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Art-science and verbal articulation in hyper-visual techno-culture

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Abstract

This article outlines a quasi-analytical process for better comprehension of current artistic and scientific representations in visual media representing language orders of experience. After a brief historical outline contextualizing a multidisciplinary approach within digital techno-cultural advance, current scientific notions regarding the neurology of vision to sensory integration and this relationship to language expression and comprehension are discussed. Hyper-visual focus or the lack of neuro-typical visual focus can induce or indicate cognitive problems involving verbal competency. Summary discussion of this is followed with examples from contemporary artists' work depicting not only visual properties but those associated with language disorders and deficits. The argument throughout is that the comprehension and articulation of techno-cultural aesthetics has been biased by the limitations of hyper-visual, digital orientations.

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This paper attempts to demonstrate how analog and analogical forms of cognition can be utilized in a broad, multidisciplinary fashion to aid in the aesthetic appreciation of works of art without compromising essential scientific discovery, interpretation and insight. Recent scientific research (Christakis, 2008, September) has made it clear that certain properties of visual digital telecommunications media impede and distort the early development of verbal, written and spoken communications. Such research discussed below informs perception and conception of visual works of art which deal with the relationship of vision to language. Before addressing these new scientific discoveries and illustrating how they can increase the comprehension of artistic

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vision, it is helpful to further understand the historical development of the digital acculturation that has led inadvertently to visual and verbal distortions of sensibility.

One serious contemporary criticism regarding techno-cultural advance is that while specialist scientific disciplines are making momentous discoveries, such discoveries are not being utilized effectively due to relatively little cross-disciplinary synthesis and application[1]. Such criticism has not been restricted to our contemporaries but was voiced outright during the onset of the 17th and 18th-century Enlightenment. A pivotal example of this critique is found in the work of the first medical empiricist to suggest that a therapeutic program involving proper elocution could help remedy natural or cultural language deficits and disorders. John Thelwall (1764/1834) was the first *logopaedic* and *logotherapeutic* authority to make such an assertion. With unusual perspicacity, Thelwall perceived that the growing cultural habit of silently reading printed texts was contributing to problems regarding verbal comprehension and expression. He suggested that poets like Milton and Dryden should be read aloud for the sake of more exactingly correct and refined personal and social communication.

Unfortunately, Thelwall's advice was ignored, possibly because further empirical investigation would have necessitated multidisciplinary cooperation. At that time the sciences, just as the arts, were being divided and prioritized in order to aid specialist focus and analysis. Scientific disciplines — given the advance of rationalism, positivism and mechanical materialism — were judged to be more authoritative and progressive than those in the humanities and the arts. Consequently, academics in the humanities and the arts often attempted and often failed to rationally justify their inquiries in the context of empirical science. That is, the growing techno-cultural context that informed industrial revolutions involving mechanical, chemical and electrical engineering which led to modern pedagogy, automation, pharmacology and telecommunications media.

While it would have been prudent to establish institutions concerned with the examination and analysis of the general effects of specialist "progress," as well as to provide multidisciplinary models for practical, pragmatic synthesis, such programs were not initiated. However, today, there is the opportunity to partially redress this oversight because of the radical discoveries in the neurological science behind general human cognition. Unfortunately,

1. For example: UNESCO world conference on Science (1998). "Toward a New Contract between Science and Society." Retrieved from http://www.unesco.org/science/wcs/meetings/eur_alberta_98_e.htm

in the neurological science behind general human cognition. Unfortunately, however, the determination of interested research academics to interpret these discoveries in terms of purely digital assumptions and applications tends to undermine the essential human necessity to think and interpret laterally, or in terms of analog and analogical cognitive processes.

The war between the Ancients and the Moderns (Analog vs. digital)

Since the classical Greeks there has been a so-called "War between the Ancients and the Moderns" – that is, between those favoring analog and analogical processes of thought and those favoring visual and digital processes of thought. The Ancients have been considered to be orators who employed rhapsodic rhetorical terms of expression involving sensual poetic analogies, metaphors, similes and metonymies. On the other hand, the Moderns have been associated with visual, written or printed texts, particularly those that eschew poetic tropes and devote arguments to literal, logical, lineal, concrete and factual narratives. For example, Plato, a Modern, wanted to exile the poets from the city. Then Aristotle, more Modern than Plato, dismissed Plato's poetic idealism and began to classify scientific forms of thinking based upon visual observation, categorization and classification.

This intellectual controversy was hotly debated by the Greeks and was perpetuated further by the classical Romans. Some favored Ciceronian rhetorical elocution while others supported the plain Senecan style (Williamson, 1951). Similarly, from the Renaissance on, the luminaries of the 16th, 17th and 18th-century Enlightenment represented Moderns while those of the 19th-century Romantic Rebellion embraced the attempt to return to Ancient multimodal, oral and poetic traditions. Since the Romantics, however, there has been consistent cultural transition toward more and more digital forms of verbal expression and educational enterprise.

It is important to emphasize that with the advance of digital rationalism human sensibility has involved more and more sensory dissociation. Cicero's (106 BC -43 BC) rhetorical divisions of speech were considered to involve simultaneous, over-lapping senses and sensibilities. These were considered to be synthetically analogical, multimodal and synaesthetic. On the other hand, in his scientific thesis, Sir Francis Bacon (1561-1626) divided sense and

sensibility into digital forms which were mutually exclusive. Bacon devised a method for scientific advancement by restricting the figurative analog properties of perception to more digital, factual, literal forms. Bacon adapted and substituted the classical rhetorical canon devised by Cicero through incorporating Gorgias's (c.485 BC -c.380 BC) Sophistic critique. In this critique Gorgias argued that the five major senses were distinct from one-another rather than dynamically integrated[2]. Consequently, Bacon's categories of thought in his scientific method were as follows:

1. Invention (Latin, *inventio*; Greek, *heuresis*) (Eye): Hypothesis;
2. Arrangement (Latin, *dispositio*; Greek, *taxis*) (Ear): Materials;
3. Style (Latin, *elocutio*; Greek, *lexis*) (Taste): Method;
4. Memory (Latin, *memoria*; Greek, *mneme*) (Smell): Observation;
5. Delivery (Latin, *pronuntiato* and *actio*; Greek, *hypocrisis*) (Touch): Conclusion.

This reductive sort of logical evaluation and dissociation of sensory reality led to the binary Cartesian sensibility (René Descartes, 1596-1650) involving mind/body duality and dualism in general, as well as the breach between material physics and spiritual metaphysics, not to mention decision-making favoring the digital over the analog.

Once Bacon's approach was adopted by The Royal Society (1660), polemical issues regarding the Ancients and the Moderns were discussed further for the remainder of the 17th-century and well into the 18th and 19th centuries. Unfortunately, the Moderns generally triumphed and continue to triumph over the Ancients. Today, the contentious debate — while largely limited to understated academic recesses — continues unabated. Much of the critical content of this colloquy has been reserved for issues pertinent to the cultural ratification of scientific authority, especially issues regarding the positive effects of scientific progress involving politics and economics. However, the

2. McEvilley (2002, 427) writes: "The second section of [Gorgias's] On Nature, or On Non-Being modulates out of ontology into epistemology: If anything does exist, it is argued, it can never be known. In this argument Gorgias abandons the "mathematical" dialectic of the Eleatics to introduce an important Sophistic critique of the five senses and mind . . . . The senses being different from one-another, it is argued, they are separate and isolated and evidence of one cannot be used to confirm or deny or in any way comprehend the evidence of the others." This is mentioned because it helps in the comprehension of ontological and epistemological philosophies that limit sensory or phenomenological investigation into reality only to re-establish mathematical descriptions of reality instead as more concrete and pertinent. That is, the same mathematics that develops towards Boolean mathematics and digital binary codification.

deeper, more substantive issues regarding epistemology and ontology have been addressed more often in philosophy and literary criticism, as found, for example, in the work of Leo Strauss (1953) and the cognitive linguistics of George Lakoff and Mark Johnson (1980).

Unfortunately, most of this criticism does not refer to seminal work by medical psycho-physiologists. While observations like Thelwell's continued to be ignored, the general dissociative and associative properties of verbal expression, and the relevant behavioral implications of such properties, were made further apparent by the great 19th-century medical scientists Jean-Martin Charcot (1825-1893), Alfred Binet (1857-1911) and Pierre Marie Félix Janet (1859-1947). These practitioners discovered that the neuro-typical ["normal"] subject can be verbally-induced into three basic dissociated states of conscious awareness and experience, each of which affect verbal attention, integration and proficiency:

1. A Superficial, Left-Brained, *Visual Trance*: only conscious of itself;
2. A Deeper, Right-Brain/Left-Brain, *Visual and Audile-Tactile Trance:* aware of itself and visual categories of thought; and
3. The Deepest, Right-Brain-Left-Brain, *Visual, Audile-Tactile and Autonomic-Nervous-System Trance:* aware of itself, of visual, audile-tactile behaviours as well as behaviours relative to the autonomic system (James [1890], V.I, Chapt. X: 291-401).

The dynamic complexity of cognitive associative and dissociative states, as well as the lack of any objective frame-of-reference to appraise pertinent medical relevance, meant that for the most part further research regarding hypnosis, split-attention and/or neuro-linguistic programing was generally abandoned.

However, discussion of such phenomenon was continued after the like of William James (1842- 1910) into the latter 20th-century by writers, historians and theorists as diverse as Harold Innis (1951), Albert Lord (1960), Marshall McLuhan (1962, 1989), Eric A. Havelock (1963), Jacques Ellul (1964/1967), Lewis Mumford (1967; 1970), Pedro Lain Entralgo (1970), Lewis Mumford (1967, 1970), and Walter Ong (1958/2005, first ed.; 1982/2002). For example, Ong (Ong, 1982) argues that the division of visual intellection from the oral or audile-tactile has been accompanied by the increasing technologizing or digitalization of the word, and, by extension, through the effect of telecommunications and hyper-visual, computational mediation. With such technologizing there is an ever-increasing tendency to habitually occupy shallow, visual

states of awareness. These visual states are dissociated and dissociational, and, hence, undermine the reflective, introspective nature of integrated, coherent synthesis necessary for verbal comprehension and competency. Such also undermine the awareness necessary for general environmental orientation and deportment. In addition, the continual disruption and distraction experienced during normal media usage is further disintegrative and disorienting. While we are supposedly becoming more adept at "multi-tasking," in reality we are losing relevant holistic focus, scope and purview. And we are losing our ability to contextualize and prioritize relevant forms of thought and behaviour.

It wasn't until the work of the late 20th-century academics mentioned above, as well as scientific philosophers like Steven Pepper (Pepper, 1942) and, more recently, the cognitive engineer Douglas Hofstadter (Hofstadter, 2001), that the analogical, multi-disciplinary nature of both scientific and artistic intellection began to be taken more seriously. Nevertheless, despite the fledgling growth of interdisciplinary and multidisciplinary cooperation, there has been relatively little synthesis and/or education toward any collective insight. Specialists continue to fail to progressively incorporate any realistic practical and 'relatively little synthesis and/or education toward any collective insight. Specialists continue to fail to progressively incorporate any realistic practical and pragmatic insights and applications because they often refuse to recognize or to become versed in multidisciplinary analog, analogical and lateral forms of ideological synthesis and contextualization. The major problem involving the application of analogical comprehension is the truism that while any particular analogy is false, the set of all analogies is true.

However, it is ironic and counter-productive that the popular acceptance of a pan-digital model of the world and the universe by physicists and others represents a sort of idealistic 'absolutism' or 'digital fundamentalism.' In addition there is the current underlying and wrong-headed presumption that the scientific method (stemming from Francis Bacon's dream to discover or rediscover a divine Adamic language, as well as Leibniz's algebraic impulse toward a universal science) has led to a *universal language* as defined and described by a zero/sum world-view. A universal language based on digital information, however, disconnects, deconstructs and dismantles organic, embodied, on-going, transitional and transformational forms of analog communication.[3]

3 Criticisms of such radical 'fundamentalism' include mention that the theoretical physics of a digital, probabilistic universe involving the existence of discrete digital states is incompatible with continuous symmetries such as "rotational symmetry," "Lorentz symmetry" and

In any case, the war, the feud, the bickering between the Ancients and the Moderns is not over by any means and remains somewhat more cantankerous and pernickity than ever. But it is hoped that the complications of the controversy may become more coherent when simplified through analogical, multidisciplinary synthesis. That is, when the adherents of a purely digital physics recognize that they would be unable to pursue their science in the first place without the root analog and analogical comprehension which grounds our psycho-physiology in the natural world.

Definition of "hyper-visual"

The term *hyper-visual* refers to high-definition, visual, digital representation in general, and also lends itself to the definition and description of a contemporary, digital "worldview." The nature of such a purely iconic "worldview" was suggested by McLuhan and Powers (1989) in *The Global Village: Transformations in World Life and Media in the 21st Century:*

> If man is able to transpose the workings of his central nervous system into electronic circuits, he will be on the brink of externalizing his consciousness in the computer. One could conceive of consciousness as a projection of internal synesthesia towards the outside world . . . [this projection] coincides with the traditional description of common sense. Common sense is the specific human ability to translate one particular kind of experience towards all other senses and to present the result of this process as one global mental image (McLuhan & Powers, 1989, 94).

By extension, McLuhan and Powers imply nothing more or less than the transformation of multimodal consciousness into a hyper-visual construct. That is, the transmogrification of synaesthetic consciousness and integral common sense into one dissociated/dissociative digital, visual sense and sensibility which, possibly, cannot be articulated. That "one global mental image" with all its attendant computational properties, that computational HD screen

"electroweak symmetry." Proponents of pan-digital physics hold that such continuous models are simply approximations of the underlying discrete nature of the universe. It is in Non-Linear Physics and Cymatics, or sciences involved with resonation, where we see beyond the digital into the vibrational analog and analogical nature of the universal. The qualitative and quantitative logic behind "A is to B as C is to D" reflects and reverberates with analog categories of cognitive thought, as well as providing a multi-dimensional axis for all mimetic comprehension and behavior, perhaps universal and otherwise.

image preoccupying the shallow, superficial left-brained, visual trance is what is referred to as the cognitive realm of "the hyper-visual."

This partially unconscious but evermore pervasive sense of the hyper-visual can be illustrated through examination of two contemporary artistic installations: Korakrit Arunanondchai's "*2012-2555*" (2012) and Yao Jui-Chung's "*Heaven*" (2001).

Korakrit Arunanondchai's "*2012-2555*" (2012) is an impressive performance installation, 17 x 12 x 12'. His installation includes two-channel video, flat screens, metal, wood, plastic, digital print on canvas, digital print on vinyl, fluorescent lights, and plastic flowers. It was inspired, as many of his works, by Bosch's "*The Garden of Earthly Delights*" (c.1490-1510). Arunanondchai's work invites access into what one anonymous commentator has suggested "could be a portal into Second Life, a gate-way into a digital reality that is both idyllic and nightmarish" or a "heavenly earth" and an "imagined hell." The same observer also states that Arunanondchai's "visual spaces are at once inviting and for[bidding];" they suggest "a point of emergence into [life] and

Figure 1: Korakrit Arunanondchai: "2012-2555" (2012)

a sealing off of death..." or a kind of skeletal memento mori. The whole is structured after the like of a human skull with the hollows of the eyes containing flat screen video monitors. To the point, this work reduces environmental elements, as well as the human psycho-physiological corpus, to almost strictly visual representations.

Jui-Chung's "*Heaven*" (2001) is a large photography installation consisting of fifteen black and white photographs. These are over-laid with gold leaf and framed in gilt fiberglass and wood frames. The photographic imagery includes broken sculptures, dinosaurs and dragons, as well as buildings in ruins. The photographs are mounted on a wall and from them fifteen spiraling copper tubes stretch five-hundred centimeters to converge together upon a brass helmet. This tubing is connected to the eyes, mouth or other sensory organs of the figures depicted in the photographic images. Then the helmet is suspended in such a way that viewers can easily place their heads inside where there is a small LCD monitor. The monitor plays a fifty-two minute, hyper-visual video loop, the content of which supposedly represents "travel through a wormhole." As a result, the focus of each spectator's experience is reduced to something like the "one global mental image" of the hyper-visual.

According to Jui-Chung, the theme of his exhibit alludes to the historical past of Taiwan in terms of what was called the "cold reality" of political conflict and isolation. Accordingly, Jui-Chung would seem to be deliberately eliminating any reference to the verbal in order to emphasize the lack of any "dialogue" or verbal communication that might have helped to ameliorate such "cold reality."

Contemporary premises regarding the neurology of visual attention, sensory integration, language skills and comprehension

Recent discoveries by neurological researchers, as outlined below, have made it clear that the evolutionary development of human cognition has been more intrinsically involved with language orders of experience than was ever previously understood. Language cognition is not only more globally-represented in the human corpus but it also plays a more paramount and dominate part in perceptive and conceptive awareness.

Language phenomenology is generated through a holistic, organic, analog process, but it is expressed verbally through logical referential and

inferential digital means. In general, it serves by being analogically associative and digitally dissociative in terms of the contextual behaviours crucial for environmental orientation and social communication.

Language phenomenology appears to be overwhelmingly synesthetic (Ramachandran & Hubbard, 2001; 2002, June); that is, its operations are generally bimodal and multimodal. It might be said that human genius can be found in the neurological facility to associate and dissociate a general pan-synesthetic sensibility for the purposes of internal, inter and intra-personal communications. Our vocabulary is a composite of various, variegated synesthetic associations and dissociations. Our verbal lexicon represents an index of multi-sensory cognitive states as these are determined through individual sensory association and dissociation. That is, each word or expression represents a unique, dynamic neurological state of sensible, semantic being. In order for each to be expressed and comprehended, each must be grounded in a particular syntactic context which transitions and transforms through a scale of meaningful qualifications.

However, overall, not only is there relatively little neurological involvement with vision, per se, but the visual operations of the brain are perhaps the most easily dissociated from other sensory operations (Wyart & Tallon-Baudry, 2008). This has numerous implications. When visual cognition is dissociated or acts independently, there is a statistical alteration in the sensory integration necessary for focused attention, as well as for coherent thought and expression. Language cognition is dependent upon optimal sensory integration for healthy development and comprehension. When there is hypo- and/or hyper-visual perception, language competencies are compromised because necessary sensory integration is inadequate, disrupted and dissipated. While it is neuro-typical to transition through a manifold of complex associative-dissociative semantic and syntactic states, because we spend so much of our time with various digital, televisual media, we are tending to occupy more and more exclusively visual or relatively shallow cognitive states. As a result, we are not as introspective and we are not integrating our sensory experience in a holistic manner toward significant personal and cultural decision-making.

Acquired language deficits and disorders

Human cognitive awareness and communication is most often predicated upon categories of linguistic thought and action. As stated, these categories are dominantly analogical; they involve resonant sensory unimodal,

inter-modal and multi-modal analogies. They incorporate metaphors, similes, and metonymies. A metaphor is, of course, a thing regarded as representative or symbolic of something else, especially something abstract or abstracted. One synonym for the word "metaphor" is "image." On the other hand, a "metonymy" represents the substitution of a part or an attribute of a thing for something with which it is closely associated. An example of a metonymy would be the word or image of a "suit" for a status quo business executive, for the status quo in general, or for all business executives.

In the early 20th-century, structural linguist Roman Jakobson (1896-1982) found evidence for the fundamental necessity of metaphoric and metonymic processing in all human experience and thought, whether verbal or not (Jakobson, Roman & Hale, Morris, 1956). When there is a cognitive inability to construct metaphors, there is an inability to formulate a field of signification for comprehension. That is, there is a loss of what constitutes a "context." And when there is an inability to comprehend metonymically, there is an inability to comprehend logical inference.

After closely analyzing medical data, Jakobson concluded that there are two underlying types of aphastic disorders: 1. *similarity disorder* involving metaphor and semantic disruption; and, 2. *continuity disorder* involving metonymic and syntactic disruption. These two basic disorders can manifest in three ways:

Aphasia

1. **Broca's Aphasia** (*expressive aphasia*): where speech is reduced to short utterances, severely limited vocabulary, poor fluency, as well as the loss of writing skills;

2. **Wernicke's Aphasia** (*receptive aphasia*): where spoken words cannot be understood; connected utterance is fluent but without proper syntax; and reading and writing are impaired;

3. **Anomic Aphasia** (*semantic amnestic aphasia*): where there is a persistent inability to recollect relevant words which causes vague circumlocution; are where comprehension of speech and printed material is relatively proficient but written communication remains disorganized and incoherent.

Since digital media eschews both the metaphoric (semantic) and metonymic (syntactic) dimensions of personal and social orientation and discourse, the general result of habitual experience with digital media can be the generation of behaviour similar to that found in aphasia as well as in the autistic spectrum. This includes acquired Attention Deficit Disorder (ADD) and Attention Deficit Hyperactivity Disorder (ADHD), et cetera[4]. Artificial or acquired, Broca's Aphasia, for example, is readily evident in texting as well as in the techno-cultural behavior evinced by what might be called the "social autism" of Facebook users.

The development of "diseases of attention"

The growth of a totalizing techno-cultural state of artificially acquired language and communication deficit comes partially as the result of habitually inappropriate attentive focus. Conditions involving sensory integration and dissociation are directly related to attention and to diseases of attention. In the 19th-century, William James defined "attention" as,

> *The taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought. Focalization, concentration, of consciousness are of its essence. [Attention] implies withdrawal from some things in order to deal effectively with others, and is a condition which has a real opposite in the confused, dazed, scatterbrained state.* [emphasis in original] (James, 1890, 1: XI: 403-404)

This "taking possession... of one out of... several simultaneous objects or trains of thought" (James, 1980) is also related to the proper cognitive dissociation regarding one sensory modality or multimodality. With characteristic sagacity, James (among others like Théodule-Armand Ribot [1839-1916]) predicted that most of the psycho-physiological diseases of the future would most likely be discovered to be "diseases of attention."

To reiterate: attention is a function that allows the appropriate selection of stimuli, the maintenance of concentration, and decisive interactions with space and time. It can be argued that while most cognitive systems can operate somewhat independently, none can function at anywhere near normal

4. The DSM (Diagnostic and Statistical Manual of Mental Disorders) has not listed ADD or ADHD as acceptable clinical terms of description and definition since the 1994 revision. These terms are used here as they are understood in common parlance.

levels without appropriate attentional engagement. Without attention, coherent thought and action is impossible.

In the absence of attention, visual stimulus can still activate the visual association cortex. This is the case during ordinary day-dreaming or zoning-out. In other words, visual stimulus can remain actively dissociated from the need for sensory-integrated focus and attention. However when base-line neural activity hasn't prepared specialized regions for processing anticipated stimulus, and when that stimulus is not forthcoming, thought production is frustrated and the individual experiences anxiety and boredom. Consequently, the disappointed individual seeks out, increasingly, more stimulation, more dopamine, more adrenalin and more speed. It is not fortuitous or irrelevant that brain scans of so-called "internet addicts" show neuro-plastic developments similar to those of cocaine and crystal meth addicts (Zhou, et al., 2009; Yuan, et al., 2011).

Medical alert

Research into the effects of telecommunications media originally focused on the relationship of media usage and media content to violent behaviour. An extensive body of research on this culminated in the *Report of the U.S. Surgeon General's Advisory Committee on Television and Social Behavior* (National Institute of Mental Health [NIMH], 1972). However, it wasn't until the seminal, groundbreaking research of Tannis MacBeth Williams and her team (Williams, 1986) that evidence regarding the positive and negative effects of television viewing was set on firmer empirical grounds. While cautious regarding full critical qualification, in *The Impact of Television: A Natural Experiment in Three Communities* the researchers articulated the deleterious psycho-physiological and sociological behaviour initiated by televisual viewing, behavior that was discovered across many if not all significant variables. Moreover, as the researchers lamented, there was still little evidence regarding the effect of television viewing on language acquisition and behaviour. And they further lamented that significant research into the form of the medium and how it might alter general perception and conception was still lacking. Subsequent research on media usage regarding both form and content has determined that such negative effects are indeed significant and most markedly so.

From the first general introduction of television in the 1950s there have been many fledgling attempts to advise parents and children about relevant behavioral problems involving media misuse. In 1999 the American Academy

of Pediatrics (AAP) issued a policy statement that addressed parents concerning children's' media usage. In the report, the AAP recommended that pediatricians should urge parents to avoid television viewing for children under the age of two years old. At that time, the organization believed that there were significantly more potential negative effects of media than positive ones. Then, in 2011, the AAP issued a further policy statement that not only emphatically reaffirmed the 1999 recommendation but provided updated research findings supporting original fears regarding harmful effects (Zimmerman & Christakis, 2007; Chonchaiya & Pruksananonda, 2008).

By 2011 it had been clearly established by medical science, established without significant professional controversy, that children's ability to develop healthy forms of interpretive decision-making through language, as well as the performance of other behavioural skills, is directly compromised by the impact of hyper-visual media; that is, all tele-visual media. Consequently, today, in order to avoid problems and developmental delays, pediatricians vehemently recommend strict monitoring of younger children's usage, and, moreover, that any and all usage be rigorously supplemented by extensive face-to-face dialogue as well as aural reading. Nevertheless, such medical formulations and guidelines continue to be almost completely ignored. The result of this ignorance is the growing severity of acquired language disorders, and these in direct tandem with the statistical growth of media-usage across the board.[5]

Inappropriate media usage can result in a complex of cognitive malfunctions

- Relative inability to focus attentively;
- Inaccurate visual perception;
- Poor spatial awareness;
- Inability to respond to visual cues due to the inability to coordinate

5. American Statistics regarding young children's media usage are as follows: 90% of children under two years of age watch some type of electronic media; children under two watch an average of 1-2 hours of television every day; one-third of all children have a television in their bedroom by age 3; 39% of parents of young children report that the television is on in their homes for at least 6 hours per day (American Academy of Pediatrics [AAP], 2011). These statistics only deal with television rather than with all computational screen instruments. See Christakis 2008, September for a full overview of the current state of knowledge involving children's media usage and its known effects.

sensory information;
- Loss of hand/eye coordination as well as vestibular balance;
- Loss of binocularity;
- Poor mind-body orientation because of inaccurate body image;
- Overall cognitive learning problems especially regarding language and math skills.

Recent neurological discoveries and evidence

The following outlines some of the scientific research that informs such medical observations, deliberations and pronouncements. First off, infants and children learn to think, act, and develop multimodal language skills through the initial prioritizing of one sense, usually visual or the visual as directly coordinated with the haptic. This behavioural coordination occurs before children are able to think and act comprehensively in terms of environmental and cultural multimodal or cross-modal contexts.

Two recent studies, "Young Children Do Not Integrate Visual and Haptic Form Information" (Gori, Del Viva, Sandini, & Burr, 2008) and "Development of Cue Integration in Human Navigation" (Nardini, Jones, Bedford & Braddick, 2008), among others, establish that children do not integrate sense modalities in a statistically optimal fashion before eight to ten years of age.

The first study by the Gori team of researchers discovered that either vision or touch dominates totally – usually vision – even in conditions where the dominant sense is far less precise than the other. In the discrimination of size and scale, for example, haptic information dominates the determination of perceived size and scale as well as other sensory thresholds, whereas vision dominates object and environmental orientation. This study suggests that when size and scale are improperly represented, as by digital media, vision dominates. Hence, children unable to access cross-modal forms of perception in a natural environment are unable to develop practical sensory calibrations as well as competent verbal expertise.

The second study by Nardini and his team, on the use of senses in navigation and motility, revealed that proper mapping and movement depend on visual determinants as well as self-generated vestibular and proprioceptive cues that signal an organism's own movement. When visual and haptic sensibilities are conflicted or compromised, visual determinants either reset estimates regarding self-motion, or integrate with them in terms of the scale and orientation of relevant physical goals. The team's results suggest

that development of individual visual spatial-representational systems precedes development of the capacity to combine these within a common frame-of-reference or context. It can be argued that this process can be compromised when spatial cues such as those represented in hyper-visual media are environmentally irrelevant and do not present proper dimensional scales. As a result, proper contextual awareness and decision-making regarding psychological and physiological perception, conception, goal-seeking and achievement are frustrated and distorted.

Causes of insufficient sensory integration

1. General inefficient sensory intake (resulting in hyper and/or hypo-sensitivity).
2. Neurological disorganization due to:
    a) A failure to receive sufficient information;
    b) Inconsistent reception of information; and/or,
    c) Inability to integrate information with new sensory perception.
3. Inefficient motor, language, and/or emotional expression due to inappropriate production of feedback and/or meaningful decision-making and/or behavior.

Poor sensory integration and sensory overload are neurologically related

Much has been said and debated about the stressful nature of so-called "sensory overload" or "information overload" regarding the effects of contemporary techno-culture and its telecommunications. Both states can be said to reveal a loss of practical "pattern-recognition" as well as poor attentive perceptual and conceptual contextualization and prioritization.[6]

6. Sensory overload and information overload can both lead to visual stress. Such stress is said to manifest in the symptomology of so-called Irlen Syndrome, or Scotopic Sensitivity Syndrome. According to advocates of this theory, individuals with Irlen Syndrome perceive the printed page and/or their environment in atypical ways, and, as a result general perception is inefficient and results in poor comprehension, strain, and/or fatigue. Irlen Syndrome can also affect attention span, listening, energy level, motivation, work production, and mental health. While there are those who are critical of diagnoses involving Irlen Syndrome, medical science has now established that poor sensory integration and sensory overload are directly related and together hamper the proper neurological development of young children.

Neuroscientist Michael Merzenich (Merzenich, 2011) discovered that early in life, when the brain is making its first decisive connections, a protein called Brain Derived Neurotropic Factor (BDNF) is released. It is directly responsible for the growth of nerve fibers. This protein also activates the nucleus basalis: the part of the brain which allows us to focus our attention appropriately.

The nucleus basalis is dynamically and decisively operative for the whole "critical period" of development, which characteristically lasts until a child is three to five years of age. Not only does this prompt the child to pay deliberate attention but also to remember especially salient experience.

BDNF is also responsible for closing down the critical period. After the age of five, the nucleus basalis only fires when something novel or important happens, and only when one is paying active, focused attention. However, when a child is hyper-stimulated more BDNF is produced. When chronically hyper-stimulated — as in the case of many people with clinical autism, or, by extension, habitual digital mediation — there is or may be the tendency in some children for the nucleus basalis to remain hyper-active long after it should. Consequently, all neurological connections are reinforced and the child remains hyper-sensitive without proper sensory integration, focused attention, discrimination and environmental orientation.

The neurology of sensory inclusion, exclusion and verbal holism

It is important to emphasize once again that the evolved human brain is predominantly an organ dedicated to verbal orders of experience, and that visual sensibility is crucially important for proper cognitive development of language skills and comprehension. Recent scientific discoveries such as those involving the arcuate fasciculus have established that the neurological wiring involving language is much more intrinsic and pervasive in all cognitive processing than was ever understood before. While the mind-brain-body delegates relatively little neurological attention and development to visual cognition, per se, human brain cells are more complexly interconnected in and around brain areas linked to language than anywhere else.

The Arcuate fasciculus and Geschwind's territory

The arcuate fasciculus (Rilling, et al., 2008) is a neurological pathway which partially connects the "expressive speech area" (Broadmann's areas 43, 44, 45) to the "Receptive Speech Area" (Broadmann's areas 39, 40* [see page x]) , as well as connecting Wernicke's area with Broca's area. Wernicke's area is involved with the reflexive mimicking of words and their syllables as these are associated with the sensory and motor images of words, while Broca's area facilitates language comprehension, action recognition and production, as well as speech-associated gestures.

In addition, Geschwind's territory provides an alternative, parallel, simultaneous back-up route to that of the arcuate fasciculus. It lies in a key location at the juncture of the auditory, visual, and somatosensory cortices, each of which it is massively connected. The neurons found in this lobule have the particularity of being multimodal. They process different kinds of sensory stimuli simultaneously. This makes Geschwind's territory an ideal location for comprehending the multiple properties of spoken and written words: their sound, their appearance, their function, and so on. This lobule helps the brain to classify, label and name things as prerequisites for forming concepts and other forms of abstract thought.

The formation of Geschwind's territory (along with Broadmann areas 39 and 40) is among the most recent evolutionary developments. Moreover Geschwind's territory is one of the last brain structures to mature in children. That late maturation is why most children are unable to learn to read or write before the age of five or six. Also, given such late maturation, when younger children are exposed to hyper-visual orientations they may be less able to properly distinguish between internal and external sensations, as well as concrete and abstract distinctions. This is one of the chief reasons why pediatricians recommend the restriction of televisual mediation for younger children.

"Continuous semantic space"

Given the prevalence of brain operations connecting vision with language neurology, scientists recently employed fMRI analysis to study the visual categorization of the object content we see when we watch a DVD (Huth, 2012). Huth's team discovered that visual categorization involves what they term "a continuous semantic space."

It had long been held that each category of object or action we see is represented in a localized, separate region of the visual cortex. However the researchers found that these categories are actually abundantly represented throughout the brain in highly-organized, overlapping maps. These include more than 1,700 visual categories of thought and their relationships, or as much as 20 percent of the brain. This integrated mapping also includes portions of the brain involving haptic perception – that is, touch, proprioception, coordinated movement as well as nonverbal and gesticular communication. Huth's study makes it crystal clear how visual attention, focus and integration is critical to the development of language skills and comprehension.

The pulvinar

A recent study at Princeton University (Saalmann, Pinsk, Wang, Li & Kastner, 2012) partially established that an area at the center of the brain called the pulvinar acts like a switchboard operator between areas of the visual cortex. The pulvinar processes external and internal visual information in order to distinguish between the two. It also prioritizes relevant effective behaviour. When we pay attention to important visual information, the pulvinar makes certain that that information is consistent and relevant.

This study, among others, suggests that when people are engaged with hyper-visual media, or when they are using, say, a cell phone, their attention can be so compromised that it over-rides pulvinar monitoring. That is, the user ignores their embodied context and gives executive sensory priority to the telecommunications medium. For example, an individual walking along a street while texting may neglect to notice an on-coming, out-of-control vehicle and fail to respond accordingly. In fact, this sort of inattention to the general environment is highly significant in terms of all media usage because pulvinar dynamics involve all the components of vision including the retention of visual memories as well as the comprehension of language, emotion and inferential meaning.

Neuroplasticity and acquired visio-spatial amnesia

As previously mentioned, it is now strongly suspected that persistent behavioural involvement with hyper-visual telecommunications causes

deleterious changes in brain anatomy. These changes are related not only to the lack of proper multimodal experience during early childhood development, but to later experience involving inappropriate visual and verbal operations concerned with memory. At any one moment we can only hold in mind a minute fraction of the visual environment we perceive, and usually for no more than thirty seconds. Although visual short-term memory is essential for a wide array of cognitive functions, and although it is supported by an extensive network of brain regions, its storage capacity is severely limited. The developmental abnormality of additional white matter in the right parahippocampal gyrus of so-called Internet addicts suggests that it is harder for them to temporarily store and retrieve information (Ko, et al., 2009; Shou, Y., et al., 2009; Yuan, K., et al., 2011).

Aspects of visual memory

1. The Visio-Spatial Sketch Pad: memory which temporarily stores visual and spatial information.

2. Eidetic or Photographic Memory: involving the complete retention of visual images.

3. Iconic Memory: primes the retrieval of vivid sensations associated with a visual image; such retrieval is fleeting and must be continually re-enforced.

4. Spatial Memory: memories that allow for sensory environmental orientation.

5. Object Memory: allows for processing different features of an object or material.

In general, such pivotal neurological discoveries infer that when our visual sensibility is in overdrive, the regulated ability to meaningfully categorize and behave in a coordinated, psycho-physiological manner is impacted. There is no way to focus relevant, meaningful semantic and syntactic operations in order to communicate coherently. In other words objects and objective goals can tend to become referentially meaningless. Words and people can simply become meaningless things, wrong-headedly extraneous for any sort

of necessary direct inclusion and communication. In addition, contextual conceptualization, categorization and classification becomes increasingly irrelevant and supposedly unnecessary. Given the hyper-visual stimulation, distraction and disorientation found in techno-culture there is new concern regarding how we know or can continue to know what is important for us to pay attention to, and, hence, to retain as seminal information.

The crisis of visual attention and verbal articulation as illustrated by art-scientists

The work of many contemporary art-scientists illustrates the relationship of visual sensibility to iconic memory — that is, to the fleeting sensory feelings and associations, especially those involving media which require constant repetition in order for there to be any sensible signification at all. The following provide a few examples.

Kim Dong Yoo: "Close-Up Painting of Marilyn Monroe" (2011)

In a manner reminiscent of Andy Warhol's silk-screen portraits, Kim Dong Woo composes a low-definition mosaic of Marilyn Monroe constructed from a repetitive, iconic image of President John F. Kennedy. Kim Dong Woo seems to be communicating iconoclastically that the hyper-visualizations of techno-culture are only vaguely contextualized and comprehended, and usually through the juxtaposition of low-definition iconic signs and symbols.

Vik Muniz: "Pictures of Magazines 2" (2012)

Similarly, employing découpage, Vik Muniz reconstructs iconic/iconoclastic paintings such as Manet's "A Bar at the Folies-Bergère" using scraps torn from glossy magazines. Then he photographs these collages and enlarges their scale up to 10 feet square. His message would seem to be that our perception and conception of visual works of art, as well as of general visual reality, is a vague mnemonic mish-mash of frayed, fragmented, fraying and fragmenting images from mass media.

Rashid Rana: "Veil Series" (c.2007)

Rashid Rana's work technique in the veil series of prints resembles that of Kim Dong Yoo and Vik Muniz. A close inspection of each print reveals that his veiled subjects of Muslim women are composed of thousands upon thousands of tiny pornographic images of women in compromising and compromised pornographic acts. These mosaics are all ordered after the like of a hyper-visual, digital grid. This subject matter and approach suggests that Rana is saying our experience, knowledge and interpretation of women, whether Western, Middle Eastern or other, is compromised by images from mass media that "re-veil" or conceal a more realistic understanding of the nature of the feminine. And, to the point, that contemporary human nature in general can be and is often concealed by digital representation.

Zhang Dali: "AK-47 Series" (c.2006) and Xue Song: "Mao Series" (c.2001)

Such artworks often employ words, letters and numbers. Zhang Dali's portrait of Mao, among other similar portrayals of Chinese subjects, incorporates a negative "camouflage" of numbers and letters referring to the notorious AK-47. In kind, Xue Song creates silhouettes of Mao from populist illustrations of Chinese people, and sometimes places these figures upon a background comprised of written character propaganda.

Hong Kyong Tack: "Pencil Series" (1995-1998)

Korean artist Hong Kyong Tack's "Pencil Series" of oil paintings depict implosions and explosions of multi-coloured pencil crayons. On many canvases images of pencils issue into and out of various centres of visual focus. These are emblematic of how the lack of any particular visual focus can confuse and confound artistic vision as well as any significant interpretive point-of-view.

Yin Shaoyang: "Dizzy Mao" (2007)

Many other contemporary artists would appear to be similarly illustrating

a general crisis involving attentive focus. Yin Shaoyang is well-known for his portraits of iconic cultural figures such as Mao Zedong. On the circular canvas of one example, "Dizzy Mao," blurred, concentric ripples of red and blue paint centre upon the subject's mouth. By implication, the major focus is on Mao's verbal utterance or its absence. In contemporary China red is associated with a politically-correct communist status while blue with optimistic future possibilities. One interpretation of Yin Shaoyang's work suggests the necessity of a transformation of political ideology, propaganda and rhetoric into new articulations. However, the painting also infers that any such visual-verbal focus is fuzzy and indeterminate, or that it leads the observer to the centre of a visual and communicational maelstrom.

Damien Hirst: "Spin Skull Series" Series (2007-2012)

Artists are also depicting visual states which discourage attentive focus and sensory integration. Examples from Hirst's general "Spin" series and "Spin Skull" series would often appear to present purposely irritating images. It has long been known that the inappropriate mix of visual shapes and colors can cause discomfort, headaches or even seizures. The juxtaposition of complementary colours and/or narrow stripes can have this effect. Hirst's choice of palette often mixes complementary colours which, thereby, stimulate visual discord and figure-ground confusion.

Debbie Ayles: "Jesmond Barn" (2003)

Hirst's work can be compared with that of Debbie Ayles. Ayles deliberately attempts to recreate the visual and sensory confusion she experiences during migraine headaches. Ayles's works can be examined in terms of the Fourier analysis of spatial and temporal visual stimuli. According to this analysis vertical stripes at the width to which we are most sensitive — three stripes per degree of the visual field, or three arms' lengths — are particularly annoying. The only comfortable position Ayles's painting can be observed from is when one's vantage is as close to the painting as possible. However, this position obscures the full visual expanse of the painting, and the work cannot be properly framed.

Paul Prudence: "Cyclotone (A Cyclotron for Sound)" (2012)

Controls over attention are competitive. In general, cortical, cognitive and sensory attentional competition can be described "top-down" and "bottom-up." While top-down attention tends toward unimodal or more selective forms of attention, bottom-up is multimodal and less selective. In addition, there is competition between internal and external forms of attentive awareness.

Many people in techno-culture might be said to be experiencing competitive confusion between and among sense modalities, as well as between external and internal orientations to visual digitation. This anxious condition is not unlike that of people with autism who are known to attempt to control their sensibilities and their attention through hyper-visual-focus on whirling objects like electric fans. There are numerous examples of this sort of entrainment in contemporary art. In the video "Cyclotone (A Cyclotron for Sound)" Paul Prudence utilizes a whirling vortex to inspire internal attentive absorption. However, the introduction of other visual elements like strobing flashes continually disrupt any attempt to formulate such attentive absorption.

Contemporary hyper-visual *panoptic* perception and conception

When we study the historical growth and development of orientations which have led to a hyper-visual techno-culture of surveillance, counter-surveillance and sous-surveillance, Jeremy Bentham's (1748/1832) well-known design for a "Panopticon" can serve as a principal sign. The Panopticon is a type of institutional building which was first designed by the English philosopher and social theorist in the late eighteenth-century. Bentham's basic concept involved the creation of a structure whereby an observer can survey all those incarcerated in an institution without the observed being able to sense whether or not they are being watched. His basic design consisted of a circular structure with an "inspection house" (or tower) at the centre from which managers or staff are able to watch any and all sequestered in cells around the perimeter. Bentham conceived this architectural plan as being appropriate for hospitals, schools, poorhouses, daycares, and insane asylums, but he devoted most of his efforts to developing a panoptic prison.

Bentham defined and described the "Panopticon" as "a new mode of

obtaining power of mind over mind, in a quantity hitherto without example."[8] While Bentham's initial model was never constructed, this so-called "utilitarian" concept became a pervasive model throughout the advance of 19th and 20th-century techno-culture, and it persists into the 21st-century. Dozens of contemporary institutions have been built using Bentham's surveillance architecture and ideology.

Often neuro-typical people, as well as people with autism, are oriented 'panoptically.' Researchers (Samson, et al., 2011/2012; Moffitt, 2011) have confirmed that such people are likely to concentrate more brain resources in neurological areas associated with visual detection and identification and less in areas used to plan and control thoughts and actions. That is, less in areas involving language competency.[9]

The AlloSphere

We continue to see a general sort of panoptical approach to sensory orientation and disorientation in many contemporary transdisciplinary designs and applications. These are often related to virtual holism rather than organic. The AlloSphere at the University of California, Santa Barbara, is a prime example. Celebrated as one of the largest immersive scientific instruments in the world, it is supposedly designed to marry science with art. AlloSphere applications involve medicine, education, green technology, computers and networking, nanotechnology, physics, materials science, geography, remote sensing, audiovisual technologies and the arts, as well as research into human perception, cognition and behaviour.

8. Retrieved from: http://panoptic.askdefine.com/

9. People are generally acquainted with Stephen Wiltshire, who has been dubbed "the human camera." Wiltshire, an artist with autism, drew a detailed 7 square-mile area of London from memory after a 20 minute helicopter flight over the city. In five days, Wiltshire also drew hundreds of London's buildings in precise scale over a 13ft. long curved canvas. There are also numerous examples of such circumspection in other artistic representations. Some associate it directly with the individual and corporate psychological and sociological tendencies of fascist and neo-fascist extremism. For example, while Renato Bertelli's 1933 panoptical ceramic bust of Mussolini models a continuous, circular profile, Pascal Häusermann's "Panoptical Portrait" (2012) is discontinuous and represents the combined features of a number of contemporary European right-wing leaders.

The main protagonist of the AlloSphere, JoAnn Kuchera-Morin, has explained that the AlloSphere can be compared to a digital microscope with access to a supercomputer. In other words, despite the fact it is attempting to model analog aspects of reality, the AlloSphere actually provides 'hypersensory' perception about digital, virtual states of awareness. Hence it is hyper-visual, hyper-audile-tactile but hypo-sensory where sensory integration is concerned, and, therefore, if one accepts that personal experience and interpretation are closely associated, it is perceptually and conceptually challenged.

Up to twenty researchers can stand on a bridge located across the centre of a spherical construction which is much like a large mechanical eyeball. These can then be collectively immersed in multidimensional digital visual and auditory information. Such immersion can be likened to the experience in chambers designed for sensory overload and/or sensory deprivation. The virtual projections and auditory stimulations in the AlloSphere visually and sonically magnify miniscule data so that researchers can better analyze it to find new patterns.

Enthusiasts say that AlloSphere researchers and visitors can experience what it is like to be inside an atom while watching electrons spin, what it is like to fly through a human brain cortex while viewing brain tissue as a landscape, or what it is like to hear blood density levels as a form of new music, et cetera. These are preposterous interpretive assumptions, although somewhat helpful for educational purposes. However, the sensory and experiential biases formulated by such education are not conducive to the development of realistic comprehension and communication. Instead, it actually extends the hyper-visual problems involving sensory orientation into an all-encompassing state of digital reality and irreality or a totalizing virtual hypo-sensory experience. Such distortion does not seem to be consciously realized, nor does it seem to be taken into usual consideration by adult staff and participants — at least there is no mention regarding hyper-visual digital and/or hypo-auditory digital distortion.

Ryan Griffin: "Sensory Deprivation/S(t)imulation Facility" (2012)

In addition to the incorporation of the traditional panoptical vision in architectural design, there is a notable shift toward design which is directly related to sensory disintegration and sensory deprivation both in terms of form and content. Contrary to the apparent focus of the scientists at the

Allosphere, Ryan Griffin (Griffin, 2013) has designed a medical facility, *"The Sensory Deprivation/S(t)imulation Facility,"* designated especially for the correction of hyper-sensory digital and other distortion. Griffin's student designs also furnish an example of the kind of visual perception, conception and logical/illogical thinking that can be observed among many in younger generations.

According to Griffin, his publicly-funded, private facility for social rehabilitation would replace the need for the growing incarceration of miscreants, as well as provide the necessary rehabilitation for others with problematic sensory integration due to hyper-stimulation. The facility, isolated from a main prison, would serve as an instrument for neurological research specifically involving the control of sensory input and deprivation. Griffin purports that any pertinent discoveries could be used to treat prisoners and others with prescribed sensory experiences.

In a triangular layout within a transparent, smart-glass architectural envelope, Griffin arranges three panoptical observation towers. These are twisted together. They can be accessed by institutional professionals from their operations at the base of the tortuous structures. Around these shafts are distributed so-called "wandering spaces" or corridors which are purposely designed to deter any central reference point for any particular sensory orientation. Then, the architect specifies, structures for sensory deprivation tanks, float tanks or sensory s(t)imulation tanks are constructed in the spaces around the "wandering spaces."

In theory, Griffin, proposes that such float tanks would serve "to deprive the senses [of prisoners and other citizens] in an acute manner." Then, after such deprivation experiences subjects would perambulate through the wandering paths in order to help them sustain the supposedly positive effects of their experience. Whether accessed before or after this radical therapy, these paths would help to "filter out the subject's psyche and remove sensory stimulation." In addition, these would vibrate and resonate in order to acoustically "blend and morph... levels of open[ness]/closeness, hardness/softness, and being [a]live and dead..." [**see page xx]

Sara Shafeie (with Ben Cowd and Thomas Hopkins): "Mosque of the Sun II: Crown of Doha" (2012)

Griffin's approach to contemporary digital design is not unique. In fact, it is common to many trends in current architectural design. For example,

the seasoned architectural genius of Sara Shafeie and her design partners has evidently been inspired by some of the same digital, hyper-visual examples of sensory experience. In an aerial model of Shafeie's "*Mosque of the Sun*," Bentham's panoptical design can be seen as it radiates out over the whole expanse of the design field.

Techno-cultural analog and digital dyslexia and autism

Anita Dube

Many genetic psycho-physiological conditions are determined to be practical or impractical depending upon their cultural context. A dyslexic condition[11], for example, is beneficial for aboriginal survival in, say, shifting snow-bound territorialities and/or densely-forested regions where nature's signs must be read from all perceptual orientations. Some populists (Eide & Eide, 2011) maintain that in techno-culture it may be an advantage to be dyslexic, or to cultivate a dyslexic sensibility, or, at the very least, to celebrate personal and general "neurodiversity." Similarly, while it was first thought to be a techno-cultural boon for individuals with ADD or ADHD, who were thought to be more proficient at "multi-tasking" computational skills, now journalists and others (Ophira, Nass, & Wagner, 2009) often despair over experiential states involving chronic, compound distraction. Of course, all such diagnostic attributes, whether genetic or acquired, involve problems with attentive focus and sensory integration. Moreover, they do not lead to a particularly loquacious conversational environment, finely fraught with subtle poetic ambiguity and richly-nuanced referential idioms. Instead, the tendency is for the techno-cultural individual, whether neuro-typical or not, to become more and more isolated, less and less understood, and, consequently, more stressed, anxious and depressed. Many studies (Becker, 2013; Primack et al., 2008) have suggested that the more depressed, anxious, misunderstood and isolated an individual, the more often that individual is likely to access "hyper-visual" media and environments. Consequently, heavy

11. *Dyslexia:* broadly, a learning disability impairing verbal fluency, accuracy, reading ability, phonological awareness, phonological decoding, processing speed, spelling, auditory short-term memory, language skill, verbal comprehension, often accompanied with the inability to summon verbal concepts, to name or to speak rapidly.

media users appear to have fewer and fewer face-to-face communications, as well as less and less eye contact. It is no coincidence that people on the autistic spectrum, who demonstrate similar behaviours, are particularly fluent with regard to media literacy and internet communications.

Perhaps it is because behaviour associated with Dyslexia, ADD, ADHD and the autistic spectrum has become mainstream, the form and content of many contemporary artists' works often depict dyslexic conditions and sensibilities. Several of the more prominent of these artists are Anita Dube and Charles Sandison. Anita Dube's work has been especially perceptive regarding cultural and techno-cultural issues involving visual and verbal communications. Dube calls her celebrated 1997 installation, "*Causes for Territorial Dispute,*" an "eye installation." In this Dube affixes patterns of supernumerary black, white and flesh-colored "eye balls" onto white gallery walls. These ceramic eyes are industrially-produced and can be commonly found on Hindu devotional statues. For Dube they symbolically refer to newly immerging socio-cultural and political-economic conflicts due to the growing techno-cultural facilitation of visual media such as satellite surveillance technologies.

Some of Dube's most emblematic photographs, the "*Sea Creature*" series (2000), either reproduce an image of a single pair of hands, or of repetitious images of hands, open and fanned together, with one large votive eye ball, among many smaller, centred on each palm. When these works are considered in light of the current research involving the essential coordination of visual and haptic sensibility, its interpretive meaning is amplified, and, more so, when it is applied to an aesthetic philosophy. Given Dube's penchant for trenchant techno-cultural critique, it would appear that she sees the current comprehension of techno-culture as myopic or snow-blind – with eyes wide-shut – when she would prefer to open sensibility toward greater sensory and socio-cultural introspection and inclusion. In the case of these photographs, she attempts to educate others to conscious awareness of the intrinsic relationship between the visual and haptic embodiment.

Anita Dube's sculptures often specifically involve depictions of techno-cultural dyslexia. Her "*Seven Deadly Sins (of Capitalism)*" (2010) presents large sculptural constructions approximately ten-feet high or square. In these, wire, elegantly furled within black-velvet couture, flow cursively into a thick dyslexic maze of the following words: "Abjection," "Corruption," "Violence," "Pornography," "Pride," "Poverty," and "Complicity." Dube seems to be suggesting that the illegible or blurred aspects of techno-culture ethics and moral responsibility are part of the currency, digital and other, of late capitalism.

Similarly, in another installation, "*Labyrinth*" (2011-2012), Dube entangles five layers of curlicue wire to reproduce the words of Pier Pasolini's poem, "The Poetry of the Tradition." In this poem Pasolini lamented the nonchalance of youth who remain unaware of history and tradition. Given the dyslexic illegibility of Dube's structure, Dube's representation would appear to go further than Pasolini and suggest the obsolescence of any notion regarding traditional historic and cultural forms of general literacy.[12]

Charles Sandison

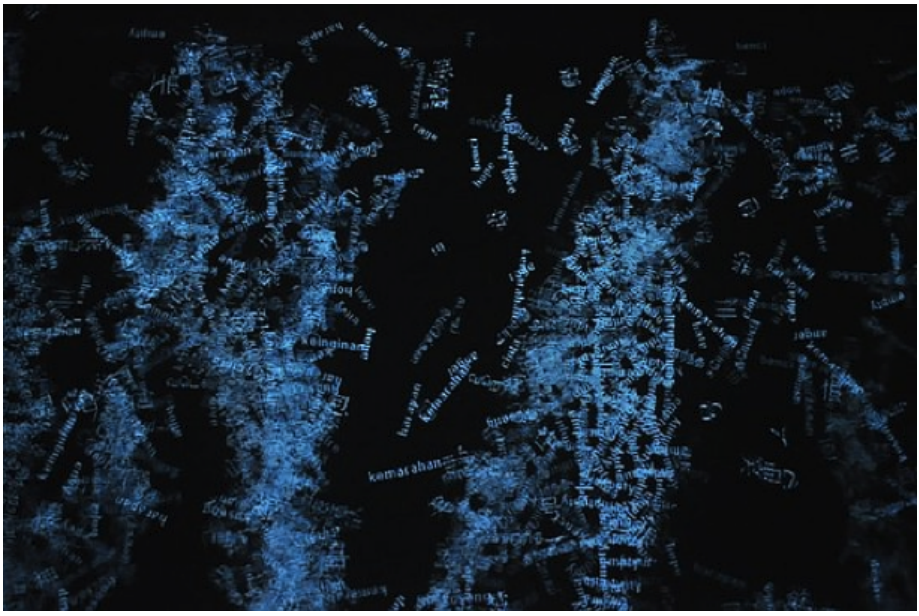
Charles Sandison is chief among the forefront of artists currently working with the aesthetic status of data signification in techno-culture. His work takes inspiration from and directly resembles secular graffiti. Norman Mailer, in his essay "The Faith of Graffiti" (Esquire, May, 1974), boldly suggested, despite conventional belief to the opposite, that there may be some sort of meaning, individual and cultural, in the reinforced concrete and asphalt-jungle of spray-can-jargon-aphasia generated by inner-city youth. Little did Mailer know that whatever the faith or meaning of graffiti, and whatever the artistic aesthetics of such might be, graffiti art would soon become a major techno-cultural form of artistic expression. Despite, or because of this, Sandison displays this faith in high-tech spectral phantasmagorias that might be said to rival *The Book of Kells* (c. 800 AD). The video projections of Sandison's immersive data installations place the individual, the crowd and the environment into an augmented irreality, into a perfect semiotic storm of visual signs and symbols. Prime examples of his mastery of dyslexic data aesthetics, as well as premonitions of the imminent experience of augmented reality computation, can be observed in Sandison's projections at Hämeenlinna Art Museum (2011) and "*Terrestrial Echo of Solar Storms*" (Grande Manege, Moscow, 2013).

Another of Sandison's works, "*Zur Farbenlehre (Data for a Theory of Color)*" (2010), projects a haphazard grid of overlapping words in various colours. This work can be loosely compared to the fMRI illustrations of brain areas involving vision and language in the "continuous semantic space" as mentioned above. Sandison would appear to be illustrating techno-cultural synaesthetic ordinations and coordinations. However, Sandison's work does not represent sensible analog, neurological coordinates but is as vigorously scattershot as

12. Dube's "Labyrinth" can be directly compared to a work of art by an autist, Dan Miller, as reproduced on an internet blog which also features an informative if not exhaustive catalog of artists working directly with language forms and concepts.

spent paint balls in a paintball emporium. Despite the beauty of its creation, it more authentically describes the indecipherable hermeneutics of a hyper-visual dyslexic night world in constant anxious flux and flow.

Image 2: Charles Sandison: "*Language as a Mirror of the World*" (Singapore Biennale, 2011)

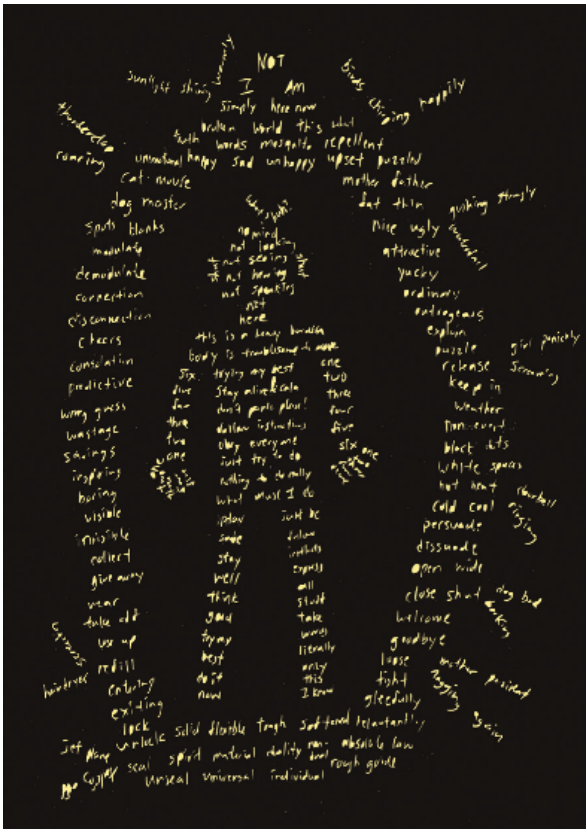


Similarly, Sandison's installation "*Language as a Mirror of the World*" (Singapore Biennale, 2011), depicts luminous, flowing projections of words for various emotions as these are found in the four official languages of Singapore. These stream like dreams of a universal language undergoing perpetual sea-change.

Sandison's work implies that the entire techno-acculturated world is now encapsulated in the derelict perseverations of a digital data delirium inscribing ZERO/SUM GRAFFITI WRIT LARGE. And his work might be considered, most emphatically, a vain-glorious hyper-visual transmogrification of traditional signs and symbols into a techno-culture-wide holistic, miasmal migraine. Such dazzling displays of digital pyro-technics seem to require an all or nothing reinterpretation of the social order of general linguistics and language phenomenology. In other words, artists and others like Sandison might be said to be illustrating the current techno-cultural oxymoron of verbal speech where language means everything and it means nothing because it

provides an inadequate sensory template for comprehending and communicating techno-cultural reality and irreality.

Image 3: Eric Chen: "Mirror Mind poster 3" (2005) Work by an artist with autism.



Finally, some aspects of Sandison's installations are not unlike the work of various artists with autism who are intent upon communicating their hyper-visual, verbal experience. Two of these works are particularly telling. One, by Eric Chen, "*Mirror Mind poster 3*" (2005), depicts a humanoid form constructed from and surrounded by disconnected, decontextualized words. Tellingly, too, a second, anonymous work (no longer available for illustration) presents a "self-portrait" behind the prison bars of what the artist designates as the "*The Autism Asylum*." Over the course of the visual field above the artists' self-portrait scrawl various verbal expressions in multi-coloured chalk. Both of

these works suggest that the inability to communicate verbally in neuro-typical ways can create the dissociational sensibility and the nonsense of mad-house incarceration. Beneath the self-portrait and script of "*The Autism Asylum*" reads the caption: "GRAFFITI ON THIS WALL PROHIBITED."

Conclusion

Under current techno-cultural conditions, it is necessary to emphasize that psycho-physiological conditions involving learning disabilities are most often the result of a genetic etiology, and that most of these underlying genetic causes and conditions have not been essentially or fully comprehended. There is a crucial distinction between a genetic etiology and techno-cultural causation. Unfortunately, the more our personal and social behaviour is dictated by habitual immersion in hyper-visual techno-cultural experience, the more difficult it is and will be for proper diagnosis and treatment of dysfunctional psycho-physiological conditions involving language and other behaviour. It is lamentable that younger generations are tending to exhibit more and more problematic behaviours while being conditioned and expected to orient themselves further in sensory distortion.

While it is clear to most of the medical and pedagogical professionals concerned that there are a growing number of people diagnosed with learning disabilities, such conditions and problems cannot be entirely related to experience with telecommunications media, but also to other environmental aspects. When acquired environmental behaviours are treated psycho-pharmacologically it is often to greater detriment because such treatment masks the true nature of negative environmental developments. Such treatment, inadvertently, is more often directed toward greater psychological, physiological and sociological compatibility to and with computational instrumentation than to environmental realities. Paradoxically, our telecommunications technologies are both techno-cultural orienting and contextualizing as well as personally and socially disorienting and decontextualizing.

Since the human corpus is implicitly and explicitly an organic, analog, verbal construct living in a direct textual relationship with greater nature, if learned, adaptive, behavioural problems due to hyper-visual digitation are not addressed there will be more and more psycho-physiological distortion and dissociation. It is therefore recommended that digital bias can be partially addressed and ameliorated when more pedagogical attention is focused upon analog orientation in terms of acquiring language skills and competency.

sensorial appreciation may be comprehended by the general population, as well as articulated by artists, scientists and, in this context, by multi-disciplinarians concerned with articulating aesthetics, neuro-aesthetics and the aesthetics of digital media.

* While recent neurological discoveries are discussed, it is important to mention pertinent past neurological discoveries involving Broadmann's areas 39 and 40 where sensory integration and verbal intellection are concerned. Korbinian Broadmann (1868-1918) numbered fifty-two areas of the brain according to the morphological similarity of various nerve cells. While structure generally dictates function, there can be a strong but not complete overlap. Specific functions in Broadmann's areas 39 and 40 are often harnessed together in mutual service. They are found in the neocortical portion of the cerebral cortex where we find the facilitation of the higher intellectual processes, which include the refinement of selfhood and cultural behaviour.

Since most of a particular culture's social rules are inhibitory, problems in the frontal lobes of the neocortex, where we find motor and inhibition functions, are reflected as social problems. Semantic meanings and syntactic grammars reflect similar social motor and inhibitory facilitation and functionality. Areas 39 and 40 are directly involved with intelligence of such rules and regulations.

Broadmann's area 39 (the angular gyrus) and area 40 (the supramarginal gyrus) are tertiary association areas. They receive visual, auditory and tactile stimuli from the secondary areas. They are capable of forming cross-modal sensory associations which allow for the linkage of sensory inputs (as in simile, metaphor, analogy and metonymy, not to mention the dynamics of specific grammars) in order to apply words regarding the definition and description of specific and general experience. Lesions in area 39 result in alexia (the loss of reading and interpretive ability), agraphia (the loss of the ability to imitate or copy), left-right confusion (confused bilateral symmetry), and finger agnosia (the inability to identify precise touch when the eyes are closed). Lesions to area 40 result in aphasia (deficits in understanding and expressing verbal thought). Both areas are involved with higher-level, complex comprehension and verbal reasoning, as well as with the ability to decipher graphic symbols of all kinds.

** *Ataxia:* Inappropriate sensory integration and attention is not limited to problems in abstract and concrete experience but also in executive decision-making as well as in top-down and bottom-up active physical behavior. There are two areas of growing medical concern which are directly related to ataxia or the severe lack of sensory and muscle coordination. In sports there is a growing epidemic of young athletes who are injured because they are unable to coordinate their muscular behaviors with proper transition, coordination and fluidity -- for example, when landing a flip off of a pommel horse. Moreover, children are losing the ability to produce cursive writing skills. The most dynamic of all muscle coordination is that involved with vision and the muscular dynamics of hand-eye and other physical spatial-temporal coordination. In both athletic and calligraphic examples, essential holistic decision-making regarding visual coordination, transition, connection, follow-through and flow is disrupted. A child attempting to write long-hand is challenged to visually focus, engage attention and keep a writing instrument directly on a page for continuous motion. The child has learned to act dissociatively, disconnectedly, and percussively, as if punching random, disconnected keys or buttons on a computer or cell phone.

A graphic designer's attempt to visually illustrate the condition of ataxic perception and conception can be seen here: "*Ataxia.*" These computer-generated designs closely resemble the designs of Ryan Griffin's "Sensory Deprivation/S(t)imulation Facility."

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