral than others?

**ISSUES, CONTROVERSIES, AND PROBLEMS**

The Complexity perspective and the use of Systems Theory is no longer seen as controversial or problematic in the Social Sciences, given ‘The Complexity Turn’ of the mid-1990s, however the integration of the Systems Model of Creativity, and the Evolutionary Systems Theory perspective has yet to become widespread in Mass Communication Studies (*pace* Fulton & McIntyre, 2013). The Evocriticism Turn (since 1995) is however still somewhat controversial and is resisted by some in the Arts and Humanities, possibly due to pervasive Romantic myths about creativity (see McIntyre, 2012; Sawyer, 2012, p. 322), and also perhaps due to anti-realist, anti-science, and anti-positivistic attitudes and prejudices in the Arts/Humanities, including common misunderstandings and mistaken assumptions about Evolutionary Theory (Carroll, 2008). Memetics has also been in a (Kuhnian) pre-paradigm state since Dawkins (1976), as the universal structure of ‘the unit of culture’ (or, meme) has not previously been identified, however it is here suggested that the *holon/parton* is one possible solution to this problem.
**FUTURE RESEARCH DIRECTIONS**

Future research directions on the unit of culture (or, ‘meme’) and also the unit of story (or, narreme) in Creative Technologies includes potential empirical investigations on the number and type (or both quantitative and qualitative analyses) of holon/partons (units of culture) which make up canonical memes (i.e., ideas, processes, products), compared to those in non-canonical ones, and preferably using the *Anna Karenina* principle in order to avoid the single-cause fallacy. As one example: Do canonical artifacts (novels, plays, movies, and so on) satisfice (succeed) in their components of story premise, storyworld, characters, theme, plot, structure, and dialog - where non-canonical artifacts, do not?

The 2011 article ‘Can We Measure Memes?’ (McNamara, 2011) asks whether fMRI technology can measure memes in the brain, also proposing the distinction of *internally* and *externally* represented memes (or, ‘i-memes’ and ‘e-memes’). The article concludes that if memes (units of culture) can be accurately defined, and, if cognitive science can measure (or conversely, falsify) memes, then this would be a significant advance with far-reaching implications in cultural evolution for many domains and disciplines, well beyond mere questions around how language works (McNamara 2011, online).

Philosophically, the concept of holon/partons (and thus, holarchies) includes Systems Theory, Set Theory, Discrete Mathematics, and Mereology (the study of parthood relations). Holarchies are also arguably, a more accurate and particulate way of analyzing the world (via Systems and Complexity theory, Evolution, and Emergence) than, say, concepts of ‘atomless gunk’ (see Varzi, 2015), film semiotics (Metz 1991), or rhizome theory (Deleuze and Guattari, 1987) not least as the universe may be infinitely hierarchical (and, holarchical) on smaller scales, and yet simultaneously a relational whole (Bohm, [1980] 2005). The literature on consilience provides additional conceptual tools for examining units of culture (in media, science, the arts and entertainment), including: the creative ‘problem-situation’ model for filmmakers (Bordwell 1997, 2008, 2011, 2012; Bordwell in Boyd, Carroll & Gottschall 2010); the ‘screen idea’ (or, story) in narrative filmmaking (Macdonald 2004, 2013); artistic and creative ‘cost/benefit ratios’ for artists (including screenwriters, and novelists) and audiences (Boyd 2009; Boyd in Boyd, Carroll & Gottschall 2010); and, the emerging integration of Creativity Theory into the screenwriting convention (Bloore 2013; Velikovsky 2014d).

**CONCLUSION**

This chapter presents the holon/parton (and thus also, the holarchy) as the unit of culture - or the meme (an idea, process or product) - and also as ‘the unit of story’, or narreme. This Evolutionary Systems Theory view of bioculture thus adopts an Applied Evolutionary Epistemology approach (Gontier 2012), and also aims to provide inroads to a solution of the problem of the definition of the term ‘culture’, and thus, a theory which may enable more accurate empirical transdisciplinary investigations of bioculture across all media in the arts, entertainment and sciences.

Practical applications include the empirical measuring, analysis and commensurate comparison of ‘units of culture’ (or, memes – ideas, processes, products), and also more accurately tracking the trajectory of units, in culture. Disciplines and domains of knowledge for such practical applications include the Digital Humanities; Empirical studies of the arts, literature and science (such as in *Empirical Studies*...
of the Arts, and Scientific Studies of Literature journals). The successful identification of the structure of the meme (the unit of culture) would also enable the somewhat-stalled domain of Memetics (or, Evolutionary Culturology) to advance.

Other disciplines in which an understanding and more detailed analysis of the structure, function and behavior of units of culture (particularly, from an Evolutionary Systems Theory perspective) would benefit, may include: Communication, Creativity Studies, Philosophy, Evolutionary Epistemology, Biology, Psychology, Sociology, Anthropology, Archaeology, History, Linguistics, Information Science, Computer Science, Artificial Intelligence, Mathematics, Cultural Studies, Literature, Media Studies, and also Narratology (aka, Narrative Studies).

If the mind is indeed a neural computer, as Pinker (1997) as many scholars in Evolutionary Psychology contend, then in assuming the Evolutionary Systems Theory view, narratives - as units in culture - and indeed all of the units within stories (including: characters, plot / problems, settings, themes, dialog, and narration) may also be analyzed as holon/partons. Stories, and their component parts (including also transmedia narratives) might thus be viewed as subject to three of the Evolutionary laws of physics, and Systems Theory, namely the three laws of holarchies.

On this view, E. O. Wilson's suggestion in Consilience (Wilson, 1998) is supported, namely that certain laws of physics (which are also laws of Evolution, and Systems Theory) appear to also apply to the growth of bioculture, ideally illuminating ‘the unit of story’, and also potentially ‘the unit of culture’ (aka the meme), where ‘ideas, processes and products’ correlate respectively with: Worlds Three, Two, and One in Sir Karl Popper’s ‘Three Worlds’ theory (Popper, 1978b).

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The Holon/Parton Theory of the Unit of Culture (or the Meme, and Narreme)


The Holon/Parton Theory of the Unit of Culture (or the Meme, and Narreme)

Green, M. C., & Brock, T. C. (2002). In the mind’s eye: Imagery and transportation into narrative worlds. In M. C. Green, J. J. Strange, & T. C. Brock (Eds.), Narrative Impact: Social and Cognitive Foundations (pp. 315–341). Mahwah, NJ: Lawrence Erlbaum Associates.


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KEY TERMS AND DEFINITIONS

Applied Evolutionary Epistemology: A discipline that aims to identify the units, levels, and mechanisms of selection, in both biology and culture (Gontier, 2012). These mechanisms may include: natural, artificial, unconscious, and also combinatorial (or, sexual) selection.

Biology: The study of organisms, or living things (Webster, 2003, p. 38). The view adopted here is that all organisms have knowledge, including plants and animals, though not explicitly conscious knowledge in the case of nonhuman organisms (Popper, 1999, pp. 32-39). Knowledge is information, and in the case of nonhuman organisms, implicit knowledge (such as instinctive behavior, or Evolutionary Psychology) is also encoded in organismic nervous systems as: ‘IF [condition] > THEN [instruction], (ELSE) [alternate instruction]’ subroutines, or ‘decision rules’ (Buss, 2012, p. 49).

Creative Technologies: Any technology (any idea, process or product – or, tool, device, or invention - including also any theory, or model) that is judged ‘creative’, namely ‘original and useful’ by a consensus in the field. Examples include: languages, symbol systems, image and sound recording equipment, editing equipment, the computer, the internet, a national flag, and the scientific method. For a more comprehensive list, see The Greatest Inventions of the Past 2,000 Years (Brockman 2000). Examples in this chapter include: the meme (unit of culture) as the holon/parton; and also the synthesized model of Creative Practice Theory.

Creativity: The standard definition of creativity is ‘original and useful’, namely a biocultural artifact (i.e., idea, process, product) judged ‘original and useful’ (or, ‘novel and appropriate’) by a consensus of the audience (i.e. the field) for a specific domain in culture (Runco & Jaeger, 2012). Examples of domains in culture include movies, literature, popular music, videogames, physics, chemistry, biology, psychology, sociology, and all their various subdomains (including genres and subgenres).

Culture: ‘Culture’ is knowledge encoded in symbol systems in the form of ideas, processes, and products (Csikszentmihalyi, 1996b) including in science, the arts, media, religion, and languages. Examples of ideas include scientific theories (e.g., gravity, general and special relativity, evolution), and also literary and media characters and narratives (Sherlock Holmes, Anna Karenina, Harry Potter); examples of processes include writing an email, having a conversation, reading a book, and in science, pasteurization; examples of cultural products include the hand-axe, the spear, the wheel, words, books, movies, songs, the printing press, the telescope, the microscope, the car, the computer, the iPod. As there is no culture without biology, a synonym for ‘culture’ is ‘bioculture’.

Evolution (Biological, Cultural, Cosmic): Evolution can most simply be defined as ‘descent with modification’ (Chaisson, 2001; Darwin, 1859). Here the concept of evolution includes the (post-1940s) Modern Evolutionary Synthesis (aka ‘Neo-Darwinism’), and the (post-2010) Extended Evolutionary Synthesis (Pigliucci & Müller, 2010), including Multilevel Selection Theory (Gontier, 2012). As a brief summary of the three necessary-and-sufficient conditions of the (iterative and recursive, or, algorithmic) systems process of evolution: ‘The evolutionary process requires variation, differential survival and reproductive success, and inheritance’ (Capra & Luisi, 2014, p. 200; see also Dennett, 1995, p. 343). Laszlo (1972) explains atoms, biology, and social systems as classes of natural (and sometimes designed) systems ‘sharing invariant fundamental properties’ (Laszlo, 1972, p. 56) and demonstrates that evolution occurs across natural systems (Laszlo, 1972, pp. 57-117). In this view, systems and also, artifacts (inputs and outputs) within systems are selected (or deselected, and thus: ‘falsified’) by their environment (Popper 1999). It should be noted that the iterative and recursive Evolutionary Algorithm (namely: variation, selection, transmission) also satisfices, rather than optimizes.
**Evolutionary Epistemology:** The natural selection, or ‘blind variation and selective retention’ (or BVSR) model of contemporary Evolutionary Epistemology (or, the growth of knowledge) is customarily dated to Karl Popper (1972, 1984), Stephen Toulmin (1967, 1972), Donald Campbell (1974) and Konrad Lorenz (1977) (Bradie & Harms, Winter 2012 Edition, online). Gontier also provides an overview of the major strands in Evolutionary Epistemology, citing Karl Popper (1963), Konrad Lorenz (1941, 1985), Donald Campbell (1959, 1960, 1974), Stephen Toulmin (1972), and Peter Munz (2001) on ‘Philosophical Darwinism’ (Gontier, 2014).

**Holarchy:** Koestler defines a holarchy as a hierarchy of self-regulating holons (Koestler, 1967, p. 103). Holarchies function according to the three laws of holarchies - which are also three laws of evolution in Systems Theory (see (Laszlo, 1972, pp. 55-118, 176-180)) - namely: (1) competition and/or cooperation (and/or co-opetition), ‘sideways’ with other holon/partons on the same level; (2) integration upwards, into the larger holon/parton on the level ‘above’; and (3) control and command of holon/partons on the level ‘below’ (Koestler, 1964, 1967, 1978).

**Holon/Parton:** A portmanteau synthesis of the above two terms. A consilient (or, ‘science meets the arts/media’) synthesis of these two words used herein is ‘holon/parton’, as this term emphasizes the dual, or ‘Janus-faced’ (Koestler, [1978] 1979, p. 27) nature of these whole/part entities; they are a whole and also a part at the same time (in both biological and in socio-cultural systems, and also, in biological and cultural units).

**Holon:** (sensu Koestler 1967) ‘A holon … is something that is simultaneously a whole and a part’ (Koestler, 1967, p. 48).

**Parton:** (sensu Feynman 1975, 2005) The parton is the name in subatomic physics that Richard P. Feynman (Feynman, 2005, p. 278) gave to the equivalent structure of the holon.

**Systems Theory:** The study of systems and their environments, including system inputs, outputs, relations and interactions, including the concept of emergence, where the whole system (its structure, function, and behavior) is more than the sum of its parts. For reviews of Systems Theory, Complexity and Emergence, see (Sepännen in Altmann & Koch, 1998, pp. 180-302), (Sadowski, 1999, pp. 7-10), (Gershenzon & Heylighen, 2005), (Warfield, 2006, pp. 38-46), (Lin, Duan, Zhao, & Xu, 2013, pp. 1-22), (Mobus & Kalton, 2014, pp. 32-40).

**Transmedia:** A narrative extended across more than one media (e.g., across a movie, novel, videogame, and so on). Importantly, adaptations of a story (or, narrative) from one media to another media (e.g. novel-to-film), and also prequels and sequels in the same media are not considered transmedia (see: Dena, 2009; Jenkins, 2011; PGA, 2010; Polson, Cook, Brackin, & Velikovsky, 2014; Velikovsky, 2013a).

**ENDNOTES**

3. It is noted that there may be many organisms within a residence, even if not all considered ‘family’.
4. At the risk of grossly oversimplifying, many Evolutionary Psychologists in general take the view that ‘The mind is a neural computer, fitted by natural selection with combinatorial algorithms for
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causal and probabilistic reasoning about plants, animals, objects and people’ (Pinker, 1997, p. 524). At the same time, the human mind also tends to feature a significant number of cognitive biases (Buss, 2012, p. 395; Kahneman, 2011).

‘Word-of-mouth’ in this context refers to any channel of communication (social media, telephony, and so on).

Aristotle avers in *Nicomachean Ethics* (Book 2, Ch. 6), ‘It is possible to fail in many ways (for evil belongs to the class of the unlimited, as the Pythagoreans conjectured, and good to that of the limited), while to succeed is possible only in one way (for which reason one is easy and the other difficult – to miss the mark easy, to hit it difficult)… *For men are good in but one way, but bad in many*’ (Aristotle, [c335 BCE] 1952, p. 352).


In human biology for example, there can be around $10^{14}$ units when different levels (and units) emerge in the holarchy: there are around $10^{14}$ atoms in cell (Helmenstine, 2014), around $10^{14}$ cells in a human body (Richards, 2012, p. 70), and around $10^{14}$ synapses (or connections between neurons) in the human brain (Zimmer, 2011). See also (West & Brown, 2005).

Amazon.com notes that the ‘average’ book on Amazon has 64,500 words (Habash, 2012).

For a discussion of transmedia ‘storyworlds’ versus story ‘universes’, see: (Kerrigan & Velikovsky, 2015).

See also. (2012b). Hierarchy of the sciences based on objective characteristics of both field and domain (p. 74). Simonton.

The first major work of Evocriticism is customarily dated to (Carroll, 1995).

For a summary of ‘practice theory’ see (Postill, 2010) and (Rouse, 2006, pp. 639-640).

An animated 2-D model of this Creative Practice Theory model is online, and demonstrates how each of the ten elements in the model is acquired (and/or, achieved) by a creative individual, over time, which a static 2-D diagram as presented here does not clearly demonstrate over time. (http://storyality.wordpress.com/creative-practice-theory/)

In *The 101 Habits of Highly Successful Screenwriters: Insider Secrets from Hollywood’s Top Writers* (2001) Iglesias includes quotes from six famous and successful screenwriters who testify that they all wrote around ten screenplays before they had one optioned, sold, and/or made (Iglesias, 2001, pp. 211-220).


See also Dutton on twelve ‘cluster criteria’ for art (Dutton 2010, pp. 51-61).


See (Macdonald, 2004, 2013) for an elaboration of the concept of films (or movies) as ‘screen ideas’.

Truby (2007) also notes: ‘the essential characteristic of a story as a structure in time. It is an organic unit that develops over time … a story is always a whole’ (Truby, 2007, p. 419)

For more on selection pressure (among biocultural artifacts) in the arts, see also (Van Peer, 1996, 1997).


It is possible that one reason for the abandoning of the *Journal of Memetics* (JoM, 1997-2005) and dispersal of the nascent field of Memetics is that the structure of the meme, the unit of culture, was not previously identified. Dennett noted in 1995 that ‘The prospects for elaborating a
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rigorous science of memetics are doubtful’ (Dennett, 1995, p. 369). The current chapter however is one step in an attempt to achieve this goal; Communication Theory, Creative Technologies, the Digital Humanities and possibly various other domains and disciplines may benefit if this task is successful. It should be noted various scholars in Memetics (e.g., Blackmore, Farncombe et al) are yet persisting in the task of solving this hard problem (see Hull, 1982 in Dennett, 1995, p. 352); see also for example (Velikovsky, 2014c).

This view of nervous systems (including brains, or ‘minds’) should in no way be understood to remove free will, nor should it be misconstrued as deterministic (see Koestler, [1967] 1989, pp. 201-202; [1978] 1979, pp. 239-241); for more detail of this view, see Koestler on free will (Koestler, [1964] 1989, p. 633; [1967] 1989, pp. 215-216; [1978] 1979, pp. 232, 235-241) and see also (Dennett, 1984, 2003) on free will.

Importantly, Simon distinguishes between natural and artificial systems (Simon, 1996).

Simon rightly notes that ‘natural selection only predicts that survivors will be fit enough, that is, fitter than their losing competitors; it postulates satisficing, not optimizing’ (Simon, 1991, p. 166).