Pattern Flows | Hybrid Accretive Processes Informing Identity Construction

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Jan 23, 2005

Abstract

How is it that persons, places, things, and language elements come to have unique identities? In particular, how do notions of the hybrid play into our understanding of identities? In what way does the computer change the way we communicate about and come to understand these entities? How does embodied experience play a part in identity forming? In this paper I will explore concepts surrounding spatial / temporal patterning as a generator of emergent meaning. A pattern in this light is a constellation of sensual perturbations. This patterning of perturbations in time enables processes central to meaning production to function. Identity understood in this light will not be static or stable. Identity should be understood as an ever evolving construction of accumulative patterns, subtly shifting in relation to embodied perception; differing contextual relations and ramifications; thought – including abstraction, inference, induction, abduction, deduction, etc.; and ongoing knowledge production — accretive meaning. Identity is here considered as linked to an embodied recombinant gathering of abbreviations of experiential pattern residues. Thus, identity is a collage like construction arising out of fragments of associated pattern flows. In this sense identity is always the result of a construction process built of pattern reinforcements and pattern updating. Identity as a product of human understanding draws on an ongoing constructive assembly of processes inherent to meaning-becoming. In this definition there is no such thing as an invariant pattern — only accretive patterns that are similar but different. Here

understandings are constantly recombined to address the nature of emergent context. Thus, understanding is always an accretive, hybridizing process.

An expanded linguistics arises as an ability to fragment, combine and recombine particular pattern instances in the service of evocation and exchange — articulation through intra-action. Thus I am proposing that we should re-understand linguistics from the perspective of a multi-sensory spatio-temporal pattern-based stance. By understanding linguistics in this manner we can bring a series of sensual instantiations and media forms into language study, not mimicking the functional nature of words, but exhibiting their own patterned qualities. The complexity that arises out of this re-interpretation is profound yet is none-the-less necessary to clearly understand an accretive, non-dualistic approach to meaning production.

Key Words

Hybrid Identity, multimodal experience, patterns of experience, expanded linguistics.

Short Bio

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Let us first try to very clearly observe how multi-modal patterns[1] are built up and inform meaning production by *(re)sensing*[2] language acquisition. Picture for a moment that you are a child. You are playing outside with a new object as yet nameless. A person uses the words 'red ball' in this particular context. You touch the texture on the outside of the ball, taste it, listen to its characteristic sound as it bounces, smell the rubber that it is made out of, notice how soft it is and its temperature.

All of these activities are time-based patterns of sense perturbations that reinforce each other, forming an expanded, embodied set. Each instance of 'use'[3] becomes enfolded with the ongoing identity construction of the 'red ball'. The environmental pattern that includes one's *playing with the ball* also includes the time-based flow of the spoken words. As these words are used again and again on different occasions, one can draw on an embodied history of spatial / temporal pattern flows to reflect on and *project* the nature of context, as well as to project meaning onto the words in new contexts. Along with spoken instances, one learns the pattern of written words that also present the terms 'red ball'. One's hand moves over the page, forming moving muscular patterns as they learn to write the words. One's mouth forms a set of shaped patterns over time as they attempt to mimic the flow of sounds and speak the words. Subsequently, one sees drawings, and paintings, movies and photographs— all similar but different *patterned* instances of 'red balls', all informing a larger, intra-folded (self/environment/other) multimodal pattern-definition of 'red ball'. The words alone, functioning as re-contextualized, patterned fragments, now carry the potential of being associated with any or all of these embodied memories depending on subsequent contextual use.

After these patterns have been absorbed into one's sphere of experience, there is the potential to act upon the memory of these patterns, to draw on and re-contextualize these patterns[4] — to recombine them through thought processes or active physical pattern production. The *space of thought* in part oscillates between environmental context and patterned, embodied contextual residue or memory. I define the 'space of thought' as the all encompassing space that includes all forms of embodied experience; reflection on that experience; fantasy and imagination; as well as all forms of thought processes that draw on these assimilated multi-modal patterns including: abstraction, inference, induction, abduction, deduction, etc. The space of thought is the conglomerate accretive space of perceptual awareness, ongoing knowledge production and self-reflection.

As we bring different words and related embodied pattern histories to bear in the service of meaning production in new contexts, the new hybridized pattern is born of multiple individual instances and becomes enfolded with relevant past instances of use. One *thinks* in organizations and reorganizations of these patterns — fragment assemblages that become ordered in thought and subsequently can potentially be articulated through physically generated patterns — spatial / temporal organizations that one can share with others (like this paper). Yet, I am interested in a more expansive approach to articulated media configurations, which I will elucidate below.

Textual and written languages are subsets of the pattern flows that inform an embodied knowledge of the world. The variety of language use enables and is enabled through hybrid constructions. Each new context adds another layer of thought and experience to the accretive nature of meaning production – generating a hybrid of hybrid of a hybrid, etc. Thus, an

assemblage of instances informs identity production as an ongoing process. Certainly Deleuze and Guattari were well aware of this in expressing their concept of the 'rhizome', 'lines of flight', as well as articulating their ideas in relation to flow processes.[5] I am forming a quite different understanding to that of Deleuze and Guattari, related to the nature of a contemporary expanded linguistics in terms of pattern reception and production. As writers, words play a more important role for them in relation to the communication potentials of media-elements and processes.

Embodied Relations

As we come to understand the complexity of sense perturbations it is important to note that here we are moving beyond the historical hierarchy of valuing sight above all other senses, moving toward 'mappings' that involve both 'motor and sensory systems'.[6] We are thus interested in coming to better understand multimodal aspects of perception that rely on recursiveness — using patterns to reflect on patterns.[7]

Perception is central to the production of our knowledge of the world. Perceptual processes are always in a state of becoming. The conjoining of differing branches of thought informs the offspring of our thoughts — new understandings. We draw on knowledge born of mixed origin, another definition of 'hybridity', informing the production of identities. Each new instance of relation enfolds a lived pattern into the 'composition' of a particular identity. Thus, each of the senses and differing forms of bodily awareness contributes to our understanding of the world. Heraclitus in the 6th century B.C. seemed to have a clear understanding of the subtle nature of this notion:

> Everything flows and nothing abides; everything gives way and nothing stays fixed. You cannot step twice into the same river, for other waters are continually flowing on… It is in changing that things find repose. [8]

In writing about Heraclitus, Wheelwright provides the following concept:

> Permanence is but a relative term, his [Heraclitus', emphasis Seaman] philosophy declares; and what we call permanent is simply an example of change in slow motion. All structures, if you observe them patiently enough and project your imagination far enough, are dissolving slowly; everything, as the Greeks put it, is in a process of coming-to-be and passing-away.[9]

Heraclitus invokes a series of bodily processes in this oft quoted passage — In reading this passage, perhaps one feels the sensation of the river on one's leg, one feels the tension in the muscles resisting the current, one sees the river, and one feels the temperature of the water. Thus a series of embodied experiences inform the evocation of this passage. Along with this multimodal understanding, the notion of coming to be and passing away is germane to identity production in both the construction of thoughts and the 'passing away' relevant to qualities of forgetting and/or the malfunctioning of memory.

In order to more clearly trace the arising of particular contextual meanings I will unpack the notion of multimodal patterning. Instead of taking for granted a series of terms, I would like to be self-reflexive about how we come to have a particular vocabulary.[10]

Certainly the set of human exchanges that enable language to arise is both social and cultural. I have earlier written with Andrea Gaugusch about these notions in a paper entitled *(RE)Sensing the Observer, Offering an Open Order Cybernetics*.[11] In this text we speak of reciprocal relations between individuals where language is learned through situated relations: in particular through embodied exchanges with others, through self-oriented observation, and through environmental relations.[12] This can be seen as an extension of the notion of *Language Games* initiated by Wittgenstein[13] in his *Philosophical Investigations* into a more environmental territory – moving away from a word-centered understanding of meaning production.

In terms of outlining a new approach to linguistics, the computer functions as a pattern producing semiotic machine[14] or *extended* linguistic mechanism that enables both the ongoing production of sensual patterns as well as the interactive manipulation of these patterns. In this light I would suggest that the computer can potentially extends our definition of language and in turn, linguistics. I call this more expansive take on linguistics *Pattern Flows*. This understanding of linguistics enfolds computer-based perturbations as well as other forms of environmental perturbations into an accretive participation in meaning production.[15] Thought itself has a patterning and can be seen as an additional sensual patterned domain.[16]

A Linguistics of Hybrid Pattern Flows

If we pragmatically understand our descriptions above, we could begin to address the construction of new linguistic 'behaviours' of embodied pattern flows and subsequent hybrid

patterns flows. Winograd and Flores adopt Maturana's definition of 'linguistic behaviour' in terms of Computers and Cognition. They suggest the following:

> Maturana refers to behaviour in a consensual domain as 'linguistic behaviour'. Indeed, human language is a clear example of a consensual domain and the properties of being arbitrary and contextual have at times been taken as its defining features. But Maturana extends the term 'linguistic' to include any mutually generated domain of interactions. Language acts, like any other acts of an organism, can be described in the domain of structure and in the domain of cognition as well. But their existence as language is in the consensual domain generated by mutual interaction. A language exists among a community of individuals and is continually regenerated through their linguistic activity and the structural coupling generated by that activity.[17]

Where Maturana, Winograd and Flores et. al. use a number of terms like 'mind', 'brain', 'body', 'cognition' etc., I am interested in *(re)sensing* these terms in relation to the perspective of multi-modal pattern flows within the frame of built-up social, cultural, environmental and self-oriented intra-actions.[18] Computer-based environments can function as consensual domains, extending human agency through this potentially quixotic technological means. In fact, one of the most quoted descriptions of cyberspace comes from William Gibson's science fiction book, *Neuromancer* — 'Cyberspace. A consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts.'[19] Maturana states the following concerning consensual experience:

> When two or more organisms interact recursively as structurally plastic systems...the result is mutual ontogenic structural coupling... For an observer, the domain of interactions specified through such ontogenic structural coupling appears as a network of sequences of mutually triggered interlocked conducts... The various conducts or behaviours are arbitrary because they can have any form as long as they operate as triggering perturbations in the interactions; they are contextual because their participation in the interlocked interactions of the domain is defined only with respect to the interactions that constitute the domain... I shall call the domain of interlocked conducts...a consensual domain.[20] [21]

In my dissertation, *Recombinant Poetics: Emergent Meaning as Examined and Explored Within a Specific Generative Virtual Environment*,[22] I suggest visiting the concept of a computer-based extended linguistics, in part invoking the above quote. This linguistics of pattern flows can be explored in the continuum that hybridizes virtual and physical space — the *space of thought*.

The Inclusive Nature of Linguistic Space

One person who begins to address a more inclusive nature of linguistic space is Roy Harris. I would suggest that the computer enables a patterning potential that produces an expansion of linguistics, which augments the scope of the term (linguistics) as articulated by Harris. A number of questions surrounding linguistic practice are addressed in *Rethinking Linguistics,*[23] which Harris contributed to.

If we proceed in understanding the contextual space of thought as a unified, conceptually oscillating space, then there is not a need to define a dualistic approach to meaning production. One can, of course, articulate any number of arbitrary separations or categorizations. One asks, is there an ultimate list of these categories that have been formulated or does each different branch of knowledge, be it philosophical, scientific, poetic, linguistic, semiotic, biologic, mathematic, etc. etc., present its own approach to meaning production. It is this very fact, that no such ultimate list of categories exists, that makes me want to present multiple perspectives — to point to these arbitrary conceptual separations — to form a transdisciplinary set of perspectives that bridge and inform each other.[24] We could say that each embodied pattern has an infinite set of other patterns that can inform it's understanding. C. S. Peirce suggests this from a semiotic perspective when he states:

> But an endless series of representations, each representing the one behind it, may be conceived to have an absolute object at its limit. The meaning of a representation can be nothing but a representation. In fact it is nothing but the representation itself conceived as stripped of irrelevant clothing. But this clothing never can be completely stripped off; it is only changed for some more diaphanous. So there is an infinite regression here.[25]

I am here, like Peirce, questioning the idea of a fixed representation in mind, moving toward a particular understanding of hybrid identity construction. Context is essential to meaning production yet I am articulating a new set of approaches to the ongoing understanding of context as a process of *meaning-becoming* in particular from the multimodal perspective of a subjectobject unity.[26] N. Katherine Hayles is also interested in patterning and presents her

ideas in *How We Became Post Human*.[27] In this text she speaks of Gregory Bateson and his daughter Catherine Bateson in terms of developing a related 'monist' epistemology:

> Gregory lays out the gist of a new 'cybernetic' epistemology. He starts from the premise that we never know the world as such. We know only what our sensory perceptions construct for us. In this sense we know nothing about the world. But we know something and what we know is the end result of our internal processes we use to construct our inner world. Thus, we know ourselves as complex beings, including processes that extend below consciousness and beyond ourselves out into the world, through the inner and outer world available to a consciousness that exist only because of those processes. 'We are our epistemology' is Gregory's formulation. Catherine's phrasing is similar. 'Each person is his own central metaphor.' In this view the dualism between subject and object disappears, for an object as a thing in itself cannot exist for us.[28]

Any linguistic act always becomes enfolded with an embodied history of actions as well as both physical and conceptual pattern flows. As we begin to recognize the meaning of this observation, we must carefully examine language acquisition, the nature of context and the nature of expanded context as enabled through technological means. The meaning of any word is always in a state of becoming — always being formed based on a history of context and use. Thus the unity of being and word or pattern flow as I have suggested, is complex and seemingly paradoxical in nature. How can the identity of an outwardly static word always be in a state of flux? Yet I would suggest any word is always presented in a new context – within a new pattern flow that falls inside the unity that bridges the 'reader' with the patterned context of reading. Alternately, continued growth re-informs past contextual

experience and/or the return to what might be considered a static context. For example, one reads a book. After some years one re-reads the same words, yet the reader's subsequent embodied set of experiences expand their understanding of the passages.

Observing just the 'static word' and its typed 'definition' does not fill in the larger picture — the hidden part of the *iceberg of meaning* is housed in the lifelong pattern flows of the interactant. Thus 'definitions' have historically ignored the pattern flows that the meaning of the word arises out of.[29] These flows are unique to each individual, yet facilitate language's functioning by enabling participation in a living field of shared experience within a potential language community. Language is alive and always changing. Thus, definitions are just shared approximations of meaning — meanings which are reified through human experience and reciprocal action[30] within an always shifting language community.

Fields of Meaning

I have for some time written about the notion of *Fields of Meaning,*[31] as a means to come to approach contextual meaning. Yet, Kurt Lewin, the father of modern psychology, began discussion of this notion in his book *Topological Psychology*[32] in 1936. In my dissertation I also discuss the relevance of other theorists to this concept including Roy Ascott,[33] N. Katherine Hayles,[34] John Frasier,[35] Andrew Paul Ushenko,[36] J. Derrida,[37] and Brian Massumi.[38] [39] [40]

A context is a spatial temporal field housing many potential sub-fields. I have been interested in how varying media-elements particularly in computer-based environments, form a constellation of meanings[41] — fields that are neighboring are brought together, each having a

particular meaning force. Instead of *seeing* 'text' as being at the top of the meaning producing hierarchy, any media element can take the fore (read, any multimodal flow). As an alternative to seeing each of these media-elements as being text-like, I understand each media element to be of-itself — communicating in a manner that is media-centric, i.e. a digital video clip communicates differently to that of a piece of music, which communicates differently to that of a written word, which communicates differently to that of a still image etc. In a time-based media environment, each set of varying media-elements contributes their own particular meaning force. A participant brings their embodied pattern history (mind set) as it relates to each of the differing kinds of media. An ongoing *meaning summing* is performed where the forces contribute to an overall meaning[42]. This approach questions the dualistic signifier/signified nature of meaning production, which has reigned for generations.[43] Mark Johnson contributes the following from his text *The Body in the Mind*:

> The idea that understanding is an event in which one has a world, or more properly, a series of ongoing related meaning events in which one's world stands forth, has long been recognized on the Continent, especially the work of Heidegger and Gadamer. But Anglo-American analytic philosophy has steadfastly resisted this orientation in favour of meaning as a fixed relation between words and the world. It has been mistakenly assumed that only a viewpoint that transcends human embodiment, cultural embeddedness, imaginative understanding, and location within historically evolving traditions can guarantee the possibility of objectivity.[44]

Obviously, I take a stance parallel to Johnson. The ongoing or intermingling of the fields that conjoin participant and linguistic pattern becomes essential to meaning production. Hayles, in

her book *How we Became Posthuman*, states a related positive comment concerning a subjectobject unity:

> For some people, including me, the posthuman evokes the exhilarating prospect of getting out of some of the old boxes and opening up new ways of thinking about what being human means. In positing a shift from presence/absence to pattern/randomness, I have sought to show how these categories can be transformed from the inside to arrive at new kinds of cultural configurations, which may render such dualities obsolete if they have not already.[45]

Thus, a set of conjoined fields of patterns forms a unity. I would here like to posit a broad conception of fields of meaning; one that is all-inclusive and seeks to explore computer-based space as a subset of all physical space. From this perspective meaning arises in a space that conjoins the physical with the virtual in any manner of degrees.

In terms of pattern flows, each of the senses perceives an ongoing set of perturbations from differing media elements and processes. Each field of sense perturbation has its own qualities and set of probable characteristics. These flows become intermingled. The body relies on difference to perceive an articulation. Each field transduces some form of environmental stimulus into a form that the body can register. The function or focus of attention enables field perceptions to be 'weighed' in terms of their relevance to meaning production. Thus, each sense continues as a flow and our attention enables us to focus on individual foci from this ongoing external world of stimuli via the world of memory, association and internal reflection. Some flows are perceived in an ongoing focused manner

while others flow on in the background, equally able to emerge and change levels in terms of focus. We may also use a scanning like attention providing a layered 'felt' flow without a central focus.[46]

The nature of focus in terms of our active zone of attention enables us to take one environment or topology and create active sub-environments – i.e. a book is sub-environment, embedded in *the neighbourhood* of a larger environment. This is the same process that enables us to generate categories. This is set theory in action.[47] A reader is always embedded in an environment,[48] where books present a pattern within a pattern informed by an embodied history of multimodal patterning.

We are constantly categorizing patterns on the fly. We form relevant subsets and call them contexts. The ongoing set of sense perturbations that informs our perceptual field at any given moment houses many differing contexts that we can focus on. Since the senses can focus on differing pattern flows over time, the body is in a continuous flow reception state while awake. Yet our sense of focus can isolate particular qualities and zones of flow, i.e. I listen to a piece of music, I can move my attention to follow a particular melody or a rhythmic section etc. or in other words apply my focused attention to a sub-pattern of a particular possible pattern-set over time.

Invariant Memory?

Fragments of articulated patterns can potentially trigger the memory of an entire set of contextual relations from the past — a short snippet of sound can recall the memory *residue* of an entire song or symphony for that matter. Yet this is not an invariant memory --- just a

residue of an experience that is potentially infinitely rich in terms of focus and pattern repetition. Focus changes our perception of the 'same' music as do subsequent listening, information we take in relevant to the music, differing versions etc. Yet, some would say that we have invariant memories. I would suggest that form and content are enfolded and cannot be separated. Each subsequent instance that relates to the 'form' of an earlier experience enfolds new experiences and relativities, forming a hybrid 'updating' process (to borrow the computer terminology). Yet, we are different from a computer in terms of how our memory functions, i.e. you remember a place very clearly and enter that place many years later. One embodied aspect of our memory relates to relative height. One first experiences this space as a small child. The space now, at first, appears much smaller than one's supposed 'invariant' memory. Yet, the act of memory and contextual understanding 'updates' the past memory in a relevant manner, hybridizing the memory space with current perceptual flows and new relevant patterns. Thus, I would argue that the accretive nature of experience changes our understanding of that 'same' person, place or thing etc. Thus memory, as it informs identity is not a fixed singularity but an accretive, relevant associative assemblage. Brian Massumi in *Parables For The Virtual* states:

> These phase spaces (and potentially many more) co-function as differential attractors governing a self-intensifying field of experience. This total field of experience is self-intensifying in the sense that it continually folds back on itself in order to add variations on itself, as part of the same movement by which it sorts itself out: its integration and differentiation always going together, for a total field.[49]

Meaning arises as an ongoing process of differences as registered through the 'ground' of the body's ability to perceive. This includes technology's ability to present data to the sphere of

understanding recognized by our perceptual apparatus. Yet the body itself, its understanding of itself, arises as drawing from the sum of all potentially remembered contextual histories plus the sum of all thought or self-reflection related to those histories. It may also draw on residues of experience that exist beneath the surface of conscious thought. Patterns, both internal to the body and external, co-mingle to form our conception of the world. Thus the process of forming a mind is always an embedded process – body as environment is embedded within a wider environment moving off into infinite space.[50] The mind both forms and is simultaneously formed through this ongoing sensual patterned flow-set of relations. There is interesting evidence that shows the importance of the timing of spatial neuronal flows. Consequently the time-based interrelation of these flows again speaks to the reinforcement of multimodal perturbations.[51]

Meaning arises in relation to the evocative nature of a multi-sensed environment over time, as perceived by a particular mind-set. Meaning also arises through projection of historical categorical relations, informing current context through ongoing linguistic framing. The space of perception is always conjoined with the space of language production and use, as well as the constructive space of thought. In terms of an expanded linguistics, when I examine my own thought, I do not think in words alone, but also in sounds, images, motions, tastes, etc. reflecting the set of all pattern flow residues. In this light we can understand all language as a subset of environmental pattern flows. Yet there is an ongoing circulation where the history of pattern – in particular linguistic patterning, informs the understanding of what we are currently experiencing as an 'educated' projection. Thus as adults we rarely have experiences that are entirely outside of our linguistic sphere. We constantly draw on our history of contextual relations (past pattern flows) to inform new contexts. Again this speaks

to the hybridizing of context in the form of a projective linguistic conceptual fragment-assemblage drawn upon to inform new experience.

Our learning from pattern-matching begins with our relationship to our parents and our early environmental surroundings. Textual language represents a particular sub-set of patterns that become part of our perceptual pattern learning and memory of pattern, as well as our ability to reproduce the qualities that make up these patterns. Thus all language use arises out of our understanding of past pattern acquisition (registered sensual stimulations). We also learn to generate patterns, to reproduce patterns, to abstract and recombine sense-oriented perturbations. Let us call this hybrid pattern production. The use of pattern empowers our ability to articulate meaning through many different forms and qualities of environmental exchange, stimulus, and interaction. In some instances, patterns are generated via the body – dance, handwriting, and speech. Alternately, we come to use differing technologies and their pattern generating potentials.[52] Perhaps the most important tool in this realm is the computer, although video, telephones, and other portable technologies also are implicated in our expanded linguistic experience.

In *Linguistics Rethought* Harris states the following:

> Language is [in part, emphasis Seaman] a process of making communicational sense of verbal behaviour, and the point of departure is always the individual linguistic act in its communicational setting. Integrationism is not a theory of the speaker in place of a theory of language. Rather it is an exploratory investigation of the integrational character of communication, – whether it be verbal, gestural, pictorial, or even communicative silence. Rethinking linguistics involves examining how we interpret

> and construct our day-to-day communicational acts, what views of language are held by certain individuals, and the source and roles that these views play in our living and learning experience. Such a perspective, precisely because it is a perspective, subject to outside influence and in constant interplay with the perspectives of other human activities, must be endlessly rethought.[53]

Environmental computer-based patterning, as stated above, can potentially be seen as a new expansive branch of linguistic study, specifically in relation to pattern production. Our new expanded linguistics can be articulated as a set of spatial/temporal patterns that are reinforced by drawing on multiple lived contextual experiences, abstractions, iterations, and most importantly, repetitions of similar but different relations. Inferences are also central to the learning of language. An abstraction of a pattern carries some element of similarity of sensual perturbation or stimulus to an earlier pattern instantiation. This expanded linguistics arises as an ability to fragment, abstract, combine and recombine particular pattern instances in the service of evocation and exchange — articulation. I am proposing a non-logocentric (or perhaps it is more clear to say non word-centered) linguistics, although words, both spoken and written, form relevant patterns that are sensually perceived and are part of this new linguistics. Here we are moving to a multi-sensory spatio-temporal pattern-based linguistics. In particular, my collaborative work with the programmer Gideon May, *The World Generator / The Engine of Desire* [54] seeks to illuminate the interactive process of emergent meaning construction in a computer-based environment exploring generative pattern assemblages.

By understanding linguistics in this manner we can bring a series of sensual instantiations and media forms into language study. The complexity that arises out of this re-interpretation

is profound yet is none-the-less necessary to clearly understand a non-dualistic approach to meaning production. The notion of the 'recombinant pattern' draws from a genetic metaphor. This term suggests a living meaning brought about through the intermingling of particular patterns that are literally and/or metaphorically 'spliced' together — hybridized. Thus, *Recombinant Poetics* is a sub-branch of this new linguistics exploring the poetics of multiple generative interactive pattern flows.

Memory provides many associations that link back to each of the differing sensual qualities registered at the time of the initial experience i.e. a smell can trigger a strong memory of an alternate place and time. We also can motivate our body in particular ways in response to particular history of movement patterns. This movement is also registered. A single pattern from a multimodal pattern flow can recall a larger historical pattern. Along with the scientific evidence, I am also speaking from first-hand experience where in my own perceptual sphere I notice the reinforcement provided by multiple senses in the service of ongoing behavioural relations. I can reach out in the dark and know where the light switch will be based on a particular pattern history. Even if I cannot see the switch, I have a pattern memory of the physical distance to the switch, the positions of my body etc., informing its placement.

The most important ramification of this environmental/pattern view of embodied understanding of the world is that language is not separated from us. It is understood through a lifelong set of perceptual patterns or time-based and spatial instances, as well as internal reflection on those instances. This relates to Wittgenstein's notion of the 'meaning is the use'[55] – yet I seek to extend this notion to a much broader sense of pattern employment. I see the emergent self as an environment that is embedded within a larger environment.[56] Where Varella, Thompson and Rosch unpack the self as being 'empty' in their book *The Embodied*

Mind, elsewhere in the book they speak of the plausibility of the self being emergent in nature. I am very interested in this particular perspective:

> In fact many people when pressed to find the self (perhaps in psychology class) will use the concept of an emergent as a solution. Indeed, given the contemporary scientific interest in the emergent and self-organizing properties of certain complex aggregates, this idea is even plausible. Such a self-organizing or synergistic mechanism is not evident in experience.[57]

Yet, perhaps we need to *(re)sense* experience to observe the subtle nature of emergence. Perceptual focus absorbs patterning where multiple senses are mutually reinforcing, generating the self in an ongoing manner. We are always participating in an emergent state of *meaning-becoming*.

The Computer

Computer code enables the mutable functioning of one kind of pattern in relation to a different form or levels of patterning. Code functions to propagate a technological/human expansion of pattern authorship, distribution and the interactive acquisition of knowledge — an expansion of the sphere of potential perceptual interrelations between various people, technologies, and environments.

Thus media-elements in a computer-oriented cybernetic context form articulations that include a series of pattern producing mechanisms, crossing a metaphorical spectrum of expressive perceptual modalities. These might include physical interface, screens, computer

peripherals, haptic devices, printed output, rapid prototyping models, virtual reality display apparatus (et. al.). All these instances expand the field of language potential and become mutable pattern elements in this sensual multimodal languaging space.

Works Exploring Meta-Patterning by Seaman

The World Generator/The Engine of Desire is an interactive computer-based generative virtual environment that enables participants to construct and navigate poetic worlds in real time. The work is an ongoing collaboration with the programmer Gideon May, one that continues to grow and move through different iterations. The system is facilitated through a new interface metaphor. At the bottom of the screen is a rotating set of virtual rolodex-like 'container-wheels'. These container-wheels house a variety of selections (media-elements and processes). I will here present a breakdown of the operative functions that are stored on the wheels as well as describe the related hardware interface that has been created to function in seamless co-operation with the software.

The menu system is a storage context. This context is revealed through the spinning of a set of virtual container-wheels. As this media collection is observed, a particular set of meanings is potentially conveyed. While a participant may not necessarily start in this given context, they can toggle this menu 'off' and navigate through the world seeing it from different perspectives or enter the world generating process during navigation of a previously generated space. This wheel houses a set of patterns. It can in some ways be understood as being analogous to differing thought processes. Thus, different stored patterns are recombined to 'construct' the virtual world.

The work functions as a discourse engine, enabling the experiential exploration of emergent meaning — the exploration of meta-patterning. The media-elements of text (both written and spoken), image (both still and time-based) and music/sound are exemplified in my techno-poetic mechanism by the following media variables: 3D computer graphic objects (non-textual), 3D spatial text objects, 2D texts, video digital image stills, digital video-image stills applied as texture maps (wrapped around graphic objects), short digital video loops, digital video loops applied as texture maps (wrapped around graphic objects), digital audio of various looped musical compositions, digital audio presented as spoken text and a set of glyphs representing various behaviours on the menu-system. When I use the term media-elements, I am referring to a particular authored collection of modular variables, as categorized by the above potential media types. It is the ability to operate on and generate new patterns with these media elements that is suggestive of an extended linguistics. Emergent recombinant pattern production and abstraction are central to the construction of new contexts.

The participant in part explores the possibilities of *The World Generator/The Engine of Desire* by navigating in the virtual world with a spaceball. By shifting the positioning of the spaceball with her/his hand, the participant can move left, right, backward, forward, as well as look up and down within the virtual space presented in front of them on a projection screen. Emergent meaning is revealed in part based on the virtual perspective of the participant as well as their time-based movement through a derived constellation of media-elements. One sits at a table designed to house all of the physical interface elements that are dynamically linked with the media-elements described above. The physicality of past, embodied, patterned hand manoeuvres becomes associated with a virtual action and informs the potentials of navigation.

The participant can call up the virtual menu of container-wheels with the menu button on the interface table. This corresponds to sifting through human memory— to oscillating between memory and the currently 'constructed/understood' environment. The virtual construction of context points at the creative, construction-oriented nature of thought and the ongoing thought assembly informing the understanding of physical context — a process that unifies perceiver with perceived. This is an example of what Varela, Thompson and Rosch call 'mindful awareness'.[58]

The 'menu button' puts the virtual menu on the screen, blows up the menu for a detailed look at media-elements and/or toggles the container-wheel menu off. One can move back and forth between the contexts of the container-wheels to the environment that is generated. Emergent meaning arises out of the difference between these two contexts – memory of pattern as juxtaposed to recombinant pattern construction. Contextual activity is brought about through the constructive/creative recombination of the media-elements and processes — patterning processes.

A physical trackball is built into the interface-table. The trackball rotates the menu wheels, navigates across the container-wheels and highlights particular media choices. The participant can make a menu choice by pressing the 'select' button, once a media-element-housing has been highlighted. This 'selection process' (choosing from relevant past patterns of experience relevant to the current context) happens more or less effortlessly in thought. This selection function also enables us to preview each spoken version of the short poetic texts included in the menu; to preview the individual music loops that are housed within the system; and to take a close look at particular media-variables. The trackball is central in

establishing a particular meaning context that can be disrupted through re-placement/recombination of the media-element on the 'Plateau' space (the space of media construction). Thus the work explores a collection of malleable pattern potentials. Each person derives a different yet related world from the set of media variables. Perhaps, the ideal system would enable each participant to load their own media-elements into the system, this would be akin to learning and absorbing, defining an ongoing *meaning-becoming*. Yet, here, to generate an artwork I have 'loaded the dice' by putting a set of media-potentials into the system — heightening a probability of a particular aesthetic/conceptual outcome in the virtual space.

The World Generator enables a means of generating a dynamic form of spatial collage. The potential is to explore different qualities of abstraction. Simultaneously one observes meaning as it changes in an accretive manner — they again become mindfully aware. Each different process brings about a change in the appearance of the world and presents a potential for generating emergent meaning. A number of editing processes are available to the user of the system. Each of these functions also contributes to a change in the environment and takes part in defining the potential of generating emergent meaning.

The collection of media-elements carries specific artistic content or fields of potential meaning. This is akin to the social nature of meaning production via pattern flows. After generating a world, the participant can then enter into the world constructed from their selections and navigate as well as manipulate the chosen variables within 3D space. This suggests a new virtual-spatial cinematic form.[59] Navigation presents differing perspectives or spatial juxtapositions of media-elements and can also potentially contribute to the production of emergent meaning.

When the system is restarted or when the participant makes the selection of clear world, the data projector displays an empty 'World', which can then be 'added to' from the construction menu (the container-wheels) at the bottom of the screen. Objects that are selected from the construction menu are instantly entered into the virtual world or Plateau space in real time, directly in front of the participant. A transparent 'aura' defines the activated object (the object the participant can manipulate/edit). The participant can also move close to an object and select it. They can then act upon their choice. Although I have presented these variables through description above, the participant, once acclimated to the system, can intuitively construct new spaces.

The work functions in an ongoing multi-stage process: the participant can construct a 'poetic' environment based on selections from the template of media-variables. A subset of that mode enables the participant to observe a blow-up of the menu. The set of container-wheels presenting the variables, rotates and the participant can choose media-objects from the main menu. The actual storage is in the form of long 'virtual' rotating belts which can have great length (based on available memory) although the viewer only sees the curved front end of the belt. Thus, human memory is pointed at.

In terms of flows of multi-modal experience, the work enables the exploration of patterns related to sonic, visual, and textual media-elements as well as physical touch, enabling navigation. This work is an initial step in addressing first-hand how multi-modal fields of meaning can contribute in an ongoing accretive manner to generative meaning production. One can project the future potentials of pattern production with computers in relation to each of the senses.

Exchange Fields

A second work explores different potentials of embodied experience. *Exchange Fields* (2000), commissioned by the Vision Ruhr Exhibition in Dortmund Germany, incorporates the recorded dance and choreography of Regina van Berkel. The programmer Gideon May also became involved in this project. The central question dealt with the generation of a new kind of interface — how might an embodied experience of interface be layered into the content of an interactive media/dance comprised of video, text, a sculptural installation and music? *Exchange Fields* sought to develop a novel interface strategy through the creation of specific furniture/sculpture. These interfaces sought to elicit culturally determined environmental 'behaviour in relation to objects' as a grammar of gesture/positioning that could be used as input to the reacting system. The work sought to tap into bodily 'patterned' environmental knowledge related to the use of particular varieties of objects. Thus this work brought a form of unspoken embodied patterning into a self-observational field.[60] [See earlier text in *Convergence*]

The Hybrid Invention Generator

A third relevant work, *The Hybrid Invention Generator* (2001) is a work that explores a patterned 'machinic genetics'. Users of the system can scroll through a series of inventions, choose two different inventions and generate the visualization of a 'related' set of hybrid inventions. An underlying logic defines a functional connection between the differing assemblages. This points to the recombinant constructive hybridizing that is enabled by

thought when one functions in a creative manner. The metaphor of the work points to a much deeper set of creative mental processes, as well as the potentials for a machinic creativity mediated through re-embodied intelligence[61]

The Poly-sensing Environment

Perhaps the most elaborate project is a work currently in process — *The Poly-sensing Environment and Object Based Emergent Intention Matrix*. This work is a collaboration with Ingrid Verbauwhede, EE, UCLA and Mark Hansen, Statistical Computer Science, UCLA. Peter Cariani is also joining in discussions related to the research.

The Poly-sensing environment seeks to integrate sensing, networking and perception augmenting technologies. In particular the work seeks to augment thought, research, education, learning, and creative expression by developing integrated sensing/augmented reality spaces that through networking link multiple environments for shared knowledge; allied physical/data-oriented information schemes and processes; and dynamic engagement with search engines that can call forth digital content 'associated' with sensed behaviour in the physical/data space. We are developing an interactive informational and/or expressive IT system that seeks to augment human teamwork and/or interaction to promote scientific/cultural production through the creation of new collaborative multi-modal sensor devices that enable a form of 'machinic perception'. This 'perception' and /or 'associated' media is displayed and interacted with through a dynamically programmable visualization/sonification system. The Poly-sensing environment enables any object or gesture (change) in the room to become the interface to an associated authored link between physical environment and media event or process be it environmental, atmospheric, robotic,

architectural , and/or media oriented etc. It points to the continuum between physical and conceptual space, and enables a new form of 'associational' authorship in this realm.

New Areas of Investigation —The Superpositioning of Patterns

Along with the flows mentioned above, we are now in a position to technologically explore even deeper patternings — flows within flows within flows. Otto Rössler writes of endophysical processes and their potential importance to consciousness, also invoking the texts of Heraclitus, suggesting that the new notion of the interface posed by Endophysics 'implicitly invokes consciousness'.[62] Stuart Hameroff has written extensively about quantum affects, in his paper entitled the Physics of Quantum Consciousness Chemistry.[63] I will in a separate paper address how these endophysical and/or quantum properties relate to the flows we have discussed above.

Conclusion

We can summarize here how pattern flows contribute to the hybrid accretive processes that inform ongoing identity construction — *meaning-becoming*. Each sense contributes an experienced pattern over time. Similar but different patterns reinforce particular absorbed/constructed understandings. Multimodal patterns become enfolded and inform an embodied hybrid pattern conjoining spatial/temporal flows of sense perturbations with memory. Through self-reflection we can focus on different qualities of these patterns.

Given a new context, one draws on fragments or residues of these pattern flows and recombines them to both articulate context in a projective manner, and absorb new patterns in

a relevant manner from the context. This points to the hybridizing of identity. A projective conceptual linguistic *assemblage* is continuously generated to inform and frame new experience. This projection intermingles the history of experience with new patterns flows in an accretive manner. This bi-directional flow functions within the unifying *space of thought*. Thus, identity is always forming, enfolding memory with new experience. Each new instance of relation potentially enfolds another perspective into the multimodal 'composition' of a given identity. Fields of meaning are conjoined and become articulated in the space of thought as an ongoing hybridizing process.

If we pragmatically understand the articulations above, we can begin to address the construction of new linguistic 'behaviours' of embodied pattern flows and subsequently hybrid patterns flows. These embodied relations arise in the sphere of the social, the cultural, and the environmental and through self-reflection — through embodied reciprocal relations — intra-actions. We learn to generate patterns, to reproduce patterns, to abstract and recombine sense-oriented perturbations. Let us call this hybrid pattern production. The notion of the 'recombinant pattern' draws from a genetic metaphor. This term suggests a living meaning brought about through the intermingling of particular patterns that are both literally and metaphorically 'spliced' together — hybridized. The computer is a particularly useful pattern-generating and pattern distributing device, contributing to this expanded pattern-oriented understanding of linguistics.

Artworks like *The World Generator / The Engine of Desire*, *The Hybrid Invention Generator*, *Exchange Fields*, and the *Poly-sensing Environment* contribute to our understanding of the workings of meaning production through participatory, generative meta-structures that enable experiential exploration of different forms of spatial /temporal pattern relations. Such a

linguistics of pattern flows can be explored in the continuum that hybridizes virtual and physical space — the space of thought. This is a space of perceiver/perceived unity.

Identity is a collage-like construction arising out of fragments of associated pattern flows. In this sense identity is always the result of a construction process built of pattern reinforcements and pattern 'updates' enfolding subsequent relations in an accretive manner. Identity is also tied to the particularity of context, which itself is a projective construction. Identity, as a product of human understanding, draws on an ongoing constructive assembly of pattern-oriented processes inherent to *meaning-becoming*.

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[1] There are three books that relate to this paper written from the perspective of cognitive science that I would suggest reading. I have quoted from two of these books at length in a paper entitled *Pattern Flows: The Thoughtbody Environment / Notes Toward a Model for an Electrochemical Computer*. April 2004. http://billseaman.com; Kelso, J. A. Scott, *Dynamic Patterns, The Self-Organization of Brain and Behavior* (Cambridge: MIT Press, 1988); Esther Thelen and Linda B. Smith, *A Dynamic Systems Approach to the Development of Cognition and Action* (Cambridge: MIT Press, 1994); A. Clark. *Being There: Putting Brain, Body, and World Together Again* (Cambridge: MIT Press, 1997).

[2] Andrea Gaugusch. and Bill Seaman, '(RE)Sensing the Observer. Offering an Open Order Cybernetics,' *Technoetic Arts*, 2:1. Ed. Roy Ascott. Also http://billseaman.com.

[3] Ludwig Wittgenstein, *Philosophical Investigations,* 3rd ed, Trans. G.E.M. Anscomb, (New Jersey: Prentice Hall, 1958), p.20. "The meaning of the word is its use in language" (Wittgenstein, 1958, p.20) I seek to extend this notion beyond text to being inclusive of various media elements and environmental pattern-based processes.

[4] G.M. Edelman, *Neural Darwinism* (Basic Books Inc. Publishers: New York, 1987), p.7. The potential is to study patterning from a transdisciplinary set of perspectives. Edelman in the book *Neural Darwinism* proposed the notion that thought arises through the combination of a "global mapping system" that enables assemblage like connections in the brain to be made between the flow histories of related perturbations. This is a Biological assumption. Edelman states:

> Input signals are abstracted and filtered by the sensory transducers, feature extractors, and feature correlators (mainly sensiomotor systems) that form elements of a global mapping system. Active neuronal groups within particular repertoires receiving such signals are selected over others in a competitive fashion.

'Reentry' is the reconnecting of active areas of the mind in the service of entertaining new contexts, as well as thought about thought.

[5] G. Deleuze and F. Guttari. *A Thousand Plateaus: Capitalism and Schizophrenia*. Vol. 2, Trans. Brian Massumi. Minneapolis: University of Minnesota Press, 1987.

[6] Edelman, *Neural Darwinism*, p.6. Edelman states: "Input signals are abstracted and filtered by the sensory transducers, feature extractors, and feature correlators (mainly sensiomotor systems) that form elements of a global mapping system. Active neuronal groups within particular repetoires receiving such signals are selected over others in a competitive fashion."

[7] K.N. Hayles, *How We Became Posthuman* (Chicago: University of Chicago Press, 1999), pp. 264-266.

[8] P. Wheelwright. *Heraclitus*. 2nd ed. (New York: Atheneum, 1968), p.29.

[9] Wheelwright, *Heraclitus*. p.29.

[10] Gaugusch and Seaman, '(RE)Sensing.'

[11] Gaugusch and Seaman, '(RE)Sensing.'

[12] Gaugusch and Seaman, '(RE)Sensing.'

[13] Wittgenstein, *Philosophical Investigations*, p.11.

[14] P.A. Agres, *Computation and Human Experience* (New York: Cambridge University Press, 1997), p.15. "Critical reflection on computer work is reflection upon both its material and semiotic dimensions, both synchronically and historically."

[15] L.A. Suchman, *Plans and Situated Action* (New York: Cambridge University Press, 1987).

[16] F. Varela, E. Thompson, and E. Rosch, *The Embodied Mind, Cognitive Science and Human Experience* (Cambridge/London: MIT Press, 1991), p.113.

[17] T. Winograd, and F. Flores. *Understanding Computers and Cognition: A New Foundation for Design* (Norwood: Ablex Publishing, 1986), p.49.

[18] Gaugusch and Seaman, '(RE)Sensing'.

[19] W. Gibson, *Neuromancer* (New York: Ace Books, 1984), p.51.

[20] H. Maturana. "Biology of Language: The Epistomology of Reality." *Psychology and Biology of Language and Thought: Essays in Honour of Eric Lenneberg*, G.A. Miller and E. Lennenberg, eds. (New York: Academic Press, 1978), pp.27-64 & p.47.

[21] Gaugusch and Seaman, '(RE)Sensing'. In the '(RE)Sensing the Observer, Offering an Open Order Cybernetics paper with Gaugusch', we question the origins of the language used by Maturana and Varella to define autopoeisis as being closed, and suggest that one should carefully trace the language that informs a particular context. See also Maturana, H. R. & Varela, F. J., *Autopoiesis and Cognition, (*London: D. Reidel Publishing Company, 1980).

[22] Bill Seaman, "Recombinant Poetics: Emergent Meaning as Examined and Explored within a Specific Generative Virtual Environment," Diss. The Centre for Advanced Inquiry in Interactive Art. University of Wales, Corleon Campus, 1999. Also available in PDF format from the Langlois Foundation and/or http://billseaman.com/

[23] Haley G. Davis and Talbot J. Taylor, eds. *Rethinking Linguistics* (London: RoutledgeCurzon, 2003).

[24] See Susan Leigh Star and Geoffrey C. Bowker, http://weber.ucsd.edu/~gbowker/classification. In their text *Sorting Things Out* they state: "Classification and its Consequences, define the notion of the Boundry Object: Drawing from earlier studies of interdisciplinary scientific cooperation, we define boundary objects as those objects that both inhabit several communities of practice and satisfy the informational requirements of each of them. In working practice, they are objects that are able both to travel across borders and maintain some sort of constant identity. They can be tailored to meet the needs of any one community (they are plastic in this sense, or customizable). At the same time, they have common identities across settings. This is achieved by allowing the objects to be weakly structured in common use, imposing stronger structures in the individual-site tailored use." "At this site, we present the introduction, first two chapters and concluding chapters of our book on classification systems published by MIT Press in 1999". (Also discussion with Sha Xin Wei concerning Boundry Objects

[25] C. Peirce. *Collected Papers, Volume I–VIII*. (Cambridge: Harvard University Press, 1931), p. 171

[26] Gaugusch and Seaman, *(RE)Sensing,* http://billseaman.com.

[27] Hayles, *Posthuman*.

[28] Hayles, *Posthuman*, p. 78

[29] Gaugusch and Seaman, '(RE)Sensing.'

[30] Gaugusch and Seaman, '(RE)Sensing.'

[31] Bill Seaman, 'Recombinant Poetics: Emergent Meaning as Examined and Explored within a Specific Generative Virtual Environment,' Dissertation. (The Centre for Advanced Inquiry in Interactive Art. University of Wales, Corleon Campus, 1999). Also available in PDF format from the Langlois Foundation and and at http://billseaman.com/

[32] Kurt Lewin, *Principles of Topological Psychology*, Trans. Fritz Heider and Grace M. Heider, 1st ed. (New York, London: McGraw-Hill Book Company, Inc., 1936); Published by Ann Arbor, MI: University Microfilms, A Xerox Co., 1970.
http://www.muskingum.edu/~psych/psycweb/history/lewin.htm;
http://www.wilderdom.com/theory/FieldTheory.html. From a discussion on fields of meaning with Otto Rössler.

[33] Roy Ascott, R, 'Toward A Field Theory of Post-Modernist Art,' *Leonardo*, 13 (1980), pp.51-52.

[34] N. Hayles, *The Cosmic Web: Scientific Field Models and Literary Strategies in the Twentieth Century,* (Ithaca: Cornell University Press, 1984), Preface II.

[35] J. Frazer, *An Evolutionary Architecture*. (London: Architectural Association, 1995), p.12.

[36] A. Ushenko, *The Field Theory of Meaning*. (Michigan: University of Michigan Press, 1958).

[37] J. Derrida, *Writing and Difference*. Trans. A. Bass. (Chicago: University of Chicago Press, 1978), p.20.

[38] B. Massumi, *A User's Guide to Capitalism and Schizophrenia: Deviations from Deleuze and Guattari*. (Cambridge/London: MIT Press, 1992), p.11.

[39] B. Massumi, *Parables From the Virtual,* (Durham, NC: Duke University Press, 2002).

[40] Seaman, 'Recombinant Poetics,' http://billseaman.com/

[41] ibid

[42] J. Aumont, *The Image*. Trans. C. Pajackowska, (London: British Film Institute, 1997). Aumont states: 'For several decades, attempts to move beyond the theory of form have largely centered on the concept of information, in the technical sense of the term as used in the well-known theories of Claude E. Shannon and Warren Weaver.…The notion of information enables Gestaltist principles to be rewritten in a more general way, incorporating them into the minimum principle: among two possible informational organisations of a given figure, it is the simplest that will be perceived, the one which contains the most redundancy or, which amounts to the same thing, the one which mobilises the least information.' (p. 47-49) 'At the beginning of the twentieth century, emphasis was put by the theoreticians of form on the innate capacity of the brain to organize the visual according to universal and unchanging laws. This was the so-called Gestalt theory. From 1950 onwards, following the work of J. J. Gibson and others, this approach has once again entered circulation, first under the guise of psychophysiology and then as ecological theory of visual perception,' pp.37-39.

[43] F. Saussure, *Course in General Linguistics* (London: Gerald Duckworth and Co. Ltd, 1983).

[44] Mark Johnson, *The Body in the Mind: the Bodily Basis of Meaning, Imagination, and Reason* (Chicago: University of Chicago Press, 1987), p.175, as quoted in F. Varela, E. Thompson, and E. Rosch, *The Embodied Mind, Cognitive Science and Human Experience* (Cambridge/London: MIT Press, 1999), p.149.

[45] Hayles, *Posthuman*, p.285.

[46] E.T. Gendlin, *Experiencing and the Creation of Meaning — A Philosophical and Psychological Approach to the Subjective,* (New York: The Free Press, 1962), on 'felt meaning' and E.T. Gendlin, 'Experiential Phenomenology,'*Phenomenology and the Social Sciences,* ed. M. Natanson (Evanston: Northwestern University Press, 1973), "What goes through is much more than what we 'have' [explicitly]... any moment is a myriad richness, but rarely do we take the time to 'have' it.... Going through a simple act involves an enormous number of familiarities, learnings, senses for the situation, understandings of life and people, as well as many specifics of the given situation," p.370.

[47] 'Set theory,' http://plato.stanford.edu/entries/set-theory. See also N. Bourbaki, *Elements of Mathematics: General Topology*. (Paris: Hermann Publishers, 1966). 'From the notion of the neighbourhood there flows a series of other notions whose study is proper to topology: the interior of a set, the closure of a set, the frontier of a set, open sets, closed sets and so on,' p.13.

See Also Claude Berge, *Principles of Combinatorics,* Trans. John Sheenan (New York, San Francisco, London: Academic Press, 1971), pp.1-3. 'What is Combinatorics: We wish to offer here a definition of combinatorics, which depends on a very precise concept of 'configuration.' A configuration arises every time objects are distributed according to certain predetermined constraints. Cramming miscellaneous packets into a drawer is an example of a configuration… The concept of configuration can be made mathematically precise by defining it as a mapping of a set of objects into a finite abstract set with a given structure; for example, a permutation of *n* objects is a 'bijection of the set of n objects into the ordered set 1, 2, …, *n*,' one is only interested in mappings satisfying certain constraints,' pp.1-3.

[48] Gaugusch and Seaman, '(RE)Sensing.'

[49] B. Massumi, *Parables*, p. 158.

[50] Gaugusch and Seaman, '(RE)Sensing.'

[51] P. Cariani, 'Temporal Codes, Timing Nets, and Music Perception,' *J. New Music Research*; http://www.cariani.com/ *Journal of New Music Perception*, vol. 30, no. 2 (2001). Special issue on Rhythm Perception, Periodicity, and Timing Nets.

[52] Manuel De Landa, 'Combinatorial Constraints,' *1000 Years of Non-Linear History* (Cambrdige, MA: Zone Books of MIT Presss, 1997), pp.218-219.

[53] Haley G. Davis and Talbot J. Taylor, eds, *Rethinking Linguistics*, (London: RoutledgeCurzon, 2003), p.14.

[54] Bill Seaman and G. May, Programmer, *The World Generator / The Engine of Desire*, 1995- present

[55] Wittgenstein, *Philosophical Investigations*, p.20. 'The meaning of the word is its use in language.' I seek to extend this notion beyond text to being inclusive of various media elements and environmental factors.

[56] Gaugusch and Seaman, '(RE)Sensing.'

[57] Varela, *Embodied Mind,* p. 69

[58] Varela, *The Embodied Mind,* 'Its purpose is to become mindful, to experience what one's mind is doing as it does it, to be present with one's mind. What relevance does this have to cognitive science? We believe that if cognitive science is to include human experience, it must have some method of exploring and knowing what human experience is,' p.23.

[59] Bill Seaman, 'Recombinant Poetics: Emergent Explorations of Digital Video in Virtual Space,' *Transluminations: New Screen Media Narratives*, Ed. Zapp and Reiser, (BFI Publishers, 2000).

[60] Bill Seaman. 'Exchange Fields: Embodied Positioning as Interface Strategy,' *Convergence Magazine,* vol. 7, no. 2 (2001).

[61] Bill Seaman. 'Emergent Constructions: Re-embodied Intelligence within Recombinant Poetic Networks,' *Digital Creativity,* vol. 9 no. 3 (1998) pp. 153-160.

[62] Otto Rössler, *Endophysics — The World as Interface* (Singapore: World Scientific, 1998), p.132.

[63] Stuart Hameroff, 'The Physics of Quantum Consciousness Chemistry,' http://tonydude.net/NaturalScience100/Topics/3Mind/4artificial_intel.html. 'Quantum mechanics describes the seemingly bizarre behavior of matter and energy at microscopic scales, e.g. that of atoms and sub-atomic particles. At that level particles may be in two or more places at the same time (quantum superposition), and particles widely separated in distance may nonetheless be intimately connected (quantum entanglement). These properties are used in quantum computation which offers potential solutions to the enigmatic features of consciousness. However quantum computation is disrupted by interactions with the environment ('decoherence'), and neurons and synapses seem too large for delicate quantum effects.' He continues: "If an atom in such a state interacts with its environment--by being bumped or prodded by nearby atoms, for instance-its waveform can 'collapse', ending the superposition by forcing the atom to commit to one of its possible states... To some investigators, this process of coherence and collapse seems strikingly similar to what goes on in the mind. Multiple ideas flit around below the threshold of awareness, then somehow solidify and wind up at the front of our consciousness." He also writes: If we look inside neurons and other cells, we see highly ordered networks (the 'cytoskeleton') comprised of **microtubules** and other filamentous structures which organize cellular activities. **Microtubules** are cylindrical polymers of the protein

tubulin arranged in hexagonal lattices comprising the cylinder wall. Cooperative interactions among tubulin subunits within microtubules have been suggested to process information, as in molecular scale ‘cellular automata,’ As the states of tubulin are controlled by quantum mechanical internal forces (van der Waals London forces), they may exist in quantum superposition of multiple states (‘quantum bits’, or ‘qubits'), and microtubules may be seen as quantum computers involved in cellular organization.

I would like to also acknowledge discussions with Otto Rössler. Teri Rueb and Yvonne Spielmann provided helpful editing hints. Special thanks to Monica Ong for extra typing.