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by Chris Mercogliano and Kim Debus

For nearly half a century Joseph Chilton Pearce, who prefers to be known simply as Joe, has been probing the mysteries of the human mind. Author of "The Crack in the Cosmic Egg," "Exploring the Crack in the Cosmic Egg," "Magical Child," "Magical Child Matures," "Bond of Power" and "Evolution's End," one of his overriding passions remains the study of what he calls the unfolding of intelligence in children. He is a self-avowed iconoclast, unafraid to speak out against the myriad ways in which contemporary American culture fails to nurture the intellectual, emotional and spiritual needs and yearnings of our young people. Part scholar, part scientist, part mystic, part itinerant teacher, Joe keeps in close touch with the most brilliant men and women in each field of inure relevant to his guest. He creates a unique synthesis of their work and translates the results into a common language-such a valuable contribution in these days of increasing scientific specialization. Then Joe travels the world wide to share his painstakingly gathered wisdom - freely if necessary - with anyone he feels can make a difference. We were fortunate enough to catch him by phone at his home in central Virginia.

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Chris: Modern neuroscience has been making some startling discoveries about the human heart. Can you tell us a bit about them in layman's terms?

Joe: The idea that we can think with our hearts is no longer just a metaphor, but is, in fact, a very real phenomenon. We now know this because the combined research of two or three fields is proving that the heart is the major center of intelligence in human beings. Molecular biologists have discovered that the heart is the body's most important endocrine gland. In response to our experience of the world, it produces and releases a major hormone, ANF - which stands for Atriol Neuriatic Factor - that profoundly effects every operation in the limbic structure, or what we refer to as the emotional brain. This includes the hippocampal area where memory and learning take place, and also the control centers for the entire hormonal system. And neurocardiologists have found that 60 to 65% of the cells of the heart are actually neural cells, not muscle cells as was previously believed. They are identical to the neural cells in the brain, operating through the same connecting links called ganglia, with the

same axonal and dendritic connections that take place in the brain, as well as through the very same kinds of neurotransmitters found in the brain.

Quite literally, in other words, there is a brain in the heart, whose ganglia are linked to every major organ in the body, to the entire muscle spindle system that uniquely enables humans to express their emotions. About half of the hearts neural cells are involved in translating information sent to it from all over the body so that it can keep the body working as one harmonious whole. And the other half make up a very large, unmediated neural connection with the emotional brain in our head and carry on a twenty-four-hour-a-day dialogue between the heart and the brain that we are not even aware of.

Kim: How does that work?

Joe: The heart responds to messages sent to it from the emotional brain, which has been busy monitoring the interior environment of dynamic states such as the emotions and the auto-immune system, guiding behavior and contributing to our sense of personal identity. The emotional brain makes a qualitative evaluation of our experience of this world and sends that information instant-by-instant down to the heart. In return, the heart exhorts the brain to make the appropriate response. Of course all of this is on the non-verbal level.

In other words, the responses that the heart makes effect the entire human system. Meanwhile, biophysicists have discovered that the heart is also a very powerful electromagnetic generator. It creates an electromagnetic field that encompasses the body and extends out anywhere from eight to twelve feet away from it. It is so powerful that you can take an electrocardiogram reading from as far as three feet away from the body. The field the heart produces is holographic, meaning that you can read it from any point on the body and from any point within the field. No matter how microscopic the sample is, you can receive the information of the entire field. The intriguing thing is how profoundly this electromagnetic field effects the brain. All indications are that it furnishes the whole radio wave spectrum from which the brain draws its material to create our internal experience of the world.

Perhaps most importantly, we now know that the radio spectrum of the heart is profoundly affected by our emotional response to our world. Our emotional response changes the hearts electromagnetic spectrum, which is what the brain feeds on. Ultimately, everything in our lives hinges on our emotional response to specific events.

Chris: How does this emerging knowledge apply to children and their healthy development?

Joe: Children's emotional experience, how they feel about themselves and the world around them, has a tremendous impact on their growth and development. Its the foundation on which all learning, memory, health and well-being are based. When that emotional structure is not stable and positive for a child, no other developmental process within them will function fully. Further development will only be compensatory to any deficiencies.

So, the first and foremost thing that must occur, if you want intelligent, successful and healthy children, is that they must have a positive emotional experience. There is forty or fifty years' worth of research from places like Harvard University, the University of Arizona's medical school with people like Schwartz and Russick, and HeartMath out in California to back this statement up. It all begins with children feeling unconditionally wanted, accepted and loved. This is the key to the entire operation. You can have everything else: a high standard of living, the most expensive school system, the finest teachers in the world; but if the children are lacking that initial experience of being unconditionally loved by at least one person, and if they do not feel safe and secure in their learning environment, then nothing is going to happen very positively. This cannot be overstated.

Chris: There would seem to be a lot of implications here for the way we educate our children.

Joe: The crux of the issue of education is that there are only two types of learning; one is true learning and the other is conditioning. Conditioning is a fear-filled response by the older or what we call the hind, or reptilian, brain. This is the reflexive, survival, maintenance brain that responds as if threatened. A form of learning does take place here, but it's conditioned learning and it's intimately associated with the emotional states of hostility, anger and anxiety.

If you want true learning, learning that involves the higher frontal lobes - the intellectual, creative brain-then again, the emotional environment must be positive and supportive. This is because at the first sign of anxiety the brain shifts its functions from the high, prefrontal lobes to the old defenses of the reptilian brain.

Kim: It looks like you can make a case that our development is based, perhaps, more on nurture than on nature.

Joe: The new research around this issue is quite intriguing. In England, researchers have come up with the hypothesis that the environment profoundly changes the genetic structuring within us, that it is the biggest influence of all on our DNA. There are studies now that show that our genes are not at all locked into unchanging

programs as previously thought, but in fact are profoundly affected by our environment, particularly our emotional environment. In the May issue of Science, there was an article that discussed how the mother's emotional state during pregnancy determined the direction that evolution would take place within her developing fetus. Her state of well-being determines whether fetal brain development concentrates on the frontal lobes or the ancient reptilian brain involved in survival.

This is probably the most explosive information to come along in quite a while. And this makes perfect sense because the heart is the first organ to form in the fetus, within ten days after conception, and it has to be because it furnishes the electromagnetic spectrum upon which DNA itself depends for its instructions.

Kim: Are you saying that even after conception our genetic make-up continues to change?

Joe: Absolutely. And after birth as well, where you continue to see a shift of emphasis between the reptilian brain and the emotional and cognitive brains. Not only do you have these shifts occurring during the first eleven years of life, you also have this huge redundancy of stuff in the brain. Around the age of eleven or twelve the brain undergoes a fine tuning and begins to decide what it can get rid of. The brain begins to shed the excess neural connections in either the ancient survival brain or in the new intellectual brain. What is removed depends upon children's life situations at that time. The question of whether they feel safe and loved, or whether they feel like they must protect themselves against a hostile world has a profound effect on the intelligence of the child.

Kim: Okay, so what about kids who were raised in negative households and who haven't had that unconditional love? What can we do to reverse this process and empower them to grow up to be whole persons?

Joe: well, to me, the whole thing again boils down to the heart. The kids you're speaking of have been deprived of adequate heart-brain nurturing. They have been operating in an environment of deep deprivation and the only thing you can do is to somehow or other provide them with a nurturing environment where they feel safe and loved and wanted.

I know it sounds too simplistic, but really that's the whole story. These young people need audio-vocal communication, nurturing, play, body movement, eye contact, sweet sounds and close heart contact on a physical level. Look at Marianna Caplin's new book that just came out called "Untouched." Its a brilliant, incredibly well-documented work that ranks right up there with Ashley Montique's classic book on

touch written thirty years ago. It deals with the touch-starved American child who has never received enough emotional or physical nurturing. We must understand here that the emotional and physical are essentially the same. So many American teenagers today have been deprived of touch and love from the very beginning of their lives.
Chris: What happens to them as a result?
Joe: They try to make up for that lack with all kinds of culturally provided substitutes that don't satisfy their needs. For the past fifteen years Ann Morrison in New York State has been working with hard-core teenage criminals in maximum security prisons, young people between the ages of fifteen and twenty who are considered by society to be unredeemable. She laments at how the public doesn't understand how easily salvageable they are.
Through storytelling, play acting and a whole series of activities like that, Ann just wins over these largely uneducated and illiterate teens. All of a sudden they're reading, they're writing their own poetry and they're expressing themselves in a variety of ways. She started out by following her own heart's instincts. With great love, she went in and began quietly telling her stories, even though they had the TVs going and they were doing all of the usual child, noisy, rambunctious things that teenagers do. And she was able to reach them because she was offering something that they had never had - a mother figure, a compassionate woman friend.
As Margaret Mead said, Art is the language that is the language of the heart, that is the language of the emotional structure.
Chris: Didn't you once say that imaginative children are never violent?
Joe: Well, in Sweden there is a group of doctors who claim this to be true. Their studies show that children who have an abundant capacity for creating inner-world images are never violent. Plus whenever they're faced with violence, they are able to imagine and implement alternative solutions.
That's what Ann Morrison is giving those young people, the opportunity to re-fashion their internal worlds, to establish the heart/emotional brain connection that was never allowed to develop during their childhoods.
Chris: I think I've also heard you say that television is the arch-enemy of imagination. Exactly what is television doing to our children?
Joe: Television literally prevents neural growth in the developing brains of children. When young children watch too much, it suppresses the capacity of their brains to create an internal image of something, or someone, or some event not presented to the sensory system by the environment, which is the essence of what we call

imagination. Researchers used to think that it was only the content of the programming that was negatively affecting children. Now we have ample evidence that the technology of the device is very harmful in and of itself. In other words, the simple act of watching television has profoundly negative effects on the physiology of human beings.

Chris: How so?

Joe: Its a long story, dating all the way back to the early 1960's when it was discovered that kid's minds go catatonic in front of the tube. This has to do with the way that the brain reacts to radiant light, which is the light source of television and computer monitors, and reflected light, which is what brings us the rest of our visual experience. This is too complicated to go all the way into here, so let me just say that the brain tends to close down in response to radiant light sources. We've all seen how hypnotized children get when they watch television for any length of time.

My biggest concern has to do with the way the television industry countered this effect by introducing what are known as startle effects into children's programming. A startle effect is anything that triggers the brain into thinking that there might be an emergency out there and alerts it to pay special attention to the source of the disturbance.

Television accomplishes this with sudden and dramatic changes of intensity of light or sound and a rapid shifting of camera angles. Eventually, however, the brain starts habituating itself to the situation, realizing that these are just false alarms, and it starts to tune out again. As a result, every ten years or so the television industry has had to up the ante by making the startles bigger and bigger, until finally what we have are periodic bursts of violent imagery in children's cartoons and so on, to the point now where there are an average of sixteen bits of violence every half-hour.

Here the nature of the program content does matter. While the higher brain, or neocortex, knows that the images on TV aren't real, the lower, or the reptilian brain does not. This means that when a child views violence on television, the reptilian brain sends a series of alarm messages up to the emotional brain, which in turn immediately contacts the heart. The moment the heart receives any indication of negativity or danger, it drops out of its usual harmonic mode into an incoherent one, triggering the release of the single most potent hormone in the human body, known as cortisol. Cortisol instantly wakes up the brain and causes it to produce trillions of neural links in order to ready the individual to face the emergency.

Then, as soon as the heart gets the message that the coast is clear,

another hormone is released to dissolve all of the new neural pathways that weren't used to make a quick, adaptive reaction to the perceived threat. The trouble with current-day children's television programming is that there's never any letdown, and the brain of the average American child, who has watched 5000 to 6000 hours by the age of five or six, is suffering a great deal of confusion as a result.

The massive over-stimulus from TV is causing the brain to maladapt in ways previously thought impossible. It is literally breaking down on all levels of neural development.

Kim: can you give us any specific examples?

Joe: I'll give you a couple. The German Psychological Institute has conducted a twenty-year study of 4000 children per year, children who have watched the average 5000 to 6000 hours of television by the age of six. Researchers found that twenty years ago young people could distinguish between 360 different shadings of a single color category like red or blue. Today its down to about 130. That's over a 2/3 loss of their ability to detect shadings of color. Now, this is strictly a neuro-cognitive breakdown. The most serious change they uncovered was a breakdown of the brain's ability to cross index its whole kinesthetic/sensory system. That is, more and more children's sensory systems are acting as isolated components in the brain and less and less as coordinated whole gestalts.

When they placed the young test subject in a natural environment that had no high-density stimuli, such as come from television, they grew very anxiety-ridden, bored and tended toward violence. The final disturbing finding of the German study is that there has been over the same twenty-year period, a 20% reduction in the children's awareness of their natural environment. This fits right in with Marcia Mikulac's studies in the 80's on evolution, where she discovered a 20 to 85% reduction in American children's ability to bring in environmental sensory signal as opposed to that of children from pre-literate, non-technological societies. So, the German studies back up what we've already known about the desensitization of children who are exposed to the inappropriate stimuli from sources such as television, rock music and computers.

Chris: Jerry Mander pointed out in his book on television that when television was first introduced it was advertised as this wonderful, democratic technology that would make everybody's life better and serve as an educational tool available free of charge to all. And the American culture of the fifties bought this fantasy lock, stock and barrel. So how about computers in the 90's?

Joe: Well, computers fall into essentially the same category. Here's one example that demonstrates how they can have the same debilitating

effects on the mind that television has. Researchers took a single page from a fourth grade level textbook that had explanatory writing and a couple of diagrams or pictures on it and asked three groups of people to review the information. Group A was given the piece of paper itself to study. Group B was shown a movie of the page, and Group C viewed it on a television screen - which is exactly the same as a computer monitor. Twenty minutes later they tested them on their comprehension and retention of the material. Group A, who held a paper copy in their hands, averaged a retention level of 85%. Those who saw it on the movie screen had a retention level of between 25 to 30%, and those who studied it on the TV monitor had a retention and comprehension level between 3 and 5%. When they mixed the groups up and tested them again with different pages from the book, in every case the retention and comprehension was identical.

This again has to do with how the brain is constructed and the way it responds to radiant light rather than reflected light as a source of information. And it should make us pause to consider, but it won't.

Chris: Why?

Joe: I attended a computer conference at the University of California at Berkeley during which twenty-one of us from all over the world spent four days discussing the computers-in-education issue. At that very time the State of California had a 500-million-dollar bill pending for a pilot project of K-12 computerized education. They asked me to come and speak to any legislators who would listen and give them a report on what we had discovered during those four days at Berkeley. The woman engineering this, who at the time was head of the Republican strategy department, was fired for asking me to come and speak. It just goes to show you how much money and power is involved.

Kim: But, so many occupations these days involve computers. How do we
teach young people what they need to know about computers without relying on them too much?

Joe: At that four-day symposium at Berkeley we concluded that everything hinges on age appropriateness. One professor from MIT made the passionate plea that we must encourage children to develop the ability to think first, and then give them the computer. After that the sky's the limit. But if you introduce the computer before the child's thought processes are worked out, then you have disaster in the making. This is because, as Piaget pointed out, the first twelve years of life are spent putting into place the structures of knowledge that enable young people to grasp abstract, metaphoric, symbolic types of information. The capacity for abstract thinking

developed as a result of the natural concrete processes that have been going on for millions of years. The danger here is that the computer, which operates by the same artificial, cathode-ray-tube technology as the television, will interrupt that development.

Chris: TV and computers aside, I get the sense from a lot of young people I know that they feel something is missing from their lives. Have you noticed this in your travels?

Joe: I've often talked about three important characteristics of all teenagers. The first is a feeling they have of great expectation that something tremendous is supposed to happen in their lives around the age of fifteen or sixteen. The second is the feeling that some greatness exists within them. The third is a longing that is so intense it can never be assuaged. And so at this point teenagers begin looking for models of who they can be, someone to help them define and put that deep longing into perspective. And what do they get? They get MTV, they get rock stars, they get all of the rest of the trash in movies and on television.

Kim: This is the stage of life when many other cultures encourage spiritual growth through things like coming-of-age and rights-of-passage rituals. Do you think the absence of these in our culture is one of our downfalls?

Joe: Certainly, but the things you're speaking of are vehemently blocked by our society because they're not economically viable. They can't be given a dollar value. Young people looking for something of meaning and substance out there have a terrible time finding what they're seeking because they are locked into our cultural system. Look into Ralph Nader and Linda Cocos new book on the corporate exploitation of children. Its a bomb shell. For instance, when Ralph Nader approached Bob Pittman, who invented MTV, and asked him if he realized the profound influence they were having on fourteen year olds, the guy leaned back and said, Ralph, we don't influence fourteen-year-olds, we own them.

Today there are actually entrepreneurs in the marketplace selling programs to corporations detailing how to exploit the child mind! In other words, we are totally set up right now as a consumer society, and changing that fact would literally threaten our economy. I don't think you can change this reality on any large-scale basis. You can only try to work around the edges and hope to reach one individual at a time. No one's going to change the overall system. All we can do is appeal to parents who have ears to hear and who are willing to take the risk of getting their children out of this madness and protect them against it.

Chris: What advice would you give to individual parents of teenagers

about how they can help them to pursue their deepest desires?

Joe: Well, first of all a great many teenagers have no idea what their desires are because they haven't been given the opportunity to find out. So, we can start by helping them to identify their desires. Next, we can start being more proactive rather than reactionary. Most of the crises that are occurring in our young people today are arbitrary, that is they're created by the culture itself. Instead of spending millions of dollars trying to fix what's wrong with teens we should invest in educating people to be good parents, to love and nurture their babies and young children so they don't have huge problems later on. The first four years of life are the most important. In Sweden, new mothers are given three years of maternity leave. It used to be one, and now they've upped it to three so that mothers can stay home with their children. And they're giving fathers a one-year leave of absence with full pay so that both mother and father can be with their child for the first critical year. So when you ask what can we do with our teenagers, I say we can begin by preventing the damage right from the very beginning.
Kim: So you think there's hope for us?
Joe: There are some extraordinary things happening right now, in little pockets all over the world, examples of true coherency in a massively incoherent system. And when this global economy nightmare we've unleashed finally self-destructs - as I think it has to -these small pockets of coherent intelligence will then manifest themselves and provide the impetus and the wisdom for the changes necessary to create a world in which children can reach their full potential. I am very optimistic about this.
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