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Contextual cardiology: What modern medicine can learn from ancient Hawaiian wisdom

I ka `olelo no ke ola (our words bring life)
I ka `olelo no ka make (our words cause death)
—2,000-year-old Hawaiian proverb

A Hawaiian *mo`olelo* (legend) speaks of the importance of loving connection, a concept that 2,000-year-old Hawaiian medicine considers to be the essence of health. To Hawaiian *kahuna* (healers), all illness takes place in the context of some form of disconnection, and all healing requires reconnection by "restorative justice" through which responsibility for the disconnection is taken and amends are made. To Hawaiians, health is an interpersonal matter, and the *pu`uwai* (heart) develops and functions in interaction with other hearts.[1] This power of heart-to-heart connection is illustrated in the Hawaiian legend of Naupaka.

THE LEGEND OF NAUPAKA

The Hawaiian princess Naupaka fell in love with Kaui, who was not of royal birth. Because marriage between a commoner and royalty was strictly *kapu* (forbidden), Naupaka and Kaui traveled together to a *heiau* (sacred temple) to see the *kahuna* (healer priest) to ask for special dispensation, but he feared breaking the *kapu*. "Your *aloha* (love) is stronger than any *kapu* and your *pu`uwai* (hearts) are joined forever, but I must banish you, Naupaka, to the sea and you, Kaui, to the mountains. Pray that your hearts will always beat as one."

As the couple knelt together to pray, rain began to fall and mixed with tears on their cheeks. As the lovers embraced for one final time, Naupaka took a plain white flower from behind her ear, tore it in half, and gave one half to Kaui. "We will always be of one heart, as two halves of the same whole," sobbed the princess.

The lovers separated, but to this day the tear-stained half blossom of the naupaka plant blooms at the same time on the same day—one half at the mountain and the other at the sea—and Hawaiians seeing these half flowers feel the sacred power of *aloha* (loving heart-to-heart connection) to transcend time and space.

ANCIENT *PU`UWAI*-OLOGISTS (CARDIOLOGISTS)

Far beyond metaphor, Hawaiians use the legend of Naupaka to teach about what they believe to be the literal connection that exists between loving *pu`uwai* (hearts). *Pu`uwai* translates as "lump" (*pu`u*) of water (*wai*), and ancient *kahuna* could be seen as some of the first cardiologists—"*pu`uwai*-ologists."

Hawaiian *kahuna* thought that the heart, like water, could be fouled and hardened by behaviors that interfered with the natural rhythm of the energy (*mana*) resonating from the lump of water in the center of our being (the *na`au*) that flows between all beings. Unlike Western medicine's "rock" logic that tends to focus on individual patients and the currently popular "statins and stents" approach to the heart as an isolated organ pumping inside an individual body, Polynesian oceanic "water" logic does not value concepts like separateness, boundaries, independence, and personal health. It sees well-being as existing between people, not within a person. As one *kahuna* put it, "One rock plus one rock is still two rocks, but water plus water is just more water."

THE INTERPERSONAL CARDIOVASCULAR SYSTEM

To Hawaiians, the cardiovascular "system" was just that, an interactive union of hearts and minds existing in *lokahi*, or infinite, loving, mutually dependent connection. They felt that healing was impossible without first finding the context not only of the illness but also of the strengths that could lead to a return to health. Treatment was a process of looking for the place where a disconnection between hearts had occurred or where hearts had begun to beat with-

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out synchronization with other hearts, diagnosing how and why the disconnection had occurred, and then working to reestablish loving connections. Any use of plants or procedures took place only in the context of a system, and treatments were never prescribed after assessing only the individual.

Western medicine neglects interdependence

While acknowledging that social support systems are important to health, modern medicine has continued Western society's emphasis on independence, self-esteem, personal power, and assertive self-representation. Even when modern medicine does acknowledge the importance of social connection, it is often from the individual point of view that it is "good for the individual's heart" to have a "social support system." The idea of a vibrant interdependent context of interactive hearts and how that system might impact the cardiovascular system either receives little attention, is seen as "touchy-feely" pseudoscience, or, at best, is viewed as secondary to the individual heart in an individual's body.*

With some notable exceptions, most of our approaches to the diagnosis and treatment of heart disease and other conditions still focus on "what's within the person" more than "what's within the relationship." Every cardiologist knows the research showing that if you want to predict how long a patient will live and you don't know anything about her genes, family history, diet, or exercise, you should at least find out about the nature of her social relationships.

A contextual cardiology

Data from psychoneuroimmunology, cardiac psychology, and other fields have demonstrated that strong social relationships strengthen our immune system, extend our life more than smoking cessation does, speed recovery from surgery, and reduce the risks of the anxiety and depression that make us more vulnerable to disease.[2] *Contextual* cardiology asks if our daily practice of cardiology reflects the relevance of these data to the interactive system in which two or more hearts exist.† It asks whether our evaluation of cardiovascular systems looks at the interpersonal system in which hearts live and whether the energy emanating from the hearts of cardiologists and other health care professionals has an influence on the hearts of those who bring their hearts to us for healing.

INTERPERSONAL NEUROBIOLOGY

Recent findings in human development, neurobiology, and affective neuroscience have led to the formation of a new discipline, called *interpersonal neurobiology* (IN), that establishes a precedent for a field of contextual cardiology. Publications such as the *Journal of Integrative Neuroscience* regularly publish articles in this fascinating new field. For example, data from a Russian study recently published in this journal suggest that cardiac rhythmogenesis relates to changes in the efferent structure of the medulla oblongata and its interactions with hierarchical brain structures, and that rhythmogenesis is not limited to intercardiac rhythm generation and sympathetic and parasympathetic neural mediation.[3] The authors suggest that the intrinsic cardiac rhythm generator is life-sustaining during stages of deep inhibition (under anesthesia or during unconsciousness) and that the brain generator provides interactive behavioral and psychological heart adaptive reactions.

Is medicine losing its mind—or finding it?

In the United States, the impetus for IN came in the early 1990s from the research of psychiatrist Daniel J. Siegel. His work showed that what we refer to as "mind" emerges at the interface of interpersonal experience and the structure and function of the brain.[4] While the rapid expansion of research in the neurosciences upon which IN is based has led some critics to argue that medicine is "losing its mind" in favor of the brain and that medicine is returning to reductionism and "biologic determinism," the data from IN lead to the possibility that we are finally *finding* the mind. Research in IN suggests that our interactions with the environment, especially with other people, have profound influences on the structure and function of our brains. In other words, what we call "mind" is a much broader concept than we ever imagined, and it emerges from an interactive system of brains not only prenatally but throughout the entire life cycle.

Three fundamental hypotheses of IN

IN is organized around three fundamental hypotheses that continue to receive strong research support:

* For a discussion of the fields of neurocardiology, cardioendocrinology, and energy cardiology, see Pearsall P. The Heart's Code: Tapping the Wisdom and Power of Our Heart's Energy. New York, NY: Broadway Books; 1998.

† For reviews of data directly related to the concepts presented in this paper regarding "loving intimate connections," see Cohen S, Herbert TB. Health psychology: psychological factors and physical disease from the perspective of human psychoneuroimmunology. Annu Rev Psychol 1996; 47:113–142; and Waise LJ, Gallagher M. The Case for Marriage: Why Married People are Happier, Healthier, and Better Off Financially. New York, NY: Doubleday; 2000.

1) What we call "mind" is a manifestation of the flow of energy and information within the brain and between brains.
2) Development of the "mind" is continuous and determined by the interaction between internal neurophysiologic processes and our interactions with others in our environment.
3) The structure and function of the brain are determined by our experiences, especially the nature and quality of our interactions with others, that help shape our nervous system's genetically programmed predispositions.

Findings from IN have important implications for understanding human behavior, health, healing, and particularly cardiology. They offer evidence that how we interact with others directly influences a neurobiologic system that influences how we think and feel, which in turn impacts our overall physiologic well-being.

This "contextual" approach is not new. Studies in animals have long indicated that a major interactive factor, such as short episodes of maternal deprivation, can have pronounced negative neuroendocrinolgic effects on an animal's ability to cope with future stressful events.[5] Studies of human development have long documented that different patterns of child-parent interaction are associated with how children come to see and interpret their world and the kinds of physiologic responses that are associated with their "cognitive style."[6] The condition of "failure to thrive" has an established research history documenting important interpersonal dimensions of health.

IN prompts key questions about contextual cardiology

Using IN as a point of departure, a number of questions related to contextual cardiology emerge:

1) If the brain's structure and function are influenced by our interactions with our environment and the persons with whom we lead our lives (as supported by recent work in IN and affective neuroscience), is the heart similarly influenced?
2) To supplement the focus on what is going on within our patients, is it productive to look at what is also going on between our patients and the persons with whom they interact?
3) Should our understanding, diagnosis, and treatment of the cardiovascular system be done in the context of our patients' interpersonal interactions?
4) Are our patients' hearts literally affected by the hearts of those closest to them (including their physicians and other health care workers), and vice versa?
5) Should cardiologists and other cardiology-related health care professionals look beyond a patient's genetic, dietary, exercise, temperament/emotional profile, and personal health profile to the system in which the patient lives, loves, and works?
6) Can and should a thorough cardiology evaluation include analysis of the context of the patient's interpersonal system, and is it realistic to do so?
7) Is there research available that documents a significant impact of the quality of our relationships on our cardiovascular system?
8) Would the development of a field of contextual cardiology that studies the nature and quality of our relationships yield helpful new approaches to the research, prevention, and treatment of heart disease?

At a time when dealing with the various diseases of the heart requires as much valid, research-based information as possible and when IN and related approaches are yielding such important information about illness and health existing *between* rather than just *within*, it would seem that the answer to all of these questions is "yes."

HARD MARRIAGE, HARD HEART

One recent example of research done from a contextual cardiology perspective is a study conducted by University of Utah researchers from 2002 to 2005 involving 150 married couples aged 60 to 70 years with no history of heart disease.[7] The researchers analyzed 6-minute verbal interactions between the married couples about a topic on which the spouses disagreed, evaluating patterns of speech. Two days later, both spouses underwent computed tomography of the chest, and the findings illustrate what can be learned about hearts in the context of the interpersonal relationships in which they exist (ie, the "naupaka effect").

The results revealed different impacts on the cardiovascular system for men and women in response to their spouses' words:[7]

- The more hostile the wives' comments (eg, "You can be so stupid sometimes"), the greater the extent of calcification or hardening of their cardiovascular arteries. Particularly high levels of calcification were found in the wives who spoke in a hostile manner and who were interacting with husbands who responded with hostility.
- The more controlling the husbands' or wives' words (eg, "I'll do what you want to get you off

my back"), the greater the calcification observed in the husbands' hearts.

The researchers concluded that hostile words during marital disputes resulted in more calcification in women's hearts but not men's. Controlling words during disagreements led to calcification in men's hearts but not women's.

These findings come in the context of prior research showing that women tend to place greater value on interdependence and to be uncomfortable with factors that seem to threaten it, such as hostile behaviors, and that men place more value on independence and become stressed by behaviors that seem to challenge that orientation, such as controlling statements. In that context, is not surprising that "hard" marriages—characterized by verbal expressions that cut at the core of each gender's general cognitive and emotional style—could result in "hardened" hearts.[8] Whether these findings merit a new kind of "interpersonal verbal stress test" or perhaps a different kind of electrocardiography—"expression cardiography," in the form of a 6-minute verbal content analysis of a couple's discussion of a stressful topic to supplement the electrocardiogram—is a question asked by the proposed field of contextual cardiology.*

'HOT' AND 'COOL' INTERACTIVE STYLES

A truly contextual cardiology would have to take into account factors beyond gender-based predisposition to interactive styles. Many other factors potentially influence such styles, not the least of which is cultural. For example, in Hawaiian culture, the female orientation toward interdependence and the male orientation toward independence are not dominant patterns, and significant variations exist between the genders on these axes and within *`ohana* (families).

Placing heart health and disease in the context of "affective style" may be helpful. Affective style is the balance between our "approach" and "withdrawal" systems as they manifest within interpersonal systems. New research from affective neuroscience indicates that this balance exists at birth and can be read by electroencephalographic measures from the forehead region.[9]

Persons with certain brain-wave patterns measured as coming from the left forehead region consistently report more feelings and behaviors characteristic of the "approach" orientation—more happiness, less anxiety and shame, more ease with establishing and maintaining interpersonal relationships—than persons with these same waves coming from the right forehead area. "Cortical lefties" also tend to be significantly less intense ("cooler") in their reactions to stress than "cortical righties," who tend to be intense ("hot") in their reactions to stress. What happens when these patterns intersect in our most intimate relationships may have bearing on the cardiovascular system.

Research has consistently shown that a good marriage is one of the life factors that is strongly and consistently associated with happiness.[10]† Part of the "marital benefit effect" on health and happiness may derive from the possibility that happy people (cortical lefties)—who are more prone to cooler (less reactive) "approach"-style behaviors—are more appealing as dating partners and easier to live with as marital partners.[11] However, just being in a marriage—and thus benefiting from the "naupaka effect"—seems to offer a statistically significant buffer against illness and to elevate the happiness associated with good health.[12]‡

In keeping with this proposal of a contextual cardiology, it may be helpful to learn more about the impact of inherited "approach" vs "withdrawal" orientations and their associated cool/underreactive and hot/overreactive styles. It seems possible that these styles, particularly in the context of interpersonal relationships, could have a significant impact on the cardiovascular system. Whether busy physicians, whose hands are already full doing heart "pump maintenance," have the interest, time, or heart for considering such factors is another matter. It may be that we need a true systems orientation to cardiovascular health consisting of a team of several health care professionals from different disciplines working together to analyze the context in which our patients' hearts live.

* For a description of the process and findings related to content analysis of verbal expression (CAVE), see Gottshalk LA. Content Analysis of Verbal Behavior: New Findings and Clinical Applications. New York, NY: Lawrence Erlbaum Associates; 1995.

† However, whether married people are happier than people who never marry is not clear because unhappily married people are the unhappiest group of all and "bring down the marital average" of happiness. For a thorough analysis of the issue of marriage, health, and happiness, see DePaulo BM, Morris WL. Singles in society and science. Psychol Inq 2005; 16:57–83.

‡ While most of the research to date shows clear benefits of marriage for health and longevity, a recent longitudinal study failed to find any long-lasting benefits of marriage on self-reported well-being. This may be due to the "happiness set point" differences between left and right cortical orientations. See Lucas RE, Dyrenforth PS. Does the existence of social relationships matter for subjective well-being? In: Vohs KD, Finkel EJ, eds. Interpersonal Processes and Interpersonal Relationships: Two Halves, One Self. New York, NY: Guilford. In press.

SENTIMENT STYLES AND THE HEART

The research of psychologist John Gottman serves as another potential basis for a field of contextual cardiology.[13] Using extensive analysis of videotapes of marital couples' communication patterns (reviewed by Gladwell[14]), Gottman argues that most marital partners exist in one of two states within their relationship, with each state having different impacts on the spouses' cardiovascular systems.

The state that Gottman calls "positive sentiment override" (PSO) has salutary impact on the heart. The positive emotions felt by the spouse in this state seem to act as a buffer against the marriage-induced stressors that lead to the "flooding response" of accelerated heart rhythm and severe spikes in blood pressure. When his or her spouse does something bad, the partner in PSO says something like, "Oh, he/she is just in a crummy mood." In the "negative sentiment override" (NSO) state, a spouse draws and persists in lasting conclusions about his or her partner. Even if the spouse does something positive, it is seen as an action by a selfish person doing a rare nice thing, probably for an ulterior selfish motive. It may be that PSO relates to the cool cortical-leftie style and NSO to the hot cortical-rightie style, but when Gottman graphed and statistically analyzed sentiment override states, he found that they had significant impact on the marriage and the spouses' cardiovascular systems.

The sentiment styles identified by Gottman also result in differing marital patterns. "Validation marriages" involve partners who share a PSO orientation. In these marriages, spouses work calmly and cooperatively to solve their problems to mutual satisfaction. In "conflict-avoiding marriages," the partners seem well aware of "hot spots" in their interactions and their respective sentiment styles. They agree to disagree and rarely delve into the problem areas that they sense could cause their hearts to race and their blood pressures to rise. In "volatile marriages," the pattern with the most damaging consequences for the participants' cardiovascular and immune systems, conflicts constantly arise that erupt into passionate disputes reflected in severe and lasting heart rhythm changes, blood pressure elevations, and negative impacts on immunoefficiency.*

CONTEMPT AND DISGUST AS RISK FACTORS

Gottman also observed that contempt is one of the most dangerous emotional states in marriage and one that signals severe danger for marital viability and the spouses' cardiovascular health. In contrast to criticism, which is characterized by more specific and behavior-based nonpersonal complaints about a correctable behavior, contempt is a generalized state of discontentment accompanied by emotional disgust. Once contempt and disgust find their way into a marriage, the marriage and the hearts of those in it are in serious trouble. To ignore this "cardio-context" is as neglectful as not asking about a patient's diet or genetic background.

One of the healthiest responses spouses can learn for saving their marriage—and, to some extent, their hearts—is for both partners to avoid the devastating effects of disgust and contempt by being willing to blind themselves to the annoying flaws and failings we all bring to relationships. For example, research shows that the bigger the discrepancy between the more objective view that close friends may have of our partner and our own more favorable illusions about our partner's foibles, the greater the chance of a healthy relationship that protects and enhances our health and our partner's health in this reality-denying but forgiving union. Thus, when it comes to a healthy marriage, delusion and denial seem essential.[15]†

HEALTH IN CONTEXT: RESEARCH QUESTIONS FOR A CONTEXTUAL CARDIOLOGY

If we consider the above hypotheses and research in contextual cardiology, together with the basic assumptions of IN, several questions emerge that seem worthy of further investigation:

- Is what we call "heart" a manifestation of the flow of energy and information between the brain and the heart, as well as between multiple brains and hearts?
- Is the heart's development continuous and determined by the interaction between internal neurophysiologic processes and our interactions with others in our environment, particularly those with whom we interact most intimately and regularly?
- Is the structure and function of the heart determined in part by our experiences, especially the nature and quality of our interactions with others that help shape our cardiovascular system's genetically programmed predispositions?

* For a review of some of the research related to lasting, loving relationships, see Pearsall P. The Last Self-Help Book You'll Ever Need. Repress Your Anger, Think Negatively, Be a Good Blamer, and Throttle Your Inner Child. New York, NY: Basic Books; 2005.

† For the Hawaiian view of loving relationships, see reference 1.

For more than 2,000 years, Hawaiian medicine has answered "yes" to these questions. Continuing progress in cardiology may be promoted by considering this ancient wisdom and applying modern science to trying to answer these questions.

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