Nature, Nurture and Human Development

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Full Text: Headnote ABSTRACT: The role of nature-nurture must be reconsidered in light of the Human Genome Project's surprising results. Conventional biology emphasizes that human expression is controlled by genes, and is under the influence of nature. Since 95% of the population possess "fit" genes, dysfunctions in this population are attributable to environmental influences (nurture). Nurture experiences, initiated in utero, provide for "learned perceptions." Along with genetic instincts, learned perceptions constitute the life-shaping subconscious mind. The conscious mind, which functions around age six, operates independently of the subconscious. Conscious mind can observe and criticize behavioral tapes, yet cannot "force" a change in subconscious mind. One of the perennial controversies that tends to evoke rancor among biomedical scientists concerns the role of nature versus nurture in the unfoldment of life (Lipton, 1998a). Those polarized on the side of nature invoke the concept of genetic determinism as the mechanism responsible for "controlling" the expression of an organism's physical and behavioral traits. Genetic determinism refers to an internal control mechanism resembling a genetically-coded "computer" program. At conception, it is believed that the differential activation of selected maternal and paternal genes collectively "download" an individual's physiologic and behavioral character, in other words, their biological destiny. In contrast, those endorsing "control" by nurture argue that the environment is instrumental in "controlling" biological expression. Rather than attributing biological fate to gene control, nurturists contend that environmental experiences provide an essential role in shaping the character of an individual's life. The polarity between these philosophies simply reflects the fact that those endorsing nature believe in an internal control mechanism (genes) while those supporting nurture mechanisms ascribe to an external control (environment). The resolution of the nature and nurture controversy is profoundly important in regard to defining the role of parenting in human development. If those endorsing nature as the source of "control" are correct, the fundamental character and attributes of a child are genetically predetermined at conception. Genes, presumed to be self-actualizing, would control organismal structure and function. Since development would be programmed and executed by the internalized genes, the basic role of the parent would be to provide nutrition and protection for their growing fetus or child. In such a model, developmental characters that deviate from the norm imply that the individual expresses defective genes. The belief that nature "controls" biology fosters the notion of victimization and irresponsibility in the unfoldment of one's life. "Don't blame me for this condition, I got it in my genes. Since I can't control my genes, I am not responsible for the consequences." Modern medical science perceives of a dysfunctional individual as one possessing a defective "mechanism." Dysfunctional "mechanisms" are currently treated with drugs, though pharmaceutical companies are already touting a future in which genetic engineering will permanently eliminate all deviant or undesirable characters and behaviors. Consequently, we relinquish personal control over our lives to the "magic bullets" proffered by pharmaceutical companies. The alternative perspective, supported by a large number of lay people and a growing contingency of scientists, expands upon the role of parents in human development. Those endorsing nurture as life's "control" mechanism contend that parents have a fundamental impact on the developmental expression of their offspring. In a nurture-controlled system, gene activity would be dynamically linked to an ever changing environment. Some environments enhance the potential of the child, while other environments may induce dysfunction and disease. In contrast to the fixed-fate mechanism envisioned by naturists, nurture mechanisms offer an opportunity to shape an individual's biological expression by regulating or "controlling" their environment. In reviewing the nature-nurture controversy over the years, it is apparent that at times, support for nature mechanisms predominates over the concept of nurture, while at other times the reverse is true. Since the revelation of the DNA genetic code by Watson and Crick in 1953, the concept of self-regulated genes controlling our physiology and behavior has prevailed over the perceived influence of environmental signals Removing personal responsibility in the unfolding of one's life leaves us with the belief that almost all negative or defective human traits represent a mechanical failure of the human molecular mechanism. By the early 1980s, biologists were fully convinced that genes "control" biology. It was further assumed that a map of the completed human genome would provide science with all the necessary information to not only "cure" all of mankind's ills, but also create a Mozart or another Einstein. The resulting Human Genome Project was designed as a global effort dedicated to deciphering the human genetic code. The primary function of genes is to serve as biochemical blueprints that encode the complex chemical structure of proteins, the molecular "parts" from which cells are constructed. Conventional thought held that there was one gene to code for each of the 70,000 to 90,000 different proteins that make up our bodies. In addition to protein-coding genes, the cell also contains regulatory genes that "control" the expression of other genes. Regulatory genes presumably orchestrate the activity of a large number of structural genes whose actions collectively contribute the complex physical patterns providing each species with its specific anatomy. It is further presumed that other regulatory genes control the expression of such traits as awareness, emotion, and intelligence. Before the project got off the ground, scientists had already estimated that human complexity would necessitate a genome (the total collection of genes) in excess of 100,000 genes. This was based upon a conservative estimate that there were in excess of 30,000 regulatory genes and over 70,000 protein-coding genes stored in the human genome. When the results of the human genome project were reported this year, the conclusion presented itself as a "cosmic joke." Just when science thought it had life all figured out, the universe threw a biological curve ball. In all the hoopla over the sequencing of the human genetic code and being got caught up in the brilliant technological feat, we have not focused on the actual "meaning" of the results. These results overturn a foundational core belief embraced by conventional science. The Genome project's cosmic joke concerns the fact that the whole human genome consists of only 34,000 genes (see Science, 2001, 291, 5507 and Nature, 2001, 409, 6822). Two thirds of the anticipated and presumed necessary genes do not exist! How can we account for the complexity of a genetically-controlled human when there are not even enough genes to code just for the proteins? The "failure" of the genome to confirm our expectations reveals that our perception of how biology "works" is based upon incorrect assumptions or information. Our "belief in the concept of genetic determinism is apparently fundamentally flawed. We cannot attribute the character of our lives solely to the consequence of inherent genetic "programming." The genome results force us to reconsider the question: "From whence do we acquire our biological complexity?" In a commentary on the surprising results of the Human Genome study, David Baltimore (2001), one of the world's prominent geneticists and a Nobel prize winner, addressed this issue of complexity: But unless the human genome contains a lot of genes that are opaque to our computers, it is clear that we do not gain our undoubted complexity over worms and plants by using more genes. Understanding what does give us our complexity-our enormous behavioral repertoire, ability to produce conscious action, remarkable physical coordination, precisely tuned alterations in response to external variations of the environment, learning, memory . . . need I go on?-remains a challenge for the future, [underlined emphasis is mine]. Of course the most interesting consequence of the project's results is that we must now face that "challenge for the future" alluded to by Baltimore. What does "control" our biology, if not the genes? In the heat of the genome frenzy, emphasis on the project overshadowed the brilliant work of many biologists who were revealing a radically different understanding of organismal "control" mechanisms. Emerging at the cutting edge of cell science is the recognition that the environment, and more specifically, our perception of the environment, directly controls our behavior and gene activity (Thaler, 1994). Conventional biology has built its knowledge upon what is referred to as the "Central Dogma." This inviolable belief claims that the flow of information in biological organisms is from DNA to RNA and then to protein. Since DNA (genes) is the top rung of this information flow, science adopted the notion of the Primacy of DNA, with "primacy" in this case meaning first cause. The argument for genetic determinacy is based upon the premise that DNA is in "control." But is it? Almost all of the cell's genes are stored in its largest organelle, the nucleus. Conventional science maintains that the nucleus represents the "command center of the cell," a notion based upon the assumption that genes "control" (determine) the expression of the cell (Vinson, Purnell, Chin &Marx, 2000). As the cell's "command center," it is implied that the nucleus represents the equivalent of the cell's "brain." If the brain is removed from any living organism, the necessary consequence of that action is immediate death of the organism. However, if the nucleus is removed from a cell, the cell does not necessarily die. Some enucleated cells can survive for two or months without possessing any genes. Enucleated cells are routinely used as "feeder layers" that support the growth of other specialized cell types. In the absence of a nucleus, cells maintain their metabolism, digest food, excrete waste, breathe, move through their environment recognizing and appropriately responding to other cells, predators or toxins. Ultimately these cells die, for without their genome, enucleated cells are unable to replace worn-out or defective proteins required for life functions. The fact that cells maintain a successful and integrated life in the absence of genes reveals that genes are not the "brain" of the cell. The primary reason why genes cannot "control" biology is that they are not self emergent (Nijhout, 1990). This means that genes cannot self-actualize, they are chemically unable to turn themselves on or off. Gene expression is under the regulatory control of environmental signals that act through epigenetic mechanisms (Nijhout, 1990; Symer &Bender, 2001). However, genes are fundamental to the normal expression of life. Rather than serving in the capacity of "control," genes represent molecular blueprints necessary in manufacturing the complex proteins that provide for the cell's structure and functions. Defects in the gene programs, mutations, may profoundly impair the quality of life in those possessing them. It is important to note that the lives of less than 5% of the population are impacted by defective genes. These individuals express genetically-propagated birth defects, whether they are manifest at birth or appear later in life. The significance of these data is that more than 95% of the population came into this world with an intact genome, one that would code for a healthy and fit existence. While science has focused its efforts at assessing the role of genes by studying the 5% of the population with defective genes, it has not made much progress as to why the majority of the population, which possess a fit genome, acquire dysfunction and disease. We simply cannot "blame" their reality on the genes (nature). Scientific attention as to what "controls" biology is shifting from the DNA to the cell's membrane (Lipton, Bensch, &Karasek, 1991 and 1992; Lipton, 1998b; Lipton, 1999). In the economy of the cell, the membrane is the equivalent of our "skin." The membrane provides an interface between the ever-changing environment (not-self) and the enclosed controlled environment of the cytoplasm (self). The embryonic "skin" (ectoderm) provides for two organ systems in the human body: the integument and the nervous system. In cells, these two functions are integrated within the simple layer that envelopes the cytoplasm. Protein molecules in the cell membrane interface the demands of the internal physiologic mechanisms with existing environmental exigencies (Lipton, 1999). These membrane "control" molecules are comprised of couplets consisting of receptor proteins and effector proteins. Protein receptors recognize environmental signals (information) in the same way our receptors (e.g., eyes, ears, nose, taste, etc) read our environment. Specific receptor proteins are chemically "activated" upon receiving a recognizable environmental signal (stimulus). In its activated state, the receptor protein couples with, and in turn, activates specific effector proteins. The "activated" effector proteins selectively "control" the cell's biology in coordinating a response to the initiating environmental signal. Receptor-effector protein complexes serve as "switches" that integrate the function of the organism within its environment. The receptor component of the switch provides "awareness of the environment" and the effector component generates a "physical sensation" in response to that awareness. By structural and functional definition, the receptor-effector switches represent molecular units of perception, which is defined as "awareness of the environment through physical sensation." Perception protein complexes "control" cell behavior, regulate gene expression and have been implicated in the rewriting of the genetic code (Lipton, 1999). Every cell is innately intelligent in that it generally possesses genetic "blueprints" to create all of the necessary perception complexes that enable it to survive and thrive in its normal environmental niche. The DNA coding for these perceptual protein complexes have been acquired and accumulated by cells during four billion years of evolution. Perception coding genes are stored in the cell's nucleus and are duplicated prior to cell division, providing each daughter cell with a set of life sustaining perception complexes. However, environments are not static. Changes in the environments generate a need for "new" perceptions on the part of organisms inhabiting those environments. It is now evident that cells create new perception complexes through their interaction with novel environment stimuli. Utilizing a newly discovered group of genes, collectively referred to as "genetic engineering genes," cells are able to create new perception proteins in a process representing cellular learning and memory (Cairns, Overbaugh &Miller, 1988; Thaler 1994; Appenzeller, 1999; Chicurel, 2001). This evolutionarily advanced gene-writing mechanism enables our immune cells to respond to foreign antigens by creating life-saving antibodies (Joyce, 1997; Wedemayer, Patten, Wang, Schultz, &Stevens, 1997). Antibodies are specifically-shaped proteins that the cell manufactures to physically complement the invasive antigens. As proteins, antibodies require a gene ("blueprint") for their assembly. Interestingly, the specifically tailored antibody genes that are derived from the immune response did not exist before the cell was exposed to the antigen. The immune response, which takes about three days from the initial exposure to the antigen till the appearance of specific antibodies, results in the "learning" of a new perception protein (the antibody) whose DNA "blueprint" ("memory") can be genetically passed on to all daughter cells. In creating a life conserving perception, the cell must couple a signal-receiving receptor with an effector protein that "controls" the appropriate behavioral response. The character of a perception can be scored by the type of response the environmental stimulus evokes. Positive perceptions produce a growth response, while negative perceptions activate the cell's protection response (Lipton, 1998b and 1999). Although perception proteins are manufactured through molecular genetic mechanisms, activation of the perception process is "controlled" or initiated by environmental signals. The expression of the cell is primarily molded by its perception of the environment and not by its genetic code, a fact that emphasizes the role of nurture in biological control. The controlling influence of environment is underscored in recent studies on stem cells (Vogel, 2000). Stem cells, found in different organs and tissues of the adult body, are similar to embryonic cells in that they are undifferentiated, though they have the potential to express a wide variety of mature cell types. Stem cells do not control their own fate. The differentiation of stem cells is based upon the environment the cell finds itself in. For example, three different tissue culture environments can be created. If a stem cell is placed in culture number one, it may become a bone cell. If the same stem cell was put into culture two, it will become a nerve cell or if placed into culture dish number three, the cell matures as a liver cell. The cell's fate is "controlled" by its interaction with the environment and not by a selfcontained genetic program. While every cell is capable of behaving as a free-living entity, late in evolution cells began to assemble into interactive communities. Social organizations of cells resulted from an evolutionary drive to enhance survival. The more "awareness" an organism possesses, the more capable it is of surviving. Consider that a single cell has X amount of awareness. Then a colony of 25 cells would have a collective awareness of 25 X. Since each cell in the community has an opportunity of sharing awareness with the rest of the group, then every single cell effectively possesses a collective awareness of 25 X. Which is more capable of surviving, a cell with Ix awareness or one with 25 X awareness? Nature favors the assembly of cells into communities as a means of expanding awareness. The evolutionary transition from unicellular life forms to multicellular (communal) life forms represented an intellectually and technically profound high point in the creation of the biosphere. In the world of unicellular protozoa, each cell is an innately intelligent, independent being, adjusting its biology to its own perception of the environment. However, when cells join together to form multicellular "communities," it requires that the cells establish a complex social intercourse. Within a community, individual cells cannot behave independently, otherwise the community would cease to exist. By definition, the members of a community must follow a single "collective" voice. The "collective" voice controlling the community's expression represents the sum of all of the perceptions of every cell in the group. Original cellular communities consisted of from tens to hundreds of cells. The evolutionary advantage to living in community soon led to organizations comprised of millions, billions or even trillions of socially interactive single cells. In order to survive at such high densities, the amazing technologies evolved by the cells led to highly structured environments that would boggle the minds and imagination of human engineers. Within these environments, cell communities subdivide the workload among themselves, leading to the creation of hundreds of specialized cell types. The structural plans to create these interactive communities and differentiated cells are written into the genome of each cell within the community. Though each individual cell is of microscopic dimensions, the size of multicellular communities may range from the barely visible to the monolithic in proportion. At our level of perspective, we do not observe individual cells but we do recognize the different structural forms cell communities acquire. We perceive these macroscopic structured communities as plants and animals, which includes ourselves among them. While you might consider yourself as a single entity, in truth you are the sum of a community of approximately 50 trillion single cells. The effectiveness of such large communities is enhanced by the subdivision of labor among the component cells. Cytological specializations enable the cells to form the specific tissues and organs of the body. In larger organisms, only a small percent of the cells function in perceiving the community's external environment. Groups of specialized "perception cells" form the tissues and organs of the nervous system. The function of the nervous system is to perceive the environment and coordinate the cellular community's biological response to the impinging environmental stimuli. Multicellular organisms, like the cells they are comprised of, are genetically endowed with fundamental protein perception complexes that enable the organism to effectively survive in their environment. Genetically programmed perceptions are referred to as instincts. Similar to cells, organisms are also capable of interacting with the environment and creating new perceptual pathways. This process provides for learned behavior. As one ascends the tree of evolution, moving from more primitive to more advanced multicellular organisms, there is a profound shift from the predominant use of genetically programmed perceptions (instinct) to the use of learned behavior. Primitive organisms primarily rely upon instincts for the greater proportion of their behavioral repertoire. In higher organisms, especially humans, brain evolution offers a great opportunity for creating a large database of learned perceptions, which reduces dependence upon instincts. Humans are endowed with an abundance of genetically propagated vital instincts. Most of them are not evident to us, for they operate below our level of consciousness, providing for the function and maintenance of cells, tissues and organs. However, some basic instincts generate overt and observable behavior. For example, the suckling response of the neonate, or the retraction of a hand when a finger gets burned in a flame. "Human beings are more dependent on learning for survival than other species. We have no instincts that automatically protect us and find us food and shelter, for example" (Schultz &Lavenda, 1987, p. 5). As important as instincts are to our survival, our learned perceptions are more important, especially in light of the fact that they can override genetically programmed instincts. Since perceptions direct gene activity and engage behavior, the learned perceptions we acquire are instrumental in "controlling" the physiologic and behavioral character of our lives. The sum of our instincts and learned perceptions collectively form the subconscious mind which, in turn, is the source of the "collective" voice that our cells "agreed" to follow. Although we are endowed at conception with innate perceptions (instincts) we only begin to acquire learned perceptions at the time that our nervous systems become functional. Until recently, conventional thought held that the human brain was not functional until some time after birth, in that many of its structures are not fully differentiated (developed) until that time. However, this assumption has been invalidated by the pioneering work of Thomas Verny (1981) and David Chamberlain (1988/1998), among others, who have revealed the vast sensory and learning capabilities expressed by the fetal nervous system. The significance of this understanding is that perceptions experienced by the fetus would have a profound effect upon its physiology and development. Essentially, the perceptions experienced by the fetus are the same as those experienced by the mother. Fetal blood is in direct contact with the mother's blood via the placenta. Blood is one of the most important components of the connective tissue;

through it pass most of the organizing factors (e.g., hormones, growth factors, cytokines) that coordinate the function of the body's systems. As the mother responds to her perceptions of the environment, her nervous system activates the release of behavior-coordinating signals into her bloodstream. These regulatory signals control the function, and even gene activity, of the tissues and organs needed by her to engage in the required behavioral response. For example, if a mother is under environmental stress, she will activate her adrenal system, a protection system that provides for fight or flight. These stress hormones released into the blood prepare the body to engage a protection response. In this process, blood vessels in the viscera constrict forcing blood to nourish the peripheral muscles and bones that provide protection. Fight-or-flight responses depend upon reflex behavior (hindbrain) rather than conscious reasoning (forebrain). To facilitate this process, the stress hormones constrict the forebrain's blood vessels forcing more blood to go to the hindbrain in support of reflex behavior functions. Constriction of blood vessels in the gut and forebrain during a stress response respectively repress growth and conscious reasoning (intelligence). It is now recognized that, along with nutrients, stress signals and other coordinating factors in the mother's blood cross the placenta and enter into the fetal system (Christensen, 2000). Once these maternal regulatory signals enter the fetal blood stream, they affect the same target systems in the fetus as they did in the mother. The fetus simultaneously experiences what the mother is perceiving in regard to her environmental stimuli. In stressful environments, fetal blood preferentially flows to the muscles and hindbrain, while shorting the flow to the viscera and the forebrain. The development of fetal tissues and organs is proportional to the amount of blood they receive. Consequently, a mother experiencing chronic stress will profoundly alter the development of her child's physiologic systems that provide for growth and protection. The learned perceptions acquired by an individual begin to arise in utero and can be subdivided into two broad categories. One set of outward-directed learned perceptions "controls" how we respond to environmental stimuli. Nature has created a mechanism to facilitate this early learning process. Upon encountering a novel environmental stimulus, the neonate is programmed to first observe how the mother or father responds to the signal. Infants are particularly adept at interpreting parental facial characters in discriminating the positive or negative nature of a new stimulus. When an infant encounters new environmental features, it generally focuses first on the parent's expression in learning how to respond. Once the new environmental feature is recognized, it is coupled with an appropriate behavioral response. The coupled input (environmental stimulus) and output (behavioral response) program is stored in the subconscious as a learned perception. If the stimulus ever reappears, the "programmed" behavior encoded by the subconscious perception is immediately engaged. Behavior is based upon a simple stimulus-response mechanism. Outwardly-directed learned perceptions are created in response to everything from simple objects to complex social interactions. Collectively, these learned perceptions contribute to an individual's enculturation. Parental "programming" of a child's subconscious behavior enables that child to conform with the "collective" voice, or beliefs, of the community. In addition to the outward-directed perceptions, humans also acquire inward-directed perceptions which provide us with beliefs about our "self-identity." In order to know more about ourselves, we learn to see ourselves as others see us. If a parent provides a child with a positive or negative self image, that perception is recorded in the child's subconscious. The image acquired of self becomes the subconscious "collective" voice that shapes our physiology (e.g., health characteristics, weight) and behavior. Though every cell is innately intelligent, by communal agreement it will give its allegiance to the collective voice, even if that voice engages in self-destructive activities. For example, if a child is given a perception of itself that it can succeed, it will continuously strive to do just that. However, if the same child was provided with a belief that it was "not good enough," the body must conform to that perception, even by using self-sabotage if necessary, in order to thwart success. Human biology is so dependent upon learned perceptions, that it is not surprising evolution has provided us with a mechanism that encourages rapid learning. Brain activity and states of awareness can be measured electronically using electroencephalography (EEG). There are four fundamental states of awareness distinguished by the frequency of electromagnetic activity in the brain. These states of activity acquire predominance in a sequential order during child development (Laibow, 1999). DELTA waves (0.5-4 Hz), the lowest level of activity, are the principle waves expressed between birth and two years of age. When a person is in DELTA, they are in an unconscious (sleep-like) state. Between two years and six years of age, the child primarily engages in a higher level of activity characterized as THETA (4-8 Hz). THETA activity is the state we experience upon just arising, when we are half asleep and half awake. Children are in this very imaginative state when they play, creating delicious pies made out of mud or gallant steeds from old brooms. The child predominantly expresses still higher levels of EEG activity called ALPHA waves around the age of six. ALPHA (8-12 Hz) is associated with states of calm consciousness. Conventionally, the highest level of brain activity, referred to as BETA (12-35 Hz), a state of awareness associated with active or focused consciousness, becomes more prevalent at around age twelve. The significance of this developmental spectrum is that a child does not express consciousness (ALPHA activity) until after five years of age. Before birth and through the first five years of life, the infant is primarily in DELTA and THETA, which represents a hypnogogic state. In order to hypnotize an individual it is necessary to lower their brain function to these levels of activity. Consequently, the child is essentially in a hypnotic "trance" through the first five years of its life. During this time it is down-loading biology-controlling perceptions without even the benefit, or interference, of conscious discrimination. The potential of a child is "programmed" into its subconscious mind during this phase of development. Learned perceptions are "hard-wired" as synaptic pathways in the subconscious, which essentially represents what we recognize as the brain. Consciousness, which functionally expresses itself with the appearance of ALPHA waves at around six years of life, is associated with the most recent addition to the brain, the prefrontal cortex. Human consciousness is characterized by an awareness of "self." While most of our senses, such as eyes, ears and nose, observe the outer world, consciousness resembles a "sense" that observes the inner workings of its own cellular community. Consciousness feels the sensations and emotions generated by the body and has access to the stored data base comprising our perceptual library. To understand the difference between subconscious and consciousness, consider this instructive relationship: The subconscious mind represents the brain's hard drive (ROM), and the conscious mind is the equivalent of the "desktop" (RAM). Like a hard disk, the subconscious can store an unimaginable quantity of perceptual data. It can be programmed to be "on line," meaning that incoming signals go directly to the database and are processed without the necessity of conscious intervention. By the time consciousness evolves to a functional state, most of the fundamental perceptions about life have been programmed into the hard drive. Consciousness can access this database and open it up for review a formerly learned perception, such as a behavioral script. This would be the same as opening up a document from the hard drive onto the desktop. In consciousness, we have the ability to review the script and edit the program as we see fit, just as we do with open documents on our computers. However, the editing process in no way changes the original perception which is still hardwired in the subconscious. No amount of yelling or cajoling by the consciousness can change the subconscious program. For some reason we think there is an entity in the subconscious that listens and responds to our thoughts. In reality the subconscious is a cold, emotionless database of stored programs. Its function is strictly concerned with reading environmental signals and engaging the hard-wired behavior programs, no questions asked, no judgments made. Through shear will power and intent, consciousness can attempt to override a subconscious tape. Usually such efforts are met with varying degrees of resistance, since the cells are obligated to adhere to the subconscious program. In some cases the tensions between conscious will power and subconscious programs can result in serious neurological disorders. For example, consider the fate of Australian concert pianist David Helfgott whose story was presented in the film Shine. David was programmed by his father, a survivor of the holocaust, to not succeed, for success would make him vulnerable in that he would stand out from others. In spite of the relentlessness of his father's programming, David was consciously aware that he was a world-class pianist. In order to prove himself, Helfgott purposely chose one of the most difficult piano compositions, a piece by Rachmaninoff, to play in the national competition. As the film reveals, in the final stage of his amazing performance, a major conflict occurred between his conscious will to succeed and the subconscious program to fail. When he successfully played the last note he passed out; upon awakening he was irreparably insane. The fact that his conscious will power forced his body mechanism to violate the programmed "collective" voice led to a neurological meltdown. The conflicts we generally experience in life are frequently related to our conscious efforts of trying to "force" changes upon our subconscious programming. However, through a variety of new energy psychology modalities (e.g., Psych-K, EMDR, Avatar, etc) the content of subconscious beliefs can often be assessed and using specific protocols, consciousness can facilitate a rapid "reprogramming" of limiting core beliefs. References REFERENCES Appenzeller, T. (1999). Test tube evolution catches time in a bottle. Science, 284, 21082110. Baltimore, D. (2001). Our genome unveiled. Nature, 409, 814-816. Cairns, J., Overbaugh, J., &Miller, S. (1988). The origin of mutants. Nature, 335, 142-145. Chamberlain, D. B. (1998) The mind of your newborn baby (3rd ed.). Berkeley, CA: North Atlantic Books. Chicurel, M. (2001). Can organisms speed their own evolution? Science, 292, 1824-1827. Christensen, D. (2000). Weight matters, even in the womb. Science News, 158, 382-382. Joyce, G. F. (1997). Evolutionary chemistry: Getting there from here. Science, 276, 1658-1659. Laibow, R. (1999). Medical applications of neurofeedback. In J. R. Evans &A. Abarbanel (Eds.). Quantitative EEG and neurofeedback. San Diego: Academic Press. Lipton, B. H. (1998a). Nature, nurture and the power of love. Journal of Prenatal and Perinatal Psychology and Health, 13(1), 3-10. Lipton, B. H. (1998b). The evolving science of chiropractic philosophy. Part I. Today's Chiropractic, 27(5), 16-19. Lipton, B. H. (1999). The evolving science of chiropractic philosophy. Part II. Today's Chiropractic, 28(6), 20-31. Lipton, B., Bensch, K. G., &Karasek, M. (1991). Microvessel endothelial cell transdifferentiation: Phenotypic characterization. Differentiation, 46, 117-133. Lipton, B. H., Bensch, K. G., &Karasek, M. (1992). Histamine-modulated transdifferentiation of dermal microvascular endothelial cells. Experimental Cell Research, 199, 279-291. Nijhout, H. F. (1990). Metaphors and the role of genes in development. BioEssays, 12(9), 441-446. Schultz, E. A. &Lavenda, R. H. (1987). Cultural anthropology: A perspective on the human condition. St Paul, MN: West Publishing Company. Symer, D. E. &Bender, J. (2001). Hip-hopping out of control. Nature, 411, 146-149. Thaler, D. S. (1994). The evolution of genetic intelligence. Science, 264, 224-225. Verny, T. R. with Kelly, J. (1981). The secret life of the unborn child. New York: Bantam. Vinson, V., Purnell, B., Chin, G., &Marx, J. (2000). Macromolecular ballet. Science, 288, 1369. Vogel, G. (2000). Stem cells: New excitement, persistent questions. Science, 290, 1672-1674. Wedemayer, G. J., Patten, P. A., Wang, L. H., Schultz, P. G., &Stevens, R. C. (1997). Structural insights into the evolution of an antibody combining site. Science, 276, 1665-1669. 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