

HIDDEN THERAPEUTIC DIALOGUE: DECODING THE LANGUAGE OF THE HUMAN HEART

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We are, in a certain sense, living in an era comparable to Middleburg, Holland at the dawn of the 17th century. Though difficult to conceive, it was in this tiny Dutch town that two technological developments suddenly appeared that inexorably changed how mankind would come to view both their external and internal worlds. The first was the development of lenses that could be paired together to create the first binoculars, called “Lippershey’s Looker”. First crafted by Hans Lippershey in the early 1600s, his attempt to sell this device to the Italian Army led the Italian Senate to forward the device to Galileo for his scientific evaluation. Immediately recognizing the importance of this technological breakthrough, Galileo quickly increased the power of “Lippershey’s Looker”, and within a few months had crafted the first telescope. In 1610, Galileo published a small pamphlet entitled “Starry Messenger”, in which he reported that his telescope allowed him to see at least ten times as many stars as were visible with the naked eye, that the moon contained a series of high mountains and was not a flat surface, and most importantly, he observed over the course of a few nights that there were four moons orbiting around Jupiter. He immediately deduced that Copernicus was correct, and that Aristotle’s cosmology was wrong. The earth was not the center of the universe, but was itself orbiting around the sun. Then within a few decades, Hans Jansen and Antonie van Leeuwenhoek crafted the first of a series of microscopes that allowed scientists to peer ever deeper into the internal universe, and see for the first time, among many other crucial biological functions, the action of the capillary system.

Though it is often asserted that Galileo’s discoveries led him to clash with the Catholic Church, the real struggle was his challenge to Aristotelian cosmology, which up to that time had dominated thinking in Western European universities. Indeed Copernicus’ heliocentric views were warmly greeted by the Roman Curia 100 years earlier, and he had been invited to present his ideas to the Pope shortly before his death. What occurred in the century between Copernicus and Galileo, however, was Martin Luther’s challenge to Papal authority, which had the unfortunate consequence of hardening philosophical attitudes toward the dangers posed by new ideas. In a hierarchical sense, Aristotle’s philosophy dominated all Catholic universities in Europe, and his writings were viewed as a comprehensive and systematic framework that gave meaning to all of the other sciences in the university system. His cosmology was largely inherited from

Ptolemy, and represented but a tiny fraction of his much more important views on epistemology, politics, and the nature of the hierarchy of souls in living matter. Also embedded in Aristotle's philosophy were the links between the human heart, the human soul and our unique capacity to talk. Aristotle's hierarchy of souls was postulated to be the source of vitality for all living matter. Even more important were his discussions of man as far more than a social animal, but a political animal as well. "Political" was derived from the Greek word *polis*, which asserted that man was but one among many men. With the sudden appearance of scientific discoveries that challenged various aspects of his theory, unfortunately what subsequently occurred was the unexamined tossing out of the Aristotelian baby with the tainted bath water of his cosmology.

And into this philosophical vacuum in the early 17th century rushed an entirely new philosophy, one enunciated by René Descartes, and summarized in his famous dictum: *cogito ergo sum* – "I think, therefore I am." The allure of Cartesian thinking was that it offered a way to extract the Catholic Church from the "body business", thus avoiding the errors of Aristotle's cosmology and returning the Catholic Church to its proper concern for the human soul. In what was a grand restatement of the ancient biblical mandate to "render . . . unto Caesar the things which are Caesar's; and unto God the things that are God's" (Matthew 22:21), the new Cartesian dictum was to render unto the new Caesar—science—all bodies in the universe (whether they be solar or cellular, human or animal) and unto God the slim pickings that were left behind—the human soul. The original assumption that science was part of "Scientia", that is, wisdom, was replaced by the notion of science with a small "s", a method to understand physical reality.

Descartes' new philosophy and new scientific perspectives emerged just as certain of the assumptions of Aristotle's cosmology were challenged by a variety of new scientific observations, and it was sweeping in its overall conceptions: all bodies in nature, including the human body, operated as mechanical clockwork. But unlike all other bodies in the universe, human beings possessed a soul, which interacted with the machine body at the locus of the pineal gland. Those phenomena that were traditionally considered to be uniquely human, including consciousness and cognition, and most importantly our capacity to speak, were assumed by Descartes to be attributes of the human soul. The souls of plants and animals were dispensed with without discussion; Descartes simply asserted that they were just lower forms of machines. Gone, too, was the Aristotelian idea of the essential capacity of human beings to relate to plants and animals, as well as to other human beings, because human beings possessed all the attributes of plant and animal souls, as well as unique aspects of the human soul.

But it was his *cogito ergo sum* that left Descartes with the certainty that he

existed because he could think about it. Descartes could never have asserted "I feel therefore I am" without first admitting that he had reduced feelings to imprecise thoughts that were decoded by the human soul at the locus of the pineal gland. Between 1605 and 1865, Descartes' concept of the human soul gradually evolved, and eventually was replaced by a new scientific term, the "mind", which proved to be the conceptual foundation of the dualistic concepts that still permeate modern psychology, the so-called mind/body interactions.

In his book *On the Origin of the Species*, Darwin extended Descartes' ideas one step further when he asserted that human bodies were qualitatively similar to animal bodies (the central core of Cartesian philosophy), and then subsequently added that the expression of emotions in men and animals were also qualitatively the same. Emotions, the so-called "e-motere" which were the biochemical perturbations that moved machine bodies in space, were a fundamental principal of Cartesian thinking. Unlike other animals which did possess a soul, it was only human beings possessing souls who could decode these *emotere* and thus through the power of the soul recognize them as imprecise thoughts. This was the essential difference between human machine bodies and animal machine bodies. Both moved in space by the power of biochemical perturbations, but only human beings could decode these *emotere* and thus come to know or recognize them. The foundations had been laid that would eventually lead to the removal of the concept of a soul from the human body (since human bodies were now similar to animal bodies), and replace it with a new word: "the mind/brain". The grand bargain had been completed, and the slim pickings of a "soul" that had been originally left to God now removed and brought under the province of the new Caesar, science. Psychology, and its literal meaning as the study of the soul, was now recast as the scientific study of human behavior and the study of reflexology. In rapid order, Pavlov and Freud appeared on the scene to lay the foundations for an entirely new 20th century science of psychology and psychiatry, and eventually even the concept of "neuropsychiatry".

Lost in this philosophical revolution was the importance of Descartes' belief that the human heart was nothing more and nothing less than a "heater" pump. Lost, as well, was the Aristotelian concept of the human heart as the center of all human relatedness. Aristotle's central assumption was that human beings were one among many, thus far more than social animals and essentially political as well, because they could talk and share the passions of their souls in dialogue. Also lost was the meaning of Blaise Pascal's challenge to Descartes in his *Pensées*, when he asserted: "The heart has its reasons, which the reason knows not . . . Do you love by reason?" Pascal instantly recognized that René Descartes had removed language from the human heart, made it an exclusive attribute of the soul, and completely confused the difference between emotions and feelings. In the Cartesian new world order, it was not mechanical hearts that could re-

late, but only human souls. Bodies, whether they were animal or human, could only interact in a stimulus–response manner, and certainly were not the source of human relatedness. The potential of the human heart to love, the potential of human bodies to relate to either other human bodies or animal bodies had been, so to speak, purged from human consciousness, almost as if some grand master had hit the “Alt-Delete” button in a computer. (The historical implications for modern views of the nature of the human cardiovascular system are outlined elsewhere in this issue by Paul Rosch.)

Late in the 20th century, a new technology emerged that was destined to have an impact every bit as significant as the 17th-century invention of the telescope and microscope that led to the overthrow of Aristotle’s cosmology. Curiously this new technology allowed one to simultaneously peer inward, into the cardiovascular system of the human body as well as outward into the larger universe, to watch the way this hidden internal universe was in constant dialogue with the external universe. More importantly, this technology gradually forced a re-examination of the overarching Cartesian philosophical assumptions that had guided virtually all psychological research (including our own research) throughout the 20th century. Ever so slowly, this new computerized blood pressure technology led us to revisit the Aristotelian baby that had been tossed out with the dirty bath water of his cosmology 400 years earlier. What gradually emerged was a new way to more fully appreciate the dialogical nature of the human cardiovascular system, and a new appreciation for the fact that the entire human body was inextricably involved in a constant dialogue with the external universe. Gradually we began to recognize that this hidden bodily dialogue had to be understood and decoded in order to engage in a more meaningful psychotherapeutic dialogue.

When the new automated blood pressure monitoring device first appeared, however, we uncritically assumed that it was merely a new technological advance, a new way to measure blood pressure on a minute-to-minute basis. The old method involved the use of a stethoscope and mercury manometer, along with a manually inflated cuff. What was initially overlooked was that the old methods used to measure blood pressure required silence in order to hear the Korotkoff sounds, while the new computerized method permitted a person to continue talking while his or her blood pressure was measured through a process of oscillometry.

Initially, we watched with a mixture of incredulity and amazement at the remarkable ways that human blood pressure could be altered during dialogue, while scarcely considering the philosophical implications of what we were observing. We began to recognize that if we peered into Galileo’s telescope, our blood pressure would fall way below its resting levels; and while his *Starry Nights* revealed the four Medician “stars” orbiting around Jupiter, Galileo had

not yet conceived that René Descartes was wrong when he asserted that the human heart was a mere heater pump, that we did not love by reason, and that our hearts were inextricably joined in dialogue to a universe that was far more than mere mechanical clockwork.

It took almost a decade of scientific research to recognize that there was a “Language of the Human Heart”, and that our bodies were in constant conversation with the universe beyond the confines of our individual and separate human bodies. We were, in fact, in constant heartfelt communication with the universe.⁽¹⁾

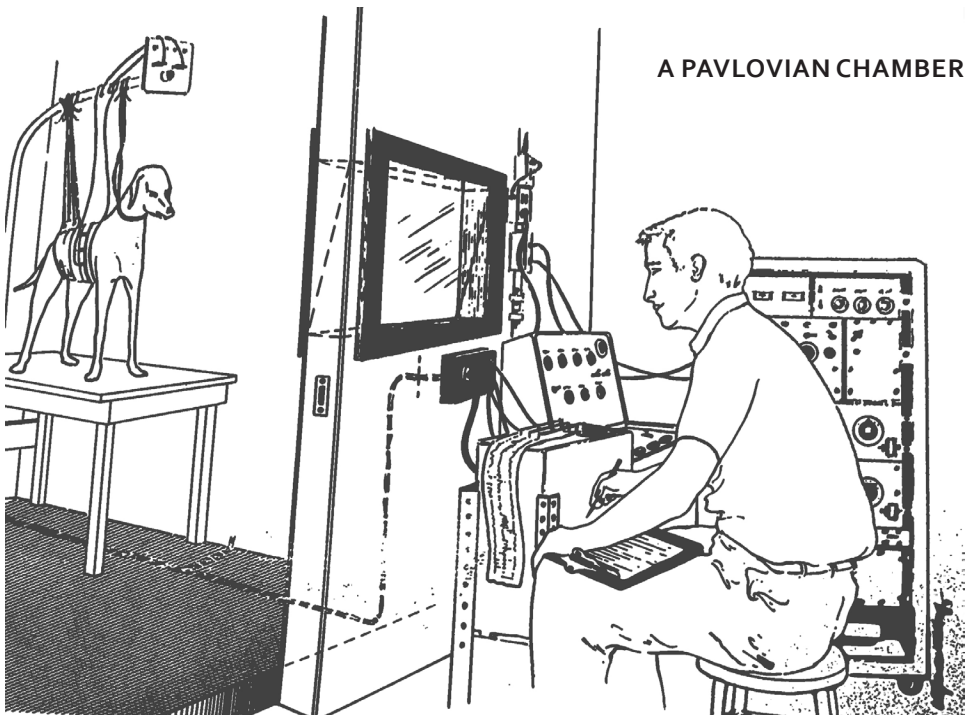
Philosophy functions very much like air; it is seldom examined until it gets so polluted that we can no longer breathe. That was certainly true when I began my own graduate research at the Pavlovian Laboratories at the Johns Hopkins University Medical School and the Pavlovian Laboratories at the Perry Point VA hospital in Maryland in 1962. The Director of these laboratories was W. Horsley Gantt, M.D., a psychiatrist who had studied for seven years with Ivan P. Pavlov from 1922 to 1929 in St. Petersburg, Russia. When he returned to the Johns Hopkins Medical School in 1929, Dr. Gantt opened the first Pavlovian Laboratory in the United States. He helped to introduce Pavlov’s research and writings into the English-speaking world. He translated Pavlov’s lectures and research findings into English and began to faithfully apply his scientific methods to the study of the cardiovascular system⁽²⁾. If ever there was a University center that embraced the philosophy of René Descartes, it certainly was deeply rooted in the perspective guiding the research studies conducted in these laboratories. Pavlov himself had asserted on numerous occasions that René Descartes and Charles Darwin were the two major influences determining all of his own research studies. For example, at the beginning of his book *Conditioned Reflexes* (translated by G.V. Anrep) Pavlov noted:

“The physiologist must thus take his own path, when a trail has already been blazed for him. Three hundred years ago, Descartes evolved the idea of the reflex. Starting from the assumption that animals behaved simply as machines, he regarded every activity of the organism as a necessary reaction to some external stimulus...Descartes’ conception of the reflex was constantly and fruitfully applied in these studies...” (Lecture 1)

Although the philosophy of René Descartes permeated the research atmosphere in these laboratories, I was unaware of Pavlov’s mechanistic assumptions when I first met Dr. Gantt in 1962. What caught my attention was the intellectual excitement and challenges that pervaded the atmosphere of those laboratories. It was a privilege to have accidentally met a remarkable teacher in a fascinating research environment.

Three streams of research were particularly intriguing:

1) The first was the concept that there was an internal cardiovascular universe that could be conditioned in the exact same way that salivation could be conditioned. Well aware of the traditional Pavlovian model of a dog salivating to a tone that had been paired repeatedly with meat, a variant of this model was used to study the cardiovascular system of dogs. Typically a tone was paired with a mild electrical shock to the forepaw of the dog. After one or two pairings of the tone with shock, there was an immediate increase in heart rate and blood pressure whenever the tone was sounded. This was called the cardiovascular conditional reflex. By contrast it took 10-20 trials of the pairing of the tone with shock for the dog to begin lifting his paw during the same tone...the somatic component of the conditional reflex. Thus, there was a split, or what Dr. Gantt called a schizokinesis, between the somatic skeletal learning and the rapid conditioning of the autonomic nervous system. Even more intriguing was the process of extinction. If the tone was no longer paired with electric shock, then after ten to fifteen trials the dog would no longer lift his paw. The skeletal conditional reflexes could be rapidly extinguished. Yet the autonomic reactions, the blood pressure, and heart rate reactions were far more resistant to extinction and often would get more exaggerated over time. It was as if the heart had a very difficult time forgetting, and in some instances, simply could not forget. ⁽³⁾

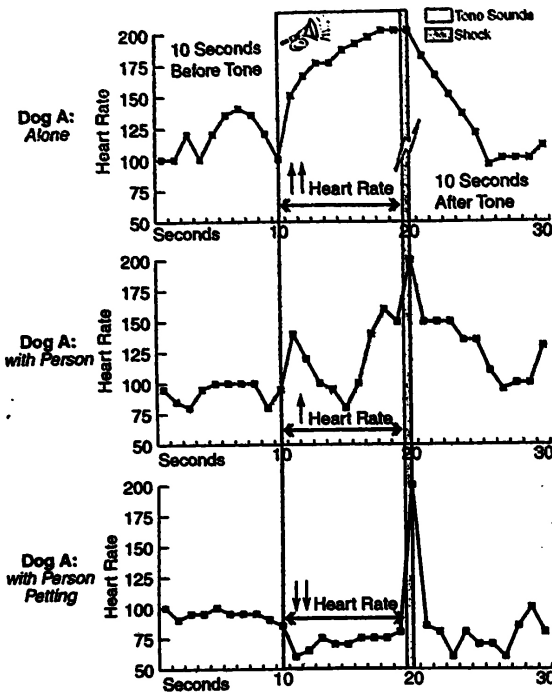


2) The second stream of research, and one that would come to dominate my own research interest, was a phenomenon that Dr. Gantt had labeled the "Effect of Person". The very nature of Pavlovian research required that the dog be placed in an environmentally controlled chamber and kept isolated from all external stimuli.

Since the cardiovascular system of the dog was being continuously monitored, it was soon apparent that whenever a human being merely entered the chamber, there would be a rapid increase in blood pressure and heart rate. Paradoxically, if the person then petted the dog, heart rate and blood pressure would quickly fall below baseline levels, sometimes falling over 50% below baseline measures. The dramatic nature of these cardiovascular responses to human touch was astonishing, and they left a lasting impression that would come to permeate most of my own subsequent research studies. ⁽⁴⁾

In my own very first experiment on this "Effect of Person", it was observed that petting a dog could completely abolish both the conditional and the unconditional cardiovascular reflexes to electric shock. See the picture of the remarkable reactions to human

petting in dogs. Human touch, it seemed, could abolish both the conditional reactions, as well as the unconditionally reflexive reactions, to painful electric shock. ⁽⁵⁾



GRAPH OF HUMAN PETTING ABOLISHING CARDIAC CONDITIONAL AND UNCONDITIONAL RESPONSES TO PAIN

3) The third stream of research involved an analysis of the cardiovascular components of what Pavlov had called the orienting reflex. This phenomenon, routinely observed in dogs as well as human beings, would eventually emerge as a core concept involved in the hidden dialogue of psychotherapy. Basically, all higher animals, including human beings, exhibit significant drops in heart rate and blood pressure, as well as blood flow when they attend or "orient" to stimuli in the external environment. In dogs, for example, if

visits from mates and friends on cardiac patients without doing any invasive research. Evidence rapidly began to accumulate that even the simple touch of a nurse palpating a coronary care patient's pulse could elicit highly significant changes in heart rate and heart rhythm. Indeed, in patients exhibiting a high frequency of ventricular arrhythmias, there was an immediate and highly significant reduction in the frequency of these arrhythmias to pulse palpation. Visits by family members could also evoke highly significant changes in heart rate and rhythm.⁽⁷⁾

In spite of the ubiquity of these reactions to human contact, it was far more difficult to isolate the specific cause of these cardiac reactions. Was it due specifically to touch, for example, or did human touch lead to changes in breathing patterns and muscle movements which then affected the heart?

Subsequent studies of patients in a University Shock Trauma unit provided dramatic evidence that touch itself had a powerful effect on the human heart. The patients in the Shock Trauma Unit of the University of Maryland were quite different than patients in a coronary care unit. They were victims of car accidents, for example, and usually did not have heart disease, were almost always given d-tubocurarine to control spasmodic muscle movements and their breathing was controlled by a respirator. Typically, they were also in comas and much younger than patients in coronary care. Yet the simple touch of a nurse, or simply the patient's hand being held, could elicit significant reductions in heart rate, as well as alterations in heart rhythm in these patients.⁽⁸⁾

Even heart transplant patients with totally denervated hearts exhibited powerful changes in blood pressure and heart rate to human communications, as well as to human touch. There was an immediate rise in blood pressure when they spoke, even though they were on high dosages of medication to control their blood pressure. Treatment of these patients showed that within ten sessions, there was a significant reduction in their blood pressure as well as their heart rate, suggesting that neurohumoral factors helped to lower their heart rate.⁽⁹⁾

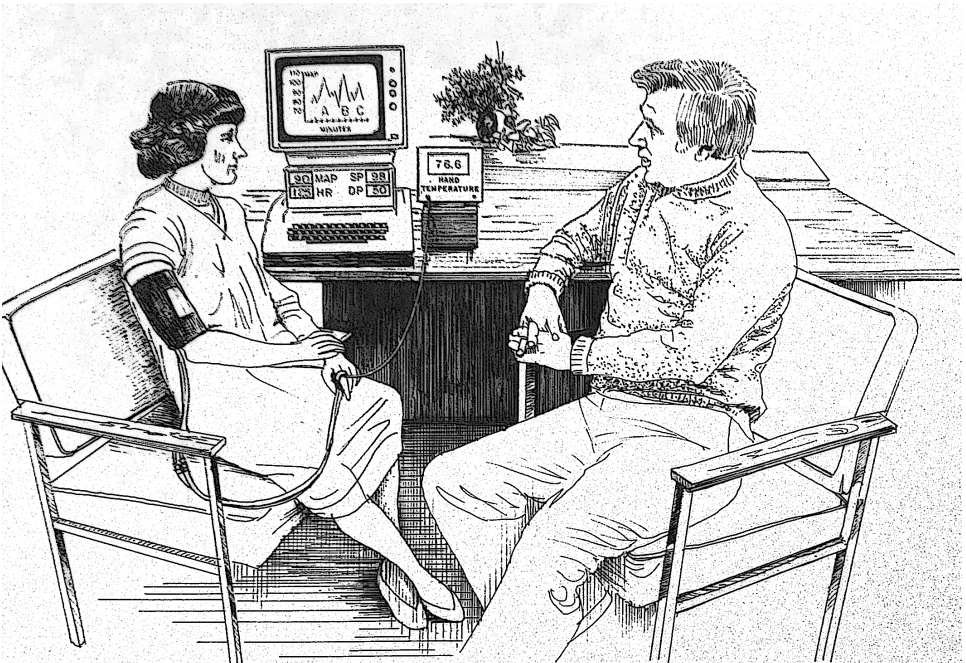
Over a period of four to five years, the results of these studies began to elicit interest in an alternative question: if transient human touch and transient human contact could have powerful effects on the heart rate and the heart rhythm of patients in intensive care units, what were the consequences of the chronic absence of human contact? What were the medical consequences of human loneliness? In what turned out to be a fortuitous coincidence, the 1960 health census was the very first to consider whether marital status might be an important statistical variable in health and illness. Prior to that, marital status had not been considered vital to health. It took epidemiologists almost a decade to analyze the census data, and when the results finally became available, we were just completing the first series of studies in the coronary care and shock trauma

units.

The health statistics were startling in their consistency. Single, widowed and divorced people in the United States were dying at rates 2–10 times higher than married people!

The Broken Heart: The Medical Consequences of Loneliness was published in 1977⁽¹⁰⁾ and was the first to document that the concept of a “broken heart” was far more than a poetic image for loneliness and despair, it was an overwhelming medical reality. In a society that seemed to be growing ever more fragmented, the lack of human companionship, chronic loneliness and social isolation, as well as the sudden loss of loved ones ranked among the leading causes of premature death in America. And while the lack of companionship was related to virtually every major disease, from cancer and tuberculosis to mental illness, the impact seemed to be particularly marked in the case of heart disease. At every age, all races, and both sexes, those who lived alone were at a significantly higher risk to die prematurely.

While we assumed that loneliness was the underlying lethal force that was contributing to these marked increases in premature disease and death, it was also apparent that not every divorced, single and widowed individual was lonely, nor were all married people living in states of marital bliss. Ironically this statistical “noise” and “variance in the health statistics” made it seem likely that the underlying hypothesis of the lethal impact of chronic loneliness deserved



far more scrutiny. If the central lethal force was loneliness, then efforts aimed at isolating this core toxic threat would undoubtedly greatly amplify the differences in mortality that the census data revealed.

Even more importantly were the issues involving the physiological mechanisms. Though the mortality statistics literally leaped out of the pages of the census data, it was far from clear how human loneliness could lead to a doubling of the incidence of coronary heart disease or a quadrupling of the incidence of hypertension. How in the world did loneliness, for example, contribute to a hardening of one's arteries?

Yet the greatest challenge was posed almost immediately by a cardiologist in charge of the University of Maryland Coronary Care Unit who challenged us with a certain degree of impatience: "If human loneliness is as lethal as the data seemed to indicate, then do something about it! Why not try to help hypertensive patients who are lonely to lower their blood pressure?"

Even before we could address any of these mechanistic questions, a distinguished University professor who appeared to fit all of the risk criteria that had been discussed in *The Broken Heart* sought our help to control his blood pressure. He was single, in his mid-fifties, mildly overweight, had already suffered a myocardial infarction, and was exhibiting symptoms of transient ischemia with labile hypertension.

Without a specific plan or course of action, we had arrived at an unanticipated crossroad, and the existing research data was not very encouraging. While it seemed intuitively obvious that psychotherapy would be the best way to deal with issues of human loneliness and human relatedness, the existing research data were replete with warnings. The overall conclusion was that psychotherapy was contraindicated for patients suffering from various forms of heart disease. It seemed to put them at greater risk!

Traditional Psychotherapy and Heart Disease

The mid-1970's was a period that was awash in a number of new non-pharmacological approaches to the treatment of hypertension. There were two, in particular, including the newly emergent field of biofeedback which offered the hope of using operant conditioning to control blood pressure, as well as the *The Relaxation Response* popularized by Herbert Benson, M.D. at Harvard University Medical School.

While the biofeedback approach first appeared to offer a significant new treatment modality, it was subsequently shown to produce little in the way of a clinical efficacy. We were well aware of the original promises that biofeedback could be used to help control the autonomic nervous system were fraught with empirical and epistemological pitfalls.⁽¹¹⁾

The relaxation response initially appeared to be slightly more helpful. Yet while the reductions in blood pressure produced by these techniques were “statistically significant”, the few millimeters of pressure reduction were not clinically robust.⁽¹²⁾

Earlier attempts to use non-pharmacological methods to help control hypertension were even more unsettling. In 1939, for example, Franz Alexander reported on the first of what would be a large number of studies attempting to use insight-oriented psychotherapy to help hypertensive patients to lower their blood pressure. These studies were initiated when there was no effective pharmacological agent that could help lower blood pressure. Sympathectomy, with all of the attendant adverse consequences, appeared to be the only way to help hypertensive patients avoid the catastrophic consequences of extreme hypertension.⁽¹³⁾

Based on the pioneering research of Walter Cannon, it was generally understood that hypertension was one component of chronic fight/flight reactions to stress, and with no effective medication, some way to manage this life-threatening problem was urgently needed. Alexander hypothesized that deeply hidden emotional conflicts were the principle cause of hypertension, and he assumed that psychoanalytically-oriented psychotherapy would be the best way to uncover the conflicts, and thus help patients to lower their blood pressure.

Alexander based his hypothesis on the psychoanalytic studies of Sigmund Freud, as well as the classic physiological studies of Walter Cannon. He hoped to bridge the gap between these two investigators. Cannon’s book *Bodily Changes in Pain, Hunger, Fear and Rage* (1929) described the autonomic and neuroendocrine systems influences on the cardiovascular system. His book was the first to emphasize the crucial role that emotional stress played in the development of this disease. Although it had long been recognized that stress plays a vital role in the development of heart disease, Cannon’s pioneering studies were the first to delineate the physiological mechanisms. He began to describe what he called the fight/flight response. He reasoned that in times of stress or emotional upheaval, the body had to have the adaptive capacity to either fight for survival or to flee.

Deeply influenced by this scientific perspective, Alexander assumed that hypertension was, in all likelihood, the end result of unconscious conflicts that placed a person in a state of hypervigilance, or a chronic state of unconscious fight/flight. For two decades, Alexander studied the personality of hypertensive individuals in order to better understand the nature of their conflicts, as well as to evaluate whether psychotherapy could be used to help alleviate their struggles, and thus lower their blood pressure.

While these studies are described in great detail elsewhere in *The Language of the Heart*⁽¹⁴⁾, basically Alexander found that there was a systematic pattern

of conflicts that could be traced back to childhood. In most cases, the conflicts had to do with dysfunctional parent-child communications. The infantile needs to be taken care of and to be understood were not adequately met and thus the person grew up driven to seek support and affection. This led the person to form dependent relationships, thus becoming trapped in a vicious circle, especially in regards to the open expression of anger. The patient thus found themselves torn apart by a chronic struggle against overtly expressing hostile impulses, and always trying to appear outwardly friendly in order to be liked by others. The hypertensive personality was dominated by excessive but inhibited hostility, which stemmed from conflicts early in life.

After two years of intensive analytic study, Alexander found that these patients were able to gain a great deal of insight about their childhood conflicts. Yet in spite of the insight and moments of catharsis, blood pressure rose unabated as the therapy continued. Quite literally, while the patients were gaining insight and were able to experience ostensible cathartic moments, the entire process appeared to be threatening to kill them. Analytic therapy and catharsis only seemed to make matters worse.

These findings were consistently replicated by a large number of other independent investigators. Indeed the findings were so consistent, that by 1978, when we were first attempted to help a hypertensive professor, it was generally understood that psychotherapy was contraindicated as a treatment modality.

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At that time there seemed to be little that could be done to address his problems either in a direct therapeutic manner or in an indirect manner through biofeedback or relaxation.

Psychotherapy and The Decoding of the Human Heart

When we first began to treat the “professor”, there was no way to directly or continuously measure blood pressure during the therapy sessions. Thus, during our initial therapy sessions, a nurse would come in every fifteen minutes and measure his blood pressure with an inflatable cuff, stethoscope and mercury manometer. It was a method first developed by N.S. Korotkoff in Leningrad, in 1904, and is still widely used in medicine today. The primary feature that was more or less overlooked was that silence was built into the measurement procedure itself. The doctor or nurse had to listen to the “Korotkoff sounds” in order to measure the blood pressure and this required silence from both the patient and the physician.

With the caveats that had been clearly outlined by Franz Alexander and others, our initial strategy was to avoid any discussion of stressful issues, and if he seemed to get upset, to instruct him to be quiet and breathe deeply. It was, in

essence, a strategy of supportive, non-invasive therapy with a strong emphasis on deep breathing. Yet in spite of our efforts to avoid anything that might be emotionally provocative, he seemed to want to discuss his interest in dating a university professor to whom he had been platonically attracted for almost 25 years. Since she was married for all of this time, he never told her about his personal interest. His myocardial infarction occurred shortly after she told him she was very unhappy in her marriage and planned on divorcing her husband. After her divorce, he wanted to ask her out for dinner but was experiencing a great deal of anxiety about that request. By chance, the nurse taking his blood pressure every 15 minutes was approximately the same age as his paramour, and she began to help ease his anxiety. Once he took his paramour out to dinner, his blood pressure began to gradually fall from 185/100 down to a normal range of 130/70. We also suggested that he might begin to consider lowering his BP medications. In essence, over a period of nine months, we had cured the professor without the slightest idea of what we had done that was so efficacious.

Just as we were engaged in terminating our “therapy”, I had the good fortune to come across what we affectionately began to call the “green” and then the “blue machines”. They were, in fact, the very first prototypes of a computerized way of measuring blood pressure on a minute-to-minute basis, freeing both the patient and doctor to continually talk during the measurement procedure. ⁽¹⁶⁾

With great anticipation, I could scarcely wait until I was able to measure the professor’s blood pressure with this computerized device. The results were simply astonishing: when the professor was silent and I was talking, his blood pressure ranged around 135/70 mm Hg. But just as soon as he began to speak, his blood pressure rapidly increased, up to levels around 200/100 mm Hg. The results were so dramatic, and replicated repeatedly during our session, that I immediately assumed the computer machine had to have been defective or inaccurate. The overall conclusion was disconcerting. It seems that we had “cured” the professor only when he was quiet. It also seemed obvious that our intuitive instructions to breathe and be quiet whenever he would begin to talk about stressful issues had proven to be of major benefit to help lower his overall blood pressure.

The first order of business was to check the accuracy of the device. Repeated studies in a coronary care catheter unit quickly revealed that the computer readings perfectly correlated with catheterized measures of blood pressure. A quick screening of fifty laboratory personnel in a protocol that involved three minutes of silence, then two minutes of talking or reading a book aloud, and then three minutes of silence revealed that everyone’s blood pressure rapidly and significantly increased as soon as they began to speak or read a book aloud. Within a year, we had shown that there was a direct and linear correlation between basal pressure readings and the magnitude of the pressure increases while talking.

Hypertensive individuals increased their pressure far more than normotensive individuals. There also was a linear correlation with age....older people exhibited far greater increases when they talked than younger people. Even newborn infants could double their blood pressure when they cried, an observation that led to the title of a book on the meaning of these pressure increases, *A Cry Unheard*.⁽¹⁷⁾ We began to sense that we had helped to lower the professor's blood pressure because we had, in part, unwittingly heard his cry and had, so to speak, "mothered" his pressure back down to normal.

The paradox of loneliness-induced premature death and marked increases in blood pressure while talking was impossible to ignore. While *The Broken Heart* asserted that human loneliness ranked among the leading causes of premature death, especially from heart disease, we were now discovering that talking itself could have powerful effects on the human heart. It initially seemed as if one was damned if they were lonely, yet stressed if they tried to talk with others to ease their loneliness.

It also was immediately apparent why the type of psychoanalytically-oriented psychotherapy studied by Franz Alexander had led to ever increasing levels of blood pressure among hypertensive patients; it appeared that talking increased blood pressure in hypertensive patients. That reality could scarcely be ignored. The higher the resting blood pressure, the more it increased when a hypertensive person began to speak. Therapy that encouraged hypertensive patients to continuously talk would inexorably increase their blood pressure throughout the sessions.

Beyond the clarification of a number of therapeutic issues that had previously escaped understanding, additional studies further clarified the magnitude of the pressure increases while talking. Rate and intensity of speech influenced the magnitude of the increases. Breathing patterns also had a major impact. People who tended to talk in a breathless manner increased their pressure far more than individuals with more normal breathing patterns. There were, as well, a number of physiological variables that helped clarify the nature and magnitude of these communicative pressure increases. These included intrapleural pressure, left ventricular ejection fraction, oxygen uptake, and most importantly peripheral resistance. They all contributed in a significant way to pressure increases while speaking.⁽¹⁸⁾ In addition, various neural and humoral variables also played a major role. These were dissected by observations made in heart transplant patients. In spite of having someone else's denervated heart, and taking strong dosages of antihypertensive medications, these patients also exhibited major increases in blood pressure as soon as they began to talk.

Nor was the phenomenon caused by talking alone, but rather involved the act of communicating. Deaf individuals showed identical blood pressure increases when they used sign language to communicate with others. And hy-

pertensive deaf individuals increased their pressure more than normotensive individuals as soon as they began to sign. ⁽¹⁹⁾

There appeared to be a universal dimension to the blood pressure increases while talking. Everyone exhibited this response, except schizophrenics! Curiously, unlike any other group, schizophrenics consistently lowered their blood pressure when they talked, and whether they were on medications or drug-free did not make any difference. Not only did schizophrenics exhibit abnormally low blood pressure at rest, they also lowered their pressure when they spoke. Ironically, if they complained about something that was incidental, such as the hospital food, they would immediately exhibit marked hypertensive increases in pressure. It almost seemed as if schizophrenics withdrew from communication in order to avoid major hypertensive reactions to talking. ⁽²⁰⁾

The Effect of Person and the Orienting Reflex Rediscovered in Psychotherapy

Ironically as our research efforts expanded in what seemed to be a dozen directions, our interests also came full circle. We began to wonder whether companion animals could affect the cardiovascular health of human beings in a way that was similar to their cardiac reactions to petting.

In a major epidemiological study of this question, we followed 150 heart patients for over a year after they were released from the University coronary care unit. We were searching for answers about the incidence of morbidity and mortality after they were released from the hospital. What determined who would live and who would die and what were the factors that influenced long-term survival? A large number of physiological, social, economic and pharmacological variables were recorded that potentially played a role. When the results were statistically analyzed, the findings were a great surprise: the single most important factor determining who lived and who died was the extent of damage to the myocardial tissue. The second most important variable, however, was an even greater surprise: those heart patients who did not have an animal as pet were four times more likely to die than those who had a pet. ⁽²¹⁾ Extending these studies to children, we then observed that a child's resting pressure was significantly lower if a dog was allowed to roam freely in the room. Even more surprising was the fact that when a child touched a dog, or petted a dog, there was an immediate and highly significant lowering of the child's blood pressure. We had indeed come full circle: both the dogs and the children exhibited remarkable lowering of blood pressure to human touch. ⁽²²⁾

This communicative heart appeared to be far more complex than René Descartes' "heater pump". This was a heart in extraordinary dialogue with the world beyond the confines of its own body. There was a hidden dialogical see-saw that

was profoundly engaged with the external universe. There was indeed a “Language of the Heart” that was far more than a group of highly sophisticated physiological mechanisms. Aristotle was right! The heart was at the center of it all!

Hearts That Never Forget: Speaking the Unspeakable

While these research studies continued, we also joined a cardiovascular rehabilitation center linked to the Sinai Hospital in Baltimore, Maryland. The American Heart Association had recommended that in order to provide maximal therapeutic benefit to patients in cardiac rehabilitation, three components had to be addressed. These included exercise, diet and stress management. What the American Heart Association failed to define was what comprised “stress” for this group of patients. A simple protocol was devised that included patients being seen at least once for an hour following their exercise on the treadmill.

Their blood pressure was measured automatically each minute on a Dinamap computer while we talked. Every effort was made to avoid stressful topics whenever possible.

Most of these patients were older and experiencing some hardening of their arteries. They were also taking a variety of medications designed to control heart rate, heart rhythm and blood pressure. Almost every patient exhibited far greater pressure increases when they talked versus when they did maximal exercise on the treadmill just before we met. They also exhibited far greater increases in pressure than they did during their preoperative stress test in their cardiologists’ office. No medication they were taking effectively blocked pressure increases while talking. In general the diastolic pressure increases while talking were significantly greater than their systolic increases.⁽²³⁾

There were, in general, marked changes in pressure increases while talking and significant drops in pressure when they were listening to their therapist. Curiously, the greater the increases in pressure, the less likely they were to detect these changes. Very quickly therapy began to take on a rhythmic pattern. As soon as their pressure would increase up to hypertensive levels, I would instruct them to stop talking and breathe deeply. It was also soon obvious that if they could listen to their therapist, pressure would quickly fall back to pre-talking, resting levels. During these 50-minute sessions, it was commonplace to watch both systolic and diastolic pressure readings change 40–50 millimeters of mean mercury even though every effort was made to minimize discussion of stressful topics.

The fact that this population was largely Jewish provided yet another unique circumstance. Perhaps fifty of these patients were survivors of the Holocaust, and had endured brutal experiences as adolescents and as young men and

women. Though it might be intuitively obvious, it was nevertheless stunning to watch the pressure increase when they alluded to experiences a half-century earlier. It was not uncommon to observe blood pressure readings of 120/60 suddenly surge to 200/125 when they talked about Buchenwald, or Bergen-Belsen. These rapid pressure surges made it clinically obvious that they would have to stop talking about these traumatic experiences until their cardiovascular system was in a better position to handle the stress. The law was predictable: the higher one's pressure, the more it increased while speaking. Thus, any sustained topic that was leading to pressure surges would only serve to push pressure ever higher. Many patients reported that they anecdotally had never discussed these traumas previously, and their pressure surges when they began to talk made it obvious that these increases in pressure could be life threatening. This led to the concept of "titrating" psychotherapeutic dialogue in a fashion that was physically bearable. Rather than talking in an unending stream of consciousness that threatened to push their blood pressure ever higher, the concept was introduced so that they could only speak about what their hearts could endure.

These hidden pressure surges were, in a somewhat crude analogy, somewhat like human blushing. In any dialogue where one person begins to blush, it is immediately obvious to the other that they are uncomfortable. They might even tell what that blushing means, that one is embarrassed and uncomfortable. In any event, rather than see a person become ever more uncomfortable by blushing, usually the other will try to change the topic. So, too, in therapeutic dialogue, these pressure surges are analogous to a form of hidden internal blushing. It is obvious that when a person's blood pressure rises to clinically problematic levels, every effort should be aimed at first lowering the pressure before continuing the topic.

A Therapeutic Analogy

In summary, talking immediately leads to increases in blood pressure, while looking out, or attending outside of one's self leads to a lowering of blood pressure. It is part of the natural physiological see-saw of human dialogue.

Thus, if one is walking along the peaks of the Blue Ridge Mountains, and looking out at the beauty of the Shenandoah Valley, blood pressure will fall below normal resting levels. Indeed, if in that experience one is not really looking out, but rather taking in the Valley to oneself, it produces a state of intense orienting, which lowers blood pressure. This state is what I call the "Physiology of Inclusion". One literally includes the external world as part of one's physical being.

If one continues on the journey and spots a black bear on the trail, then all those beautiful vistas disappear from one's consciousness, and the body imme-

diately goes into a fight/flight mode of self-preservation. Blood pressure and heart rate begin to surge, and the body prepares itself for survival. This I call the “Physiology of Exclusion”.

As human beings we do nothing more frequently than talk. It can exert a profound effect on human health. In an analogous manner, if one is talking to one’s mate, when are they perceived as the Shenandoah Valley, and when are they seen as a life-threatening black bear. When talking, do we perceive our mates as something to take in, or exclude from our vision?

The same is true in psychotherapy. It is a continual dialogue, and ought to be designed to facilitate the taking in of information, to relax the body, to lower blood pressure and enhance the dialogue, rather than threatening information, that triggers an unending series of fight/flight responses. Emphasis must be geared towards heightening the Physiology of Inclusion, and thus increasing the body’s capacity to relax.

The continual monitoring of the cardiovascular system during therapeutic dialogue gives the therapist information that previously was hidden from our understanding. There is an exquisitely sensitive language of the human heart that we are only now beginning to understand. The mechanistic heart that we inherited from Descartes is in the process of redefinition, moving far closer to the heart that was first outlined by Aristotle—a heart that is at the center of all human dialogue.

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