

James V. Hardt, PhD: Alpha Waves—Elevated Consciousness, Creativity, and Mental Health

Interview by Karen Burnett

Dr James V. Hardt serves as the president and founder of Biocybernaut Institute, Inc. He holds a BS in physics from Carnegie Institute of Technology, MS and PhD degrees in psychology from Carnegie-Mellon University, and he has completed postdoctoral training in psychophysiology at the University of California, San Francisco.

Dr Hardt has authored or coauthored more than 60 papers and professional presentations, and has authored, coauthored, or has pending more than 30 patents for applications stemming from his research. He has dedicated his life to research and development surrounding brain wave training and has earned a national reputation as a preeminent research scientist through more than 30 years of work in biofeedback.

Support for Dr Hardt's research has come from federal grants and contributions from prestigious organizations such as the Fetzer Foundation. He regularly presents at national and international meetings and has published in leading scholarly journals such as *Science*, *Psychophysiology*, *Journal of Experimental Psychology*, and *Advances in Mind-Body Medicine*.

His exploration of the electrophysiological basis of spiritual states has brought him to India to study advanced yogis and also includes studying the practice of Zen meditators and Zen masters, and Christian prayer and contemplation. He has developed a technology based on electroencephalographic (EEG) measurement and feedback, combined, in a highly optimized methodology that also incorporates computerized measures of subjective states, personal in-depth interviews, and extensive coaching in forgiveness and nonattachment to unlock higher states of consciousness through promotion of alpha and theta brain waves. (*Adv Mind Body Med.* 2013;27(2):34-41.)

Advances in Mind-Body Medicine (Advances): What was your childhood like? Did you always know that you wanted to be an explorer in the field of brain research and how did you get involved in psychology, healing, and meditation?

Dr Hardt: My childhood was fragmented and disjointed and disconnected. I never lived more than 4 years in one place and sometimes was in a city only for a summer. My father was a music teacher and symphonic band and choir director—always looking for a better position, and always finding one, and so we would move. So I would just get some friends and start to be integrated into the school system and the community, and then we would move. Now, I am reminded that Margaret Meade, whose father was a cultural anthropologist, was in a similar situation where her father would drag her and the family to this primitive culture and then that primitive culture. She actually wrote a book, *Coming of Age in New Guinea*. So she credited her understanding of cultural relativity to the fact that she had this kind of childhood, because in one community it was a capital offense and they would kill you if you did X. In another community you were required to do X. So she saw that it is all relative, that people can be acclimated to this or that or the other thing as a function of what their upbringing was. I was born in the North. I went to the South for 6th and 7th grades, and I saw discrimination against black people, and I had never seen that in the North. I also was discriminated against for being a “damn Yankee.” Then after having been in the South long enough to acquire a southern accent I moved back to the North, and then I was discriminated against for being a Johnny Reb. So I saw both sides of discrimination and saw how silly it was.

Advances: You must have become resilient because you had to acclimate yourself socially every time.

Dr Hardt: ... Or fast. I was typically the fastest kid in town. So when bullies would come after me I would simply run.

Advances: That's a good skill. Did you know that you wanted to get into psychology and healing?

Dr Hardt: When I was 7 years old, I was determined that I was going to be a railroad engineer and drive a train. That was my ultimate. Then I went to grade school and high school, and there I realized I wanted to be a scientist. I actually won some scholarships to different colleges and went to the college which was the highest bidder, Carnegie Institute of Technology (CIT), which gave me a full scholarship in physics plus room and board, money for books, and so on. I graduated with a degree in physics. Along the way, I had also become interested in psychology. Even though our department at CIT consisted of mainly behaviorists and rat runners, there was another school in town, Duquesne University. A dear friend of mine was a psychology grad student there. They were studying phenomenology. Well, our professors at CIT looked at that as witchcraft, because, of course, you cannot study experience, they said. The only thing you can study is behavior. This was their belief and to think otherwise was heresy.

One day on my campus, I had the good fortune of meeting Dr Joe Kamiya. I came out of the CIT student union—I am a physics major—after lunch, and there was a big hand-painted sign where every letter was a different color, and it said, “Dr Joe Kamiya will speak on brain waves and consciousness.” It gave a time, which was just 10 minutes hence, and gave a building, which was right in front of me, and I did not have a class, so I went. Joe was traveling back and forth between San Francisco, where his lab was at University of

California, San Francisco, and Washington, DC, which was where his funding source was. He was stopping off to see a girlfriend who happened to be a painting and design teacher at my college. So her students had made these signs. I was the only one from the engineering college who went to the talk, but I was absolutely fascinated. I was in the habit then of going to San Francisco every summer; I would ride my motorcycle out. So I told Joe I would come and see him and we began correspondence.

Meanwhile I went to the library and read everything I could find on brain waves and made a big stack of copies of articles. By the time I got to San Francisco that summer, I had read through everything three times, so I was brimful of book knowledge about electroencephalographic activity and recording and alpha waves—things like that. When I reached

Joe's lab, I volunteered as a research subject, and I had 3 days, 3 consecutive days, of alpha feedback training: one EEG channel—middle of the back of the head (O_2), one tone, and one three-digit score. I loved it. It was wonderful.

I went back on the fourth day wanting more, but they were not doing any studies and the lab was shut down. So I found Joe's California girlfriend, Joanne Gardner, who later became his wife, and I asked her if she would hook me up to the equipment so I could just play. She obligingly

did this and then went off about her business. Later lunchtime came, and she went off to lunch with the whole lab crew. It was about course 11 or so of a 12-course Chinese lunch when she remembered, to her horror, that she had somebody in the chamber.

So all ten of the lab crew jumped back into Paul Gorman's VW camper van and went hurtling back across town, ran up to the building, went inside, ripped open the door to the chamber, and interrupted the late stages of an adventure which totally changed my life. When I went into the chamber, I was a physics major, a protestant fundamentalist, and I had no idea of anything about consciousness. I



had never meditated. I did not even know what it was. I had never had any drugs. I had not even been drunk on alcohol. So I was a complete ingénue with regard to things related to consciousness, but when the door was ripped open, that had all changed. I did not any longer fit back into those little boxes that I had been in. So at the end of the summer, when I rode my motorcycle back across the country, I registered for grad school in psychology, sensing I would need to get my rational mind certified in order to do work on the edge like I knew I would be doing.

Advances: Could you describe what the experience was like in that biofeedback laboratory, or would you like to explain the physics of alpha brain waves?

Dr Hardt: Well, I can do those two and more. Not long after I had registered, which was probably the first day I was back, I went looking for someone who might understand my experience in the chamber. Living in a big rented house, from the robber-baron era of Pittsburgh's history, was one of these phenomenology professors from Duquesne University, Rolf von Eckartsberg. I thought if anyone was going to know what this was about, it was going to be Rolf. So I went up and someone let me in. I walked into Rolf's office. He took one look at me and motioned for me to sit on a chair in front of his desk. Then he took an arm and swept everything off his desk onto the floor. He said, "Okay, tell me." He could see that I was different than when I left for San Francisco.

He was a very keen student of consciousness. He had been a grad student under Timothy Leary at Harvard, and he and his wife had done tons of LSD, and they had lived at the community at Millbrook, so he was among the cognoscenti about consciousness. He recognized that I was not the same person as when he had last seen me. I spent about three and a half hours telling him in detail what had happened to me in that chamber, and he did not interrupt at all. He just let it pour out. Then, when I had finished, he leaned forward and said to me, "Jim, we can do that here." That created a huge shift. There was a shiver that went through me, and it was extremely powerful. In that moment I realized I had been given a vocation. Up until that point it was just, "Oh, let me tell you about this cool thing that happened to me," and in that comment that he made—that perfect comment—I realized that I could help others into these altered states.

So I began the process of doing that: building a laboratory, designing studies, training people, learning how to do it. There were some pretty steep uphill climbs there in my psychology department, because many of the professors not only did not believe that consciousness existed, but philosophically, in terms of ego-resistance, they were opposed to anybody doing work in that area. At one point I was denied permission to do any work related to consciousness, and it took an intervention by the dean in order to sweep aside the resistance, in the name of academic freedom. It was pretty challenging at first. Many times along the way there were blocks—obstacles that were thrown in the way. But the expe-

rience had been so powerful—you can read about it in detail on the Biocybernaut website—that I was not going to let anyone tell me I could not do this work or that consciousness was outside of science.

If you would label some of the things that happened to me in Joe's EEG feedback chamber, there was out-of-body experience; there was ego dissolution; there were transpersonal experiences, mystical experiences; and there was contact with discorporate entities.

Advances: Could you explain how alpha brain waves were discovered and what role they play in the brain and its connection to our personalities and our lives? What are the psychophysics of alpha waves?

Dr Hardt: Psychophysics experiments occupied most of the experimental time dedicated to studying electroencephalographic (EEG) measurement from the moment the first publication came out in 1918 until Joe Kamiya's discovery, reported in April of 1962, that brain waves could be voluntarily controlled. Almost the entire time and all the research articles in between 1918 and 1962 were psychophysics. My understanding of the origin of alpha was that it was discovered by a Dr Hans Berger, an Austrian psychiatrist, who had been conscripted into the Austro-Hungarian army to fight one of their interminable wars in the Crimea. Being a professional he was made an officer and he had a horse, and in a battle the horse was shot, and it fell on him and he broke a leg.

He spent long months in recovery in an Austrian army hospital—in German what would be called a *Krankhaus*, a military *Krankhaus*. Of course, there being no cell phones or things like that, he was unable to communicate with his family about what had happened to him. When his leg was mended and he was released. He goes back to Vienna, gets together with his family, and tells this remarkable tale, whereupon his sister took him into her room and brought out her diary—called a *Tagebuch*, her daybook. In it, he read, to his astonishment, a detailed description of his horse being shot, falling on him, his leg breaking, and all of that. Now as a Germanic scientist, he would have dismissed such as utter nonsense, but there it was in his sister's handwriting.

So he all of a sudden became a believer, and he knew about work with animal electricity. Galvani and Volta had shown that battery terminals connected to a frog's leg could make it jump and things like that. So Berger got the idea that there might be electrical waves in the brain, and he went in search of those using utterly primitive equipment that we would just gasp to see how primitive it was. I won't go into the details, but what he designed was a ballistic galvanometer, which he used to find little electrical wiggles in the brain. The frequency of the wiggles was, depending on the person, between 8 and 13 cycles per second. Because they were the first electrical wiggles ever to have been found in the brain, he called them alpha waves because alpha is the first letter of the Greek alphabet. Jesus had said, "I am the alpha and the

omega,” meaning “I am the beginning and the end,” so it was common for people to use alpha for number one.

Since he was convinced that these alpha waves were the basis of ESP, he kept it secret and studied it in secret for 10 years, finally publishing in 1918, and then it went global. It absolutely electrified the scientific world. Pretty soon in England and, of course, on the continent—he had discovered this in Austria—but also in the United States and even Australia, people were setting up electroencephalograph wave laboratories to study brain waves. Mostly what they studied was psychophysics; they would put somebody in a dark chamber and project a 4-inch by 4-inch square of light on the screen and then measure how seriously that disrupted the alpha waves. They found that if they made the area half but doubled the luminance, so that the product of the area times the luminance was a constant, that this had a constant effect on disrupting the alpha. It was even ennobled by being referred to as Block’s law. So the product of the luminance times the area led to the alpha disrupting effect. Those kinds of psychophysics experiments were common.

One of the psychophysics experiments was seminal, actually, in my having a breakthrough with the hard-nose psychological-physiological psychology professors in my department who did not believe in consciousness and who also believed that there was no possible way of studying consciousness. Everyone knew that if you looked at a bright light it would diminish your alpha waves and if you sat in the dark your alpha waves would increase. So I found a study where they had people look at bright lights and then they turned out the lights and had them close their eyes, and they would be looking at the visual afterimages—everybody can report this experience. If you look at the sun for a second and then close your eyes, you will see a burning image of the sun, and it will fade over time. Well, that is a purely subjective experience in consciousness. However, guess what? Looking at visual afterimages suppresses alpha, just like looking at a real image, and so I was able to show my hard-nosed physiological-psychology professors that there were some experiences in consciousness that could in fact be measured with observable things like brain waves.

Advances: They did not believe you?

Dr Hardt: It was not my research. It was published in a name-brand journal, so yes, they believed it. They were not happy about believing it because this meant that a general belief that they had about consciousness being an epiphenomenon and not real and not worthy of study was being chipped away pretty significantly at its foundation. The antipathy toward me doing this work in that department was such that when I had finished my doctoral dissertation research and had passed all the qualifying exams, that my advisor scheduled my thesis defense at such a time that two of the worst opponents were teaching classes and would not be able to attend. They sent written questions, which were

very hostile questions, but I simply answered them and then there was no follow-up because they were not there. My thesis was accepted by the professors present and I became a PhD.

Advances: So your resilience from your early years of moving about came to your aid at that time.

Dr Hardt: Yes, you could say that. There is a theme I had not noticed, but yes, that is true.

Advances: After your happy accident with biofeedback and enhanced brain waves, did you continue to practice controlling alpha waves on a regular basis?

Dr Hardt: The only thing I do regularly is avoid doing anything regularly. It was Emerson who said, “A foolish consistency is a hobgoblin of little minds.” I did a lot of brain wave feedback training, but not regularly. Frequently, but not regularly. So I began learning more and more about alpha, and when I would be in the chamber doing alpha feedback, I would be shown how to upgrade the technology. In a sense, the technology or the consciousness behind the technology has designed the advances in the technology through me—it uses me as the agent in physical form.

Advances: You have mentioned that it helps to try to separate the self from consciousness when thinking, to try to relax and slow the breathing process in order to enhance alpha brain waves. What else do you try to do to control alpha waves?

Dr Hardt: Well, there were some imprecisions in what you just said. The ego has consciousness. It probably also has self-consciousness. One of the things that occurs when something has self-consciousness is that it resists, mightily, any interruption of that consciousness, which is why people fight against dying—because it interrupts their consciousness. Also, a 4-year-old who is having so much fun that he throws a temper tantrum when told he has to go to bed does not want to interrupt his consciousness. Father Pierre Teilhard de Chardin said, “The true self, or the higher self, grows in inverse proportion to the growth of ego.” So if you are going to rise in consciousness, your ego has to shrink. Well, ego is the ultimate control freak, and it will fight bloody murder against any attempts to diminish its control of you. So whenever you embark on a path of higher consciousness you are embarking on a battle between yourself and your ego. When you have moments of transcendent experiences, you have, in those moments, separated yourself from your ego, and your ego does not like that interruption of its control of you. Thus there are often egoic counter-attacks after someone has had a few moments of egoless bliss.

Advances: So the ego is the enemy of ...

Dr Hardt: ... Well, let us say, at least, it is the adversary. I sometimes suggest that the ego is the internal ambassador of the external Great Darkness, which some call the Devil. Eternal vigilance is the price of liberty. Being vigilant against the attempts of the ego to control your consciousness is necessary to attain liberation and higher consciousness.

Advances: What about rational analytical thinking? Does that push away alpha brain waves?

Dr Hardt: Yes, it does. Now, the intellect is more or less neutral with regard to higher consciousness, but the ego will often recruit the intellect to provide rationalizations for not doing things that would, in fact, raise the consciousness by diminishing ego.

Advances: What does fear do?

Dr Hardt: Fear reduces alpha. In the Zen Ox-Herding Stories, which recount the collective spiritual wisdom of more than 1000 years of Zen practice in Japan, there are identified the Five Hindrances to spiritual growth, which are, of course, the tools ego uses to thwart your spiritual growth. They are (1) Doubt, (2) Drowsiness, (3) Distractibility and Worry—that is where you find fear, (4) Aversion, and any form of Ill Will—that is where you find anger, (5) Boredom, and then I have added a sixth hindrance, which is (6) Forgetfulness. Ego is an opportunistic predator so if new ways become available to block spiritual growth, ego will adapt and use them. In days past, without mercury contamination of the environment as we have now, people's memories were far better, so the Zen guys did not notice Forgetfulness being a tool that the ego would use to block meditative or spiritual progress, because people did not have that much forgetfulness. It is only with the advent of endemic mercury poisoning, throughout all of us, that ego has the opportunity to use Forgetfulness against us.

Advances: What does the body experience when the mind is able to tune in its alpha brain waves, if you're doing it correctly?

Dr Hardt: To a certain extent, we know from psychophysics that light coming into the eyes will block alpha. So most meditation is done with the eyes closed. The only major tradition that does eyes open is Zen, and they use soft focus and the eyes are downcast, so vision is blurry. Ram Dass said Zen is the steepest path and without any railing, and eyes-open meditation contributes to the difficulty of learning Zen meditation. So it is much easier to do your meditation, or your alpha training, in the dark with the eyes closed. Even having the eyes open in the dark will diminish the alpha somewhat because it primes the visual system. So your highest levels of alpha will be attainable when there is minimal

input from the body. We are talking input from the eyes, ears, sense of balance, touch, whatever.

So when you say, "What does the body experience," well, any experience that you have, you have only when you have the appropriate pattern of brain waves. So we can say that the body never experiences anything. The brain experiences things based on inputs—some of them could come from the body. To clarify that, the body does not experience anything, and we can go further in saying when you minimize input—all input to the brain—then the brain is able to be more at peace and has the capacity to go to deeper states. You typically do not find monasteries where the monks spend all day sitting in the middle of a crowded street. They go to places of peace and tranquility and silence—mountains, forests, caves, the desert—to get away from the maddening crowds so that there are fewer inputs.

Advances: You have done extensive research and exploration into the electrophysiological basis of spiritual states, exploring Zen meditation, advanced yogis, and Christian contemplation and prayer. What led you to do this, and what did it teach you about the connection between the brain and the body?

Dr Hardt: At a very early stage, when I was interrupted in that fourth day in Joe Kamiya's lab and came out blinking into the light, there were ten people standing there: all those who had been to lunch. They had all gone off in Paul and Jane Gorman's VW camper bus, in which Paul and Jane had toured India the summer before. As I described various things that had happened to me, Paul would interrupt and say, "Oh, that is a meditation experience." Well, that was news to me, because Lutherans did not know anything about meditation, and as a physics major, it was just not in my realm. So from a very, very early stage in my alpha training I had these anomalous experiences interpreted as *meditation experiences*, which of course made me more interested in meditation. I actually started doing meditation a few months later. A dear friend, Robert Odell, sent away for the Yogananda correspondence lessons.

So, here is the chain of experience. I am sitting in Rolf von Eckartsberg's study, and he is listening with rapt attention as I am telling him—just one day back in Pittsburgh, Pennsylvania—and I am telling him about what happened in Joe's lab. While I am talking, his neighbor lady came in. She stood there, did not say anything, listened for about 20 minutes, and then she left and shortly came back. She walked up to me, did not interrupt or anything, and put down by my right hand on the desk, a book: *Autobiography of a Yogi* by Paramahansa Yogananda. I read it that night, and I know that 2 weeks earlier if somebody had given it to me, I would have looked through it and gone, "Oh, this is nonsense," and just thrown it away; but after the awakening in Joe's lab I read it, and it was so wonderful.

Then I gave it to my roommate, Robert Odell, who read it, and he ordered the correspondence lessons from the

mother center of the Self-Realization Fellowship in Los Angeles. So he and I, together, started doing the Yogananda lessons. We actually went through to the point where we were initiated in Kriya yoga, so I had an extensive meditation practice at the same time I was doing frequent alpha feedback training, but there was one point along the way—I think it was probably after I had been initiated into Kriya—where I did a 1-month meditation retreat in my own house. We had a room dedicated to being a meditation room. So I did two 3-hour sittings each day in full lotus for a month, and at the end of that time my knees were broken, basically.

It took me months before I could walk correctly, and there had been effects in consciousness of that 6 hours a day of meditation, but I also knew what consciousness would be available from alpha feedback training, and at the time, I compared the month of 6 hours a day of meditation to having just 5 days in the alpha chamber of maybe 90 minutes each day. There would have been that much progress or more from just 5 days of alpha feedback. So out of that experience I pretty much stopped doing meditation. Meditation just seemed inefficient. If once a week or twice a month I could get into the alpha chamber, that would be as much progress as if I had done hours of meditation every day. Not that there is anything wrong with meditation; it is just not an efficient way to grow in consciousness. If you are trapped in an airport and your plane is delayed for 6 hours, well go for it, but if you are doing work in the world and helping people, there are, maybe, things you can do that would be more beneficial than 2 to 6 hours a day in meditation.

Advances: How did you move from that phase to the next phase in your journey?

Dr Hardt: All through this I was at the university, and I was continuing to upgrade the equipment or the software that ran it and I was running research studies, writing, and publishing. When I would analyze data, I would see more of what the process was beneficial for, and I would also see ways that I could further improve the technology. This constant improvement continues today, so some weeks—even during trainings—I make three or four upgrades to the software in a week. I have three computer programmers that do work for me. It is an ongoing enterprise.

Advances: You now have a setup where people can come and experience this kind of fine-tuning of alpha brain waves themselves for a week at a time. Could you describe this setup?

Dr Hardt: We actually have three training centers, one in Maierhöfen im Allgäu Bavaria, Germany; one in Victoria, British Columbia, Canada; and one in Sedona, Arizona, USA, and I am in my office right now at the Sedona, Arizona training center. We have soundproof chambers, which are wired for sound and for brain waves. First people have electrodes put on by technicians. Then they go into the chamber

and plug in. At that point we can see their brain waves (EEG) scrolling across the screens in the control room, and they go through various processes. They take computerized mood scales several times a day, before and after the alpha feedback training or the theta feedback training, because we want to show them how their moods change and how they change as a function of altered brain waves. That is very helpful, but also the computer can analyze the data it is receiving from the people in such a way as to detect emotions within them that are below the level of their own conscious ability to detect.

So if, for example, the word *angry* comes up and the person puts a zero, saying they are “Not at all” angry, but the computer does not buy it, then in a postsession interview, which we do every day, we ask the person, “What’s going on with anger? What are you angry about?” Sometimes right away, sometimes after a little reflection, they may come up with an incident that was decades ago where they were raped or beaten up or robbed or cheated or abandoned or whatever it was. So then we have identified a perpetrator and a perpetration, a crime, whatever, and then the next day they go in and they bring that person into a courtroom that they dream up where they have three unimpeachable high beings as judges. They accuse the person, and then they attempt to feel the pain of that charge, and if they can, in fact, feel the pain their alpha will drop and they will see that in the feedback. The colors of the periodic numerical scores turn white if alpha is dropping. Then once they see that they got their whites, proving they connected with the pain, then they turn around and they start forgiving by whatever means come to them. There may be ten things they try and only two that work, but when the forgiveness starts to work, their alpha will start to go up, and it will start turning the scores from white to blue or even green. Blue means going up and green means they are setting new highs for the day. So they continue forgiving as long as their alpha is increasing—blues and greens. When alpha drops into whites again, then they check with their judges and ask if they have done all they can do for now. If the judges give them a yes, then they go on to the next activity, or if they say no, then they have to go back and refeel the pain and start that forgiveness over and maybe go a little deeper, maybe this time they will get all the way to love for the perpetrator. Jesus said to love your enemies, and here we have a practical way to learn how to do this. It does not mean that you let your guard down against dangerous people, but you no longer carry the stress of the anger, hatred, or bitterness that you felt before you did the deep forgiveness work in a high alpha state.

Advances: Is there a connection between alpha waves and forgiveness?

Dr Hardt: Oh yes. Only in the environment of rising alpha waves can people do *effective* forgiveness.

Advances: What are some other benefits to improving alpha wave control? Creativity?

Dr Hardt: Yes! A study we did with Stanford Research Institute scientists showed a 50% increase in creativity from just the Alpha-one training. The Alpha-one training also produces a boost in IQ that averages 11.7 points and is stable for at least a year out.

Advances: Do people with high creativity and high IQ naturally have a high alpha brain wave level?

Dr Hardt: Not necessarily. Take creativity: in order to have a creative inspiration, you have to go into a high alpha state, but it does not mean you live there all the time. For example, Colin Martindale in 1984 drew upon people who had the obvious indicia of creativity: patents, publications, painting, sculptures, things like that. They were recognized as being creative people. Then he put together a matched group with the same demographics, but who did not have these indicia of creativity. He brought them into his lab, and he had members of both groups record their brain waves in two conditions, one sitting at rest and another having been given problems to work on—the kinds of problems that creative people do well on. At rest there was no difference in the brain waves of the creative people and the normals. In fact, there was a slight tendency—it didn't reach statistical significance—but there was a slight tendency for the creative people to actually have a little bit less alpha in this novel environment.

The normals, if you sit them down and tell them to rest, they sit there and rest. A creative person—you put them in a new environment and tell them to rest, they are going to be looking around all wide eyed, interested, with high alertness: "What is that? What is this?" they will ask themselves, unlike the normals. So that would tend to suppress alpha a little bit in the more alert creative people, but the difference did not reach statistical significance. It was only suggestive. Then when Martindale gave them problems to work on, the normals sat there in their normal brain wave state and did only as well as normals usually do, whereas the creative people, when given problems, immediately turned on a high-alpha state, in which they quickly and effectively solved the problem in a manner which distinguished them as creative people.

Advances: So it has to do with their ability to access and enhance their alpha?

Dr Hardt: Yes. We are talking about the ability to change state. That is very important.

Advances: Can I get back to the topic of spirituality? I am interested in whether you believe there has been a shift toward the acceptance of the role of spirituality in the field of healing in Western medicine, including meditation and

Eastern spirituality.

Dr Hardt: There are now a number of studies that have documented the healing power of prayer. Anybody who reads the literature—even if they are agnostic or atheist—they are going to be aware of that, so that definitely constitutes a shift. When I first went into this field there was a book edited by Charles Tart called *Altered States of Consciousness*, and it had in it two papers about the brain waves of meditation. One was about yogis in the state of Samadhi, where their alpha did not block in response to environmental stimuli. They could have cymbals banged in their ears, they could have a red hot poker put on their arm so it burned, and they could have their arm put in a bucket of ice water, which an ordinary person cannot stand for more than 5 minutes. Half an hour later—no effect on their alpha brain waves. They were absorbed in a higher state in which ordinary reality is just an illusion, and they call our ordinary reality *Maya* which means illusion in Sanscrit. So these sensory stimulation things were not even real to them, when they were in the state of Samadhi.

By contrast, in Zen, the Zen super-conscious state is called Satori, and Zen philosophy is quite different from yoga philosophy, likely because of major differences between Samadhi and Satori. If a Zen monk sitting in Satori had a little bell rung in his ear, his alpha would block, but then it would soon come back. Then you wait a little bit. You ring the bell again, and the alpha would block again then soon come back. Now, with an ordinary person, after six, eight, or ten rings, the brain goes, "Huh, it is that same bell again. It's not dangerous. It is not interesting," and so the alpha stops blocking, but in the Zen in Satori you could ring that bell a thousand times and each time the alpha would fully block. It is like the English poet William Blake who wrote, "When the doors of perception are cleansed, everything will appear to man as it is, namely infinite." So they were experiencing it as a fresh new ring every time.

Here you have two different spiritual traditions, Zen and yoga, with different descriptions of reality—and guess what? Their brain waves respond differently to "reality." So it is very clear that the philosophy that people live by is going to be consistent with their brain activity. If you change your brain activity, you are going to change your philosophy and your psychology and even your personality. I have demonstrated that when you change your brain waves with feedback, you actually change core dimensions of your personality. My latest publication in *Advances in Mind-Body Medicine* (Fall, 2012) was about reducing psychopathology in a group of Canadian Aboriginals who did the alpha training. Many of them came in depressed, paranoid, angry, and after the alpha training those conditions had vanished and had been replaced by hope and kindness and enthusiasm and a renewed interest in their spiritual traditions.

Advances: Do you have new projects or experiments coming up that you are looking forward to?

Dr Hardt: Oh, very much. One of them is a wish I have had every year since 1985—Christmas of '85. On Christmas Eve I hang my metaphorical Santa Claus stocking by my metaphorical chimney, and I ask that on Christmas morning there will be a magneto encephalography technology that I can install in my laboratory. With magneto encephalography you can look deep into the brain, about 7 centimeters from every surface. So you can record feedback on subcortical structures or, in the case of the hippocampus, it is cortical material which is buried deep in the brain and washed by the cerebrospinal fluid. My first Celtic teacher said that the hippocampus is the “keyboard of the mainframe,” but the only way to access it presently, aside from magneto encephalography, is to take a long needle and stick it into the brain. Most people do not want that, so I cannot do any subcortical research and training. Anyway, my Christmas stocking will ever be hung there consistently. As soon as somebody comes along with the money, then I will add that into my repertoire.

Meanwhile, we are gearing up to do a study with the Prince Albert School System in Saskatchewan, Canada. We had a principal come and then some teachers, and everybody just loved the alpha training. The schools there have up to 85% Aboriginal students, and many teachers are Aboriginal, so it would be a really good case study: a lot of drugs, a lot of absenteeism. We did a pilot where we had two mother/daughter pairs come, in one case a 13-year-old daughter, another case a 17-year-old daughter. During the girls' last year, neither had exceeded 10 days in school for the entire year. Following their alpha training, they have not missed a single day of school. We now have parent/child teams besieging the principal's office eager for the study to begin so that they can come and do the brain wave training. We will be looking for foundation funding for the schools and the school children and their parents.

Advances: Is there anything else you'd like to add?

Dr Hardt: The Psychophysiological Principle is that any experience—we teach this in our training sessions—any experience that you have as a living human being, you have that experience only when you have the appropriate underlying pattern of brain waves. If you change your brain waves, you change your experience. Whether it is a spiritual experience or an experience of starving or an experience of being stuffed or an experience of flying, an experience of swimming, an experience of walking, an experience of being abandoned, an experience of being beloved, any experience you have, you have only when you have the appropriate underlying pattern of brain waves.

With this technology, we can help people to learn to have the brain waves that will facilitate absolutely any experience. We have had people sitting alone, not moving, in the dark, in the chamber, and go into spontaneous orgasm. This has happened with men as well as women, because if you have the brain waves for that, the body really does not have much choice except to follow along. So obviously if there is a

spiritual state, whether you call it seeing angels or Kundalini or experience of enlightenment, the only way you can do that is by running the brain waves for that state.

It used to be said that there was a *lingua franca* or common language of many countries. Well, the common language of all human experience is brain waves. So we do not have to make spiritual experiences separate or different. They are just experiences that occur when you have the appropriate underlying pattern of brain waves. By the way, having fewer ego-based thoughts and fewer sensory stimulations coming in—all those contribute to those brain waves that facilitate altered states of spiritual awareness, but it simply comes back to the brain waves.

Advances: Do people have a hard time with the negation of ego part?

Dr Hardt: People vary. Some people's egos have them by the throat or by the gonads or whatever metaphor you want to use, and so some of the sessions can be tumultuous. When people realize—or when people's egos realize—that the training is a confrontation to the ego, they respond with the ego defense mechanisms, which are denial, projection, getting angry, and things like that. But it is all being recorded. So the next day they get to look at themselves: “This is what you looked like when you were having an ego attack.”

Advances: Do you think that you will ever get tired of this studying experience and studying the brain?

Dr Hardt: I think that would be impossible. Boredom is one of the hindrances, and the only way you can be bored is if ego is running the show. What I have found is that even children as young as 8 years old have an almost unlimited capacity to pay rapt attention to, to be absorbed by, and to understand accurate information about themselves, and that is what we do. We give people feedback, accurate information about themselves. People love it.

Advances: And then they are capable of creating their own experience.

Dr Hardt: Yes.