

Biofield Science: Implications for the Study of Human Behavior

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As a long-time follower of biofield science research, I recently found my attention drawn to two newspaper articles that at first glance seemed unrelated. One reported on a study showing that the human brain could detect external magnetic fields, and the other described how the new manager of the Boston Red Sox baseball team had brought about an entirely different positive atmosphere in the clubhouse. On further reflection, I saw that their intersection revealed a deep truth about human health and behavior. Here's how.

Magnets and Baseball

The first article was entitled "Pole position: Human body might be able to pick up on Earth's magnetic field" (Davis, 2019) and described how a team of physicists at the California Institute of Technology (Caltech) documented that humans can detect external magnetic fields (Wang et al., 2019). The Caltech researchers found that brain activity—in particular, regional cortical alpha wave dominance—changed in response to externally delivered magnetic pulses. These pulses were not applied directly to the skull, as is done clinically to treat a range of neuropsychiatric conditions (McClintock et al., 2018), but were

generated at a distance of several feet and were of similar strength to the earth's own magnetic field. Subjects were seated in a space that was enclosed by metal shielding (a Faraday cage) to screen out as much of the Earth's electromagnetic field (EMF) as possible. (EMFs are composed of both electric fields and magnetic fields; the cage screens out the electric field and the higher frequency components of the magnetic field.) Despite these strict controls, the subjects' brains were still able to detect and respond to the pulsations of the nearby magnetic fields.

The Caltech researchers acknowledged that further experiments will be needed to determine the pathways by which this neural detection system works, though it is thought to be mediated by a magnetite-containing protein, cryptochrome, found in the eye (Sherrard et al., 2018). The EMF link to consciousness and behavior is also not yet clear, but at least the EMF-brain connection has now been documented more definitively than ever before.

The second article came from the sports section of the *Boston Globe* and described the dramatic change in the clubhouse atmosphere of the Red Sox when their new manager took over at the beginning of the 2018 season, which ended with their World Series championship. This positive atmosphere was still present at the start of the new 2019 season, and the sportswriter hoped that it would continue throughout the upcoming year. Referring to the impersonal computer-like efficiency of the previous manager, he noted, "The churl is gone, and so is the chaos" (Shaughnessy, 2019). The new leader's interpersonal empathy and compassion fostered a sense of mutual respect and team cohesion in the locker room, in the dugout, and around the batting practice cage.

So what is the link between these two stories? It's the human biofield.

The Biofield

The biofield is a construct that bridges the worlds of physics and metaphysics. A study group at the National Institutes of Health (NIH) introduced the word “biofield” in 1994, though the concept is similar to such notions as the energy body (described in various mystical traditions), the morphic field (proposed by researcher Rupert Sheldrake), and the aura (a favorite term of New Age energy adepts). Scientists have described the biofield as a set of interpenetrating and interacting fields of information and energy that guide the homeostatic function of living organisms, thereby directly impacting our health. The biofield has multiple components, including the electromagnetic field, low-energy ultraviolet and biophoton emissions, possible quantum interactions, and perhaps even the metaphysical element of “etheric” or “subtle” energy (Rubik, Muehsam, Hammerschlag, & Jain, 2015).

Biofield science attempts to explain phenomena associated with invisible healing energies like “qi” in traditional Chinese medicine and “prana” in yoga’s Ayurvedic philosophy. Thus biofield science may help us better understand the mechanism of action of such therapies as acupuncture, tai chi, and Reiki (Jain et al., 2015), as well as such common but hard-to-explain behavioral experiences as the “sixth sense” or the personal boundaries of the “aura.”

These intangible phenomena fascinated me as a medical student 40 years ago when they were virtually taboo subjects in academia. My medical school mentor warned me that using such vague New Age-y terms would be off-putting to any colleagues who might otherwise be interested in exploring subtle energy as a valid subject for research. He predicted that carefully chosen terminology (i.e., saying “magnetic field” instead of “aura”) would be the key to building bridges between the esoteric worldview and the conventional medical paradigm. That is precisely the role now being played by the term “biofield science,” as the following examples will show.

The Personal Biofield

Consider the sensation of having one’s “personal space” invaded—a hot cultural topic in today’s world of microaggression and political polarization. The sensation may be a simple matter of visual and cognitive recognition of an “other”

coming too close for comfort. But given how often the intruder is first sensed when still outside the actual field of vision, this sensation might involve an intangible force such as the biofield. That is, the sensation may be triggered when an unfamiliar or unexpected EMF impinges on one’s own personal magnetic field, exactly as occurred in the Caltech study.

This “auric” field has its own sensory integrity and structure, as shown by several lines of evidence. In one study (Schwartz, Russek, & Beltran, 1995), blindfolded subjects were asked to determine which of their two outstretched palms was being approached (but not touched) by the experimenter’s hand. Despite the hand never coming close enough to detect thermal signaling (i.e., the 98.6 degree temperature of the hands), subjects were able to respond accurately more than 65% of the time, a statistically significant improvement over the 50% accuracy rate that would be expected if there were no intervening forces between the hands and random chance was the deciding factor.

Similarly, several case reports have concluded that the phantom limb sensations felt by many amputees are not constructs of their brains’ sensory cortex, as proposed by conventional neuroscience, but are palpable external fields whose outlines can be reliably detected by trained energy healing practitioners (Eden & Feinstein, 2008, p. 38; Leskowitz, 2000). Controlled laboratory tests have also validated the reliability of the related “sense of being stared at,” concluding that it does not depend on known sensory cues and may involve biofield activation (Sheldrake, 2000). Furthermore, many animals are highly attuned to magnetic fields: Birds use magnetoreception to orient themselves to the Earth’s magnetic field during migratory flight (Wiltschko & Wiltschko, 2005) and many fish have electrosensitive “lateral lines” that help them coordinate their schooling behaviors (Moore & Riley, 2009).

Humans are not just detectors of EMFs, however; we are also EMF emitters, in accordance with Oersted’s Law: Moving electrical charges (in this case, the electrical activity of the nervous system and, even more important, of the heart) induce an adjacent reciprocal magnetic field. Although this human magnetic field is much weaker than the Earth’s field (Proudfoot, Woolrich, Nobre, & Turner, 2014), it can be amped up dramatically—as much as 1000-fold—by energy-building practices such as qigong (Seto et al., 1992). So the

same mechanism that enables the brain to detect the Earth's magnetic field could conceivably detect the biofields of nearby people; our "sixth sense" might come online when our biofield sensing system gets activated by adjacent EMFs (Hand, 2016).

Researchers from the Institute of HeartMath have addressed these interactions by focusing on the cardiac component of the biofield, because the heart actually generates a stronger magnetic field than the brain. The heart is not a metronome but is highly responsive to input from the autonomic nervous system: The interval between heartbeats varies according to emotional state. This heart rate variability (HRV) reflects the balance between the sympathetic/activating and the parasympathetic/restorative branches of the autonomic nervous system. By receiving direct feedback of an aspect of their HRV called heart coherence, while subjectively generating positive emotions like appreciation, patients can reliably learn to increase their level of heart coherence, thereby increasing the resilience of their nervous systems and enhancing their mind-body coordination, for example, by speeding up their reflex reaction times. Interestingly, the strength and size of the field are not increased during coherence, but rather the informational content and spectral patterns are optimized (McCraty, Atkinson, Tomasino, & Bradley, 2009, Appendix E).

Biofield Interactions

By extension, the biofield may mediate many aspects of human behavior that involve group interactions. Heart coherence has been measured during dyadic interactions, and the results lend further support to the biofield model of human behavior and have shown that the emotion of appreciation generated by one person can influence the HRV of a nearby person (or dog!) by entraining them into a state of heart coherence (McCraty, 2003). Autonomic nervous system entrainment has also been described during compassionate intention practices with couples (Radin et al., 2008). And in one laboratory demonstration, four heart coherence adepts were able to rapidly entrain the nervous system of an HRV-naïve guinea pig (a human one) into a state of heart coherence, despite his being in sensory isolation when their heart-centered meditation began (Leskowitz, 2008, 2019 [video]). In other words, this interactional coherence was

not cognitively mediated via the five physical senses; the subject did not relax simply because he saw several smiling people sitting near him (he was blindfolded). Instead, as hypothesized by HeartMath and others (Morris, 2010), biofield entrainment seems to have been at play.

Much like tuning forks resonating to the same vibrational frequency, the subject's biofield may have become entrained to the larger coherent group field. By placing the subject inside a Faraday cage, a follow-up study could determine which component of the biofield was at work. Since most EMF interactions would be blocked by the cage, any entrainment that did occur would, by process of elimination, have to be the product of more esoteric forces such as quantum, torsion, or etheric fields.

Biofield interactions may also be the key to a clinically important dyadic connection: the doctor-patient relationship. A heart-coherent doctor may, in theory, be entraining his patients into healthier states of central nervous system balance simply by his presence, above and beyond the medical treatments being prescribed. Stories abound of patients who feel better in their MD's presence, and even though nonspecific psychological factors like trust, hope, and placebo responsiveness are certainly at work (Scott et al., 2008), the resonant healing impact of a heart-centered clinician's biofield may also be a key component of the proverbial "good bedside manner."

Many MDs nowadays complain that they have to pay more attention to their computers than to their patients and are locked into a digital Faraday cage that, in effect, screens out any potential emotional connection with their patients. But studies show that doctors and patients can learn to become more compassionate toward others and themselves by heart coherence training or mindful self-compassion practice, leading to greater job satisfaction and less burnout (Germer & Neff, 2013). These states of compassion clearly have interactive effects, so every clinical interaction is a two-way street (McCraty, 2017). When caregivers adopt self-care practices that encourage what has been called "energy hygiene," they ensure that their biofields do not get entrained to the illness patterns that are omnipresent at their worksites.

Group Cohesion and the Biofield

Moving to larger-scale interpersonal interactions, groups of people who cooperate successfully

(athletic teams, musical ensembles, workplace collaborations) may also be characterized by higher levels of heart coherence. This is, in fact, a testable hypothesis: Can group training in HRV biofeedback build a stronger sense of team bonding? Did the Red Sox manager's healing presence entrain the biofields of his players so that they all resonated together, in sync with his own coherent heart? We know that "team chemistry" is a highly valued goal in sports training (Leskowitz, 2010), but perhaps it should more accurately be called "team physics"!

But no matter how heart-coherent a group of humans might become, people will never show the effortlessly synchronous and spontaneous behavior of schools of fish and flocks of birds (e.g., the "murmuration" of starlings, a very large flock in coordinated flight; video, Winter, 2010). Mathematical modeling with computerized algorithms conclude that these group behaviors "arise by self-organization from rules of coordination with nearby neighbors" (Hildenbrandt, Carere, & Hemelrijk, 2010). These statistical reconstructions seem, however, like feeble attempts to digitize the transcendent, akin to neuroscience's quest to reduce consciousness to a series of brain scans and encephalograms. More helpful are Rupert Sheldrake's "morphic fields," the invisible coordinating matrixes that organize group activities at all levels of complexity, from the multiplying cells in a developing human embryo to the individual fish swimming in a school (Sheldrake, 2009). These dynamic analogue fields are not reducible to digital data points but come from a higher, meta level of organization. These fields keep the birds flying together in synchrony, much like the classic science demonstration of iron filings kept in precise geometric alignment around a bar magnet by the otherwise invisible lines of force emanating from the magnet.

Societal Aspects of the Biofield

Finally, human interactions at the societal level may also have a biofield element, according to researchers with the Global Coherence Initiative (GCI). The GCI studies how the Earth's magnetic field entrains human behaviors by carrying biologically relevant information to all living systems: "Large numbers of people creating heart-centered states of care, love and compassion will generate a more coherent field environment

that can benefit others and help offset the current planetary discord" (HeartMath Institute, n.d.). It's another testable hypothesis: that conscious alignment of biofields can have a ripple effect on the behavior of other people, even at a distance. One such experiment documented a decrease in crime rate during a large meditation retreat in a major metropolitan area (Hagelin et al., 1999); related studies are rapidly accumulating confirmatory data (Church, 2018).

Much work remains to be done in clarifying the distinctions between the biofield and its various components, and their relation to conscious intention and to anomalous perception. But at least we can now begin to see how baseball and biomagnetism might be linked—not just by batting cages and Faraday cages, but also by biofields.

To be fair, though, it takes more than entrained biofields to be successful in team sports. Soon after I began writing this essay, the Red Sox's promising new season collapsed, despite the continued presence of their inspiring manager. A series of strategic blunders regarding personnel deployment and injury management sank them into an early hole that looked, as the regular season neared its end and this essay was completed, to be too deep to rebound from—with or without heart coherence.

Thus the tangibles sometimes outweigh the intangibles, in sports and in life. Nevertheless, with this caveat in mind, we can still say that our sixth sense, our auras, and our coherent group interactions can bring our biofields in sync, on and off the field. These coordinated biofields bring with them the power to manifest change—in our physiologies, in our interpersonal connections, and in our society as a whole.

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Resources

- Institute of HeartMath: <https://www.heartmath.com/science/>
- Global Coherence Initiative: <https://www.heartmath.org/gci/>
- Consciousness and Healing Initiative: <https://www.chi.is/>
- Global Consciousness Project: <http://noosphere.princeton.edu/>
- Schwartz Center for Compassionate Healthcare: <http://www.theschwartzcenter.org/>
- Center for Mindful Self-Compassion: <https://self-compassion.org/>