BYU Studies Quarterly

Volume 49 | Issue 1 Article 7

1-1-2010

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REVIEW ESSAY

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Recent Developments in Neuroplasticity

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During the twentieth century, many in the emerging fields of brain science operated under the assumption of absolute biological materialism—the idea that all reality in life can be reduced to our natural, physical dimension. For example, some neuroscientists sought to explain the deep mysteries of human consciousness not as any cosmic interconnection of spirit and matter but merely as a series of chemical reactions in the brain. Such assumptions in reductive materialism and pure determinism may sometimes be necessary within the realm of controlled scientific inquiry; but when adopted as a way of life, determinism has profound repercussions not only in the public realm of political strife but also in the quieter realm of personal struggle.

For example, academic circles and mass media outlets alike reported the neuroscientific discovery that human qualities are determined in the first few years of life. True, the developing brain is a specimen of great wonder as neurons and synapses nimbly multiply and trim themselves according to external stimuli, but once the brain's hardware is fully wired, it is no longer plastic or pliable and therefore is much like that old dog, the one with no new tricks. Parents had about three years to make the right impression on their child—or else. From the late 1940s onward, determinism became big business as disciples of Dr. Benjamin Spock and disciples of behaviorism rushed out to buy the latest parenting manual. In fact, proper child development became a great controversy between behaviorists and Spockites in the 1940s and 1950s precisely because both sides assumed that the window of opportunity to mold the little tykes was so fleeting and so crucial.

Science may not have intended it, but there was a side effect to this zeitgeist, namely that adults were banished to the doghouse where the proverbial old dog dwelt. The philosophical ramifications of pure determinism became the conventional, albeit devastating, wisdom. If the wellspring of all adult thoughts and cognitions cannot change, then adults themselves cannot change; thus, happy notions of regeneration or repentance are but deluded tricks grown-ups play on themselves. Any appearance of authentic change in the human spirit can be dismissed as an anomaly in the human biological system. As a result, countless adults, helped along by Freudianism, bemoaned the abominable events of their childhood as the cause of their troubles, and countless more used their childhood as an excuse to make trouble and act rather abominably.

As it turns out, more recent research into neuroplasticity has firmly established that the adult brain is capable of profound changes even in the later stages of life. Beginning in earnest during the early 1990s and picking up steam in the 2000s, influential researchers began publishing their findings in adult neuroplasticity. A seismic shift began taking place in the field of psychology at the same time, for if adult neuroplasticity is possible, then it would follow that many aspects of psychology would need to be revisited—which, it appears, is precisely what happened. Four psychologists—Seligmann, Haidt, Schwartz, and Burns—exemplify this seismic shift.

In 1990, Dr. Martin E. P. Seligman wrote for a general audience *Learned Optimism: How to Change Your Mind and Your Life*, which later helped spawn the positive psychology movement as well as instill the hope that people are not helpless and that profound and fundamental changes are possible in adulthood.[1] Seligman and others note that the DSM-IV, the manual used by all psychiatrists and psychologists to diagnose their patients, is a thousand-page codex of every mental flaw ever discovered but has almost nothing to say about human strengths and how to build upon them. Such a negative skew does have important and even vital uses, but all shadows and no light is rather dreary, particularly to those trying to chase away the indigo shades of anxiety and depression. Positive psychology has become a welcome desert *shekinah* to those groping for more illumination.

Just as quantum mechanics infused a mystical essence into the sciences, researchers in positive psychology also began to see patterns and correlations emerge between the new understanding of neuroplasticity and age-old religious practices. Dr. Jonathan Haidt set out on the ambitious task of sifting through and redacting those universal moral ideas

1. Martin E. P. Seligman, *Learned Optimism: How to Change Your Mind and Your Life* (New York: Knopf, 1990).

found in all the major ancient religions and civilizations and then reinterpreting them according to modern research in positive psychology and neuroscience—thus was born *The Happiness Hypothesis*.[2] Such a link between religion and this new psychology is compelling, so compelling that even an atheist like Haidt can see it. And for believers, there is something soul-satisfying in seeing Jesus' and Paul's admonitions vindicated in verifiable research.

For instance, Haidt points out that the Christian (as well as Buddhist and Hindu) notion that humans are divided beings battling between two forces is also true for the brain. Scientists can measure brain waves in the left and right frontal cortexes, areas found just behind the forehead. But "it has long been known from studies of brainwaves that most people show an asymmetry" (33). Those who are naturally happy, upbeat, and given to other positive emotions show stronger brain activity in the left frontal cortex. Those who suffer depression, anxiety disorders, and a host of other negative emotions display a more active right frontal cortex. In fact, a person's level of happiness "is one of the most highly heritable aspects of personality" (33). But inheritance need not kill hope. Haidt argues that "you can change your affective style" (35) to a happier disposition, and he points to research showing that focused prayer and religious meditation can cajole the brain's activity to lean to the happy left.[3]

Haidt and Seligman are willing to engage religious ideas, but Latter-day Saints are still likely to disagree with a few of their views concerning the restrictions materialistic biology places on human nature. Seligman suggests elsewhere that abnormal sexual identity is totally unchangeable,[4] and Haidt devotes a portion of his book to exploring research that suggests spiritual experiences are merely a series of neurochemical reactions in the brain's temporal lobes that can be manipulated with drugs (201–6).

Such passages may strike Latter-day Saints as somewhat faithless and skeptical, especially coming from a couple of positive psychologists.

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2. Jonathan Haidt, *The Happiness Hypothesis: Finding Modern Truth in Ancient Wisdom* (New York: Basic Books, 2006).

3. See also Daniel Goleman, "Behavior; Finding Happiness: Cajole Your Brain to Lean to the Left," *New York Times,* February 4, 2003, http://www.nytimes.com/2003/02/04/health/behavior-finding-happiness-cajole-your-brain-to-lean-to-the-left.html?sec=health; and Sharon Begley, *Train Your Mind, Change Your Brain: How a New Science Reveals Our Extraordinary Potential To Transform Ourselves* (New York: Ballantine, 2007).

4. Martin E. P. Seligman, *What You Can Change and What You Can't: The Complete Guide to Successful Self-Improvement, Learning to Accept Who You Are* (New York: Knopf, 1994), 15.

Latter-day Saints do acknowledge biology as a powerful force, but one that under normal circumstances *influences* human action rather than one that *determines* it. Latter-day Saints do acknowledge that in some cases biology has a stranglehold on freedom of choice (such as those with severe mental handicaps, major neuropsychiatric disorders, or advanced chemical addictions), but even then they hold onto the hope that someday, somehow, there will be miraculous relief. Also, for Haidt to observe that a reported spiritual experience has an effect on the physical brain creates no problems in Mormon theology, which teaches that the essence we call *spirit* is actually a refined material. Hence there is nothing very spooky in the idea that the temporal lobe, though physical, might help interpret spiritual data. But for Haidt to suggest that the source of the experience begins and ends in the brain seems, to a believer, particularly closed-minded.

True, Latter-day Saints and scientists alike acknowledge that certain deterministic boundaries exist because of biology. We all experience them and easily observe them every day. But Latter-day Saints come from a tradition where they believe, for instance, that the people in the city of Enoch, over a lengthy process of time, were so transformed that they no longer belonged on this earth and were taken to heaven. It should not be surprising, then, that Latter-day Saints are likely to hold a more optimistic view on the possibilities of human change and redemption than what much of the research currently suggests.

More in line with this Latter-day Saint optimism, two other psychologists' works exhibit much more unabashed exuberance towards the powers of human agency in swimming against the pull of mighty biocurrents: Dr. Jeffrey R. Schwartz's *The Mind and the Brain: Neuroplasticity and the Power of Mental Force* and Dr. David D. Burns's bestseller, *Feeling Good: The New Mood Therapy*.[5] Schwartz and Burns strike me as more willing to push against the boundaries of determinism and forge ahead under a new, brain-as-dynamo paradigm—but not in a foolhardy way. They point to mountains of research—much of it more cutting edge—and decades of clinical experience to back them up.

Schwartz introduces readers to a world where patients with total paralysis move cursors on computer screens with the power of their own brain waves; subjects who overcome paralysis through prolonged mental effort despite the sensory nerves to their arms being completely severed; patients who suffer profoundly from obsessive-compulsive disorder

5. Jeffrey R. Schwartz and Sharon Begley, *The Mind and the Brain: Neuroplasticity and the Power of Mental Force* (New York: Regan Books, 2002); David D. Burns, *Feeling Good: The New Mood Therapy* (New York: Avon Books, 1999).

receiving considerable or complete relief through "redirected attention," a method that observably changes their brains' structure; and examples of mind-over-matter that do indeed exist beginning at the quantum level.

Delightfully, Schwartz also considers the spiritual realm of the mind in connection with the material realm. His smashing together of the ancient spiritual particle and the new science particle creates a brilliant flash of energy that should be quite refreshing to educated religionists. And more than refreshing, his book is also a sobering reminder of the moral hazards that arise when spiritual notions of mind and consciousness are altogether removed from neuroscience:

> Wrestling with the mystery of mind and matter is no mere academic parlor game. The rise of modern science in the seventeenth century—with the attendant attempt to analyze all observable phenomena in terms of mechanical chains of causation—was a knife in the heart of moral philosophy, for it reduced human beings to automatons. If all of the body and brain can be completely described without invoking anything so empyreal as a mind, let alone a consciousness, then the notion that a person is morally responsible for his actions appears quaint, if not scientifically naïve. A machine cannot be held responsible for its actions. If our minds are impotent to affect our behavior, then surely we are no more responsible for our actions than a robot is. It is an understatement to note that the triumph of materialism, as applied to questions of mind and brain, therefore makes many people squirm. For if the mysteries of the mind are reducible to physics and chemistry, then "mind is but the babbling of a robot, chained ineluctably to crude causality," as the neurobiologist Robert Doty put it in 1998. (52)

Related to Schwartz's ideas on redirected attention, Burns's book *Feeling Good* has pioneered the field of cognitive restructuring, which is a systematic redirecting of a person's distorted thoughts toward more truthful thoughts. Humans have an automatic internal dialogue of thoughts running nearly all the time, and, as it turns out, this internal dialogue often lies. Catastrophizing, overgeneralizing, labeling, filtering, and other distorted thoughts create distorted emotions. Reprogram the distorted internal dialogue, and watch depression, anxiety, anger, and other troubling states of mind dissipate over time:

> Even if there is some type of genetic or biological disorder in at least some depressions, psychotherapy can often help to correct these problems, even without medications. Many research studies, as well as my own clinical experience, have confirmed that severely depressed patients who appear very "biologically" depressed with lots of physical symptoms often respond rapidly to cognitive therapy alone without any drugs. (460)

Also, several independent studies reveal that depressed patients "appear to stay undepressed longer than patients who receive only antidepressant medication therapy and no psychotherapy" (462). The mind's ability to overcome biological forces is powerful indeed, but it is no reason to become giddy or reckless. Those with severe disorders like bipolar I or schizophrenia must almost always stabilize their condition with medication first before volitional cognitive restructuring can have any effect (462). "My clinical practice," says Burns, "has always been predicated on an integrated approach" to biology and the mind (463).

Latter-day Saints can benefit from a more integrated approach as well; whatever spiritual advantages they might enjoy do not always translate into mental health advantages. They suffer from mental disorders almost as frequently as the larger population.[6] But many Latter-day Saints are suspicious of psychology, partly because of its secular nature (and its Freudian beginnings) and partly because of the idea that true religion is supposed to fix everything. For some Latter-day Saints, using psychotherapy is to admit spiritual defeat. Ironically, the scriptures are saturated with Schwartz and Burns—or at least the principles they espouse. Latter-day Saints eager to learn more about the workings of their minds should consider reading *The Mind and the Brain* to gain much-needed hope and then *Feeling Good* to gain much-needed skills.[7]

Among brain researchers, the adage once was, "For every twisted thought, a twisted molecule." Now it might read, "For every twisted thought, there is a way to untwist it." Granted, all those ways have not yet been discovered. Many mental disorders baffle both subjects and scientists to this day. The city of Enoch example must be tempered by the example of the "lunatics" in the New Testament who were quite helpless to control their actions until Christ performed a miracle. But for those who are suffering milder disorders and for those "normal" people who just want to keep

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6. Daniel K Judd, "Religiosity, Mental Health, and the Latter-day Saints: A Preliminary Review of Literature (1923–95)," in *Latter-day Saint Social Life: Social Research on the LDS Church and its Members,* ed. James T. Duke (Provo, Utah: Religious Studies Center, Brigham Young University, 1998), 486–88.

7. Those who are wary of outside approaches to psychology have many LDS resources available to them. The Association of Mormon Counselors and Psychotherapists (AMCAP at http://ldsamcap.org) continues to conduct research, publish, and assist LDS professionals in sharpening their skills as serious clinicians, and Dr. Allen E. Bergin's book *Eternal Values and Personal Growth: A Guide On Your Journey to Spiritual, Emotional, and Social Wellness* (Provo, Utah: BYU Studies, 2002) is probably the most exhaustive resource under one cover that combines research-based psychotherapy with a Latter-day Saint perspective.

improving and progressing well into old age, neuroplasticity offers the evidence that such change is possible. And Schwartz and Burns uncover two main roots of that change: human belief and human will. A crucial moment on the path to brain transformation is when people first *believe* they can transform it and then *decide* to transform it.

This is not to say it will not take time, effort, and wisdom, nor is it to say that many will not need the help of medication or the guidance of a good doctor. Schwartz's research using brain imaging technologies firmly establishes that consistent amounts of doctor-assisted mental effort over months and even years, amounting to thousands of good choices, is often necessary to affect the desired biological changes within the brain. And, of course, adult neuroplasticity has certain boundaries, just as human agency has certain boundaries.

But we now have strong evidence that those boundaries are less confining than previously supposed. Schwartz's research firmly establishes that another essence is working on the brain that transcends a deterministic biology; something else is affecting the brain and changing it. I call it humanity—external human experience and internal human will. Many more psychologists today agree that this humanity has great transformative power, and they are throwing off the old Freudian-era *Sturm und Drang* and embracing a more optimistic and pragmatic approach to psychology. And many others, like Schwartz, go a step further and see neuroplasticity as one more reason that the scientific realities of material determinism should be interwoven with the religious and spiritual perspectives of agency, will, and volition.

Biological determinism is everywhere, and to some of it we must surrender. All are susceptible to infirmity and disease. All must grow old and die. But these facts are no reason for scientists, philosophers, or regular folk to surrender to a one-sided determinism that does not allow for transformation, redemption, liberty, and transcendence. Gladly, if the new research is any indication, such a surrender will not be necessary.

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