Consequences of Increments in Cognitive Structure for Attentional Automatization, the Experience of Boredom, and Engagement in Egocentric, Hyperdynamic, Interest-Generating Behaviors: A Developmental Psychophysiologic Approach

Augustin de la Peña, PhD

Center for the Study of Boredom, Interest, and Entertainment
7032 N. 5th Street; McAllen, Texas, USA
adelapena@Center for the Study of Boredom, Interest, and Entertainment.org

Abstract

Major claims: (1) the set of assumptions shaping the beliefs and behavior of the majority of Westerners are invalid, being synthesized from an obsolete set of assumptions culled from 17th century scientific and philosophical thought (2) uncritical acceptance of the orthodox Western paradigm by the majority of Westerners over the past millennia has brought man and the planet to its current state of ecological unsustainability and to crises on political, economic, social, and spiritual fronts, and (3) the trajectory of the current crises can be deflected by Western man's adherence to a more valid paradigm synthesized from core premises of perceptual-cognitive developmental psychology and psychophysiology conjoined to the core assumptions of systems, information, and control theory.

Traditional analyses of etiologic and modulating factors in the development and expression of "crises" of all stripes--ecological, economic, political, social, etc.--have almost invariably attributed the greatest agency or weight in the development of the crises to (1) the "evils" of this or that economic or political system, political party, group of people perceived to be "different," "subhuman," or uncivilized, and/or terroristic (2) a dysfunctional personality structure and behaviors running through homo sapiens (viz., man, particularly those of a different culture or set of beliefs, is inherently greedy, egocentric/self-serving, psychopathic, narcissistic, paranoid, sadistic, cruel, etc.), and/or (3) to *interactions* of these variables with each other (i.e, capitalism further reinforces man's innate dysfunctional personality structure and behaviors).

This paper argues that the traditional analyses have focused on factors that are in fact *secondary* or derivative effects of a more fundamental dynamic entailing an interaction of several fundamental factors, namely (1) the developmental level of man's/a culture's knowledge system and capacity for analytic, abstract thought, which itself modulates a broad array of crises-modulating parameters, including man's immense capacity for perceptual/attentional "habituation" or "automatization," his erroneous perception of himself as "separate" from all other parts of his external environment, including from his own well-buried internal nurturing feelings of connection to the world, his predispostion to experience boredom when engaged in everyday, frequently experienced sensory enviroments and/or frequently-performed habitual motor behaviors, and (2) man's always-growing need to *deautomatize perception/attention* (i.e., mitigate boredom/introduce interest) through either engaging in mobile, hostile, and/or violent-injurious behaviors, and/or by contributing new, creative physical and psychological structures that provide relief from personal boredom, and which eventually add to the culture's cultrual advance. The bulk of my paper will involve presentation of a set of observations and data that support the idea that man's knowledge system and the habituation/automatization of perception/attention fostered by the level of development of the knowledge base, is a major determiner of the level of man's boredom experience when engaged in routine, everyday, enviroments and motor activities, which in turn is at once the major driver of man's most heinous and inhumane crimes against man and the planet's fauna and flora, and simultaneously of the glorious creative thought and behaviors that comprise and spur man's cultural advance.

Increments in experience/knowledge, the generation of boredom experience, and the generation of cultural or planetary crises, followed by innovations that mitigate/solve the crises are viewed as forming a "unitary system," the "crises" serving to foster increasing innovation in knowledge development, heretofore primarily along technological lines, and now finally nessitating *development along psychological* lines as well. The greater the knowlege base of any cognizing system, the greater its need to avoid boredom through the conscious and unconcious creation of "crises", which serve a functional de-automatizing, boredom-mitigating, interest-generating, novelty-generating function for the highly developed structure, the new develpments themselves eventually generating intended and unintended "side-effects," which often spur new threats/crises to the sustainability of given structures, which generates new knowledge and experience that is added to the knowledge base of the structure, which eventually promotes "boredom" to old structures, which in turn generates new dangerous crises, and so on, in an always accelerating dynamic of new knowledge effecting increased boredom, which effects dysfunctional and/or creative behaviors to mitigate the increased boredom, which generate new crises, which in the solving, invaribly generates new unintended crises, which call into play new solutions, etc. etc. A few examples from the real world: the invention of the automobile, television, computer, phone, cell phone, etc. Each innovation plays a role in generating new crises, which in the solving, adds to man's expereintial/knowledge base, but also contribute to atmospheric, noise, and other kinds of pollution of various types of "environment." .

My developmental psychophysiologic approach will be seen to have considerable explanatory power in describing contemporary trends in the mores of the normative Western adult and in Western culture broadly considered, including the ascendance of the entertainment industry, trends in media programming, and the difficulty of brokering long-lasting peaceful coexistence among individuals and nation-states (conflict and drama are much

more interesting/entertaining/less boring than peace and cooperation). The paper concludes with a survey of methodologies employed by the author and other researchers in the empirical study of attentional automatization, boredom experience, behavioral dynamicity, and the egocentric/narcissistic/psychopathic personality styles and structures underlying destructive and/or exploitative behaviors.

Keywords: knowledge, automatization, boredom, development, psychophysiology, egocentric/narcissistic behavior

Introduction

Traditionally, analyses of etiologic/modulating factors in the burgeoning planetary multi-pronged crises have attributed the crises to faulty economic-political systems and/or individual/societal dysfunctional "personality" characteristics. For example, the economic system of capitalism and the individual greed, egocentrism/self-immersion, psychopathy, and narcissism assumed to be fostered by capitalism are favorite culprits in traditional analyses of ecological erosion and destruction. This paper posits that the traditional foils/whipping boys of conventional analyses are *de facto* "secondary effects" of a more fundamental phenomenon-- *increments in experience/knowledge* among individuals and societies, which invariably effects increments in "attentional/perceptual automatization" in individuals, the phenomenologic sequela of which is the experience of boredom. In turn, increasingly sophisticated, bored structures/systems subsequently attempt to mitigate their boredom experience by engaging in high-impact hyperdynamic, destructive, or injurious behaviors. Increments in knowledge/cognitive capacity can easily be seen to be the primary culprit in current contemporary crises along many fronts. For example, it is patently impossible for individuals who have *very low levels* of cognitive/linguistic development (e.g., the infant, the primitive, the mental retardate, the Alzheimer's patient, and other cognitively-memorially compromised individuals to invent a gasoline-powered automobile or airplane, computer, traditional desk telephone and cell phone (which ultimately increase the air pollution of the planet's atmosphere and the noise pollution of everyday environments), hold a political grudge across centuries, plan an intricate terrorist attack against "the enemy," plan and carryout deforestation of a forest for financial profit, entertain the idea of dominion and superiority over the planet's non-human fauna and flora, etc.

Prior analyses of the crises that confront comtemporay man and the planet have failed to see that the crises are in large part the direct result of man's always incrementing knowlede base, which when engaged in everyday, habitual sensory environments or activities expereinces "boredom," which not-infrequently fosters the development or invention of new gadgets or services that are adopted by the culture because they help to mitigate boredom. But all innovation comes at a price. The automobile brought pizzaz to the West and speeded up the physical transport of people over geographic distances, but also effected air pollution. The television astonished in bringing entertainment into the living room, but ultimately weakened the fiber of the family-the family gathered around the dinner table. It also encouraged passive watching, and diminished the need for active imaginative thought. The computer speeded up the processing of information and enabled much-improved word processing capabilities, but brought with it the problems of increasing solitariness for many individuals, as well as an increase in injuries of the wrists and hands. The development of the cell phone brought increasing communication for the normative peripatetic Westerner, and thus a decrease in loneliness for many, but effected the problem of noise pollution and inane conversations that we all must now endure at the bookstore, grocery store, doctor's office, and anywhere else people feel lonely/bored and get on the phone to re-effect a sense of connection to the larger world.

All of the new problems and crises emanating as unintended "side effects" of the aforementioned new technical developments, themselves foster the incrementing of new research and knowledge development, which in turn invariably will effect a unique set of crises that themselves will foster innovation and the incrementing of knowledge. The proliferation of terrorists and the events of "9/11" will speed up technologic and psychological advances in counterterrorism. Global warming may create the crisis of increasingly intense hurricane seasons, but will also provide sights and sounds that thrill and mitigate boredom, as well as foster the development of atmospheric science, as the latter field explores new ways of predicting and controlling hurricanes and other natural disasters. In my view, then, increments in knowledge accrual is always a double-edged sword, and *always* generates "new crises." Increments in the knowledge base of a structure/system of structures and the generation of crises thus go hand in hand, forming a unitary system that continues to effect more dangerous crises as knowledge continues its inexorable growth/incrementing for any cognizing/living structure in nature, including collectives of structures/systems.

All innovation and cultural development, as well as the generation of all "crises" depends on the development of a *relatively high level* of cognitive, memorial, and/or linguistic structure that enables conceptual differentiation of "self" from "non-self," and an "in-group" of "friends and allies" from an "out-group" of "enemies." If the world were comprised exclusively of human infants, non-humans, lower animals, mental retardates, and the cognitively/memory-impaired, our current ecological, economic, and political crises would not be be very far along or as potentially genocidal as they are today. Our fast-paced western world of automobiles, telephones, television, airplanes, books, weapons of mass destruction, continuing developments in the arts and sciences, proleration of handheld diversions such as the BlackBerry and the video iPod, and always-brewing conflicts/wars between individuals and nation-states has come into being owing to gradual increments in knowledge/experience and the correlative cognitive capacity to differentiate "self" from "non-self," and "friend" from "foe." Without increments in knowledge/technological development, the world be a relatively quiet, peaceful, relatively static, soporofic, and even "boring" place for the normative contemporary Western adult whose normative stance on most things is "more"--more stimulation, money, sex, power, house, car, posessions, exercise, learning, etc, owing to a relatively high level of development of cognitive structure, the effect of which is the simultaneous process of an incrementing capacity to organize, predict, and thus *reduce* the "intensity" of experience.

In this paper, I take the reader through a series of observations and arguments that prior analyses of etiological and modulating factors in the current many-headed crises have ostensibly overlooked. That is, adherence to and employment of the obsolete Western paradigm effects the impossibility of acknowledging the validity of the claim that increments in cognitive structure and of its phenomenologic sequela of boredom are prepotent factors in development, evolution, and behavior, and especially in the many-pronged crises currently confronting the planet. If I can be lucid in the exposition of my paradigm's main assumptions and premises, the reader will be able to acknowledge the more fundamental factors that have brought man and

the environment to its current perch of unsustainability, and to recognize that the trajectory-speed of the multi-pronged, interdependent crises is accelerating with each passing second of inexorable knowledge generation. The major culprits in the looming interlaced ecological, economic, and political disasters are seen not to be "external" to individuals, nor in the main a result of our conditioning by environmental factors and/or man-made social or economic systems, but rather part of the woof and warp of the fundamental fabric of our being, man's always-growing *knowledge system*. Increments in knowledge accrual are conceptualized to be a fundamental core of our identity as living/cognizing systems, involving nothing less than the continuing incrementing/development of our always-growing capacity for analytic thought/cerebration, as well as increasing boredom when our habitual sensory environments and activities become automaztized by incresingly sophisticated knowledge systems and no longer provide a sufficient level of conflict, challenge, or interest/entertainment.

Relatively Unexamined Core Premises of the Orthodox Western Paradigm

Every culture has a central set of ideas that mold the spirit and behavior of the culture. This set of ideas is assumed and proffered by the culture as containing unambiguous and certain truths about reality, and the culture's place in that reality. Detailed critiques of the major assumptions of what I am here labeling the received "Western Paradigm" have been provided elsewhere (de la Peña, 1982, 1983; de la Peña, 2006, under review), as well as by trenchant analyses provided in the work of well-known holistic/system's thinkers such as Charles Tart, Willis Harman, Fritjov Capra, Larry Dossey, KenWilbur, Ervin Laszlo, to name a few). Owing to space/word limits of this paper, I will focus only on those premises of the Western paradigm that to my mind have received comparatively little recognition even from these ecologically-minded/concerned "systems" thinkers. Fundamental premises and concepts such as the nature of space-time, "self," "the individual," "information," "system," etc., must of necessity be omitted, not only owing to the limited space/word count of an annual meeting paper presentation, but because brilliant elaborations of these fundamental concepts have already been provided by several critics of the received Western paradigm. In providing an exposition of my major ideas and hypotheses, I will only only reference studies or writings that are essential to the train of my main arguments. In honor of the 50th anniversary of the founding of the ISSS, I will especially quote heavily from the writings of Ludwig von Bertalanffy, arguably *the* principal architect of General Systems Theory, whose writings have been seminally formative of my perspectives and conceptualizations about a broad array of phenomena.

Premise 1. The idea of progress holds that mankind has advanced in the past from some initial condition of primitiveness, barbarism, or even nullity-is now advancing, and will continue to advance through the foreseeable fuutre. This advance or development is assumed to occur primarly through the slow, gradual, and cumulative accrual of knowledge--especially the "objective" knowledge emanating from developments in science/ technology. Increments in knowledge additionally are assumed to effect a gradual increment in man's moral or spiritual condition, his happiness, his freedom from the torments of nature and society, and above all, his serenity, peace, and tranquility. The latter effects are assumed to lead twoards the ever-greater perfection of human nature. The history of all that is greatest in the West--its sciences, freedom, equality, reason, justice, art, and philosophy, etc.,--is grounded deeply in the belief that what one does in one's own time is at once a tribute to the greatness and indispensability of the past and its derived knowledge, and confidence in an ever more golden future partneership of man and knowledge (Nisbet, 1980).

To be sure, there have been in the past, there are now, and there will awalys be those who believe that the two aforementioned propositions have an *inverse* relation to one another. That is, realization of spiritual bliss and moral perfection demands not achievement or increase in knowledge of world and man, but *repudiation* of such knowledge. *To know is to to sin*, or to lay the foundations of sin, e.g., the ancient Greek legend of Pandora's box, the Jews and their pristine garden, an originally innocent Adam and Eve, and then through their insatiable desire to know, the Fall from grace and subsequent displacement from the paradise of Eden.

While the premise of "progress through gradual increments in knowledge" continues to shape the beliefs and behavior of most Westerners, there are signs, particularly in the past half-century, that more and more people are jumping off the good ship Progress's cheering squad. Books such as Gunther Stent's Paradoxes of Progress (1978), Arthur Herman's The Idea of Decline in Western History (1997), and John Horgan's The End of Science (1996) have chronicled the growing skepticism among lay people and thinkers/academics about the purported monolithic character of progress.

Less well-known is Ludwig von Bertalanffy's perspective of the Western paradigm's assumption of monolithic progress through increments in scientific/technological development. In Robots, Men and Minds: Psychology in the Modern World (1967), von Bertalanffy articulates a perspective of progress that puts him in the skeptic's camp. He notes that everyday experience and a bit of introspection point out an apparent *paradox* of contemporary Western life. Technological developments in the physical sciences have released human beings from tedious, mind-numbing tasks, given them increasing control over the vissitudes of nature, helped to eradicate certain kinds of illness and disease, and have provided an unprecedented amount of freedom and leisure time for an increasingly larger number of people in theWest . However, instead of monolithic progress toward a state of individual well-being, health, and realization of potential, as well as the continued discovery of marvels in technology, medicine, and society, von Bertalanffy observes contradictory developments: the possibility of nuclear annihilation; accelerated war and violence; distrust and paranoia toward self and society; an increasingly exploited, polluted, and overpopulated planet; a leisure society frantically involved in "staying busy" to help fight off chronic feelings of boredom, anxiety, depression, alienation, and spiritual dyspepsia; increasing rates of homicide, suicide, schizophrenia, autism, obesity, neurosis, behavioral hyperactivity/attention deficit disorder, alcoholism, stimulant drug use/ abuse, some types of cardiovascular disease and hypertension, and most forms of cancer.

He notes that at a time when advances in the physical sciences have given humankind mastery over many aspects of the environment, medicine and psychology continue to disappont. The inadequacies of current health care practice are obvious: increasing numbers of patients in specialty-dominated medicine, where physicians attend to and treat increasingly narrow parts of the patient's body while ignoring "side effects/collateral damage" effected by the specialized treatment(s), and also generally ignoring psychosocial factors in the etiology and/or modulation of disease. The result is the patient's shuffling off to another specialist visit toting an increasingly large bag of medications for yet another narrowly-defined treatment, possible "side-effects" of treatment(s) again rarely mentioned to the unsuspecting patient . Von Bertalanffy notes that while psychiatry is progressing as a discipline and a science, psychiatric patients continue to fill a major proportion of hospital beds. The long-term efficacy of psychotherapy and psychopharmcological treatments has yet to be demonstrated. Similarly, while medicine is spectacularly effective in the treamtment of traumatic structural damage and infectious disease, it is marginally, if at all, effective in treating chronic degenerative diseases and life style problems such as drug addiction, obesity, alcoholism, and stress-anxiety management. The predominant physically-expressed diseases of contemporary man, i.e., cancer, cardiovacular disease, and the various pain syndromes remain stubbornly resistant to traditional medical intervention.

Von Bertalanffy also proffers an analysis of what he considers as the fundamental problem of our times, an analysis that dovetails with the conceptualization proffered in this paper. Rather than regurgitating the usual mantra of the various evils/problems in the world articulated by most commentators and pundits, von Bertalanffy assigns the chief culprit role in ecologic and political nonsustainability to a far more subtle "enemy": increments in the development of *cognitive structure*, i.e., gradual increments in *experience/knowledge* over the eons of evolution, which have brought man to his current precarious perch atop looming ecological and political crises and catastrophies (von Bertalanffy, 1967, 44):

> ....man's original sin was precisely what the Bible says it was; eating from the tree of knowledge; that is, in modern parlance, *invention of symbolic universes*. This made man both
> better and worse than other species with their inbuilt drives and controls. This opened up his tremendous history from cave shelters to skyscrapers, from fetishm to Fredianism, from
> paleolithic painting to Pop Art. As already said, it did not change man's instinctual equipment. And man became the enormously dangerous beast he is precisely by the clash between instinctual
> and symbolic worlds, by using techniques of symbolic manipulation for aggression. Here again, the Bible is right. The first murder--Cain slaying Abel--was not a fratricide from instinctual
> drive; it was a fight about an unworkable altar--a symbolic artifice which would not work on Cain's part. For this reason--not because of instinctual sibling rivalry--Abel was slain by Cain.
> And from that moment to the present day mankind have slaughtered each other (and the environment) for unworkable altars; that is, for symbolic contraptions--nation, religion, dynasty,
> democracy, communism, whatever you want--created by man's so-called reason and lending a changing foil for that intergroup aggression which, without the symbolic superstructure,
> would have remained a comparatively harmless affair.

Premise 2. The perceptual process of the normative Western adult is *camera-like,* faithfully and accurately recording the discreet "bits and parts" of the world that are objectively "out there," "external" to the camera-like Western adult human perceptual apparatus and process.

This fundamental premise of the orthodox Western paradigm permeates most areas of contemporary discourse on a broad range of issues. Uncritical acceptance of the paradigm is particularly easy to see, for example, in the knowledge claims of the stress-management industry, the mantra of which is that society is massively "stressed" by the fast pace of life, the constant innovation, and the "torrent of sounds and images" emanating from an ever-growing, 24/7 media presence in our lives. The premise is held by virtually all behavioral scientists, who in collusion with unschooled, uninformed media "star" personages simply parrot the prevailing dictum of a Western society *overwhelmed and overstimulated*, about to fall apart owing to the the absence of quiet/down time, as well as that other assumed but equally fallacious societal bugaboo--"massive sleep deprivation" on the part of virtually everyone. The hackneyed and fallacious solution of the "experts": learn how to relax, find a quiet room, engage in deep breathing, take more time to relax, and get more sleep.

The validity of the orthodox Western view that Western society is massively overwhelmed by "stress" is easily challenged by a host of observations and data: Why do most people find exercise to be "relaxing"? Exercise *increases* physiological activation, the main factor that the conventional stress reduction prodecure/technique seeks to decrease. Why is it that some individuals become more anxious in response to the traditional stress-management interventions, most of which entail "getting away" from stimulation (Heide and Borkovec, 1983). A host of other conceptual inconsistencies for the received view of stress: Why do some people report that they relax most when engaged in extreme sports such as bungee jumping, hang-gliding, climbing mountains that they could easily fly over, canoeing or swimming great distances, and participating in long distance running marathons? How to account for the enormous popularity of the thrills and chills industry: riding roller coasters, watching horror and action movies. Why do many retirees , including major sports figures, unretire after a few days on the golf course? How to account for the enormous popularity of contact and dangerous sports, such as NasCar races, boxing, and any competitive game? For the popularity of game shows, crossword puzzles, and any form of mental or physical challenge? For the millions of people who watch the pain of the protagonists on their favorite Soaps, for the tens of millions who watch and volunteer for Reality Shows (wherein stress, personal degredation and humiliation are the prize, and provided in ample amounts)? For soldiers who re-enlist for the adrenalin rush of combat? For the incredible business of tourism (wherein what is sought are new perceptions and experiences)? Why do people in New York and other large dynamic, busy cities sign up in large numbers for long hours at high financial cost to be tied up, carried away, and roughed-up a bit? Why the increasing viewership for the most violent of TV shows and for the violence/carnage that is the major focus of the local and national news coverage?. The stress-management gurus/experts are curiously mute on these questions, and are never called on by members of the culture to explain these paradigm-inconsistent contemporary

phenomena.

Any student lucky enough to take college courses in the social and psychological sciences would be able to tell our stress gurus that peoples in other cultures have world outlooks and perceptions that are often very different from those of the normative Westerner. For example, some cultures lack the use of "nouns" in their language. Others have tens of words to differentiate different kinds of snow. For every term in English that describes a psycholgocal or experiential/psychological state/quality, there are four in Greek and forty in Sanskrit. From courses in comparative biology and psychology the college student would learn that the universes apprehended by non-human beings are very different from ours. Von Uexkull's (1929) classic and colorful description of the *Umwelt* or world view/experience of a starfish, a paramecium, a fly, a tick; Nagel's musings on "what it is like to be a bat," hightlighting the different qualities or "qualia" of experience for different organisms, -- all these examples point out that the experience of a given species is determined by the latter's organizational strucutre--in particular the structure of its receptor and effector organs, The human *Umwelt*--the world as we Westerners experience it--is seen to be only one of countless universes of ambient worlds and "world views," i.e., not the only "take" on the world, and, given the multiple crises generated by our world view, probably not the most accurate or adaptive. Gestalt psychology points out that the perception of the most commonplace objects--houses, tables, chairs, people-- is not the mere sum of sensation or of the "sense data" that Western philosophers are fond of describing. Rather, as described by Gestaltists, perception is comprised of gestalten (wholes) of sense data *plus* memory, concept formation, verbal and other symbolic elements, conditioning to suitable use of objects, and to many other factors. Literally hundreds of studies of perception made intentionally simple in the perception labooratory show that motivation and expected gratification modify what is perceived.

The phenomenological analysis of introspective psychology points out that we do not find a simple antithesis between "physical objects "outside" and myself "inside", but all sorts of intergradations. For example, in auditory experience, the "boundary" between "outside" and "inside" is inclear. Is Bach's *Air on the G String* an object in space, or does it belong to inner experience? Equally unclear is the spatial localization of sensations associated with our sense of smell and taste. Developmental psychology teaches us that the dualism of "external world" separate from "internal experience," self evident as it may appear, is in fact the outcome of a long process of phylogenetic and ontogenetic development/evolution. In the human neonate, the earliest stage in "mental" development is one where a difference or "boundary" between "outside world" and "separate self/ego" is not yet developed. Only slowly with acculturation and continuing development does the child learn to diffentiate "self" from "non-self," mainly aided by obstacles, hindrances, and challenges imposed by "outside objects or events" upon the child's activities.

Possibly the most obvious limitation of the camera model of perception is that it is fails to incorporate two of the most well-established principles of contemporary psychobiology: the related principles of *habituation* and *perceptual/attentional automatization*. The Western paradigm assumes erroneously that the camera-like human mind never tires or "habituates" to stimuli. The assumption is that the camera's response is the same on the first presentation of a stimulus as on the 5000th presentation. The related notion of the increasing economy/efficency of perception with increments in experience--one of the best-demonstrated phenomena in perception--additionally seems a foreign concept to those who have adopted the premises of the Western paradigm. If the camera (human perceptual process) never "habituates" or "automatizes," it is easy to see why virtually all Westerners equate "information overload" stress as the only "real"/valid form of stress, and why most adult Westerners appear completely oblivious/ ignorant of the existence and incredibly powerful agency of "boredom/understimulation stress."

As usual, these observations and "paradoxes" have not escaped von Bertalanffy: (1967, 10):

> The limitations of robot man (von Bertalanffy's term for the view of man as nothing but a bundle of conditioned associations of "stimulus" and "response") should be apparent. The
> S-R (Stimulus-Response) scheme discards a large part of behavior that is an expression of autonomous activity: play, exploratory activity, any form of creativity. Environmentalisn is
> refuted by the elementary fact that not even fruit flies or Pavlovian dogs are equal... The principle of equilibrium or tension reduction is refuted by the fact that the complete relaxation
> of tensions --say, sensory deprivation but even simple boredom--does not lead to a state of beautific nirvana but rather to mental disturbance; in the first case, to psychosis-like states,
> in the second to the experience of meaninglessness, sometimes culminating in existential neurosis and suicide. Juvenile delinquents who committ crime for fun, a novel psychopathology
> resulting from leisire, all of this is proof that the scheme of robot man doesn't work.

Premise 3: Man is essentially a skin-encapsulated ego/mind that is "separate" from his environment of things, other people, and objects. This belief is reinforced by orthodox Western education all the way from kindergarden through graduate school. The traditional Western education provides no courses that point out the absurdity of such a view, or as Colin Wilson has put it, that "everyday consciousness is a liar." Normative Western man goes through a lifetime of identifying with his narrow "thinking mind," and very rarely will encounter teachers or books that contradict this exceedingly narrow and erroneous view of a "separate self," isolated from all other structures in the universe. This topic is much too large to cover in this paper. It has been explicated by a host of spiritually-oriented writers (Wilber, Tart, Harman, Dossey, among others, most of whom point out the conceptual and expereintail backruptcy of such a view.

Habituation and Automatization: Two Major Related Concepts/Premises of the Developmental Psychophysiologic Approach

A complete listing and description of my developmental psychophysiologic approach is provided elsewhere (de la Peña, 1982, 1983; de la Peña, 2006, under review), and will not be replicated here. In this section I provide a conceptual skeleton of two central concepts/premises of my developmental systems approach to perception/reality, each of has been virtually ignored by other ontologies, including the orthodox Western paradigm. As will be demonstrated in this section, "habituation" and "perceptual/attentional automatization" are arguably two of contemporary psychobiology's most well-established constructs, the existence and agency of which is unequivocally supported by hundreds of empirical studies. The received Western paradigm competely ignores the existence of the two related phenomena, the result of which is the relative invalidity of the Western paradigm in explaining many of the main features of contemporary life in the modern West. Knowledge and understanding of the two premises effects very different conceptualizations of the fundamental problems for contemporary man, and the precarious, unsustainable state of his contemporary ecological, economic, social, and political systems.

"Habituation" refers to the fact that repeated presentations of a given stimulus elicit smaller and smaller physiologic/psychological responses, until a point is reached in which there is little or no response, at which point the percipient is construed to have "habituated" to the repeated stimulus. Increments in experience with stimulus congurations and contingencies are considered to build up "properties" in the percipient's mind/brain that serve to "make order" out of incoming sensory information. These "properties" are commonly termed "cognitive structure." The term cognitive structure is used herein in the sense used by various theorists, including Piaget ("schema"); Lawrence ("coding response"); Miller, Galanter, and Pribram ("plans"); and Neisser ("constructions"). These genetic and acquired structures "choose" which inputs of stimulus configurations and contingencies to process at a relatively high rate, and which at a relatively low rate (i.e., "to filter"). The development of cognitive structure converts the environmental situation *per se* into "stimuli," occasions for action or emotion, to which the organism responds in terms of "meaning." According to Neisser (1967), these structures, when activated, constitute the percipient's experience, perception being regarded as an active constructive or synthetic process.

In this view, "structures" need not be simple sensory analyzers, such as the one that signals the occurrence of a simple attribute like "green," nor do they need to be experientially concrete, such as the specific memory structure representing the face of a friend. The facts of cognition and memory argue for the proposition that such structures might be very abstract/schematic. Such schemas, which play a large part in the theories of cognitive psychologists are used by a percipient structure as a guide/rough outline for constructing an experience or a memory of some event with internally-provided content. According to Furst (1971), "schemas" suggest the operation of some high-level process that generates relatively unconscious "subprograms/sub-routines," and is more suggestive of a process than are unitary "trace" ideas. Accordingly, the concept of attention deals mainly with the selection of cognitive structures appropriate to a given environmental situation. An organism thrown into a novel situation will try to "make sense" or "organize" the situation. The percipient will succeed to the extent that it can relate the extant sensory information to existing cognitive structures--or rather, to the extent that he can activate a well-integrated set of structures that "models/matches" the sensory input. If the percipient is unsuccessful , it can still make sense of the novel situation by creating new, well-integrated schemata or "cognitive/mental models." When the need to form new cognitive models arises, a state of novelty or uncertainty obtains, which calls forth the activation of many previously unrelated bits and pieces of cognitive structure in an attempt to synthesize a new cognitive structure and thus reduce the uncerainty/novelty.

When the process of creating new cognitive structures is succesful, the result is the establishment of stable and wel-integrated schemata that are adequate for the situation, in that the structures provide good models into which incoming sensory data gets broken down. Thus an organism involved in creating new structures/models is sampling *sensory* information at a relatively *high* rate because the lack of cognitive structure results in inefficiency in gathering the sensory data needed for the immediate perceptual task, and because the percipient must construct models of the environement that include as much information as possible in order to optimze its chance of survival in the environment. One might say that such a percipient is paying *more* attention to the *sensory* enviroment, or is even more conscious/aware of it than an organism/percipient that is merely monitoring the environment to ensure continuing goodness-of- fit of his schemata, and consequently only extracting the items of sensory information that the internal mental model defines as relevant to the task at hand. With continuing increments in experience with the percipient's sensory and ideational environments, the "mental models" of expected stimulation grow increasingly comprehensive and predictive of future stimuli and experience in repeated and related informational contexts. The result is that increments in experience with any stimulus *dampens* or *reduces* the magnitude of the percipient's initial response to the stimulus, since much of the stimulus is now *in the percipient's mind/brain*, in the form of cognitive and/or memorial processes. Eventually, with continuing experience with any given set of stimuli, the percipient may not even be consciously aware of the stimulus; however, if asked, the percipient could relate the absence or presence of the given stimulus configuration/ contingency or other details of the stimulus.

Since the orthodox Western paradigm's camera model of perception fails to take into account the related twin phenomena of habituation and atuomatization (the latter to be described below), it is not surprising that the Western paradigm considers that information *overload* stress and the experience of anxiety to be the main drivers of man's behavior and his cultural advance. From the perspective of the received Western paradigm, which conveniently overlooks and denies the existence of habituation and automatization, most of an organism's behavior is engaged-in to help *reduce* the "torrent of sound and images" and high degres of physiological arousal assumed to be encountered in the everyday, fast-paced West, so as to achieve a manageable rate of information flow for organized perceptual-cognitive-behavior (PCB) and the experience of fun/ relaxation/interest.

In contrast, the developmental psychophysiogic approach to mind-behavior-development interrelations posits just the *opposite,* standing the major beliefs of the received Western paradigm on its head. In the latter view, the major problem for the highly experienced system is *not* information overload (although this can occur in the situation of an *extreme* sensory enviroment for even the most experienced of percipients), but rather *information underload stress* when the percipient is engaged in everyday, habitual sensory environments and motor activities, the phenomenologic correlate of which is boredom. In severe cases, boredom experience can morph enantiodromically to the experience of anxiety.

Furst (1971) has described automatization in information processing terms:

People often refer to acts that have become so habitual that they are performed unconsciously, and it is not difficult to accept the proposition that motor skills, at least, can be in some sense automatized. But most skills that we learn are neither purely motor nor purely perceptual in nature, but some complicated mixture of both. When a person relates the common experience of driving a car over a familiar route automatically, it is not surprising to find that one of the things he means is that he was unconscious not only of the movements of his arms and legs, but that he was also unconscious of the events and things going by his car's windows.

Arguing from a functional viewpoint, Furst points out that automatizing of a perceptual process occurs in order to *increase* the efficiency of all ongoing perceptual activity. Automatizing would be evidenced by a *decrease* in the activity of a perceptual system or by a decrease in the rate of information being processed by that system. Since perceptual channels have limited capacity (Broadbent, 1958), any savings in the amount of information flow in a subsystem must result in a *gain* in the system's capability for processing *other* information *simultaneously*. That stimulus-specfic perceptual processes *decrease* in activity as a result of increments in experience is well known (Sharpless and Jasper, 1950). This phenomenon is known as "habituation." The concept of automatization has been formally construed as an efficient decrease in the sensory information necessary to construct a repeated perceptual event. On a phenomenological level, this can be understood as implying a *reduction* of immediate awareness of things one acquires as a result of past experience with them. Compared to the relatively inexperienced percipient/perceiving structure, the more experienced percipient/perceiving structure is conceptualized to process *less* information from ordinary, previously encountered sensory events and configurations because most of the information about the stimuli has previously been encoded *in the individual's* mind/memorial processes and/or is being processed by sub/unconscious mind/brain processes.

On a phenomenological level, automatization can be seen as implying the reduction of awareness of stimuli a percipient structure acquires as a result of past experience with stimuli. Furst (1969) has provided some elegant descriptions of the phenomenology of perceptual automatization:

After you habituate to a stimulus, it can still be recognized and acted upon in an apparently unconscious or automatic manner. This phenomenon is one aspect of a general tendency towards the unconscious execution of any activity that is performed habitually. Consider the case of a tourist approaching the Golden Gate Bridge for the first time and a commuter viewing it from the same spot, one car behind. They are both looking at the same object in their visual fields, taking mental note of it, and categorizing it, identifying it. They would both be able to tell you, for instance, that the color of the bridge is red, and that it is suspended from two tall towers by a web of steel cable. Still, there is a sense in which the commuter, who has seen the bridge twice a day for the last seven years, is not as aware of the bridge. The color of the bridge is less vivid, the towers less imposing and graceful, the web of cables less intricate than when he himself had seen it for the first time.

...What the commuter would say about his unawareness is that he knew the route so well that he drives it "automatically." We use the term in everyday speech. It is a common observation, for example, while we are learning some new and complicated skill, like hittting a golf ball or driving a car, that at some point in time the actions become unconscious. Where we once had to pay attention to the coordination of many different muscles, now things seem to run off so smoothly that it seems automatic. The term "automatic" refers simply to our lack of mental effort or our lack of awareness. This metaphor is a fortunate one, in terms of what we have come to call the mental "economy of attention."

Increasing experience with a given stimulus and/or contingency creates ever-more comprehensive mental models of the stimulus, so that less channel capacity and less information is processed upon repeated exposure to stimuli. With increments in experience with a given stimulus, human subjects show a greater efficiency of information search compared to efficiency parameters obtaining in the initial presentation of the stimulus (Furst, 1971; de la Peňa, 1971), as well as a lower level of physiological activation. In essence, the more experienced individual does not have to expend as much energy--work so hard--in subsequent presentations to perceive and model the stimulus, compared to the first presentation. Automatization thus entails the notion of efficient "chunking" of information in representations in memory, so that a great deal of information can be stored in larger and larger "chunks." The chunking of information is analagous to "file compression" in computers, and to the use of mnemonics used by humans to help in the recall of large amounts of information.

A core premise of my developmental psychophysiologic approach is that automatization is *the* central dimension in evolution. It is a neccesary condition for the development of perceptual-motor and cognitive-linguistic skills, including analytic thought and perception. The sequela of perceptual/attentional automatization is a lowering of the "intensity" of consciousness, the phenomenologic correlate of which is the experience of boredom and/or depression. Colin Wilson, the British existentialist thinker, has written brilliantly on the concept of automatization (indeed it is the focus of virtually all of his writing and prodigious literary output), explaining its role in the acquisition of skill and in the genesis of the experience of boredom (1969, 70-72):

I have invented a useful concept for dealing with this basic psychological problem (of boredom); I call it the "robot." When a human being

learns anything difficult--to talk, to write, to calculate, to drive a car, to type, to speak a foreign language--he has to begin by concentrating upon the details of what he wishes to learn. Even when he has learned a basic French vocabularly, he finds it difficult to read French, because he is still thinking in English, and he has to translate each word into English. But gradually, the "remembering" process is passed on to a deeper level of his being, a kind of robot in his subconscious mind, and the robot can read French without having to translate it back into English. It is in every way more efficient than his conscious personality. All animals possess a robot to some extent-otherwise they would be unable to learn (i.e, they would be unable to "habituate", and go onto "something new").

But man has the most efficient robot of all. The cleverer he is, the more efficient the robot. But the very efficiency of the robot is one of his greatest problems.....

Wilson goes ont to point out that the sense of freedom, of being vitally alive, tends to occir when we are doing something for the first time. The amateur actor gets far more excitement out of acting than does the professional. The most blasé person becomes a schoolboy again when he engages in an activity at which he is totally inexperienced: riding a horse, skiing, appearing on television. For Wilson, the great disadvantage of the robot (perceptual/attentional automatization) is that it not only eventually drives one's car and talks French, but also takes the interest and excitement out of skiing or a repeat listening to a symphony. In my view, at this point in the evolution of man, automatization has taken over too many of our functions, the consequence of which is that when life is peaceful, we feel it difficult to feel really alive. Automatization is *sine qua non* for any new learning or development. Evolution and/or development is associated with *increasing* automatization of *sensory information processing*, which frees up space in the percipient's limited channel capacity for attending to the *conceptual-ideational* aspects or information of the "same" stimulus configuration/contingency. Automatization makes possible the impressive array of perceptual, motoric, and cognitive skills that emerge with increments in experience/development; it is at the core of the development of "intelligence/analytic thought." However, since stimulus configurations and/or events beome more predictable with increasing development of cognitive structure, the perceiving system experiences a lowering of the "intensity" of consciousness, which manifests as the experience of "boredom" when engaged in habitual, "routine" environments and/or motor activites. This is why most of us enjoy, like Willie Nelson, "going on the road again," which we subsequently habituate to, necessitating the desire for homesteading, which subsequently becomes automatized and elicits bouts of boredom and yawning, which in turn propels us to going on the road again, and so on through the duration of most of our adult lives.

Increasing automatization of perception/attention, then, essentially reduces, simplifies, negates, or selectively destroys task-irrelevant sensory information in a percipient's inforamtional enviroment. With increments in phylogenetic and ontogenetic development, increasingly experienced, sophisticated information processingstructures in nature eincreasinly feel "empty," "hollow," anergic, and bored when not engaging new, extraordinary environments and activities. The percipient soon notices that what was interesting and exciting yesterday is not necssarily so with repeated exposure to the previously new environemtn or activity. The result is a feeling of an emptiness or void at the core of one's expereince of self, which must be filled with new stimuli, interests, and activities, even a change in spouse , career, and spiritual endeavor/religion, occasionally "progressing" to the hyperdynamic and/or violent, destructive behaviors that are increasingly commonplace in our society (or at least on our televions screens).

Wilson (1979, 524-525) expains the interrelation of automatization and evolution, spelling out their implications for engaging in hyperdynamic and/ or violent, destructive behaviors:

> Evolution *is* the development of the robot. Our hearts beat automatically. Our hair and nails grow automatically. Our stomachs digest food automatically. These functions have already been automatized by the evolutionary process, so that consciousness is free to to deal with other/new problems. If I had to think about my breathing, I would have no attention to spare for anything else. Our low pressure consciousness can be held responsible for most of our major defects. It produces a kind of nagging hunger for excitement that leads to all kinds of irrational behavior. This is why gamblers gamble and sex maniacs commit rape, sadists inflict pain and masochists enjoy having it inflicted, and why men become alcoholics and drug addicts.
>
> It also explains why we are so prone to outbreaks of criminality and mass destruction. Violence and pain are preferable to boredom and frustration. Throughout his history, man has shown the same depressing tendency to escape his boredom through violence and destruction, and there is no reason to believe that the invention of nuclear weapons will improve his record. There is an element of absurdity in seeking out forms of crisis that will catapult him into "wide-awake consciousness"; it is like persuading yourelf to go out for a walk by setting your house on fire.

Wilson's insight is to see that automatization and boredom are not only *sine qua non* for the development of all skill and cognitive structure, but conjointly also modulate the expression of hyperdynamic and/or violent destructive behaviors. Habituation and automatization are not only essential for the development of cognitive structure and correlative cultural advance, but also for the capacity for the expression of man's most inhumane and heinous crimes against his fellow man, the planet, and the planet's fauna and flora. Without the processes of habituation and automatization there is no creativity, innovation, "exploration" in the arts and sciences, or movement/transformation of individual or societal mores. Creativity in the arts and sciences helps automatized, bored percipients to escape its the worm's eye view of the world, and allow entry into a world of wider significance and meaning.

In an earlier work (de la Pena, 1983), I reviewed a broad range of literature supporting the hypothesis that some of our somatically and behaviorally-expressed "disease" processes can be conceptualized as being promoted by high degrees of information underload and/or boredom experience for perceiving structures at all levels of structure in the hierarchy of information processing structures in the universe, the associated pain and challenge acting to mitigate automatization of physiological function and the experience of information underload, a process which was posited to always be increasing in phlogeny and ontogeny secondary to an always-incrementing memorial store of experience/knowledge and associated automatization of perception. The premises of habituation and perceptual automatization suggests that for highly-experienced, cognitively-developed Western adult man, the more salient stress is thus not *information overload stress and the experience of anxiety,* but rather, *information underload stress and the experience of boredom* (which in *severe* cases flip-flops enantiodromically to the opposite state, eliciting the experience of anxiety).

Consequences of Increments in Cognitive Structure and Boredom Experience for the Current Crises Along Multiple Fronts

This paper has contrued the core culprit in the many-headed crises in the contemporary world not as some "external" agent like pollution, or an outside imposed economic system like capitalism, but rather the consequence of increments in cognitive structure and boredom experience that eventually resulted in man's invention of the automobile, the airplane, the computer, and other technical marvels whose use has had addes a great deal of pizzaz and and "adventure" for man for short while, but which development has had dire consequences for the environment. The approach considers that the human capacity to analyze, think, plan, and remember, and man's *capacity for boredom* are fundamental to the development of the various crises that currently threaten the future viability of man and aerobic life on earth. A bored individual additionally engages in many behaviors that would not otherwise occur if he were not experiencing a high degree of perceptual automatization and correlative boredom experience. He might light up a cigarette, overuse his car in trying to maintain changing scenes/vistas, pick a fight, eat more than he needs to for weight maintenance, scheme to make a great deal of money off exploiting anything or anybody, go on a safari hunt for thrills and adventure, kill animals for their fur and/or exotic gustatory taste, and so on. When the percipient's boredom experience is severe, it will show the highly egocentric, self-serving, restless, hyperdynamic behavior that not-infrequently escalates to violent, psychopathic behavior, similar to that of individuals undergoing sensory deprivation or stimulant drug withdrawal. It will not be a concern to him that his loud talking on his cell phone at the movie theater or at the library is disturbing the experience of the movie/library for the nearby-sitting movie-goer/studier.

I refer to this ever-escalating need for stimulus among increasingly experienced/cognitively developed percipients as the incrementing knowledge-automatization-boredom-behavior (IKABB) dynamic (de la Peňa, under review). The dynamic posits that as percipient structures in the hierarchy of structures in nature continue to gain experience/knowledge/cognitive structure about their respective worlds, their capacities for perceptual automatization increases, as does the experience of boredom, as well as attempts to rectify the increments in boredom. A favorite strategy for mitigating boredom experience (i.e., for "de-automatizing attention/perception) is to increase the *dynamicity* of motor behavior, which manfests in an ever-increasing restlessness, i.e., an inability to stay sequestered in one's room/house without access to entertainments/diversions and hyperdynamic motor activity. If the increased dynamicity of behavior is insufficiently ameliorative of boredom experience, the *ante* of behavior can be further increased or intensified to entail engaging in violent, aggressive, or destructive behavior.

I posit that all of the institutions of modernity have been significantly impacted by an always-incrementing knowledge base and correlative boredom experience . Increased boredom experience in turn prompts the bored individual/society to invent *new ways* of speeding up the flow of information. Continuing technological development is one response to mitigating individual or collective boredom, and results in the invention of devices, e.g., automobiles, airplanes, computers, telephones, cell phones, Blackberries, ipods, video games, etc., all of which act to accelerate the pace of life and mitigate the experience of boredom. All of these innovations themselves have "side effects," which ultimately further accelerates knowledge accrual via inducing exploration and discovery of interventions and processes that mitigate the prior "side effects."

My developmental psychophysiologic appprach to mind/brain-behavior interrelations posits that the IKABB dynamic is now to the point where man's greatest enemy is himself--more precisely, his high level of development of knowledge and cognitive structure, the latter effecting a correlative increasing boredom experience when engaged in habitual, routine environments and activities. The increasing boredom can only be temporarily assuaged by increasingly stronger stimulus and/or more complex, uncertain, risky, exploitative, high-intensity behaviors. Colin Wison would not find these ideas novel: In A Criminal History of Mankind, 1984, he writes:

> But we have seen that man's chief mechanism for survival was the development of a formidable apparatus that allows him to concentrate upon specific problems: a kind of mental microscope. He hurls himself at problems with the same violence that the tree shrew hurls itself on food. Patience was never one of man's chief virtues. When problems arise that threaten his survival, he experiences an intense desire to solve them instantly, All this explains why man is at once the most creative and the most murderous of creatures. The story of his triumphs cannot be separated from the story of his crimes, because they spring from the same source: that specialsized instrument for problem-solving. ...Because of this specialized instrument (of analytic intelligence), man suffers from boredom more than any other creature. Most animals dislike boredom, but man is tormeneted by it.

The fundamental behavioral strategy of the highly automatized, bored individual is *more*: more acquiring, stimulation, property, money, noise, confrontation, drama, spectacle, risk/danger, fun and adventure, sex, stimulating drugs, attention, an so on, to fill an increasingly acute sensation of personal isolation and spiritual emptiness. His desires are difficult to quench because perceptual automatization is constantly accelerating the pruning/threshing of what was initially "stimulation," effecting the experience of eventlessness/the void, leaving Western adult man in a chronically incrementing sense of personal isolation and spiritual emptiness, which can only be assuaged by stronger and stronger stimuli of any and every sort. The percipient will at some point be so self-immersed with satisfying his unique unquenchable need for "more," that he will increasingly only think of trying to quench *his* needs for *more,* even if the temporary quenching comes at the expense of others' health and well-being, in much the same way that an individual addicted to stimulants eventually begins to live only for the next fix of the stimulant, which increasingly is more and more quickly habituated to, to the point where even large doses of the stimulant hardly effect any augmenting impact on his intensity of consciousness. The stimulant addict must thus search for increasingly large doses or new and more highly potent stimulants to maintain organized perceptual-cognitive-behavioral function and the experience of interest, fun, and relaxation, a plight that not-infrequently drives him to increasingly engaging in ever-more irrational and/or violent/destructive behaviors. For example, ordinary sexual behavior might escalate to sadistic/masochistic or abusive or exploitative behavior as a way of attempting to keep general/sexual boredom at bay. The effect of nicotine for the increasingly experienced cigarette smoker begins to habituate/wane, necessitating experimenting with marijuana, LSD, and/or other mind-altering substances, which themselves gradually lose their punch, and are subsequently replaced by increasingly impactful drugs and/or increasingly psychopathic, egocentric/self-serving narcissistic behaviors, the main function of which is to feed the individual's always escalating sense of personal emptiness and/or an always-growing sense of stimulus deficit, personal isolation, and sense of existential insignificance. The latter state can be deflected by committing a homicide and/or suicide, but also by joining a cult or religion, which augments a failing sense of meaning/intensity of consciousness.

Applications of the Developmental Psychophysiogic Perspective to Trends in Contemporary Western Life

In this section, I point out how the reality of the continually escalating IKABB dynamic helps in understanding contemporary trends in various Western institutions. A more-comprehensive outline has been provided elsewhere (de la Peña, 2006). Only a few of the more salient trends are described here.

The Ascendence of the Entertainment Industry

Increasingly across the dinner table at home and around the water cooler at work, shared entertainment experience is the central grounding of our increasingly isolated and fragmented lives. As Michael Wolf puts it (1999, 38):

> More and more, if you are looking for common ground with family and colleagues, it will be in shared entertainment experience, a few stolen moments in an America Online chat room, a book you know everyone else is reading, a day at a theme park with other families and kids just like your family and kids. Entertainment products put the mass audience on the same wavelength, and while engaging the emotion, they replace the sense of shared community that is disappearing in regular life.

Wolf points out that in the late 1900s in the United States, which has the West's most developed entertainment and media industry, entertainment ranked ahead of clothing and health care as a percentage of household spending. And in the mid-1990s, while the rate of personal savings in the United States had declined to a 63 year low of 2.1%, spending for entertainment reached a high of 8.4 % of total consumer expenditures. According to Wolf, the annual outlay among Americans for entertainment in the late 1900s will surpass the combined outlay for heatlh care, household supplies, and home furnishings. Even wtih the exclusion of consumer electronics--TV sets, VCRs, DVDs, etc., which can easily be argued to be bought primarily for entertainment--the entertainment industry in the mid-1990s in the United States alone was a $500 billion/year industry. In most part of the developed industrialized world (including China, Japan, and most of the developed Orient), entertainment *is* the fastest growing sector of the economy (Wolf, 1999). Of even wider impact is the way that entertainment content has become a key differentiating factor in virtually every aspect of the broader consumer economy. Wolf again (1999, 4-5):

> From travel to supermarket shopping, from commercial banking to financial news, from fast foods to new autos, entertainment content has seeped into every part of the consumer economy in much the same way that computerization made its presence felt in previous decades. In choosing where to buy french fries, how we relate to political candidates, what airline we want to fly, what pajamas we choose for our kids, and which mall we want to buy them in, 'entertainment' is increasingly influencing every one of these choices that each of us makes every day. Multiply that by the billions of choices that, collectively, all of us make each day, and you have a portrait of a society in which entertainment is one of the leading institutions.

Southwest Airlines, the consistently profitable airline in an industry stuck in intensive care, has incorporated Michael Wolf's thesis in its mission statement and *modus operandi*. CEO Herb Kelleher on Southwest Airlines' success formula: "We defined a personality as well as a market niche. We seek to amuse, surprise, and entertain." Another way of indexing the value of a service or product in society is to ascertain how financially

rewarded that service/product is by the society. Beginning as long as two decades ago, and increasing with each passing year, the annual salaries of entertainers has far outdistanced those of any other profession. A decade ago (1993-1994), the top five highest-paid entertainers (dollars per two-year period), not including athletes, in descending order were Steven Spielberg, $335 million; Oprah Winfrey, $105 million; Barney (Richard Leach, publisher; Sheryl Leach, creator), $84 million; Pink Floyd, $62 million; Bill Cosby, $60 million. In 2002-2003, action movie star Harrison Ford was commanding $20 million-or more-per movie. In 2033, TV sitcom start Ray Romano was making $1.8 million per *weekly* episode of *Everybody Loves Raymond*. In 1982, more than $3.4 billion worth of movie tickets were sold in the United States, a box office record at that time. By 1987, Americans were spending $4.38 billion/year to get into theaters.
Spending on the broadcasting of sports, on travel/tourism, video games, and other forms of entertainment is similarly mind-boggling, and certainly indexical of our addiction to events and people who interest/entertain, i.e., mitigate boredom, if only until we leave the theater, the stadium, the video game arcade, the TV set, etc.

The Growing Sensationalism and Violence of TV Fare

A prominent trend in TV and in the general media is the increasing sensory and emotional impact of the programming. Westerners are treated to non-stop, 24/7 programming of murder and mayhem of every stripe, emotional and physical pain, financial and political sleaze, natural catastrophe, suicide, and other "entertainments." In 1990, an article appeared in *U.S. News and World Report* entitled "The Entertaining of America." The author, John Leo, pointed out that we have always turned crime and violence into entertainment, but until recently it never came anywhere near the currently feverish level. The hot TV commodity in the early 2000s has been the "Reality Show," in which real people subject themselves to various sorts of humiliation for the audence's entertainment. On "Fear Factor," people gulp slime, eat slugs, and submerge themselves in a tub of other creepy creatures. Subsequent Reality Shows have become even more gross in their attempts to hold fast-habituating viewer attention. Another trend in TV shows is that today's good guys are more savage than the villains used to be.

The same trend of increasing sensation and violence had even appeared in the lyrics of our popular music. Nearly 50 years after Johnny Cash first sang "I shot a man in Reno, just to watch him die," we remain fascinated by music with a body count. Eminem's latest CD, "The Marshall Mathers LP" sold 5 million copies in five weeks, despite (or perhaps because of) blood-drenched lyrics in which he murders his mother, his wife, and just about anyone else who crosses his twisted path. Similarly, the plots of the story lines of works of fiction have become increasingly complex, with books of decades ago seeming slow-moving and simple-plotted compared to the stories of the contemporary fiction writer. These are but a few of hundreds of examplars of an increasingly sophisticated/experienced viewing and reading public that is always in need for an upping of the *ante* of stimulus impact, complexity, and/or surprise to hold viewer/listener attention.

TV Coverage of War and and Acts of Terrorism

Network and cable coverage of war has been increasingly sensationalistic since the Gulf War in the early 1990s, each station competing with the other with dramatic-romantic graphs and "story lead" intended to attract and maintain viewer interest. Beginning as early as 2003, TV news began treating the prospect of war with Iraq like a blockbuster movie, the various newsreaders/anchors of the various network and cable channels acting the role of shills for the upcoming "big show," their respective pre-op previews calling us to "Showdown with Saddam!" and "Target Iraq!," with the use of rapidly changing and dramatic images of war, sophisticated computer graphics, "danger-drama" leading into and following reports, and retired generals describing the action and strategy with all the hype of an upcoming Super bowl football game. "Online" coverage of war began with the War in Iraq, dishonestly excluding the showing of wounded or dying American and Iraqi soldiers, civilian "collateral damage," and other non-romantic imagery.

Media entertainment exploits our always growing, snowballing hunger for interest and entertainment in such diverse theaters as basketball courts and war between nation states. Development of the media and entertainment into the world's biggest industry has grown into a bigger and more sensationalist enterprise in large part because of the dialectic between our incresingly sophisticated knowledge stuctures manifesting increasingly rapid habituation to the latast media novelty, which effects a lowering of our "intensity of consciousness," which we experience as increasing boredom/decreasing interest, which in turn fuels a need for added strength of stimulus in order to at least temporally re-experience fleeting moments of interest-entertainment.

In my view, the media and audience form a self-regulating, symbiotic system in which the increasing accrual of experience/knowledge in the audience effects increasingly rapid "habituation" to media offerings. In order to maintain or re-attract viewer attention, the media must continually ratchet-up the sensationalism and immediacy of its coverage of the grotesque, vulgar, and destructive, since these are more slowly habituated to than neutral or peaceful events/stimuli. Our increasing boredom, accelerated by our increasing knowledge and experience with the world, demands the increasing violence and sensationalism of our TV series and the songs we listen to and buy. Now that tens of millions of TV viewers have seen the jets flying into the New York towers of "9/11" (over and over again), as well as the U.S. military's "Shock and Awe" campaign over Baghdad, what is the next stimulus "step-up" that will be necessary to keep us from yawning and feeling bored at the next major act of terrorsim. What lengths must the terrorists go through in order to top their activities of 9/11 and provide an "orienting response" among the terrorees?

Methodologies for the Study of Perceptual Automatization and Boredom Experience

All of the measurement instruments described below are now available with complete hardware and software packages to enable quick and easy objective quantification of the various perceptual, behavioral, and experiential variables mentioned in earlier sections of this paper.

1. Perceptual Automatization

Empirical studies of automatizing of visual attention have been performed by the author and other researchers (Mackworth, 1967; Mackworth and Bruner, 1970; de la Peña, 1971; de la Peña et al., 1973; de la Peña et al., 1982; Furst, 1969; Furst, 1971). A Mackworth stand camera was used in all of these early studies to record the locus of fixation during subjects' inspection of color photographs. The technique involves reflecting a small spot of light off the cornea and optically superimposing this eyespot on a picture of the stimulus being viewed. The movement of the eyespot is roughly proportional to corneal movement for stimuli occupying about 20 degrees of arc, and with careful alignment the apparatus can give a record of where a subject looks to an accuracy of about 1 degree. Stimulus pictures have typically taken the form of 8 x 8 inch color photographs mounted on boards that are loaded into a frame and shutter arrangement, mounted at eye level, and 22.5 inches in fornt of the subject's eye. A display subtending 20 x 20 degrees is effected. Eye tracks have generally been recorded on high-speed Bolex H16 movie camera on 16-mm film at a rate of 11 frames/second. Eye marker recorders of the past decade enable the recording of eye movements in unrestrained, free-roaming subjects, thus increasing the "ecological validity" of study findings.

The primary data for repeated 10-second trials is a sequence of picture sectors, one sector for each frame of film, showing where the eyespot is located in each frame of film (each frame is approximately 100 milliseconds). A change of sector defines a change of fixation. Visual automatizing is indexed by computations of the spatial and sequential stereotypy of visual fixations in ten second trials. The technique involved obtaining spatial and sequential distributions of ocular fixations, using the Shannon entropy function H of the distributions (Shannon, 1948). Any change in average uncertainties (in bits) reflects a change in the degree to which fixations become predictable or stereotyped with repeated exposure to a stimulus pattern. A decrease in Shannon Uncertainly indicates an increase in predictability of visual information search, i.e., an increase in automatizing of visual attention. That is, visual automatization is indexed by decreases in the mean uncertainty of the spatial and sequential distributions of visual fixations. Mean uncertainties of spatial and sequential disributions of fixations have been found to decrease across sequential 10 second trials, indicating increased automatizing of visual attention with repeated expoures to the same visual stimuli.

2. Boredom Experience

Farmer and Sundberg's (1986) Boredom Proneness Scale (BPS) is currently the only full-scale measure of the general construct of trait boredom. In addition, there are two instruments that measure job boredom, one that assesses coping with boredom, two that appraise leisure/free-time boredom, another that measures sexual boredom, and the Boredom Susceptibility Scale, which is a subscale of the Zuckerman Sensation Scale.

Vodanovich (2003) has reviwed the psychometric properties and correlates of each scale, with special focus on the BPS. The BPS consists of 28 true-false items (e.g., I often find myself with time on my hands and nothing to do"; "It takes a lot of change and variety to keep me really happy"; "I am good at waiting patiently"). Review of the the internal consistency, reliability, and BPS factor analytic structure suggests a valid, reliable instrument with excellent test-retest reliability for the measurement of *trait* boredom. A scale designed to measure *state* boredom is nearing completion (Vodanovich, personal communication, 2005).

Vodanovich and colleagues at the University of West Florida have used the BPS in over 20 studies, correlating various personality and behavioral measurements with the BPS. Vodanovich's review (2003) of the literature on the BPS found that boredom proneness (BPS scores) is statistically significantly *positively* correlated with scores on various validated scales of psychopathy, overt and covert narcissism, aggression/ hostility, negative affect, fatigue, guilt, depression, procrastination, sexual boredom and preoocupation, dogmatism, impulsivity, extraversion, Type A behavior, pathological gambling, alienation, social dependency, loneliness, job boredom, disregard for rules, and anxiety. In various studies, BPS scores showed statistically significant correlations with subjects' perception of time passing slowly, as well as faster rates of physiological habituation to repeated sensory stimuli. Significant *negative* correlations have been reported between BPS scores and validated scales of life satisfaction, assertiveness, enthusiasm, job involvement, self-actualization, job satisfaction, vigilance performance, "flow" proneness, psychosocial development, positive affect, attributional complexity, and impuse control.

Massimini and Massino (1988) have used the Experience Sampling Method (ESM) to assess boredom expereince throughout the day over days-weeks at at time. In this technique, subjects are provided with an electronic pager and a questionnaire booklet. Each sheet of the booklet includes 25 validated self-report scales, including boredom proneness and boredom coping scales. The investigators activate the pagers through a radio transmitter seven or eight times a day accoring to a random schedule. Each time the pager signals, the subject fills out one sheet of the booklet. By the end of a week the booklet will contains a sytematic description of the external parameters of the person's life (the activities performed, the places visited, the people encountered, etc) and of the personal experiences and dimensions of consciousness (the affect, cognitive efficiency, motivational states, including boredom experience) of which the subject was aware when the signal occurred.

3. Personality Assessment Scales and Questionnaires

Validated scales are now available for quantification of *trait* psychopathy, overt and covert narcissism, hostility, anxiety, hyperactive/Type A behavior, impulsivity, depression, alienation/social isolation, loneliness, introversion-extraversion, and authoritarianism.

4. Recording and Measurement of Behavioral Dynamicity

Relatively inexpensive accelerometers attached to the wrist and ankles ("actigraphs") provide an objective index of general motor activity. They are used by sleep clinicians to help differentiate sleep from wakefulness, and nonREM sleep from REM sleep. ADHD researchers use the actigraphs to quantify behavioral hyperactivity.

5. Recording and Quantification of Cortical, Autonomic, and Somatic Activity

Digital polysomnographic recording and analysis methodology is now used routinely in Western clinical and research sleep laboratories. The hardware and software to accomplish sleep technologist-assisted recording, monitoring, scoring, and analysis of all-night or 24/7 polysomnograms has been available since the mid-1990s. The recording and analysis equipment is now sufficiently portable that long-term sleep recordings can now easily be accomplished in the patient's customary sleep environment.

In summary, all of the methodologies (equipment, questionnaires/scales, and data collection-analysis software) now exists for the conduct of social psychophysiological studies of visual automatization-boredom-behavior interrelations. While studies of the sort conducted decades ago by Stanley Millgram (on authoritarian personality structure and student readiness to administer electric shocks to fellow students) and Phillip Zimbardo (the "Stanford Prison Experiment," in which student-guards began to identify with their roles, displaying arrogant, aggressive, and cruel behavior towards their fellow student-prisoners) are now much harder to justify from an ethical standpoint, creative researchers could probably design ethical and humane experimental and correlational studies that would test some of the hypotheses articulated in this paper. Parenthetically, neither the Millgram or Zimbardo study assessed the possibly confounding role of boredom in eliciting the sadistic behaviors (both experiments were conducted in impoverished sensory environments, raising the possibility that some of the aggressive/punitive behaviors displayed in the two studies were in fact modulated by the quasi-sensory deprivation setting inherent to the two studies). Individual differences in boredom proneness might have contributed to some of the individual differences among student-guards in commission of heinous behaviors toward their fellow student-prisoners. Obvious applications to understanding the inhumane/sadistic behavior of American soldier-guards at the Abu Grahib prison in Iraq immediately come to mind, as does any real-life situation in which man's inhumanity to man is displayed.

References

Battista, J. (1977). "The Holistic Paradigm and General Systems Theory," *General Systems*, 22:65-71.

Bateson, G. (1979). *Mind and Nature: A Necessary Unity,* E.P. Dutton, New York.

Broadbent, D. (1958). *Perception and Communication*, Pergamon, Oxford, England.

Capra, F. (2002). *The Hidden Connections: Integrating the Biological, Cognitive, and Social Dimensions of Life Into a Science of Sustainability*. Doubleday, New York.

de la Peña, A. (1971). "The Psychobiological Role of the Rapid Eye Movement Dream State," *Dissertation Abstracts International,* 32(3): 1871-B.

de la Peña, A. et al.(1973). "Correlation between Measures of the Rapid Eye Movements of Wakefulness and Sleep," *Psychophysiology*, 10(5): 488-500.

de la Peña, A. et al. (1982). "Information Search Eye Movements in DOES and DIMS," *Sleep Research*, 11: 141.

de la Peña, A. (1982). "Automatization of Sensory Information Processing: Some Consequences for Perception and Behavior," in *General Systems Theory and the Psychological Sciences*, (W. Gray et al., eds.), Intersystems Press, Seaside, California, 2: 59-73

de la Peña, A. (1983). *The Psychobiology of Cancer: Automatization and Boredom in Health and Disease*, Praeger, New York.

de la Peña, A. (2006). *Knowledge, Automatization, and Boredom: A Seminal Dynamic Modulating Behavior, Cultural Change, and Our Enormous, Always-Growing Need for Entertainment, Community, and Spiritual Experience*. Book manuscript under review, Spiegel and Grau, Doubleday, New York.

Deikman, A. (1966). "De-Automatization and the Mystic Experience," *Psychiatry*, 29: 324-338..

Dossey, L. (1982). *Space, Time, and Medicine*. Shambhala, Boulder and London.

Farmer, R., and Sundberg, N. (1986). "Boredom Proneness: The Development and Correlates of a New Scale," *Journal of Personality Assessment*, 50: 4-17.

Furst, C. (1969). "Automatizing of Visual Attention." Unpublished doctoral dissertation, Stanford University.

Furst, C. (1971). "Automatizing of Visual Attention," *Perception and Psychophysics*, 10(2): 65-70.

Herman, A. (1997). *The Idea of Decline in Western History*, The Free Press, Simon and Shuster, New York.

Horgan, J. (1996). *The End of Science: Facing the Limits of Knoweldge in the Twilight of the Scientific Age*, Addison-Wesley, New York.

Harman, W. (1988). *Global Mind Change: The Promise of the Last Years of the Twentieth Century*, Knowledge Systems, Indianapolis, Indiana.

Heide, F., and Borkovec, T. (1983). "Relaxation-Induced Anxiety: Paradoxical Anxiety Enhancement Due to Relaxation Training," *Journal of Consulting and Clinical Psychology*, 51(2): 171-182.

Laszlo, E. (1972). *The Systems View of the World*. Braziller, New York.

Mackworth, N. (1967). "A Stand Camera for Line-of-Sight Recording," *Perception and and Psychophysics*, 2: 119-127

Mackworth, N, and Bruner, J. "How Adults and Children Search and Recognize Pictures," *Human Development*, 13: 149-177.
Massimini, F., and Massimo, C. (1988, pp. 268-269). "The Systematic Assessment of Flow in Daily Experience," in *Optimal Experience: Psychological Studies of Flow in Consciousness,* (Csikszentmihalyi, M., and Csikszentmihalyi, I., ed.), Cambridge University Press, Cambridge, England.
Neisser, U. (1967). *Cognitive Psychology,* Prentice-Hall, New York.
Nisbet, R. (1980). *History of the Idea of Progress,* Basic Books, New York, pp. 4-6.
Shannon, C (1948). "A Mathematical Theory of Communication," *Bell System Technical Journal*, 27: 379-423.
Sharpless, S., and Jasper, H. (1956). "Habituation of the Arousal Reaction," *Brain*, 79: 655-680.
Stent, G. (1978). *Paradoxes of Progress*, W.H. Freeman, San Francisco.
Tart, C. (1977). "Some Assumptions of Orthodox, Western Psychology", in *Transpersonal Psychologies*, (C. Tart, ed.), Harper and Row, New York, pp. 66-111.
Vodanovich, S. (2003). " Psychometric Measures of Boredom: A Review of the Literature," *The Journal of Psychology*, 137(6): 569-595.
Von Bertalanffy, L. (1967). *Robots, Men, and Minds: Psychology in the Modern World*, George Braziller, New York.
Von Bertalanffy, L. (1964). "The Mind-Body Problem: A New View," *Psychosomatic Medicine*, 26(1):29-45.
Von Uexkull, J. (1929). *Umwelt und Innenwelt der Tiere*, Springer, Berlin, edition 2.
Wilber, K. (1981). *No Boundary: Eastern and Western Approaches to Personal Growth,* Shambhala, Boulder and London.
Wilson, C. (1969). *Poetry and Mysticism*, City Lights Books, San Francico.
Wilson, C. (1974). *The Philospher's Stone,* Warner Books, New York, p. 42.
Wilson, C. (1978). *Mysteries*, Hodder and Staughton, London.
Wilson, C. (1984). *A Criminal History of Mankind*, Carroll and Graf, New York.
Wolf, M. (1999). *The Entertainment Economy: How Mega-Media Forces are Transforming Our Lives,* Times Books/Random House, New York.