

# MEASURING the IMMEASURABLE



THE  
SCIENTIFIC  
CASE *for*  
SPIRITUALITY

*including*

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How do biology and the evolving science of epigenetics interface with current evidence about consciousness and the subconscious mind? Who is actually “running the show” in our brains? These are the questions Bruce Lipton, author of several books including *The Biology of Belief: Unleashing the Power of Consciousness, Matter, and Miracles*, examines in the following essay. Lipton leads us from new discoveries about cellular biology to the true ability of the subconscious mind and its relationship with mindfulness.

## Revealing the Wizard Behind the Curtain

*The “New” Biology and Epigenetics*

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There is a “new edge” biology in town and it’s radically reframing our understanding of life. Frontier science is recognizing that there is a lot more to life than just a biochemical machine controlled by genes. Amazing advances in cell biology and biophysics are invoking the role of mind and spirit as the creative force controlling the character of our lives. Recently described biochemical pathways have now revealed the mechanisms by which thoughts, attitudes, and beliefs create the conditions of our body and the external world. An

awareness of these biological breakthroughs is fundamental for healing ourselves and our planet. Through a personal understanding of how consciousness interfaces with biology, we are offered the key to realizing personal growth and impacting global transformation.

Since Watson and Crick's discovery of the genetic code in 1953, the public has been programmed with the conventional belief that DNA "controls" the attributes passed down through a family's lineage, including dysfunctional traits such as cancer, Alzheimer's, diabetes, and depression, among scores of others. As "victims" of heredity, we naturally perceive ourselves as being powerless in regard to the unfolding of our lives. Unfortunately, the assumption of being powerless is a path that leads to personal irresponsibility: "Since I can't do anything about it anyway . . . why should I care?"

By the 1970s, the notion of *genetic determinism* led scientists to believe that life's programs were encoded in the genes. They thus set out to map the human genome, hoping that in revealing that code, they would find the key to finally preventing and curing human illness. The project was well underway when cell biologists began to uncover a paradigm-shattering view of how life really works. Their revolutionary research has led to an entirely new branch of science known as *Epigenetics* (Watters, 2006). Epigenetic science has shaken the foundations of biology and medicine to its core, for it reveals that we are not "victims," but in fact "masters" of our genes.

The prefix *epi-* means "over or above." Currently, students in high school and basic college biology courses are programmed with the now outdated notion of *genetic control*, the belief that genes primarily control the traits of life. In contrast, the new science of *epigenetic control* reveals that life is controlled by something "above" the genes. Exciting new insights concerning what that *something* "above" the genes is provides a gateway

to understanding our proper role as participatory creators in the unfolding of our lives.

#### SOMEWHERE BEYOND THE GENES

Epigenetic science focuses upon the mechanisms by which environmental signals regulate gene activity. Protein “switches” in the cell’s membrane respond to environmental signals by relaying “secondary” signals into the cell’s cytoplasm. Some membrane-derived signals regulate the cell’s physiologic functions (e.g., digestion, respiration, and excretion); other membrane signals are directly sent to the cell’s nucleus where they control gene activity (Lipton, 2005).

This is far different from the conventional belief that genes turn themselves “on” and “off.” Genes are not *emergent* entities, which means genes do not control their own activity. Genes are simply molecular “blueprints” (Nijhout, 1990). In contrast, epigenetic mechanisms are functionally analogous to “contractors” that select appropriate gene blueprints needed for the construction and maintenance of the body. Genes do not *control* biology . . . they are *used* by biology.

The traditional notion that the genome represents “read-only” programs has given way to a new reality wherein epigenetic mechanisms modify the readout of an individual’s genetic code. The power of epigenetics is revealed in the fact that epigenetic mechanisms edit the readout of a gene and are able to create over thirty thousand different variations of proteins from the same gene blueprint (Silverman, 2004)! Depending on the nature of the environmental signals, the same gene can be modified to produce either healthy or dysfunctional protein products. In other words, one can be born with healthy genes but through a distortion in epigenetic signaling, can develop a mutant condition such as cancer (Kling, 2003). On the positive side, the same epigenetic mechanisms enable individuals

born with potentially debilitating mutations to create normal, healthy proteins and functions from their inherited defective genes (Waters and Jirtle, 2003).

Epigenetic mechanisms modify the readout of the genetic code; consequently, the genome represents “read-write” programs wherein life experiences can actively redefine an individual’s genetic traits. As organisms interact with the environment, their perceptions engage epigenetic mechanisms to fine-tune genetic expression so as to enhance their opportunities for survival. This environmental influence is dramatically revealed in studies of identical twins. At birth and shortly after, these siblings express almost the same gene activity from their identical genomes. However, as they begin to experience life, their personal individualized experiences and perceptions lead to the activation of profoundly different sets of genes (Fraga, 2006).

This revised version of science emphasizes the reality that we actively control our genetic expression moment by moment throughout our lives. We are “learning” organisms, and our life experiences can become incorporated into our genomes and passed to our offspring. Rather than perceiving of ourselves as helpless victims of our genes, we must now own the empowering truth that our perceptions and responses to life dynamically shape our biology and behavior. Now let’s take a look at how those all-powerful perceptions are actually shaped.

#### FROM THE MICROCOSM OF THE CELL TO THE MACROCOSM OF THE MIND

Most of the trillions of cells forming bodies such as ours have no direct perception of the external environment. Liver cells “see” what’s going on in the liver, but don’t directly know what’s going on in the world outside the skin. The function of the brain and nervous system is to interpret environmental

stimuli and send signals to the cells that integrate and regulate life-sustaining functions of the body's organ systems.

Evolution accommodated increases in brain size, allowing organisms to dedicate vast numbers of nerve cells for cataloging, memorizing, and integrating complex perceptions. The ability to remember and select among the millions of experienced perceptions acquired in life provides the brain with a powerful creative database from which it can design and integrate complex behavioral repertoires. When put into play, these behavioral programs endow the organism with the characteristic trait of *consciousness*. In this case, the term *consciousness* is used in its most fundamental context: *the state of being awake and aware of what is going on around you*.

Many scientists prefer to think of consciousness as something an organism either has or does not have. However, the study of evolution suggests that consciousness mechanisms evolved over time. Consequently, the character of consciousness would likely express itself as a gradient of awareness from “less conscious” in primitive organisms to the unique character of *self-consciousness* manifest in humans and other higher vertebrates. *Self-consciousness* endows one with the quality of simultaneously being both a participant and observer in the unfolding of one's life.

The expression of *self-consciousness* is specifically associated with a small evolutionary adaptation in the brain known as the *prefrontal cortex*. The prefrontal cortex is the neurological platform that enables us to realize our personal identity and to experience the quality of “thinking.” Monkeys and lower organisms do not express self-consciousness. Monkeys looking into a mirror will never realize that they are looking at themselves; they will always perceive the image to be that of another monkey. In contrast, neurologically more advanced chimps looking in the mirror recognize the mirror's reflection as their own image.

An important difference between the brain's *consciousness* and the prefrontal cortex's *self-consciousness* is that conventional *consciousness* enables an organism to assess and respond to the immediate conditions of its environment that are relevant at that moment. In contrast, *self-consciousness* enables the individual to factor in the consequences of their actions not just in the present moment, but also as to how they will impact the future.

*Self-consciousness*, which incorporates a reasoning individual ("self") in the decision-making process, enables us to be cocreators, not merely responders, to environmental stimuli. While conventional *consciousness* enables organisms to participate in the dynamics of life's "play," the quality of *self-consciousness* offers an opportunity to be not just an actor, but also an audience member and even a director. *Self-consciousness* provides an individual with the option for self-reflection, and the ability to review and edit their character's performance.

As significant as it is to our own identity, *self-consciousness* is actually just a small part of what we call the *mind*. While the self-conscious mind is engaged in self-reflection, someone has to be minding the store; enter the *subconscious mind*. In conventional parlance, the brain's mechanism associated with automated stimulus-response behaviors is referred to as the *subconscious* or *unconscious mind*, because this function requires neither conscious observation nor attention. Subconscious mind functions evolved long before the prefrontal cortex. Consequently, organisms unable to express self-consciousness are fully able to operate a body and navigate the challenges of a dynamic environment. In a manner similar to lower organisms, we too can cruise on "automatic pilot" regulating our physiologic and behavioral functions without need for advice or other input from the *self-conscious mind*.

## WHO'S RUNNING THE SHOW?

The *subconscious mind* is an astonishingly powerful information processor that can record perceptual experiences (programs) and forever play them back at the push of a button. Interestingly, many people only become aware of their subconscious mind's push-button programs when their own "buttons are pushed" by the actions of others.

Actually, the entire image of pushing buttons is far too slow and linear to describe the awesome data processing capacity of the subconscious mind. It has been estimated that the disproportionately larger brain mass providing the subconscious mind's function has the ability to interpret and respond to over 40 million nerve impulses per second (Norretranders, 1998). In contrast, the diminutive self-conscious mind's prefrontal cortex only processes about forty nerve impulses per second. As an information processor, the subconscious mind is *one million times* more powerful than the self-conscious mind.

In contrast to its computational wizardry, the subconscious mind has only a marginal aptitude for creativity, best compared to that of a precocious five-year-old. While the self-conscious mind can express free will, the subconscious mind primarily expresses prerecorded stimulus-response "habits." Once a behavior pattern is learned—such as walking, getting dressed, or driving a car—those programs become automatic habits in the subconscious mind, meaning you can carry out these complex functions without paying any attention to them.

While the subconscious mind can run all internal systems *and* chew gum at the same time, the much smaller self-conscious mind can juggle only a small number of tasks simultaneously. Although its ability for multitasking is physically constrained, the trained self-conscious mind is quite adept at "single-tasking." It is the organ of focus and concentration. It was once thought that some of the body's involuntary functions, such as the regulation of



heartbeat, blood pressure, and body temperature, were beyond the control of the self-conscious mind. However, yogis and other adept practitioners have clearly demonstrated that the mind can indeed control presumed “involuntary” functions. Most of us have experienced how mind controls such functions when we become excited, happy, or sad while watching a movie or awoken from a scary dream, wet with perspiration and our hearts pounding. A vivid imagination controls autonomic functions as much as real events.

The subconscious and self-conscious minds work as a marvelous tandem tag team. The subconscious mind’s role is to control every behavior that is not attended to by the self-conscious mind. For most of us, the self-conscious mind is so preoccupied with thoughts about the past or the future, or engaged with some problem in our imagination, that we leave the day-to-day, moment-to-moment “driving” to the subconscious mind. Cognitive neuroscientists reveal that the profoundly more powerful subconscious mind is responsible for 95 to 99 percent of our cognitive activity and therefore controls almost all of our decisions, actions, emotions, and behaviors (Szegedy-Maszak, 2005).

The most powerful and influential behavioral programs in the subconscious mind were acquired during the formative period between gestation and six years of age. Now here’s the catch—these life-shaping subconscious programs are direct downloads derived from observing our primary teachers: our parents, siblings, and local community. Unfortunately, as psychologists are keenly aware, many of the perceptions acquired about ourselves in this formative period are expressed as limiting and self-sabotaging beliefs (Lipton, 1998, 2001).

Unbeknownst to most parents, their words and actions are being continuously recorded by their children’s minds. Since the role of the mind is to make coherence between its programs and real life, the brain generates appropriate behavioral

responses to life's stimuli to assure the "truth" of the programmed perceptions.

Let's apply this understanding to real-life behavior: Consider that you were a five-year-old child throwing a tantrum in a department store over your desire to have a particular toy. In silencing your outburst, your father reprimands you with his *often-repeated* response, "You don't deserve things!" You are now an adult and in your self-conscious, thinking mind you are considering the idea that you have the qualities and power to assume a position of leadership at your job. Remember, while in the process of entertaining this positive thought in the self-conscious mind, programs in your more powerful subconscious mind are automatically managing all of your behaviors. Since your fundamental behavioral programs are those derived in your formative years, your father's rebuke that "you do not deserve things" may become the subconscious mind's automated directive. So while you are conjuring up wonderful thoughts of a positive future and not paying attention to the current moment, your subconscious mind automatically engages self-sabotaging behaviors to assure that your reality matches your program of "not deserving."

#### THE SUBCONSCIOUS MIND: THE INVISIBLE PILOT

When the self-conscious mind is engaged in thought, it rarely observes the automatic behaviors generated by the subconscious mind. Consider the significance of this common reality: Let's say you have a friend Mary whom you've known since childhood. Being familiar with her and her family so long, you recognize that Mary's behavior closely resembles that of her mother. Then one day you casually remark, "You know, Mary, you're just like your mom." Mary backs away in shock, indignant that you could even suggest that she was like her mother! "How can you say something so ridiculous?" she demands.

The cosmic joke is that everyone else can see that Mary's behavior resembles her mom's *except* Mary. Why? Simply because when Mary is engaging the subconscious behavioral programs she downloaded in her youth from observing her mom, her self-conscious mind is preoccupied in thought and she's not paying attention. At those moments, her automatic subconscious programs operate without observation; hence they are *unconscious*. Only rarely do we observe our unconscious behavior—and it is usually a shock when we do.

Consequently, most of our personal and cultural problems arise from the belief that we are running our lives with our conscious desires and aspirations. "*This is what I want from life. I want to do all these wonderful things.*" Yet our lives usually don't match our intentions; as a result there is a tendency to think, "*I can't get the things that I want . . . the world is not providing them. The Universe is against me!*" Generally, the reason we fail to get what we desire is not because the Universe does not want us to succeed, but because we undermine our own efforts with "invisible" limiting behaviors. Unfortunately, our fundamental subconscious programs were acquired by observing the behavior of others (e.g., parents, family, community, TV), people who may not share our personal goals and aspirations. While our conscious minds are trying to move us toward our dreams, unbeknownst to us, our subconscious programs may be simultaneously shooting ourselves in the foot and impeding our progress.

We have all been shackled with emotional chains wrought by dysfunctional behaviors programmed by the stories of the past. However, the next time you are talking to "yourself" with the hope of changing sabotaging subconscious programs, it is important to realize the following information. The subconscious mind is simply a "record-playback" mechanism that downloads experiences and programs them as "behavioral

tapes.” There is no thinking, conscious entity controlling subconscious programs; this autopilot mind is basically a stimulus-response reflex mechanism. Using reason to communicate with your subconscious mind in an effort to change its behavior would essentially have the same influence as trying to change a program on a cassette tape by talking to the tape player. In neither case is there an entity in the mechanism that will respond to your dialogue.

Positive affirmations and positive thinking are not that effective in reprogramming limiting beliefs. Positive thoughts are generated by the conscious mind, a tiny processor that controls the system less than 5 percent of the time. If programs in the subconscious mind do not support the intentions of the conscious mind, which will win out? Positive thinking is a good idea, much better than negative thinking, yet while one is engaging the conscious mind to create positive thoughts, the subconscious mind with its limiting and self-sabotaging programs is running the show! Consequently, positive thinking does not necessarily improve the situation for most people.

#### FROM THE BLAME GAME TO RESPONSE-ABILITY

One of the most important points to make is that subconscious programs are *not* fixed, unchangeable behaviors. We have the ability to rewrite our limiting beliefs and in the process take control of our lives. However, to change subconscious programs requires the activation of processes other than engaging in a running dialogue with the subconscious mind.

One of the more ancient processes of taking control of your life is to be fully present and use your creative conscious mind to control behavior, rather than rely on the “autopilot” habitual programs downloaded into your subconscious mind. For example, the next time you are driving and come to a stoplight, pause for a moment and listen to the monologue that is continuously

emanating from your mind. Most of the information is either a rehashing of the past or expectations about your future.

Psychologists suggest that most of these thoughts are negative and redundant, with 95 percent of them arising from perceptions programmed in the subconscious mind. As mentioned earlier, the function of the brain is to create coherence between its programs and the life you experience. When you have the opportunity to “listen” to your thoughts, realize that their content is greatly influencing your future expectations. Increasing consciousness by being an observer of your thoughts is a foundational principle of Buddhism.

Amazingly, the power of thought is also fully recognized by the principles of quantum physics, a science that acknowledges the participation of the observer in the creation of reality. This profound conclusion is originally derived from many experiments that attempted to identify the “true” character of Nature’s fundamental building blocks—were they made of immaterial *waves* (energy) or were they physical *particles* (matter)? This is an “either-or” solution since something cannot be both physical *and* nonphysical. The surprising answer to their quest: if the scientist created an experiment that registered particles, they were particles; if the scientist created an experiment to detect waves, they were waves. Simple conclusion: “The observer *creates* the reality!” This role of mind in creating reality was recently underscored in the prestigious scientific journal *Nature*. In an article entitled “The Mental Universe,” Richard Conn Henry, professor of physics at the Johns Hopkins University, concludes, “The universe is immaterial—mental and spiritual. Live and enjoy” (Henry, 2006). It is a scientific reality that thoughts influence the material world!

When the *subconscious mind* provides for most of our thoughts, then our lives are primarily shaped by our developmental experiences, including behaviors and attitudes acquired from others (e.g., parents, family, and community) (Lipton,

2001). However, if we keep our self-conscious mind focused upon the present moment, rather than letting it wander into the past or future, we can actively control our mind by using thoughts that empower ourselves and lead us to our desired intentions and aspirations.

Interestingly, you may have actually experienced the spectacular consequences of living from the *self-conscious mind*, and it was probably the happiest, healthiest, and most energetic period of your life. It was when you fell in love and experienced the “honeymoon effect,” a period where you were fully present and very self-conscious of your attitudes and behaviors. Your self-conscious mind was “running the show” to assure that you were presenting yourself in the qualities you aspire to, rather than allowing the expression of habitual traits programmed into your subconscious mind. These new insights from biology and physics provide a scientific recognition of the powerful, life-affirming consequences of the Buddhist spiritual practice known as *mindfulness*.

Other approaches to rewriting limiting or sabotaging subconscious programs include clinical hypnotherapy and a new field of diverse modalities, collectively called “energy psychology,” that identify and rapidly rewrite limiting belief programs in our subconscious minds. For more information on how to rewrite our subconscious programs, review the Resources selection at [www.brucelipton.com](http://www.brucelipton.com).

#### THE OLD STORY IS THE NEW STORY

The conclusions of the “new edge” biology provide a radical departure from our conventional beliefs of how life works. In contrast to the notion of being a genetically driven biochemical automaton, the new insights reveal that it is the mind that controls genes, which in turn shape our biology and behavior. The self-conscious mind, associated with our individual identity

and the manifestation of thoughts, is guided by our own personal beliefs, desires, and intentions.

Here's what is important for now: As we recognize our ability to change our programming, we evolve from passive victims to responsible cocreators. In the process, we are afforded the opportunity to respond to life, not merely react to it.

Once we realize that our past behaviors were predicated on the invisible operation of the subconscious mind—whose programs are derived from other people's beliefs—we are afforded the opportunity to forgive ourselves. Our invisible behaviors are programs primarily derived from others, who in turn were programmed by others, backward through time. Perhaps instead of original sin, we should be talking about "original misperception." In any case, neither we nor our parents, nor their parents, were aware that we were primarily controlling our lives using behavioral programs derived from others.

In this regard, it is important to remember this: ALL of the people we have ever engaged with over our lifetime were also responding using invisible behavioral programs downloaded into *their* infant subconscious minds. Consequently, they too were personally unaware of their own invisible participation and contributions that may have impacted our lives.

Based upon the scientific insights on the nature of how the mind works, the "new" biology implores us to heed the advice of all the great prophets to forgive all of those that have transgressed against us. We have all been shackled with emotional chains wrought by dysfunctional behaviors programmed by the stories of the past. Through forgiveness, we unshackle ourselves and others, allowing us all to let go of the old story.

It is of profound importance to the evolution of humanity that these new insights reach the public. Efforts to bring peace into the world are truly impeded because most citizens are unconsciously responding to cultural wrongs that were

perpetrated generations ago on their ancestors. From this perspective, it behooves us to step back and reconsider our emotionally charged notions concerning blame, guilt, victims, and perpetrators. These labels can only be legitimately applied to situations in which the participants are fully cognizant of the programming and operation of their self-conscious and sub-conscious minds and yet still engage in destructive behaviors.

In studying the life and teachings of Jesus, it is clear that He was innately aware of the mechanics of consciousness and employed it in controlling His own biology and behavior. This is why Jesus emphasized that were it not for our (limiting) beliefs, we all could do the miracles He did, and perhaps, even better than He did them. He was on target when He declared that we could renew our lives with our beliefs. And most importantly, He saw the reality of forgiveness as the most important path toward peace. If enough of us performed this simple “local” act, we would indeed advance global evolution.