

Information Sheet

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Abstract

This study assessed possible effects of exposure to compassionate presence on people in comatose or non-communicative states near death. It used several different instruments in this assessment: biofeedback technology, co-researcher interviews and survey reports. The biofeedback tool chosen for use in this study was the HeartMath Freeze-Framer heart-monitoring system. This tool measures heart rate variability, a parameter that has been linked to emotional unease or well-being. Simultaneous biofeedback measurements were taken of persons sitting in an identified state of compassion with patients, and the patients themselves. In addition, other measures such as interviews with caregivers and family members, and reports from and interviews with sitters were utilized to assess the effect of interaction. This study compares information collected from these different methods, and attempts to draw conclusions about the responses that comatose patients and their sitters had to the experience of compassionate exchange.

Findings of this investigation were that the patients studied appeared to be very sensitive to people in their environment. Patients and their sitters exhibited many simultaneous responses to each other in these sittings. Further, there seemed to be evidence of response based on the longevity of the relationship in some patients, as well as response to interventions of prayer, meditation and touch in both patients and sitters. Sitters without exception were unable to maintain qualification coherence levels when at the bedside of a patient. Finally, post-project interviews indicated that sitters and patients showed evidence of response to sittings that extended beyond the study period.

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I would like to acknowledge and dedicate this thesis, first to the patients and sitters who participated in this investigation. Second, to anyone who might use this small beginning for further study and advancement of the spiritual and emotional care of the dying. Third, and definitely not least, to Mark Brady who was an unfailing support from beginning to end. Finally, to my family, Nick, Michael, Grace, Peter and Gil, who suffered with me as I tried to learn how to undertake a research project and write about it. Thank you.

For David

At first you only watch for the movements of the busy physician
until you notice the silent presence near you
at the pivot of the spinning room
and your eyes that keep retreating there

He was like this. Like a large bosomed widow sitting at the bedside nodding
or gazing placidly at the broad knuckles of her folded hands
Within the prayers of this kind of church woman
there is an old voice humming a song that has never become common

If you are lucky, one sits by your bedside
holding the rare vessel of acceptance
within your labor, your illness, your birth
your dying

folding your song of suffering indifferently into pleats
of a great black dress
or her apron pockets
always made from the same pattern

If you call out, sometimes you find one there
forgiving your painful body of stories with a vacant focus
because she has always known your history
and it is not different now than it ever has been

Here,
I have a wish for you:
May one of these sit with you too in the long hours that come
during the mourning of your next beginning.

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Chapter 1: Introduction to the Thesis

This study was initiated from an innate desire to understand more about one of the great crucibles of the human spirit, the process of dying, and ways to be of help to people going through this process. This introduction presents background and rationale for this study.

Rationale

In the United States alone, each year over 2.4 million people die. The vast majority of these deaths are neither accidental nor sudden, but are related to disease processes (Hoyert, Kung, & Smith, 2005). Since most disease processes resulting in death culminate in a comatose or non-communicative state for some period of time before death occurs, most Americans – indeed, most people living - will experience this state before their last breath is taken. Yet because there is generally no return to coherence from this state of consciousness, there is still much to be learned about the inner experience of this state or the spiritual care most likely to help in this transition.

While much has been reported in recent years about how the dying die, and the beauty that this change can hold, most information on the dying is presented as anecdote or story that offers inspiration for hospice workers and bereaved family members, and opens spiritual ideas to others working through their life processes. It is not so common for researchers to study the non-communicative dying and their responses directly. Indeed, a cursory search of journal articles and periodicals resulted in no direct physiological or psychological studies of this stage of dying. Most studies screened focused on the responses of family or caretakers to death, or on the experiences of dying

people while they are still in communicative states. This, of course, does not mean that there are no studies of this nature, but it may indicate either a reluctance by researchers to question or investigate the consciousness state of dying person with objective scientific instruments, a decision that this state is impenetrable, or the conclusion that findings are irrelevant to life and the living.

This general impasse and an impatience to discover more about communication at the end of life spurred my interest this project. It is my own strong interest in the mysteries of how consciousness is shaped during a most vulnerable moment in human life, during the processes of dying, which has brought me to this study. I carry a sense that there is an intrinsic connection between these processes and that an expanded understanding of them can yield much to the fullness of ordinary life.

Background

Clues to the mystery of the transition out of life are offered by research on the Near-Death Experience (NDE), stories from people who have survived coma and unconscious states, the experiences of people who care for the unconscious, comatose and dying, as well as esoteric and spiritual practitioners. Numerous reports from practitioners and coma patients suggest that the presence of others who are loving or caring is helpful and meaningful for those who venture into unconscious states near death (Boerstler, 1986; Lawrence, 1995; Parker, 1984; Sogyal Rinpoche, 1992; Tosch, 1988; Villaire, 1995). Further, if caretakers are aware and sensitive to their own experience, providing this presence can be transformative for them as well, often leaving them with a changed perspective on their lives (Morris, & Knafl, 2003; Smith 1998; Sutherland, 1990; Whitfield 1998).

This pilot investigation explores the possible effects that compassionate presence may have on the mental, emotional, or physical states of a dying person and those of people who hold this state of compassionate presence with them. Ultimately, it is an investigation into a particular type of communication: non-verbal communication with people in the altered state of consciousness called coma in a near-death state. It explores whether the direct, instrumental means of studying the phenomenon of human interaction are valid when applied to people in this state of consciousness.

The comatose state is one of the most physically static states human beings can enter into, and yet no one is completely static while they live. Cellular movement, metabolic changes, cardiovascular pulsation and bioelectrical events are a part of life at the subtlest levels even as gross movements and speech are stilled. There is growing evidence of the strong relationship between mental and emotional states of being and patterns of physiological response in the healthy population (Cardinali, 2001; Pearsall 1998; Rein, Atkinson, & McCraty, 1995). There is also compelling research that what esoteric practitioners for thousands of years have observed is true: that there are ways in which the subtle biological and bioenergetic pulsations of people in relationship influence each other, possibly through electromagnetic fields (McCraty, 2003). These fields are generalized in this text as *energetic fields*. The study of people in relatively static, non-communicative states provides an opportunity to explore these most subtle interactions.

Unfortunately, studying people near death poses numerous serious limitations. People near death do not give overt confirmation of their experience or share their points of view. They do not respond in obvious ways. They do not answer interview questions. They rarely come back from the dead like Lazarus to tell us all. Instruments of

observance must be extremely sensitive to record interactions at this stage of life. Perhaps a well-tuned, fully prepared and aware human consciousness is still the best instrument for observing the subtlety that occurs between two individuals sitting together while one of them is in the radical transformations of death. Nevertheless, research on the delicate neural and hormonal responses to emotions and stressors is expanding. What critical care nurses have found through practice is confirmed by research: that there is much that can be learned from tracking physiological parameters when trying to understand emotional and mental states of being and the relationships between them (Villanueva, 1997; McCraty, 2003).

This pilot investigation pairs information collected through interviews with study participants and caregivers with measurements from a tool that monitors subtle changes in the pulsations of a vital human organ: the human heart. It uses biofeedback technology to track heart rate changes in both a comatose patient and a person sitting compassionately with them to see if relationships in this data can be found. It interprets this data based on HeartMath Institute research on heart rate variability and the connection between patterns of heart rate and emotional states of being that has been established through research with healthy populations. Since it was not known whether people in near-death states would have the same HRV patterns or responses as the healthy subjects in the original research, this study explores that question.

Delimitations

Though these study methods would likely be useful for exploring any type of unconsciousness, the subjects that I had access to for this study were Hospice patients of United Hospice of Rockland County (UHR). As a result, the pilot project dealt with a

variety of non-communicative consciousness states that might typically be seen near death.

Patient participants in this study are described in detail in Chapter 3 – Methods. The study population was limited to women in comatose or non-communicative states near death, enrolled with United Hospice of Rockland (UHR) and who were residing in one of two identified institutions in Rockland County, NY. Sitter participants were selected from UHR volunteers who met numerous requirements described in detail in Chapter 3.

Limitations

This investigation presented numerous limitations. One significant limitation was the lack of information about the applicability of HeartMath Freeze-Framer software technology developed for healthy populations to people near death. It was not known whether this population exhibited heart rate variability patterns similar to the vigorous population that has been studied, or what conclusions might be drawn from different patterns of heart behavior if they manifested. I assumed that if there were a reasonable alignment of patient data with that taken from a living population, the emotional factors underlying the data would also be similar.

A second obvious limitation was the small sample size that I worked with. There was admittedly a good chance that I would not be able to find correlations, or valid conclusions as a result. Further, there was a chance that patient participants would die before a full cycle of sessions could be completed. Since expanding the sample size was not practical, this limitation had to be accepted.

Another issue associated with use of a biofeedback program to measure emotional processes was the effect that awareness of this measurement might have on sitters, particularly during the training and qualification sessions. Awareness that the quality of their emotional state and well being would be measured while participating might have produced performance anxiety that could interfere with the capacity to hold a state of compassionate presence with a patient. It was hoped that discussion of this issue, as well as adequate preparation and practice, would help sitters will gain confidence and detachment from the measurement process. In reality the levels of anxiety and detachment did vary between sitters. There was significant anxiety for three sitters during qualification. Two did not qualify for participation. The third ultimately declined to participate for personal reasons.

One institution was identified to host this study: United Hospice of Rockland in Rockland County, New York (UHR). This project was approved by both ethics committee and the governing board of this organization, and was widely supported. Numerous presentations, letters and informational packets were developed for staff and board members to give them the background that they needed to support this project. For examples of introductory letters and other materials used in the approvals process, see Appendix A – Introductory Letters. Throughout the project I worked and coordinated with staff and volunteers of UHR, as well as family members. Working with an organization introduced the possibility of being terminated and of being subject to their priorities in connecting me with patients. In addition, I had to work within the institutional requirements and possible objections of the nursing home and sanitarium staff where patients resided. The problem of informing many staff members on different

floors of the activity with their most vulnerable patients increased complexity. It was hoped that the benefits for the study of being in an institutional setting would outweigh the difficulties it introduced.

Another area of concern was the use of human subjects that were not competent to evaluate and sign their own consent to participate. Family members had to provide this for them. Because this research at worst carries exceptionally low risk, and at best provides a benefit by expanding services to patients, it seemed reasonable to move forward despite this concern. Families participated for various reasons, some of them personal, but most were motivated by the feeling that without research on death and dying, it would not be possible to improve or evaluate the care that the dying and comatose now receive. They hoped that their loved one might receive a benefit for themselves, but also that they benefit by having a last opportunity to be of service to others.

The limitations of this study described above were accepted and worked with in the hopes that even though it may be seen as only a pilot investigation, it will give later, more elaborate studies a clearer direction and a more sure-footed foundation. It is hoped that death research will expand and continue and that some aspect of this study will result, as the Buddhists say in the phowa, in more people dying “...a good and peaceful death, and through the triumph of (their) death... able to benefit all other beings, living or dead.” (Sogyal Rinpoche, 1992, p. 215).

Working Definitions for this Study

Caretakers - For the purposes of this study, caretakers are defined as doctors, nurses, aides, social workers, primary caregivers, hospice volunteers and family.

Coherence - Logical connectedness, internal order or harmony among the component parts of a system. In physics, two or more waveforms that are constructively phase-locked together are described as coherent. When a system is coherent, virtually no energy is wasted, because of the internal synchronization of its parts.

Coma- A state of extreme insensibility to outer stimuli from which it is difficult to arouse the individual, connected to psychogenic problems, organic brain lesions, or systemic metabolic changes such as glucose or oxygen deficiency. (Mindell, p.108)

Compassionate Presence- A state of awareness of another's plight and openhearted willingness to witness and give loving, sympathetic attention to them while in this state. For the purpose of this study, presence will refer to being in close physical proximity as well as being in a general state of attention.

Cross-Influence - A situation in which some parameter of the sitter's are taken on by the patient at the roughly the same time that some parameter changes for the sitter or vice versa. For example, the sitter may become incoherent just as the patient becomes coherent after touch contact. Other evidence of this can be the taking on of patient patterns by the sitter, similar to entrainment.

Energetic Contact- This term refers to the sense of a non-physical, non-verbal communication between individuals that occurs through interaction of energetic fields, such as the heart's energetic field. Though energetic contact can occur through touch, this study did not necessarily involve physical contact.

Entrainment - A phenomenon seen throughout nature, whereby systems or organisms exhibiting periodic behavior come into sync, oscillating at the same frequency and phase.

PNS Mediated Response- A phenomenon of HRV in which the Parasympathetic Nervous System (PNS) is either activated or inhibited during periods of emotional or physiological stress. This causes sudden changes in HRV. Erratic HRV patterns can be a result of PNS mediation and are often signs of anxiety or distress in ordinary populations.

Simultaneous Response - A situation in which there are simultaneous changes or reactions in both sitter and patient that appear to be connected to each other. Simultaneous responses do not have to be the same in both patient and sitter. For example, a patient may experience a sudden increase in PNS mediation at the same time that a sitter has a different change in HRV pattern, or a sitter's coherence may occur simultaneously with the lowering of patient amplitudes.

Sitter- A participant in this study who attempted to provide a state of compassionate presence to a comatose patient for a period of 20-30 minutes while sitting near them. Sitters allowed their own biofeedback data to be collected at the same time as the patient.

They also agreed to complete reports on their experience at the end of each session and in an interview at the end of their participation.

Chapter 2: Literature Review

Introduction

Several subjects seem essential to explore in this literature review. First, this pilot project examines a particular state of unconsciousness called coma and a person at the boundary between life and death. Literature pertaining to definitions of these states, the experiences of workers who take care of with people in them and the experiences of patients themselves is reviewed. A selection of literature dealing with Near-Death and unconscious experiences was also reviewed.

Second, this project also explores the interaction of people in two very different states of consciousness: one in a near-death coma and another in a waking state. If the interactions in this domain have been explored at all, it has traditionally been done by religious and spiritual practitioners. As a result, there is a general interest in 1) esoteric and religious traditions surrounding death, 2) the teachings of healing and 3) the teachings of shamanism. Because the Tibetan Buddhist religion encompasses many of these elements and is one of the world's great sources for the exploration of consciousness through dying, literature from this tradition was identified for review. In addition, two interviews were conducted with Tibetan Lamas for insight on their experience with companionship through death and the Buddhist theories surrounding this practice. Their comments are discussed.

Finally, this project has to do with exploring the possibility of non-verbal contact and influence between individuals. In order to do this more fully and within scientific constructs, biofeedback technology was used. Relevant research conducted and

published by the HeartMath Institute was reviewed to help ground this investigation in other scientific research and to support the application of this technology.

Death, near-death, coma and their relationship

A fascinating issue in this review has been this discovery: though we commonly think that we know the definitions of *death* and *coma*, there is considerable ambiguity in the medical definitions of these terms. Further, there is an important relationship between these two states. Each process seems to contain elements of the other.

The On-line Medical Dictionary defines death as: “The cessation of all vital phenomena without capability of resuscitation, either in animals or plants.” (<http://cancerweb.ncl.ac.uk/cgi-bin/omd?query=Death&action=search+OMD>)

It then goes on to give many qualifications of the use of this term. There is local death (which we all experience constantly in the form of cell and element replacement). There is general death of two kinds: of the body as a whole or of individual tissues. The latter follows the former in most cases. Definitions of *coma* (discussed below) generally have to do with the capability of response, or the ability to communicate and move with conscious intent. Different forms of coma are delineated by cause. Most definitions of death have to do with the capability for returning to biological function.

After review, similarities and differences in these states are striking. Certainly loss of function is common to both. Certainly the experience of coma is commonly found to be a stage *within* the dying process. Death of individual tissues may just as certainly be an aspect of the coma state before general bodily death occurs. Perhaps coma might be seen as part of a dying process, which is incomplete in some way. Death and coma seem

to be different in the issue of possible reversibility. But even this seemingly obvious fact might be challenged. In both cases there is a point when a subtle energetic process changes and there is no return to either bodily function or capacity for response.

Esoteric literature makes the distinction between death and coma even more ambiguous. Anthropological descriptions of the Tibetan de-logs, or the rituals surrounding shamanic initiation provide numerous reports in which a human appears to be dead for hours or even days and then returns to bodily function. In the meantime, the person in question has many remarkable experiences and adventures in another level of consciousness similar to those who have had an NDE. (Bailey, 2001; Ring, 1993) It is a challenge for our dualistic, western minds to understand the mysteries within both of these processes, while at the same time learning how to help those that are in them.

On Death and the Study of Dying

Modern death studies in recent years seem to be largely traceable to the pioneering work of Elizabeth Kubler-Ross who, with the publication of *On Death and Dying*, almost single-handedly brought the reality of dying to a resistant public mind (Kubler-Ross, 1997). Kubler-Ross began to say the unsayable: first that death exists, second that the dying are often tacitly asked to protect the living from this reality at a great price of the denial of their own needs at this juncture, and third that there are discernable stages within emotional process of dying. Kubler-Ross's classic five stages of the latter were: denial, anger, bargaining, depression, and acceptance. Using her authority as a member of the medical establishment, she was able to say that our over-attachment to life as an outcome has robbed the dying of quality-of-life at end-of-life. Further,

seeing death as an embarrassing failure, rather than a developmental process, interferes with needed closure in relationships at a cost to both the dying and the living. *On Death and Dying* was a remarkable and courageous first step out of denial.

That being said, few people have contributed more to interpreting the subtleties of consciousness at the bedside of the dying since Kubler-Ross's work than Stephen and Ondrea Levine. Bringing Buddhist perspectives to the young field of death studies, the Levines's numerous works focused public attention on meaning in death and the spiritual potency of this passage. The Levines began to bring forward the role of consciousness in the dying process, the relationship of healing to dying, and the importance of supporting the evolution of consciousness while in this process of transformation. Stephen Levine also developed many practical spiritual practices and meditations for the terminally ill, the dying and the bereaved (Levine & Levine, 1982; Levine, 1987; Levine 1997).

Concurrent with Levine's publications, the Hospice movement began to produce a fairly large number of writings on experiences of being with the dying, their communications and transformations. These books have come from Hospice nurses (Callanan, 1992), Buddhist monks and hospice social workers (Kapleau, 1998; Smith, 1998), physicians (Byock, 1998), clergy (Morrissey, 1994), and undoubtedly many others who were touched by the care of the dying.

As the hospice movement grew, Buddhist ideas were natural companions for many grappling with spiritual guidance of the dying. The Tibetan esoteric thought, which contains rich teachings about death and dying, began to make its way into the literature of both psychology and death studies. This influence was augmented by the transplant of Tibetan monks to western cultures and the growth of interest in Buddhist studies in the

west. Though *The Tibetan Book of the Dead* was made available in English by W.Y. Evans-Wentz as early as 1927 and the *Tibetan Yoga and Secret Doctrines* in 1935, and these important works were undoubtedly delved into by some, they were not so widely read by the public (Evans-Wentz, 1957, 1958). An important interpretation of some of these Tibetan teachings appeared in 1992 when Sogyal Rinpoche published *The Tibetan Book of Living and Dying*. This book translated many teachings out of the technical speech of Buddhist culture, and made the spiritual possibilities of death accessible to the western mind. This book remains a classic in relating the relevance of death awareness to life (Sogyal Rinpoche, 1992). This and other books from the Tibetan Buddhist tradition are discussed in more detail below.

Several important books on the processes of consciousness through death have appeared since Sogyal Rinpoche's book. One, *The Grace in Dying* by Kathleen Dowling-Singh, has expanded Kubler-Ross's original five steps in the dying process to include many more subtle processes of the psychological transformation in death. Singh includes terms such as withdrawal, radiance, interiority, silence, sacredness, transcendence, knowing, intensity and perfection in her descriptions of the "nearing-death experience" (Singh, 1998).

The Near-Death Experience

The body of literature on Near-Death Experiences has burgeoned in the past thirty years since the publication of Raymond Moody's *Life After Life* in 1975. This has expanded our information and insight on consciousness states through the dying process. This preliminary review does not fully explore the research in this area, but reviews

several articles to explore the role of caretakers in NDE's, and the effect of this experience on the caretakers themselves. This literature provides clues to understanding the continuum between death and coma.

Of the studies reviewed, two of three indicated that the experiences of patients could potentially have strong influences on medical and emergency personnel, who often had a sense of the presence of the dying being in the proximity of, but separate from their bodies (Kelly, 2002). These studies also indicated that personnel were often deeply moved by reports of a patient's NDE (Morris & Knafl, 2003). This information supports the idea that there may be important inter-relationships formed with people in close proximity to bodily death.

NDE reports often describe consciousness as being self-contained and autonomous while in the experience. After perhaps viewing his or her body as if from the ceiling and watching others work with it, he or she often has experiences that seem to have little reference to the people in normal consciousness states (Ring, 1980). However, it is not uncommon to find Near-Death survivors who report being very sensitive to the speech of companions during some point in their transition. Some report anger or unrest at hearing things that were said by people in proximity. In "The Nature and Meaning of the Near-Death Experience for Patients and Critical Care Nurses" (a study of 12 NDE patients and 19 nurses), Morris and Knafl give this summary:

Finally, the patients were very uncomfortable hearing information that was said in their presence, even though they were unconscious. They wanted health professionals to realize that, even though they may have appeared unconscious, they were often nonetheless able to see and hear what was going on around them. (2003, p.153)

One woman heard a nurse comment during her cardiac arrest: “Why don’t they just let her die and put her out of her misery?” She later reported that on hearing this she had felt unworthy of life, as if she were too much trouble and that maybe she should just die (Morris & Knafl, 2003, pp.153-154). In directives for medical staff, Morris and Knafl conclude:

Unconsciousness did not necessarily indicate lack of awareness; in fact, patients reported that the NDE produced acute awareness. While patients *appeared* unaware of events outside of themselves, they were often acutely aware of events – more aware than if they had been conscious (p. 164).

The writing and experiences of others support the idea that positive meditative and spiritual practices used with unconscious states near death can be helpful to the patient. Sogyal Rinpoche, discussing the phenomenon of the delok (or de-log) in *The Tibetan Book of Living and Dying*, gives such an example. Describing the story of a famous delok, he notes the pain she felt when her family did not see, feed or notice her in the period between dying and reawakening. However, during this time she reported feeling great joy when spiritual practices were done for her and “immeasurable happiness” when the master practiced for her and brought his mind into oneness with hers (Sogyal Rinpoche, 1992, p.330). Boerstler and Kornfeld give less riveting, but similar testimonials of the positive effects of comeditation (a practice in which the dying person and another person meditate together) in their work with the dying before death (Boerstler, 1986; Boerstler & Kornfeld, 1991.) Other reports have been documented in studies of coma survivors and will be discussed below. This information indicates that the even in NDE or clinical death situations there may be great sensitivity to quality of communication and contact with the patient.

Coma

Coma literature reviewed for this project to date has largely been that gathered from medical websites, literature of critical care professionals and the work of Arnold and Amy Mindell. The former provided practical definitions and descriptions of coma types so that I could gain an understanding of the varieties of this physiological state.

There were clearly different definitions of this term. Some stating that coma is

.... A state of unconsciousness, during which an individual is not able to react to their environment. Someone in a coma cannot respond to any form of stimulation whatsoever.

(<http://www.neurologychannel.com/coma>)

Or:

A deep prolonged unconsciousness where the patient cannot be aroused. This is usually as the result of a head injury, neurological disease, acute hydrocephaly, intoxication, or metabolic derangement.

(<http://cancerweb.ncl.ac.uk/cgi-bin/omd?query=coma&action=search+OMD>)

Others define it more narrowly:

Coma is the prolonged period of unconsciousness immediately following traumatic brain injury...The person in coma may have a simple reflex in response to touch or pain, but essentially there is no meaningful response to external stimuli. (<http://calder.miami.edu/pointis/tbifam/coma1.html>)

The typical state of unconsciousness before death is metabolic coma. Metabolic coma is defined as:

Coma resulting from diffuse failure of neuronal metabolism, caused by such abnormalities as intrinsic disorders of neuron or glial cell metabolism, extracerebral disorders that produce intoxication or electrolyte imbalances. (<http://cancerweb.ncl.ac.uk/cgi-bin/omd?query=metabolic+coma&action=search+OMD>)

Literature collected on the memory of coma survivors and non-communicative ICU patients provides insight on the subjectively felt needs of the patient through their

memory of what helped them most. Lawrence provided a significant study in this area by studying 100 people who survived unconscious or comatose states. This study documents that patients in a variety of unconscious states heard, understood and had emotional responses to things that were said around them when it was assumed that they were unaware. In addition, a significant percentage (23%) reported some kind of paranormal experiences, such as near-death or out-of-body experiences (Lawrence, 1995).

Another study of traumatic coma survivors was conducted by Paula Tosch. This study of fifteen coma survivors (confirming previous research by Schnaper) revealed that the comatose often recall feeling as if they were imprisoned, having intensified sensory experiences and death-like experiences. Four of the patients studied recalled that:

physical touch, hearing details of the accident and reassuring voices were helpful. One subject stated, 'The most helpful thing to me was the calming tone of one of the nurses. The tone was much more effective than what they said' (p. 226).

Two case studies of non-comatose Intensive Care Unit (ICU) patients were also reviewed. (Parker, Schubert, Shelhamer & Parrillo, 1984; Villaire, 1995). Similar to the studies of coma, both studies involved a near-death condition and some alteration of consciousness through use of drugs. Both patients were non-communicative through ordinary means, though one learned to use a spelling card during the months of confinement. In one report, the patient was actually an ICU nurse.

The intense need for communication with caring others was expressed throughout these articles. Both reported periods of terror, nightmarish dreams or visions, and confusion in which they felt unsafe. Both articles indicated that patients were sensitive to the expressions and attitudes of their caretakers during this experience. One patient (the ICU nurse) needed to be constantly reassured about specifics, such as time, day,

procedure, tasks of caretaker and that the state would be temporary (Parker et. al., 1984).

The other felt intense need for any kind of communication or contact to the point that she learned ways to set the monitor alarms off so as to overcome the isolation she felt.

(Villaire, 1995):

It didn't matter what they talked about, as long as they talked to me....They could have talked about anything and I wouldn't have cared, as long as they stayed in there. (p. 84)...The most important thing for me in the ICU was the human contact, the communication. Acknowledge me, even though I can't communicate with you; treat me like a human being, just say anything (p. 86).

In both cases, communication through speech was the primary method of finding connection and safety. The preservation of the conscious mind and human connection was being fought for. In this last respect these examples may differ from those of the near-death survivor, the comatose and the person actually dying who may be in a deeper process of surrendering this mind. Nevertheless, these examples underscore the need for human connection in at least a certain segment of this process, and the terrors that can beset someone in physical crisis who does not feel safe in this state.

Finally, the work of psychologists Arnold and Amy Mindell is useful in forming an understanding of coma consciousness and working with it. Arnold Mindell developed methods for communicating with those who are in various forms of coma, sometimes awakening them. These methods include careful observation and mirroring of any verbal cues and images that are presented by the patient, imitation or adoption of breathing rhythms, tremors, moans, sighs, gasps, shouts or any other body gestures (Mindell, 1998). Amy Mindell expanded on her husband's work, offering a practical guide for caretakers working compassionately with the comatose (1999).

The Mindells' work defines several levels of coma: quarter-trances, half-trances, three-quarter trances and full coma in which "one cannot respond to any verbal or nonverbal approaches" (1989, p. 56). However, their work shows that defining coma simply as the inability "respond to any form of stimulation whatsoever" (see above) is too limited. With numerous patients Arnold and Amy Mindell demonstrated that response exists in most patients if you were willing to admit changes of breath rate or subtle gestures as evidence. Indeed, they report that even with patients in full coma they have succeeded in communication through imitation of the somatic gestures of the body. An interview with Arnold Mindell in Amy Mindell's book, *Coma: A healing journey*, states:

I have, to date, never come across anyone in coma – be it due to severe brain injury, to metabolic problems, or to old age – who hasn't been reachable in some form or other by the kind of communication we do (1999, p.256).

The observations of the Mindells is confirmed by ICU nurses who, through many years of work with the comatose and critically ill, have found that the monitoring of subtle body movements and biophysical data are key to communication with this type of patient. In one dissertation on nursing experiences in the ICU, nurses were questioned about the means by which they assessed pain, fear or tension in comatose patients. They reported using the following factors: changes in vital signs (such as heart rate and blood pressure), muscle tone, facial expression, eye movements, and gut feelings (Villanueva, 1997).

Reports from the Mindells, coma and Near-Death survivors, and critical care workers provide important cornerstones for this pilot investigation: years of evidence that people in various states of coma can be profoundly influenced by those around them, and are somatically responsive to loving attempts to communicate with them.

Certainly the work with, and recorded observation of the dying, unconscious and comatose extends far beyond this brief. Nevertheless the general direction of collective work on death in the past 50 years has been toward a broadening of our understanding of death as a major, transformative event in the chronicle of human development, rather than an embarrassing failure. Further, this work indicates that the various unconsciousness states are often permeable to human communication. Currently, there seems to be a great deal of integration between fields of interest in death as practitioners of religion, psychology, consciousness studies, eastern wisdom traditions, medicine, healing, and legions of hospice workers share their experiences and find a common language.

Tibetan Buddhist ideas about companionship through death

There are many religious traditions that can be explored for insight on this study of dying. Probably every wisdom culture has probed the mystery of death, recognized the importance of dying as a crucible for the human soul, and has developed some methods for assisting people through this passage. However, to have reviewed American Indian, Egyptian, Christian, Muslim, Judaic or tribal shamanic cultures for ideas about death processes would have been well beyond the scope of this study. I chose to identify the Tibetan Buddhist tradition to support this study for several reasons. First, because it seemed to embody many elements from religion, healing and shamanic work that are part of other traditions. Second, because it is a tradition which contains within it a working understanding of an energy or consciousness system and this system's relationship to the human body, it seemed likely to be compatible with a biofeedback approach to

understanding relationship in dying. Third, there is ample literature available on the subject and there are practitioners readily available for consultation. Finally, Buddhist theories of helping the dying seem to be providing meaningful support and spiritual grounding to the American Hospice movement at present. All of these factors make the work of this wisdom tradition particularly relevant to this study.

The progress of the soul's exit from the body and its role in the evolution of the spirit

The Tibetan perspective on death includes a very clear picture of an optimal dying process. In this tradition, dying has a deep and enduring influence on an individual and determines his or her next incarnation and its particulars. For this reason, the preparation for death throughout life is seen as a most critical, central part of one's work in life and the greatest opportunity for liberation from the physical or conditional plane of existence called Samsara, and hence enlightenment. Individuals who have practiced the clearing of their mind (or energy bodies) throughout their life through yogic practices or meditation are seen as having the best chance of achieving enlightenment through the dying process. (Sogyal Rinpoche, 1992; Bokar Rinpoche, 1993)

On the other hand, if an individual who has not prepared for death through internal work and meditation, should have a sudden death or one fraught with terror or uncertainty, there is a higher chance that they will make non-optimal choices for themselves while moving through the bardo states (states which bridge between consciousness states or incarnations). This may result in a less evolved reincarnation. Help and support through this passage and afterwards is therefore seen as having the

utmost importance to the life and rebirth of an individual. (Sogyal Rinpoche, 1992; Bokar Rinpoche, 1993)

One of the important ideas presented in Tibetan theories of the pre-death state is the sequential dissolution of energetic bodies during the dying process. In the Tibetan system, stages of the dying process are envisioned as dissolution of five bodily elements: earth, water, fire, wind, and air and following this, a sequential transmutation of consciousness through experiences of color (Carr 1993; Coberly 1998). Though there are physical and psychological analogues to these stages, they can be understood as energetic, possibly electromagnetic processes. Using the metaphor of “winds” and “gates”, the Buddhists describe the movement of energy (winds) up the central channel and through the charkas (gates). These ideas in slightly different form occur in the work and teaching of healer Barbara Brennan as well, who describes her observations of the auric field during dying and the dissolution of the lower three energetic bodies in *Hands of Light* (1987). The idea that there are not only archetypal physical and emotional processes, but also archetypal energetic processes during the later states of death introduce questions of what an “optimal” death might look like from this perspective.

As Tibetan Buddhists see this, the energetic bodies in an ideal death are transmuted upward from lower energetic bodies to higher ones, eventually being dissolved into white light (enlightenment and liberation). Optimally the exit of the energetic bodies from the physical body occurs through the crown chakra. In a non-optimal death, the exit might occur through any combination of lower charkas, or gates.

The Extreme sensitivity of the dying and the promotion of peace at end of life

The idea that the non-communicative dying not only are aware of their environment and the people in it, but actually are hyper-aware is commonly expressed in Buddhist discussions of the dying process. The dying are seen as having senses that are very highly amplified. This teaching was confirmed in interviews with two practicing Buddhist Lamas. All senses, but hearing in particular, are described as amplified. Loud noises are particularly jarring. Hence, it is seen as especially important in work with the dying to have a gentle, peaceful and cautious demeanor, approaching the bedside slowly, talking quietly and touching very gently. The inner state of peace is considered to be especially important for a helper to bring to the bedside (Lama Norla Rinpoche, personal communication, February 6, 2006; Lama Pema Wangdak, personal communication, February 9, 2006) .

According to Tibetan Buddhism, not only are physical sensations exaggerated in death, the inner dissolution of the physical and energetic bodies (represented by the elements earth, water, fire, air and space) also have exaggerated effects in the mind and body. In the Buddhist tradition, these progressive processes of dying are described with naturalistic imagery. For example, the stage of dissolution of earth element is described as being felt as being crushed by heavy weights, such as mountains bearing down, or in the dissolution of fire element the individual feels that they are being consumed in flames (Sogyal Rinpoche, p. 251). All of life is seen as the grand preparation for these final trials. The more educated and practiced we become for these events, the more likely it is that we can navigate through the products of our own unfettered mind with ease. The reading of the *Bardo Thodol*, otherwise known as *The Tibetan Book of the Dead*, is a

technique which uses the sensitivity of the dying to hearing in order to give comfort and direction through these states of energetic and physical change and to help the dying person navigate through them with the least fear and uncertainty (Evans-Wentz, 1957; Sogyal Rinpoche, 1992).

The Role of the Heart in Dying

The heart has a particular role in Buddhist ideas about dying that is possibly significant to this study. In short, most Buddhist conceptions of dying include the convergence of energies from the extremities toward the heart prior to death (Lama Pema Wangdak, personal communication, February 9, 2006). This occurs at the endpoint of the absorption of the elements (earth, water, fire and air). In traditional Buddhist thought this occurrence is imaged as the convergence of white and red energetic drops, the red rising from below and the white dropping from above. The white drop is conceived as the masculine principle located at the top of the head. The red drop is conceived as the feminine principle located at the base of the spine. From the point of conjunction of these two energetic principles, the mind is reported to experience emptiness and undertakes “the black path”. At the end of the black path, the clear light (or enlightenment) dawns. (Coberly and Shapiro, 1998; Bokar Rinpoche, 1993; Sogyal Rinpoche, 1992)

The significance of these conceptions to this study is the idea that the energy of the heart has a central role in the process of dying. Further that the heart has functions, not just to pump blood in the body, but also to be a giver and receiver of love and the holder of our primordial connection to the union of the male and female. The energetic heart, intimately related all our life to the giving of love and role of being in relationship,

may possibly be of great service to this ultimate process of the human spirit. It does not seem to be a stretch to consider that this energetic and physical organ may be deserving of the greatest care at this final juncture.

Helping the Dying

The Limitations of the Helper. Relevant to this study, these ideas raise the question of how energetic processes might be supported by the presence and conscious interaction of others. In an interview with Lama Norla Rinpoche of the Kagyu Thubten Chöling Monastery in Wappinger's Falls, New York, the Lama spoke of his views on helping people through dying. At this point of the process he felt it was essentially too late to have a significant influence someone's outcome through dying if they had not already undertaken a life of purification and practice, or unless the helper is accomplished in the practice of Phowa (described below). "It is like going to school. Nobody can do it for you." (Lama Norla, personal communication, February 6, 2006). This evaluation of success is obviously defined by the religious culture of Tibet, in which recognition of the clear light or enlightenment is widely accepted as the ultimate goal of dying. However, Lama Norla did note that being in the presence of someone who has a clear mind and a peaceful, compassionate disposition is certainly a benefit to the dying.

These views were affirmed in my interview with Lama Pema Wangdak, director of the Vikramasila Foundation in New York City. In addition, Lama Pema described the difficulty of working with a dying person's cultural expectations for the spiritual practitioner. As he saw it, the expected cultural forms of the spiritual at this crossing point will strongly color what the dying person will or will not receive from someone at

their bedside. Lama Pema expressed his feeling that a sense of safety with the spiritual practitioner or priest is of utmost importance, and that safety will often be defined by cultural expectations. The presence of robes, prayers, habits, prayer beads, charms and other familiar religious objects can influence the degree to which a person will yield the mind to energetic dissolution and receive support from a helper. In other words, there seems to be a dramatic aspect to the interplay of relationship at death that is related to expectation and pre-determined mental constructs. According to Lama Pema, the priest must always be aware of these factors as well as the tradition of the person when approaching work with the dying, even in the unconscious states. (Lama Pema Wangdak, personal communication, February 9, 2006)

One of the most important books written on these topics for a western audience in recent years is Sogyal Rinpoche's *The Tibetan Book of Living and Dying* mentioned above (1992). This book is now a classic on death and dying from a Tibetan Buddhist's perspective. It roughly outlines esoteric practices that were traditionally given only to initiates in monastic settings. In this book, Sogyal Rinpoche introduces the principles of Tibetan practice and thought on preparation for death and compassionate care of the dying. It describes the essential elements from the *Tibetan Book of the Dead*, and esoteric practices for helping people through physical death and after. In terms of the near-death experience, Sogyal Rinpoche describes the connection between this and Tibetan theories of karma and reincarnation.

The most useful section of this book with respect to this study was *Part 2: Dying*. In it, Sogyal Rinpoche describes several practices that are used to help people through the dying process and after. The two primary practices that are presented are Tonglen, which

is a way of taking on the suffering of another onto yourself and giving them back love, and Phowa, which is a type of consciousness transfer to the person who is dying or has died. (Sogyal Rinpoche, 1992) An understanding of these methods was expanded through reading *Tibetan Yoga and Secret Doctrines* (Evans-Wentz, 1958). They are discussed below.

The Phowa. The Phowa, or technique for consciousness transfer, is one of the most carefully guarded practices in the Tibetan yogic tradition because of the fear that unscrupulous practitioners can abuse it. *Tibetan Yoga and Secret Doctrines* describes the phowa in this way:

Mastery of the Art of Pho-wa primarily confers the yogic power to bring about in oneself, at will, essentially the same process as that which under normal conditions is called death, there being the difference that in natural death the principle of consciousness departs from the human form permanently, whereas in yogically-induced death the departure may be but temporary. Secondly, it confers the yogic power to direct the departure of the principle of consciousness of another person, or to influence the principle of consciousness of a person not long deceased, in such manner as to afford it spiritual guidance in the after-death state and in the choosing of the womb at the time of its rebirth. (Evans-Wentz, p.253-254)

A second application of Phowa, in the direction of others at the time of death is also described:

More ordinarily...the yogin who performs the deathbed or funeral rites, in accordance with the Bardo Thodol, does not so project his consciousness. He aims to act from the human plane directly upon the consciousness-principle of the person dying or just deceased. If the person be dying, the yogin employs a sort of yogic suggestion, intended to guide the dying person through the death process and thence onwards through the state intervening between death and rebirth. (p. 258)

The benefit of using this practice with the dying is that consciousness can be set free at time of death without the more tedious reading of the Bardo Thodol (p. 269).

While Tonglen has to do with relieving the suffering so that a dying person can more easily pass through their great trial with the highest level of self-directed concentration, the Phowa has to do with the direct guidance and perhaps acceleration of this process by another. In a cultural context such as Tibet, in which there is an understanding of the desires of the dying person and probably a natural trust in the practitioner who provides these practices, this practice may pose few ethical considerations. However, in the multi-cultural and multi-religious community of American institutional care in which the spiritual desires of the individual are seldom fully conceptualized, the application of this practice raises some issues of choice and consent. For example, assuming that the practices described are truly accurate, what if the goal of the dying person is not, in fact to merge into the clear light?

In the *Tibetan Book of Living and Dying* Sogyal Rinpoche provides an abbreviated method to offer consciousness-transfer of some kind to the dying for people in the diversity of western culture in the name of Phowa. These visualizations can be done with any religious or spiritual entity that is important to the dying person and is significantly simpler to impart than the traditional method. It involves the calling forward a high level spiritual entity, a prayer to that entity for the care of that person and their progress through life and death, and the imaging of the consciousness of the person and the entity merging. He also describes a means by which energy can be directly imparted to the dying through visualization. (Sogyal Rinpoche, 1992)

Tonglen and The Role of Compassion. In *Death and the Art of Dying* (1993), Bokar Rinpoche provides an excellent overview of the Tibetan ideas of the role of compassion in helping others through the death and dying process. This text includes discussions of the bardo states, rebirth, practices for death in life, the nature of impermanence and finally a chapter on helping others die. In terms of this study the last chapter was most relevant. In it Bokar Rinpoche describes which attitudes and practices are of service to the dying and which are not. He particularly focuses on compassion as a useful element in the spiritual care of dying people, noting several ways to express compassion effectively. One is the meditation on Chenrizig (the personification of the compassion of the Buddhas) for the deceased person. In this practice

...first we turn our mind toward the person when we engender the mind of awakening. We imagine that we are going to work for his or her benefit, helping him or her to obtain release from suffering...from the heart, Chenrezig radiates light that touches the deceased, purifies bad karma ...then we imagine that the person is really released from any suffering and that he or she is filled with joy and happiness. (p. 105-106)

The dedication of prayers, mantras, beneficial acts, offerings are all noted as helpful to the dying. He also notes the act of taking on the other person's suffering, as in the practice of Tonglen.

While reciting the mantra, we can also do the sending and taking visualization. We imagine that we breathe out white light that spreads all over the deceased and gives our happiness. Then we breathe in black light and take on all suffering... This can be done for the benefit of everybody, be they Buddhist or not. (pp. 106-107)

As the literature reviewed above shows, the study and practice of compassion is central to Tibetan Buddhist teachings and to the support of people through death. Compassion, as described by Buddhist literature has to do, not simply with the radiation

of love, but equally the active and voluntary taking on of another person's pain. In the Tibetan view, far from creating a condition of depletion, impoverishment, or a contagion of illness in the caregiver, Tonglen practice actually creates conditions for optimum growth and health. This is called the "Holy Secret."

The one thing that you should know for certain is that the only thing that Tonglen *could* harm is the one thing that has been harming you the most: your own ego, your self-grasping, self-cherishing mind, which is the root of all suffering... The stronger and greater your compassion, the stronger and greater your fearlessness and confidence. So compassion reveals itself as your greatest resource and your greatest protection. (Sogyal Rinpoche, p. 207)

To reinforce his point about the health-supporting attributes of Tonglen, Sogyal Rinpoche notes a story in which lepers began to heal from their leprosy, and others who had themselves taken to the cemetery to die came back healed through this practice.

Tonglen has closest correlates to the task of the sitter envisioned by this particular study and raises the fewest issues of spiritual violation at bedside. Although clearly there is always uncertainty about the desires of the uncommunicative dying on their deathbeds, few people do not feel grateful for compassion in times of trial. However, the Phowa provides an important reminder of the power of one energetic body to influence another for good or ill, and the responsibility caregivers may have for even these subtle interactions in the presence of the dying.

The Role of the Environment. A final aspect of Tibetan ideas about helping the dying relevant to this study is that having to do with the sensitivity of the dying to their environment. Sogyal Rinpoche notes his experience that the dying are particularly vulnerable to environmental influences and should, if at all possible, die at home in a

harmonious environment. Indeed an environment similar to home is most people's expressed wish for their own death (Gott, Seymour, Bellamy, Clark & Ahmedzai, 2004). It seems easiest for people to achieve a peaceful death in an environment where they are most at home and where they feel most comfortable. The invasive procedures that are part of hospital protocol are seen as non-optimal from the standpoint of these esoteric practitioners (Sogyal Rinpoche, 1992).

In sum, the rich traditions and wisdom around death and dying that have been developed in more than a thousand years of contemplation and study by Tibetan Buddhists provide a useful backdrop to understanding the care and experience of the dying and way to evaluate study results.

Biofeedback, HeartMath and Ways of Relating without Talking

In the field of mind-body studies, the phenomenon of biofeedback has been a great contributor in substantiating esoteric claims. It has established the connection between physiological psychological processes, and provided tools for self-regulation of consciousness states. Using technological equipment for measurement of physiological responses, such as brain waves, heart rate, blood pressure, etc., biofeedback tools allow the consciousness of a patient to participate in the remedy of physiological and psychological disorders. This work has served to establish the mind-body connection in ways that are admissible to the concrete and scientifically oriented modern mind. Subtle energy and biofeedback pioneers Elmer and Alyce Green propose the following principle of human functioning and demonstrated it in their work:

Every change in the physiological state is accompanied by an appropriate change in the mental-emotional state, conscious or unconscious, and, conversely, every change in the mental-emotional state, conscious or unconscious, is accompanied by an appropriate change in the physiological state. (Green, 1977, p.58)

Their work on the connection between emotional content and physical responses has been developed in the work of many others, among them the Institute of HeartMath (IHM) whose research is used to support this study. A description of their work and the research that supports this study is outlined below.

Overview of the Institute of HeartMath Research

Since 1991 The Institute of HeartMath has been researching heart-brain interactions and the physiology of emotion, learning and performance using biofeedback technology (<http://www.heartmath.org/about-ihm.html>). The institute has also developed tools for monitoring these factors, along with methods for improving them. Software technology from one of these, a biofeedback program called Freeze-Framer, was used to measure heart rate variability (HRV) coherence in this study. Freeze-Framer is described in more detail in the section on Quantitative Measurement below (see Chapter 3).

Coherence and Entrainment

A number of HeartMath research papers have been reviewed to date to substantiate the application of their work to this study, as well as *The HeartMath Solution*, a book by Institute founder Doc Childre and Howard Martin (1999). The most important principles established by HeartMath from the point of view of this study are:

1. There is an energetic interaction between the heart and the brain that cannot be explained by physiological mechanisms alone (McCraty, 2003, p.1).

2. The heart produces effects on many systems of the body and mind through, nervous system interactions, electro-magnetic waves, hormonal secretions and blood pressure waves and that these influences have a primary role in emotional experience.

“... the low-frequency oscillations generated by the heart and body in the form of afferent neural, hormonal, and electrical patterns are the carriers of emotional information” (McCraty, 2003, p.1).

3. Patterns of the heart rhythm are strongly associated with changes in autonomic activity. Specifically, when a person is experiencing emotions in which there is less “synchronization in the reciprocal and between the parasympathetic and sympathetic branches of the autonomic nervous system (ANS)”, such as in fear, anger or frustration, heart rate variability becomes erratic and disordered (McCraty, 2003, p. 3). This pattern is called incoherence. When these disordered patterns are a result of rapid changes in beat-to-beat heart rate, they are caused by sudden changes in Parasympathetic Nervous System (PNS) activity. I am calling this a PNS mediated response. In contrast, the opposite conditions occur when there is good synchronization, a condition called coherence. This state is associated with positive emotions such as love, compassion, or appreciation. In this state there is also synchronization between heart rate variability patterns, respiratory and blood pressure rhythms and very low brain waves, as well as the activity of other organ systems, a phenomenon termed *cross-coherence* or *entrainment*. Therefore, an analysis of HRV has the potential of offering a good indication of heart/brain synchronization, autonomic nervous system dynamics and emotional states (McCraty, 2003, p.3).

4. The electromagnetic field generated by the heart of one person can be detected in another person in both physical contact and non-contact experiments. While effects on EEG signals are strongest when people are in contact, they are also evident when in proximity (McCraty, 2003 and 1998).
5. When in a coherent state one's own brain waves can synchronize another person's ECG at distances up to five feet five feet. (McCraty, 2003) Further, heart rhythms can sometimes produce the effect of entraining with other people's heart rhythms in some circumstances, such as spouses who live and sleep together or in coworkers who work in proximity. According to IHM, the other key factor in whether entrainment of this nature occurs seems to be coherence of the receiver. When a receiver is incoherent, IHM material shows less capacity to be influenced by another's rhythm (McCraty, 2003).
6. The more love and care a person has received in their life, or are accustomed to receiving, the more easily they receive cardiac signals from another. (Study by Schwartz referenced in McCraty, 2003).

In sum, research from the Institute of HeartMath has shown a connection between HRV and emotional states such as frustration, joy, appreciation and gratitude. This research has also shown the correlation between the HRV of one subject and another in some circumstances, a phenomenon called entrainment. Through the use of this tool it is hoped that this investigation may begin to assess possible influence between the consciousness state of someone sitting with comatose patients and that of the patients themselves.

Group influence on HRV

In addition to experiments between two individuals, the IHM has explored the effect of group energy dynamics in its work with corporations, schools and hospitals. Most of this work appears to have been done with the intention of increasing individual performance, productivity and overall job satisfaction. However, the implications of HeartMath materials are that there may be discernable effects produced by the phenomenon of group coherence on individuals, or that somehow raising the coherence of individuals has an effect on group energy dynamics. This work has been intimated in discussions of “societal coherence” in *The HeartMath Solution* (Childre and Martin, 1999).

The Institute of HeartMath research on the autonomic nervous system was used to help interpret the responses of all participants, particularly *Autonomic Assessment Report: a comprehensive heart rate variability analysis*. (McCraty and Atkinson, 1996) A specific goal of this document was to provide other investigators a way to validate the effect of interventions, such as this one, on autonomic function. The important ideas from this publication for this study are summarized below to help with the interpretation of patient and sitter data.

The Parasympathetic and Sympathetic Nervous Systems

Research of the HeartMath Institute on the interaction of the parasympathetic nervous system (PNS) and the sympathetic nervous system (SNS) indicates that the phenomenon of coherence is produced by the inter-relationship of these two systems. The intrinsic heart rate generated by the sinoatrial node is reported to be between 100 to 120

bpm in the absence of neural or hormonal influence. (McCraty and Atkinson, p. 6).

Changes in this heart rate are produced by the PNS or the SNS, with PNS activity acting to protect the heart by lowering HR and SNS acting to speed up the HR.

In a healthy individual, the HR estimated at any given time represents the net effect of the parasympathetic (vagus) nerves, which slow HR, and the sympathetic nerves, which accelerate it. (p. 6)

Because the actions of the two nervous systems have different response times, it is possible to differentiate and analyze the level of influence of each branch of the nervous system on the HR. Vagal (PNS) stimulation results in an almost immediate change in HR, within one or two heartbeats, and quickly returns to its previous level. Sudden increases or decreases in HR can also be brought about by a sudden inhibition or increase in vagal activity. “Thus, any sudden changes in HR are parasympathetically mediated.” (McCraty and Atkinson, p. 6) On the other hand, the heart response to a change sympathetic activity is slower, and acts to progressively increase the HR over a period of 5 to 25 seconds. Added to the effects of blood pressure regulation systems, the integration of the PNS and the SNS produce most of the beat-to-beat changes in HR (p. 7). These changes can be observed in the Freeze-Framer tachogram used in this study.

PNS-mediated responses, sometimes called incoherence, can be a result of many things. In an ordinary population it is often a result of emotions producing anxiety or stress. In a group of people with many health issues or near death, the PNS can be unstable and activated for other reasons (R. McCraty, personal communication, April 24, 2006).

Two types of analysis for HRV are relevant to and used in this study: time domain analysis and power spectral density (PSD). Time domain analysis measures and

presents the HRV as it varies in time (bpm/minutes). When HRV is graphed over time with this analysis method, coherent states present as a sinusoidal wave form (see Appendix B for example of this graph).

Implications of Peak Spectrum Data

One of the tools Freeze-Framer provides is a way of looking at the distribution of PNS and SNS activities. Power spectral density analysis gives information on how the heart's power ((bpm)²/Hz) varies, or how frequently different power levels were encountered in a given time period. By analyzing these parameters, the level of mediation by the PNS and activity of the SNS can be evaluated. This analysis in the Freeze-Framer program produces a graph of the distribution of frequencies in the HRV cycle. This graph generally has a distinctive peak frequency that indicates the predominant frequency of any given sitting (see Appendix B for an example of this graph).

The Institute of HeartMath has analyzed different bands of frequency and outlined how the interaction of sympathetic and parasympathetic nervous system can be understood through identification of this peak activity. The frequency bands identified and the significance of them are:

ULF - Ultra Low Frequency - Below 0.0033 Hz

Activity in this band has been shown to be predictive of mortality in post myocardial infarction (post heart attack) patients (p. 12)

VLF Very Low Frequency - .0033 to .04 Hz

Activity in this band is an indicator of sympathetic nervous system function. Power in this band is also associated with a reduction of air

exchange, such as in sleep apnea or respiratory arrest. (p. 11) Activity in this band has also been shown to be more highly associated with all-cause mortality than other bands (p. 12).

LF Low Frequency - .04 to .15 Hz

Activity in this band reflects a combination of both sympathetic and parasympathetic nervous system activity, however it is more influenced by sympathetic activity than parasympathetic in long-term recordings. When the HRV pattern and respiration are entrained (the coherence state), peak activity occurs near .1 Hz in this band. (p.11)

HF High Frequency - .15 to .4 Hz

This band indicates parasympathetic nervous system activity. PNS activity is generally observed to protect the heart. Reductions in PNS mediation is associated with panic disorders, anxiety and worry. (p. 13). Lowered parasympathetic activity is associated with reduced HRV in aging populations. (p.10)

Analysis of the power spectrum, therefore, may provide another tool for useful insights on autonomic function as well as physiological and emotional states.

The body of research developed by the Institute of HeartMath appears to provide a basis for exploration of somatic and emotional influence between individuals in proximity. The implication of the IHM writings is that coherence is a useful parameter of measurement of ideal physiological and emotional states. Further that there may be a meaningful relationship between one person's coherence and the psycho-physical responses of another in their proximity. An additional suggestion of the writings developed by IHM is that energetic information, such as gratitude, appreciation, love and compassion, is more easily transferred in the state of coherence than other states.

Through their research, the Institute of HeartMath has produced evidence of energy exchange and influence between people in relationship, a principle that is avowed

in many healing modalities, but one that has been largely rejected by western science because of lack of plausible mechanisms. This principle may be at the heart of understanding non-verbal communications, the experience of esoteric practitioners and people at the boundary of life.

Conclusion

It is interesting to reflect upon the fact that there has been significant medical research done on the physiological responses of the unborn and seemingly little on the psychophysical responses of those very near death. Indeed, one of the primary means of monitoring the state of the unborn through birth and before is through observation of their heart rate and its variation. Thus it seems fitting to use the examination of heart rate variability to begin to explore the psychosomatic landscape of life's end.

The field of death studies, rooted in wisdom traditions such as Tibetan Buddhism, championed by doctors such as Elizabeth Kubler-Ross, promoted by teachers such as Stephen and Onedea Levine and advanced by innovators such as Arnold and Amy Mindell, appears to be undergoing relatively rapid change and expansion. As Hospice has grown into a household word, so perhaps has our curiosity about the nature of this crossing. The potential of somatically oriented research to explore the psychic landscape of the dying is important at this time. It is hoped that the research below provides a small link toward the expansion and development of future study.

Chapter 3: Methods

Introduction

The primary method used in this pilot investigation was the exposure of people in near death, non-communicative states or coma to a particular experience: the experience of a loving, respectful and non-invasive presence called compassion, and the measurement of possible effects of this experience by several means. Participants were drawn from the population of patients and volunteers at United Hospice of Rockland. The methods of used to measure effects in this investigation are both quantitative and qualitative. Comparisons are made both within measurement vehicles and between them. Particular procedures, protocols, measurement tools and comparisons with which I initiated this study are defined below. For working definitions used in this study, please see *Chapter 1*.

Participants

This project was initiated with an intention to involve at least five patient participants, and three separate sitters. The project concluded having worked with four patients and a total of five sitters including myself. For an explanation of the changes made, see *Deviation from Protocols* below. As noted above, patients were drawn from the United Hospice of Rockland patient population, while sitters were drawn from the population of UHR volunteers. Patients were residing in hospitals and nursing homes. Parameters used for selecting participants are given below.

Selection of Patients

The following considerations governed the selection of patients for this study:

1. Patients were to be in or near a state of metabolic coma in the final stages of life. They were to be non-communicative.
2. Preference was given to institutionalized patients or situations in which there was a limited amount of human contact similar to what is being provided by this study.
3. Patients who could not grant their own consent for participation were required to either have designated a person to make decisions for them by healthcare proxy or were to have a legal guardian qualified to give consent on their behalf.
4. Candidates for the study preferably did not have visitors more than once a week.
5. Patients were to be of one gender. This gender was female.
6. The patient was to have been in Hospice care for at least one week.

It was felt that conformance to these parameters would ensure the strongest study.

All of these criteria except the first were goals rather than strict rules. There were constraints that required compromise in order to collect a study group in the timeframe available. These deviations are discussed below in Chapter 4 in *Deviations from Protocols*.

Some thought was given to the issue of gender, race and ethnicity in the selection process and these criteria were included. However, while variety in the population is a worthy goal, the sample I was able to study was not large enough to conclude much about differences of this nature. Further, I hypothesized that the interactions studied in this project are fairly universal, and that these processes occur at a time in life where cultural

coding and identity have to a large part become diminished as a factor important in shaping behavior and response. Gender differences, similarly, would have increased the number of confounds in a small sample. Therefore, an attempt was made to choose patients from one gender. Since the largest percentage of institutionalized patients are female, this was the gender of choice for this project.

Selection of Sitters

1. Sitters were UHR trained volunteers.
2. Sitters were selected based on experience with relaxation, meditation, or training in healing modalities, body awareness and/or self-regulation of consciousness.
3. Sitters were asked to demonstrate and define a working understanding of the concept of compassionate presence, as they understood it. This capability was evaluated by the definition provided in Appendix A.
4. Sitters were tested for their ability to hold a conscious, positive state of presence in isolation as measured by the biofeedback instrument, The HeartMath Freeze-Framer. For this project, that meant that the participants were able to sustain a Heart Rate Variability within the medium to high coherence ratio range for at least five minutes during a 10 minute reading. The program setting for this qualifying test was challenge level two, or “normal”.
5. Sitters were required to sign an informed consent form for their participation and be available for participation in all study requirements.

I attempted to use sitters other than myself in sessions with patients. However, when there was a time-limited situation in which there were no sitters other than myself available for a session or a sitter did not show up for the session, I filled in. As a result, I

participated in a total of 10 out of 27 sittings. In this case I operated the software and was responsible for patient finger sensor adjustment as well as providing compassionate presence. I completed a Sitter's Report at the end of these sessions. I avoided using my own subjective reports in any final analysis of sitter's reports to improve objectivity of data except when there was a compelling reason not to do so. Data that was objectively recorded, such as biofeedback data, was treated the same as other sitter data.

Informed Consent

Informed consent was received from sitters, institutional caregivers and from children and spouses of patients. Preference for patient selection was given to patients who had an active healthcare proxy in place and who thus had designated the person they wished to make decisions for them. Informed consent forms are included in Appendix C. Consent forms included a description of this pilot project, its purpose, risks, benefits, confidentiality, and information on contact and termination of consent. All family members providing consent were assured that declining participation would in no way interfere with services they were being offered by any provider.

The issue of informed consent was clearly a difficult one in this investigation as patient participants in all cases were not competent to give their own consent, nor would they have anticipated or voiced their wishes about a study such as this while they were able to communicate. Judgments concerning participation had to be made solely at the discretion of the guardian or family member and could have been influenced by their preferences and desires. The preference for patients who have a healthcare proxy in

place helped give credibility to the consent, but it does not have the same weight as a consent form signed by a conscious, competent participant.

Nevertheless, research of this nature is important for the advancement of care for these populations. This pilot project provided an expansion of services for these individuals, and the non-invasive character of this investigation did not pose any known threat to the well-being of participants. Finally, as outlined below, the patient was asked for a physical response (bodily gesture) to indicate any resistance prior to the start of each session. While this legally was not informed consent, it was a measure of consideration that introduced the possibility of choice at the time of the sitting.

Procedures

Sitter Training

The goals of this training were to provide education about the project, to reduce sitter anxiety about participation, and to enhance the HRV coherence of the sitter as well as the possibility of positive energetic contact between sitter and patient. Training topics included:

1. Summary of research on comatose and near-death states.
2. Summary of HeartMath research on HRV, the relationship between HRV and emotions, and the inter-personal effects of heart coherence in normal populations.
3. Explanation of the Freeze-Framer program.
4. Techniques for enhancing energetic contact and heart coherence (see details below).

5. An experiential trial in which trainees enacted being both a sitter and being in a comatose state while someone else sat with them.

In the training, sitters attempted to find preparation techniques most likely to bring them into HRV coherence as measured by the HeartMath Freeze-Framer program. These steps then became a protocol for preparation before each recorded patient interaction.

Techniques for enhancing energetic contact and heart coherence included the following:

1. Grounding preparation including: pulling consciousness into lower parts of the body, feet and legs, exercises for legs and breathing.
2. Breathing into the heart area while bringing conscious attention there. Visualizing the heart opening, or using some other sense to determine the quality of this experience.
3. Clearing the mind
4. Use of Brain Gym techniques for brain hemisphere integration, such as lazy eights, hookups or cross-crawling (Dennison& Dennison, 1989).
5. Visualization of the heart connection with patient prior to entering room.
6. Finding an attitude of general compassion, as the sitters understand it, with an initial focus on self-compassion. Compassionate presence is defined in Appendix A.

At the conclusion of training, sitters were pre-qualified for their ability to sustain HRV coherence by use of the Freeze-Framer program. For details, see *Protocols for Selecting Sitters* above. Sitters were also asked to sign an informed consent after full disclosure of project requirements.

A total of seven sitters were trained and five were pre-qualified for participation prior to sitting with patients. Two sitters did not qualify due to advanced age or poor health. One qualified sitter became ineligible because of personal time constraints.

General Parameters for Sitting with Patients

1. States of compassionate presence were held for each participant in this study for between six and eight contact sessions by hospice volunteers selected and trained for this project.
2. A primary series of sittings with each patient were completed within periods ranging from 11 to 15 days. Subsequent sittings were conducted after this time with three patients in order to expand and clarify data.
3. During sittings, biofeedback data on Heart Rate Variability for both sitter and patient were simultaneously collected by means of a HeartMath Freeze-Framer heart monitoring system. For information on biofeedback equipment, processes and settings, see description in Instrumental Measurements section below.
4. Interactions lasted at least 20 minutes per session measured from beginning of instrumental measurement to end. Sitters generally selected time for closure, however sessions did not last longer than 30 minutes.
5. An attempt was made to study patients in the presence of different sitters within the study period.
6. Notes and evaluations of the experience of each sitter were made after each interaction with patients by means of a sitter survey report (see Appendix B).

7. Survey reports were completed at the end of each session, prior to knowledge of external measurement outcomes except when the sitter was the operator of the equipment.

Protocols for Interacting with Patients

I felt that the spontaneous needs of any given patient should take precedence over any procedural requirement of this project, and did not wish to unduly circumscribe the responses of sitters. If a patient opened their eyes to make contact or begin to speak, or seemed to be in undue pain, for example, sitters were instructed that the need for appropriate contact should be met regardless of protocol. This occurrence was recorded in notes of the session. Generally speaking, however, besides greeting and closure this was intended to be an investigation of non-physical contact and interaction.

The project was initiated with the following instructions to sitters:

1. Sitter prepares outside of patient room as noted above.
2. Upon entering the room, participant approaches patient and makes light physical contact (such as taking a hand or placing a hand on an arm). Sitter announces herself and her intention to the patient using the patient's name and asks for their permission for this interaction. This could be a typical example: "Hi Mary, my name is Jeanne. I am going to be sitting with you for a while and measuring your heart rate. If that is not ok with you, please let me know in some way." Specific suggestions were to be made based on patient capacity, such as blinking eyes, squeezing hands or moving head. Though patient may not have had the capacity to respond, this was not assumed. An opportunity for elective participation was to

be offered. If patient indicated that they did not wish to participate, this was to be honored and recorded. See *Deviations from Protocols* in Chapter 4 below.

3. Physical contact ends, and sitter or facilitator sets up equipment.
4. While physically within two to four feet of the patient, the sitter will begin to make energetic (non-physical) contact with the patient. Freeze-Framer session for both participants is initiated. During the session, the sitter will find the position that they feel maximizes this contact. Arms may be open with hands in receptive position. Other gestures to enhance heart opening may be experimented with. If it is possible, synchronizing the breath with the patient may be useful for achieving a sense of engagement. Movement is acceptable.
5. Session will last between 20 and 45 minutes, at the discretion of the sitter. At the end of this time equipment will be packed and removed.
6. After packing equipment, sitter will again make light physical contact with patient, thank the patient both for their participation and the privilege of contact with them. Session and contact will end.
7. Sitter will complete response questions concerning their experience in the session.

Clearly, the possibility of death during the period of study of any individual patient existed. Protocols for this event were put into place, however none of the patients for this project died within the study period.

Confidentiality

Preserving confidentiality of information, and protecting the identity of participants was a primary concern in this project and of final writings related to it. All

participants and sitters were assigned a letter identity and everyone except myself was assigned an alias. Because I have disclosed my identity in this thesis by choice in order to make the data more clear, an alias is not needed for myself. Letter identities were used to analyze data and refer to patients at all points in the study. I was the only person to know the assignment of letter names to patients. This project was not intended to focus on personal life details that might allow participants to be identified. It was not expected that social or physical histories would be taken or required as a basis of study. However these later restrictions were revisited during the study, and some description of participants and their history was collected as part of the study because some of these parameters became relevant. These deviations are discussed below in Chapter 4.

While it was difficult to disguise the pilot project activities from everyone when it was conducted in a public care facility, the disadvantages of this were weighed against the advantages of using patients who had limited contact with loved ones. I hoped that this would allow a better assessment of effects of interaction and would provide services to patients most in need of companionship. Caregivers obviously knew about the participation of patients, as well as the administration of nursing facilities, and roommates. Hospice personnel and participants also were informed of patient participation. Participants and staff members were asked to refrain from disclosing the identity of patient participants.

Data Collection

This pilot investigation utilized both quantitative and qualitative methods of measurement to:

- 1) Test for the presence of non-verbal interaction between a patient in a comatose state and a person in a compassionate state of presence with that patient.
- 2) Evaluate possible physical, emotional or spiritual effects of this interaction on either patient or sitter.
- 3) Gain expanded insight into the nature of this interaction.

Quantitative Measures

Two forms of quantitative measurement tools were used. One was an instrumental biofeedback device. The other was a quantitative rating (survey) included as part of the Sitters Report form for each session. These measures are described below.

Instrumental Measurement. Instrumental measurements were made of the heart rate variability of both sitter and patient while in an energetic state of contact and generally (though not always) in the absence of physical contact. Measurements of each participant were recorded in parallel on independent biofeedback devices. The equipment used to collect biofeedback information on HRV was:

1. HeartMath Freeze-Framer® Version 2.0 (USB) software manufactured by the Institute of HeartMath installed in one Compaq Presario 2100 laptop computer, and in one Dell Inspiron B120 laptop computer.
2. Two Freeze-Framer® Finger Sensors (Serial) also manufactured by the Institute of HeartMath.
3. One Kensington docking station for connection of the serial port finger sensor to the Dell Inspiron B120 laptop to the finger sensor.

One laptop (the Compaq) and one sensor were utilized for the patients, while the other laptop (Dell) was used for sitters with the docking station installed between the computer and sensor by means of electrical leads. The sensor was connected by a single electrical lead to a USB serial port in the Compaq computer designated for that participant. Finger sensors received HRV data through detection of the pulse. This data was processed partly in the sensor mechanism itself and partly by the Freeze-Frame software.

The Freeze-Framer program is designed and marketed by the Institute of HeartMath as an interactive learning program for prevention, management and reversal of stress in general populations. It includes a patented heart monitor system (software and sensor) that processes heart rate data and develops graphical images of HRV, as well as other parameters. Research the Institute of HeartMath has done on correlations between emotional state and HRV are used in conjunction with this technology to help people in the general population learn and maintain more optimal states of well-being as understood by the Institute of HeartMath.

The heart monitor system is the portion of the Freeze-Frame program that was utilized for this study. All measurements were monitored and compared using the Heart Rhythm Display (see Appendix B). In addition to HRV, the Heart Rhythm Display records Average Heart Rate, Coherence Ratios and an Accumulated Coherence Score per session. Each session was recorded with date and time and saved under a file coded for that participant. Session notes included relevant notes to identify the other participant in the sitting (also encoded) and other significant factors.

As noted, the Freeze-Framer program graphs the pattern of HRV, as well as provides a bar graph indicating the percentage of time during the session when the participant registered in low, medium and high coherence ranges (Coherence Ratios). This program provides four challenge levels: low, normal, high and highest. These levels relate to how closely a participant approximates ideal heart coherence as determined by HeartMath research (HRV of .1 Hertz). This setting does not affect the graph of the session, but does affect the low, medium and high bar graph percentages of the coherence ratios and accumulated coherence scores. At project outset it was expected that the challenge level for use with someone close to death would be Level 1- Low. This was to be the initial setting tried for all participants. Unfortunately program default settings of Level 2 were inadvertently used in 12 sittings for either patient or sitter. See *Deviations from Protocols* section below. The finger sensors made contact with the finger of each participant by means of a small plastic saddle (2.5 inches in length) that follows the contour of a finger, secured by a flexible Velcro strap.

Survey Reports. Sitters Report Forms included five questions that required a numerical rating response (evaluations from 1 to 10) and three descriptive questions (See Appendix C). The first five questions quantified perceptions of contact, both self-contact and contact with other at various points, and the sitter's sense of the patient's well-being.

Qualitative Measures

In addition to biofeedback measurements and numerical ratings, possible effects of states of presence were evaluated through:

1. Interviews with family and/or caretakers.

2. Sitter reports (verbal/descriptive).
3. Interviews with sitters.

These different measures are individually discussed below.

Interviews with Family and/or Caregivers. For the purposes of this study, caregivers are defined as doctors, nurses, aides, social workers, primary caregivers, or hospice volunteers. Interviews with family or significant caregivers for each patient were conducted where possible to assess physical, emotional and spiritual conditions of the patient before participation in this study, and again at the end of the period of study. In some cases this was not possible.

The intention of these interviews was to assess effects of the contact experiences and perceptions of change in the patient from the point of view of someone who either is deeply connected to them, or had regular contact with them. These interviews were guided by interview questions (see Appendix D). They were conducted as open-ended discussions rather than scripted interviews.

Sitter Reports. Sitter Reports were administered after each session with patient (see Appendix C). They included both numerical ratings (discussed above) and three more open-ended questions that allowed participants to express observations of the session in his or her words. The focus of these survey questions was to identify the sitter's experience of the patient and the nature of their connection with the patient given in their own words. The sitter report also allowed for identification and description of any meaningful occurrences during the sitting.

Interviews with Sitters. Final interviews were conducted with sitters other than myself who participated in this study. (See Appendix F) Interviews were guided by

questions but were somewhat open-ended. I wrote a summary describing my own experience as a participant in this study responding to the interview questions used for other sitters. The intention of these interviews was to evaluate any physical, emotional, or spiritual effects this participation had on the sitters as well as their relationship with the patients. Interviews also provided a vehicle for processing this experience, and for receiving general observations about longer-term effects of participation on sitters.

Analysis of Data

Data from the numerous measurement vehicles of this investigation required fairly extensive review, interpretation and assimilation. Freeze-Framer software, developed as a tool for more normal populations, does not calculate parameters that are immediately useful for observing a population close to death. Calculated parameters, such as coherence ratios, were certainly reviewed and compared, however the subtlety of interaction between patient and sitter required an exploration of the minute-by-minute changes of expanded HRV graphs.

Sitter reports and interviews with sitters, family members and caregivers were used to give insight on the biofeedback data as well as to evaluate longitudinal comparisons in patients and sitters that occurred. These were compiled by the following analysis methods.

Review and Analysis of Biofeedback Data

The first step in analysis was to record the biofeedback parameters for the session as calculated and reported by the Freeze-Framer program for both sitter and patient. These included average heart rate, coherence level, challenge level, and peak spectrum

values (See Appendix B for example of output). The second and more complex step was to systematically evaluate both sitter and patient Heart Rate (HR) graphs (bpm/time). This was done in minute-by-minute parallel review at a time axis of 40 and a Heart Rate axis of 10 and (20 if required). The time axis expands HR data so that patterns and correlations can be more clearly observed. Graphs of heart rate/ time and pulse spectrum for both sitter and patient for each session are printed in Appendix G—*Graphical Output of Sitzings*. Baselines are provided where available. It is noted that the graphs provided are compact version of a roughly 20 minute segment. As a result, this form of the graph can only offer a general sense of the session. Much of the information presented in commentary was gathered from the expanded time axis cannot be directly seen in these graphs.

The HR graphs were reviewed for quality of oscillation, overall beat per minute variation in oscillations, and presence of simultaneous changes between sitter and patient. Quality was evaluated because even when a person is not technically presenting as coherent by Freeze-Framer calculations, shifts toward the form of sinusoidal oscillation, or a change from a jagged and erratic form to one more rounded and regular, seem to indicate a propensity or movement toward coherence that might be meaningful for patients in this state. Changes in patterns toward or away from a more sinusoidal form seemed to indicate a movement toward a more peaceful state, while changes of pattern toward more erratic or variable HRV seemed to indicate probable agitation. This evaluation was also made because the numerical coherence levels designed for healthy populations generally did not give enough information on the subtle influence of sitter on

patient or vice versa. Possible influence was easiest to see in the subtle changes of form in the HRV graph.

The quality of patterns was described with words such as jagged, erratic, low or high amplitude, sinusoidal, smooth or flat in order to easily reference the nature of typical patterns in HRV. Charts were created for each session to summarize and condense this sitting data (See Appendix H).

Compilation of Sitting Data and Commentary

Freeze-Framer data was reviewed from 28 sittings, 19 pre-sitting baselines, two post-sitting baselines, and one short sitting with a family member. As sittings were reviewed, notations were made on what appeared to be simultaneous occurrences between sitter and patient HRV patterns. These notations were recorded on the *Summary of Sitting Data and Commentary* tables along with pertinent information from sitter reports and my notes from the session (See Appendix H). Comments also included a description of patient state at the beginning of a sitting, times of any significant occurrences (such as prayer or touch when they occurred) or other relevant information reported by sitter or myself.

Evaluation of Patient Response from Biofeedback Data

After data and commentary from sittings was gathered and condensed into tables, sittings were reviewed for repetitive themes. Parameters that occurred in multiple sessions or that seemed to facilitate meaningful comparisons and insights were identified. The following significant parameters were identified and evaluated:

Simultaneous Responses. Sittings were evaluated for presence of at least one simultaneous response. A simultaneous response is defined as a point, in comparison of the sitter and patient HRV graphs, in which changes are exhibited in both sitter and patient at roughly the same time. Responses do not have to be the same in both patient and sitter. For example, a patient may experience a sudden increase in PNS mediated responses at the same time that a sitter has a different type of change in HRV pattern, or a sitter's coherence may occur simultaneously with the lowering of patient amplitudes.

Coherence changes. Increases and decreases in coherence were evaluated with respect to baseline readings for patients. Where there was no baseline reading immediately prior to the sitting (as in Patients A and B), the pre-project baseline values were used for comparison. Coherence in Medium and High levels were considered additive for these comparisons. Where coherence was within one percentage point of original value, no increase or decrease of value was noted as this was not deemed significant.

Cross-Influence. Sittings were evaluated for whether they contained at least one apparent example of cross-influence. Cross-influence is defined as a situation in which some parameter of one participant appears to be adopted or imitated by the other participant at the roughly the same time that there is a change in the pattern of the first. For example, the sitter may become incoherent just as the patient becomes coherent after touch contact. Other evidence of this can be the adoption of patient patterns by the sitter at roughly the same time that there is a different change in the pattern of the patient.

Changes in peak spectrum. Changes in patient's peak spectrum values were compared with their baseline values and evaluated as to whether they moved toward or

away from their sitter's values. Where there was no baseline reading immediately prior to the sitting (as in Patients A and B), the pre-project baseline values were used for comparison.

Change in Patient Amplitudes. Changes in patient amplitudes often appeared to coincide with periods of sitter coherence. The presence of this occurrence was noted as an increase, decrease or no change.

Changes in PNS Mediated Responses. PNS mediated patterns seemed to be a possible indicator of anxiety or distress. As a result, the presence of changes in this type of pattern were noted, either as an increase or decrease. Increases in PNS mediation patterns were generally considered a sign of anxiety, however in this population this response might have other interpretations, such as excitement. Even an anxiety response might provide a possible indication of recognition and relationship.

Responses to other factors. Touch, prayer and off-body touch were occasionally explored toward the last half of the project. Any discernable response in either sitter or patient was noted where it occurred.

Analysis of Patient Coherence

Patient coherence was analyzed to assess overall percentage of coherence in baseline readings versus sittings, both as individuals and as a group. These figures were developed by doing time-weighted averages of baseline sittings and regular sittings. Post-baseline sittings were not analyzed because of the low sample size.

Assessment of Other Patient Response

Parameters used to evaluate whether responses were positive or negative varied.

Generally, the following were interpreted as positive responses.

1. An increase in patient coherence, either during a sitting or immediately after
2. A decrease in PNS mediation during a sitting or in conjunction with sitter coherence
3. A trend to more regular, smooth or sinusoidal HRV patterns
4. An increase in amplitudes for patients with flat HRV patterns, or
5. A decrease in amplitudes for a patient with erratic or highly variable HRV

Other types of responses to sitters evaluated were noticeable shifts in the peak spectrum with respect to the baseline, changes in heart rate, or improved post-sitting coherence level. Generally, the following were interpreted as negative responses:

1. A decrease in patient coherence
2. An increase in PNS mediation during a sitting
3. A trend to more jagged, erratic or less sinusoidal HRV patterns
4. An decrease in amplitudes for patients with flat HRV patterns, or
5. An increase in amplitudes for a patient with highly variable or erratic HRV

Though the words “positive” and “negative” are used here as part of the evaluation, in fact any response from the patient is positive in the sense that it indicates some level of somatic awareness and the possibility of developing relationship.

Evaluation of Patient Response from Family or Caregiver Interviews

Evaluations were made of changes or significant shifts in patients during the study period or in some cases after the study period if information was available. Only three

patients had complete interviews with informed consent forms in place. Interviews are summarized in Appendix I- *Summary of Family/Caregiver Interviews*. Because I had personal knowledge of patient outcomes after the course of the project through my affiliation with UHR, I added what I could to these descriptions from this knowledge.

Analysis of Sitter Coherence

Sitter coherence was analyzed to assess overall patterns of coherence with respect to different patients and different locations if applicable. Comparisons were also made to the sitter's qualification sitting coherence. Because there was no known vehicle for developing medium and high coherence values into a single weighted score, these two values were added together to produce an overall coherence percentage.

There was also a problem of comparing values for different recorded challenge levels. A method was discovered for re-running the sessions at a different challenge level so that new data and figures could be developed for comparisons. These figures are presented in Appendix H- *Summary of Sitting Data and Commentary*.

Evaluation of Sitter Experience from Sitter Interviews and Reports

Sitter Interviews. Sitter Interviews were reviewed after completion for general themes and trends. These responses were as seen by sitter from a vantage point of weeks to months after completion of their portion of the project. For interview questions and responses see Appendix F – *Final Interviews with Sitters*. While interview questions and responses varied slightly they keyed on the same general issues. The general issues I was interested in were:

- 1) Sitters' perception of their relationship with the patients, their aversions and attractions
- 2) Sitters' levels of comfort with the experience, their disturbance or distraction
- 3) Sitters' perceptions of the differences between sittings
- 4) Sitters' perspectives on the short and long term effect of sitting with comatose patients on themselves
- 5) Sitters' feelings about being involved with this project
- 6) Sitters' willingness to engage in this activity again

These interviews were reviewed intuitively for correlation with biofeedback data as described below in Comparisons, and especially for insight on the long-term effects of this kind of sitting activity.

Comparisons

Comparison within Biofeedback Data

Biofeedback data for each patient and sitter was reviewed as part of the analysis. Questions explored in these comparisons were:

1. What were the characteristic patterns of each patient if any? How did patterns vary from sitting to sitting?
2. Were there characteristic responses to sitters or to particular experiences (such as the exposure to sitter coherence)?
3. Were there similarities between sitter and patient HRV graphs?
4. Were there meaningful shifts in peak spectrum data with respect to baseline values?

5. Were there meaningful shifts in coherence data with respect to baseline values?
6. Were changes occurred over the course of the project?
7. Did this data show evidence of relationship?

Comparisons Between Individual Patients and Sitters

Further comparisons had to do with exploring patterns between individual patients and between individual sitters. Differences and similarities in experiences and responses were explored and compared.

Comparisons between Biofeedback Data, Interviews and Reports for Each Participant

The third level of comparison was to explore the differences and similarities between the conclusions of different measurement vehicles: biofeedback, interviews and reports. These were examined for each patient. Where was there corroboration? Where did there appear to be contradictions? Where were there anomalies? Did noted occurrences in sittings (such as touch) align with HRV shifts? Patterns were examined within samples collected for each individual, for each sitter, and also between individuals. Notations were made of both similarities and differences in patient and sitter responses that seemed to be meaningful to interpretation.

Sitter reports were compared with the corresponding Freeze-Framer reports to find validations or contradictions between these two instruments for each individual session. The conscious perceptions of the sitter often provided insight about the recorded physiological phenomenon and vice versa.

This point in the analysis required the most intuitive interpretations of what had happened between sitter and patient. Here, I allowed my own perceptions as witness and participant to help me assimilate and integrate the data.

Longitudinal Comparisons for Patients

Longitudinal comparisons were made for each patient based on both initial and final family/caretaker interviews, the sitter survey and biofeedback reports over the duration of time with a patient, and sitter interviews. These comparisons considered questions about effects of this type of interaction on physical, emotional, and spiritual well-being of patients, if any.

Longitudinal Comparisons for Sitters

Longitudinal comparisons were made for each sitter based on both initial and final sitter interviews, the sitter survey and biofeedback reports and my own observations of sessions. These comparisons considered questions about the cumulative effects of this type of interaction on physical, emotional, and spiritual well-being of sitters, if any.

Limitations of Study

These methods of study and analysis posed numerous limitations. Some have been mentioned throughout the text. A significant limitation of the study mentioned above was the lack of information about the applicability of HeartMath Freeze-Framer to people near death. It was not known whether this population would exhibit heart rate variability patterns that were similar to those of the vigorous population that had been

studied, or what conclusions might be drawn from different patterns of heart behavior if they manifested. I assumed that if there was reasonable alignment of patient data with that taken from a healthier population, the emotional factors underlying the data might also be similar.

A second obvious limitation was the small sample size that I worked with. There was admittedly a good chance that I would not be able to find correlations, or valid conclusions as a result. Further, there was a chance that patient participants would die before a full cycle of sessions could be completed. Since expanding the sample size was not practical, these limitations had to be accepted.

Another issue associated with use of a biofeedback program to measure emotional processes was the effect that awareness of this measurement might have on sitters, particularly during the training and qualification sessions. Awareness that the quality of their emotional state and well-being would be measured while participating may have produced performance anxiety that interfered with the capacity to hold a state of compassionate presence with a patient. It was hoped that discussion of this issue, as well as adequate preparation and practice, helped sitters gain confidence and detachment from the measurement process. In reality the levels of anxiety and detachment did vary between sitters. There was significant anxiety for three sitters during qualification. Two did not qualify for participation.

One institution was identified to host this study: United Hospice of Rockland in Rockland County, New York (UHR). This project was approved by both ethics committee and board of this organization and was widely supported. I coordinated with staff and volunteers to execute this project. Working with an organization introduced the

possibility of being terminated and of being subject to their priorities in connecting me with patients. In addition, I was obligated to work within the institutional requirements and possible objections of the nursing home and sanatorium staff where patients resided. The problem of informing many staff members on different floors of the activity with their most vulnerable patients increased complexity. I reasoned that the benefits for the study of being in an institutional setting would outweigh the difficulties it introduced.

Another area of concern was the use of human subjects not competent to evaluate and sign their own consent to participate. Family members had to provide this for them. Because this research at worst carries exceptionally low risk and at best provides a benefit by expanding services to patients, it seemed reasonable to move forward despite this concern. Without research on death and dying, it will not be possible to improve or evaluate the care that is now received.

In terms of the analysis and interpretation of data, it was unfortunate that much of the evaluation had to be done through a slow, painstaking review of HR graphs that are not easily presented for other's review and critique rather than through a more direct and objective measurement. There are likely judgments and interpretations that others would make differently when assessing the significance of a response.

Despite these limitations, there seemed to be enough potential for learning from this project to accept its risks and difficulties.

Chapter 4: Results

Deviations from Protocols

Numerous deviations from protocols and anticipated methods were deemed necessary during the execution of this project. These deviations and their rationale are described below.

Addition of Baseline Measurements

I began this project with the intention of providing one pre-project baseline for each patient with the thought that this would establish a characteristic HRV. With Patients A, B and C I initiated a pre-project baseline independent of a sitting before beginning working with them. I did not anticipate the instability of the patient's HRV patterns and the wide variation that they exhibited from day to day. After discussions with HeartMath researchers several weeks into the project it was clear that collecting a baseline before every session would make findings more clear. I began to collect a baseline before every sitting after Session 12. The length of these baselines varied, but generally were around five minutes. In two cases I also collected at post-sitting baselines.

Introductions to Patients

Soon after the project started, it was clear that there was an easier way to offer patients an opportunity to dissent than originally proposed. It was much more natural for me to introduce the sitting and propose the question when I came to set up the equipment in advance of the sitting than to have sitters do this. I approached patients with words similar to

what was planned in the protocol. At that point, if there was no discernable response, I placed the finger sensor. The sitter introduced herself to the patient when she arrived, but did not offer an opportunity for dissent.

Freeze-Frame Challenge Levels

It was discovered after early sessions and in some later sessions that the default setting on Freeze-Framer had reverted to a default Challenge Level 2 rather than Level 1 as intended in the methods section. This was an unfortunate oversight. I was able to retroactively change these settings by re-running them in real time using the Freeze-Framer demo function. The sitter qualification runs were also re-run at Challenge Level 1 to facilitate comparison with later coherence levels.

Introduction of Touch and Prayer

Early sessions did not demonstrate that patients were likely to have significant coherence, therefore I chose to introduce touch in the sessions to explore the effect of this technique. This often occurred at the end of the session, after or near the end of the requisite 20 minute reading. As the study proceeded there were also numerous times when sitters were moved to use touch with patients during the sitting. I did not interfere with this, but chose to explore the effects of this approach on this patient. Other techniques, such as Therapeutic (off-body) Touch, meditation techniques and silent prayer, were also explored within some later sittings. Descriptions of these methods are given below. Times for this are noted in most sitting comments.

Equipment problems

In several sittings there were either power interruptions on computers mid-sitting or difficulties with placement of the finger sensors. In these cases the sessions were either immediately repeated, extended after correction was made or completely abandoned. Notations were made of these occurrences.

Identification of Participants and Description of Patients

The means used to identify participants of this project are described below. No information about patients was originally going to be presented. However, because the physiological condition of patients became significant to interpretation of biofeedback data, it was decided to offer a description of patients below.

Identification of Participants

Patients, sitters and family members were given letter designations for identification throughout the study period. For the purposes of this text, participants other than myself were also given pseudonyms for ease of discussion. Pseudonyms and letter designations are given in tables and charts for reference.

Description of Patients

A description of patient participants follows. It provides what was known and considered relevant about the patient's personal and medical history through hospice records and interviews with caregivers. Four women were identified by UHR as candidates for this

project and were worked with. A short description of each is given below. I note that information about patients was often very difficult to get and is therefore not detailed.

Patient A - Anna. Anna was a 76-year-old woman classified by UHR as suffering from “morbidity and mortality”. She was also noted as having breast cancer. Although Patient A appeared to be somewhat alert, for example opening eyes, moving her head and gazing around the room, she was not verbally communicative and the origin of her condition was unclear.

Anna seems to have enjoyed strong family ties and had a connection to an active church community. Her living daughter was active in her care and visited her mother regularly, though the interval of visitation was not known. There did not appear to be daily family contact with this patient. Anna had been on Hospice for one month when the pilot project began.

Patient B – Karen. Karen was a 59-year-old woman living in a comatose state. She had been fed by feeding tubes for many years and was reported to have been living in Facility A for over 25 years. Karen’s original condition was a brain tumor. At some point early in her illness she suffered from a debilitating brain surgery, which compromised her intellectual and physical capacities. Over the years, her cancer slowly metastasized. Her condition had been grave but stable, or very slowly declining for years. Karen had been on hospice approximately 16 months when this project began.

Karen was able to open and blink her eyes, move her mouth and groan from time to time. During my time of contact with Karen as her hospice volunteer for approximately 10 months prior to the project beginning, I observed only minor changes in her outward physical condition, though nurses reported evidence that cancer seemed to be progressing in her body.

Karen received few visitors other than hospice staff and volunteers. Her elderly mother lived about six hours drive away and was not able to visit her often. Karen was reported to be a brilliant scholar in her youth. She never married or had children.

Patient C: Pamela. Pamela is a 51-year-old woman who has been in a institutional care for over 10 years, and in a comatose state for much of that time. She is in the end stages of Multiple Sclerosis. She has severe lesions on the brain that have compromised cognitive and motor abilities. She is fed by feeding tube and has a respirator attached to her larynx through which she breathes. She is heavily medicated, according to her husband. Pamela opens her eyes from time to time and her expressions are sometimes very animated. It is not clear whether or not she recognizes the people in her environment. Family members feel very strongly that she has differential behaviors based on who is with her and preferences for certain nurses.

Pamela is married and has three children in their late teens and early twenties. Her husband visits her approximately three times a week. No information was available on the frequency of her children's visits.

Patient D: Maureen. Maureen is an 88-year-old woman who suffers from Alzheimer's disease, dementia, and chronic renal failure. She has been institutionalized for about 8 years and was on hospice about six weeks before the project began. She is now confined to a bed most of the time, although once or twice a week she is dressed. On these days she sits in a reclining chair. Maureen is fed by feeding tubes. She often babbles incoherently, however occasionally she says a clear word or phrase that seems appropriate. She often seems to be quite happy or animated. Her husband reports that he has noticed a progressive decline in her condition. Maureen has more than average visitation from loved

ones and did not meet the protocols of the project in this area. She was visited by her husband one to two hours per day, by one child weekly, and by her brother and niece occasionally. Maureen was selected because there were no other available patients who fully met the criteria in either facility during the timeframe of this study.

Maureen is reported to have been both a teacher and social worker in her youth. She raised three children, only two of whom survive. One is confined to a wheelchair and can no longer visit her. Maureen was active in the Catholic Church when she enjoyed good health. However, her husband reported that the Eucharist and other religious rituals make her very agitated at this time and have been discontinued.

Findings

At the completion of this study, a number of factors were identified for review and analysis. For description of analysis see Chapter 3. Findings of this review are summarized below.

Patient Coherence and HRV

Patient Coherence was analyzed and compared with baseline measurements and post-sitting measurements. This analysis is presented in Appendix K. A first clear observation of these four patients was that three of four were generally not able to sustain much heart coherence as monitored and analyzed by the Freeze-Framer heart monitoring system. Patient coherence was variable, but generally low. In some cases it was nearly non-existent. Patient coherence appeared to vary with physical condition and also level of medication. Indeed, each patient seemed to have characteristic patterns of HRV, but these patterns were often

unstable, were influenced by medical conditions, medications and medical implements, and subject to sudden change. As a result, the pre-project baselines did not provide a useful measure of the normative state for the patient. Pre-sitting baselines used after Sitting #12 provided more accurate comparisons.

Comparisons with available baselines showed that patients had an increase in coherence in 14 out of 28 sittings, and a decrease in patient coherence in 6 out of 28 sittings. In 7 of 28 sittings there was no significant change in coherence (changes of 1% were not considered significant). In one sitting, coherence values were undecipherable.

Mean baseline coherence readings were calculated for each patient and are summarized below in Table 1. Note that Anna and Karen did not have pre-sitting readings before each individual sitting. Comparisons are made to a single pre-project baseline, in the case of Anna, and two pre-sitting baselines for Karen. As a result, these comparisons are less valid and are placed in parentheses.

Table 1 .

Mean Coherence Scores in Pre-sitting Baseline for Patients

	Medium	High
Anna	(12%)	(7%)
Karen	(0%)	(4%)
Pamela	1.4%	2.1%
Maureen	16.4%	13.1%

Mean patient coherence scores from sittings are given below in Table 2.

Table 2.

Mean Sitting Coherence Scores for Patients

	Medium	High
Anna	8%	3.5%
Karen	4.7%	2%
Pamela	1.7%	1.2%
Maureen	14.9%	8.6%

Although it is difficult to evaluate the combination of medium and high coherence scores, it would appear that three of four patients on average had a reduction of coherence scores during sittings, however it is unclear whether the degree of reduction is meaningful. For example, a half of one percent increase represented a 14% change in Pamela's coherence. These levels of measurement are probably not meaningful variations in the Freeze-Framer program. Because the coherence values are relatively low for patients and because two of the patients did not have baselines conducted immediately prior to sittings, comparing percentage increases for patients did not seem useful.

The most neurologically damaged patients, Karen and Pamela, were understandably the least responsive to sittings in terms of coherence. Pamela, who was both on a respirator and the most heavily medicated patient, was the least responsive to anyone in her presence other than her husband. However, even Pamela showed evidence of subtle responses to sitters (See Appendix H – Tables H17-H27).

Two patients had post-sitting baselines measured for one sitting each. (See Appendix H - Tables H20 and H35). These measurements occurred immediately after a sitting in which the patient either lost coherence or had a very minor change during the sitting. In both post-sitting baselines there was an overall increase in final coherence over pre-sitting baseline and sitting measurements.

Table 3.

Coherence Scores in Sitting #15 and #27

	Pre-sitting Baseline		Sitting		Post-Sitting Baseline	
	Medium	High	Medium	High	Medium	High
Pamela	0%	0%	1%	0%	0%	6%
Maureen	15%	4%	8%	4%	21%	15%

Though this sample was not large enough to draw conclusions, it is an interesting phenomenon that will be discussed further in Chapter 5.

Other Patient Responses to Sittings

Generally speaking, after review of HRV data it appeared that though there were differences in receptivity and responsiveness, most patients were responsive to most sitters. Responsiveness in this context means that the patients had discernable patterns or changes in their HRV that coincided with the sitting, or with the sitter patterns, changes or actions. As discussed above, responses to sitters were often very subtle. The

presence of these factors was evaluated in Appendix L : *Analysis of Patient Response to Sitters*. Most of these responses are discussed more fully below.

Sitter Coherence

A second, and unanticipated result of this investigation was that with few exceptions sitters were unable to maintain the level of heart coherence at the bedside of a patient that they had achieved in their qualification reading. Sitters did not achieve periods of continuous coherence for most sittings. An analysis of sitter coherence was tabulated and is provided in Appendix K. The average loss of sitter coherence with respect to the qualifying sitting was 56%. Values are tabulated in the table below.

Table 4.

Percent Reduction in Average Coherence with respect to Qualification

Sitter A – Beth	-63%
Sitter B – Cynthia	-68%
Sitter C – Sally	-72%
Sitter D – Ellen	-22%
Sitter Z – Jeanne	-57%

This approximate figure was generated by translating all sittings to challenge level one, and treating all medium and high coherence as equivalent and additive.

At first this striking loss of coherence was attributed to self-consciousness and the effect of participation in a study. However, the consistency of this result suggested that the

setting, the sensitivity of the sitter and possibly the activity itself, played a part in this outcome. This investigation suggests the possibility that being in groups of possibly incoherent persons may have the effect of lowering the heart coherence of people who come into that group.

The settings in which this work was done were medium to large convalescent facilities: one a 341 bed County Sanatorium, the other a community 203 bed nursing home. The pain, suffering and loneliness of many individuals, combined with the fact that these facilities are manned by overburdened staff, may have had the effect of lowering the coherence level of sitters whose expressed purpose was to be compassionately present. Clearly, because the coherence of others in the environment was not directly measured, this theory is only based on a subjective experience of stress in these environments. However, the idea that coherence in groups of this nature may be low is supported by research on the HRV of people who are ill and elderly, as well as research that suggests that there is a high level of stress on caregivers in health facilities. (McCarty and Atkinson, 1996; Aiken, Clarke, et al., 2002).

Another possible explanation for the lowering of sitter coherence is that training and preparation of the sitters was inadequate. However, while poor training and lack of experience might explain low coherence values, it does not explain why all sitters did significantly better in their qualification sessions at a time when they had no experience with patients. Other explanations will be explored in Chapter 5.

If environment alone is responsible for the change in coherence among sitters, it does not explain the variation between sitters. While four sitters had average coherence losses

between 57% and 72%, Ellen's average loss of 22% stands out. This finding will also be discussed in detail in Chapter 5.

Aside from the issue of reduction of sitter coherence over qualifications scores, there was a significant difference in sitter coherence in the field. Mean coherence scores for each sitter are summarized below.

Table 5.
Mean Sitting Coherence Scores for Sitters

	Medium	High
Beth	12%	21%
Cynthia	18%	11%
Sally	16%	6%
Ellen	21%	56%
Jeanne	19%	35%

Ellen had the highest and most consistent coherence of all sitters. It is noted that the level of overall coherence in sittings is directly related to the percent of reduction in coherence measured from qualification levels. In other words, the higher the qualification score, the less the percentage of coherence reduction in sitters, or the less the sitter was possibly influenced by the environment.

Effect of Location on Sitter Coherence

The effect of location was examined in the analysis of sitter coherence. Unfortunately only two sitters were present at two locations. This was too limited a sample to formulate conclusions on the effect of location. It should be noted, however, that both

Ellen and I had significantly stronger coherence with Pamela in Location B than any patients in Location A (See Appendix J – Tables J4 and J5). Ellen, in fact, commented specifically on her sense greater sense of comfort in Location B over Location A in her sitter interview (See Appendix F). On the other hand, I have very mixed feelings about Location B, having had a mix of many positive and negative experiences with staff, patients and numerous issues with patient care in this facility previously. Notwithstanding, these facts lend some validity to the idea that the overall coherence of the external environment might be a factor in sitter coherence reduction.

Sitter's Response to Sitzings

Review of coherence scores, above, indicates that there was some degree of struggle or discomfort with the experience for sitters at least on an unconscious level during sittings. This was echoed in several sitters' conscious reflections on their experience (See Appendix F). However, though interviews with sitters indicated that the overall post-sitting effect on them was varied, the experience seemed to have generally supported their personal growth. Four of five sitters (including myself) noted feeling good about what they had done for a variety of reasons. Cynthia reported the feeling that her heart was more open, that she had more presence and fewer judgments. She also noted feeling the “embarrassment of riches” of her present life and health. This experience deepened her gratitude for mobility and awareness. She noted “a deepening appreciation for this stage of life”(referring to the end of life). Beth felt more neutral about the experience itself, but felt good about herself as having been a participant in a study. Sally felt good about having been part of the study and having been a witness to the comatose state of Pamela. Two sitters (Sally and Ellen, both sitters of

Pamela) seemed to feel more sober or as if they had been wakened to a very different reality. Sally stated, “I felt like I did coming home after visiting a foreign country. There was no way to communicate the experience and it was hard not to be able to be able to share it.” Ellen said: “When you leave people who are talking, you feel kind of uplifted. I left these patient’s in a quieter state...I left there feeling a little more melancholy... I was able to feel the compassion. That was the same. But I was wondering if it was meaningful for these people.”

Four of five sitters said that they would be willing to do this again. Sally qualified her affirmative response to the question of whether she would do it again with “...but I would be more conscious of the fact that it would take me on my own journey.” Ellen stated that she would not seek this experience out again. “I like to converse and see at least an apparent exchange. I wouldn’t seek it out.” Ellen’s responses and apparent resistance to participation in the study (she was very difficult to schedule) seemed to indicate that, of all of the sitters, she had the greatest aversion to or anxiety about the experience. Further, the longer-term effect of the experience seemed to raise anxiety about the possibility of her own outcome in life that may not have been felt as fully positive. It is interesting and possibly significant to note that Ellen was the most coherent sitter. The irony of Ellen’s coherence and response is discussed further in Chapter 5.

Sally expressed a similar anxiety, however she seemed to understand this experience as a positive challenge. Sally stated that this experience had “allowed me to hold more questions.” She noted that being able to hold more questions was her definition of being more alive. “It was life-affirming in the farthest possible way, though the surface was disturbing.”

In sum, having listened to the experiences of the sitters I would characterize most all responses, even Ellen's, as providing evidence of growth and personal evolution through the experience of sitting with a form of existence that was new to them and that raised new questions. No sitter was resoundingly overwhelmed, disturbed, depleted or depressed by the experience. Sitters seemed to internalize the experience with different levels of intensity, and interpreted the experience based mainly on how it related to personal issues and questions.

Evidence of Relationship

Evidence of Relationship could be seen in the careful examination of HRV graphs and coherence scores and comparison of these with sitting notes. These factors are analyzed and presented in Appendix L. Relationship in this context means that there is energetic contact between individuals and apparent influence of one person on the other.

Simultaneous Response. The most obvious and pervasive evidence of the overall fact of relationship in sittings was the prevalence of what I chose to call simultaneous responses. These were places in the HRV graphs where changes occurred simultaneously in sitter and patient HRV (see definition in Chapter 1). In 24 decipherable sittings, simultaneous responses were noted in 23 sittings. In three of the remaining four of the 28 sittings, the reading was undecipherable because one or the other of the participant's readings was not clear. In only one clear reading was no evidence noted (Sitting 18).

Cross-Influence. Cross-influence is defined and discussed below in more detail. It is a specific type of simultaneous response. It was not observed often, but its presence certainly seemed to indicate a particular type of relational dynamic: that in which one participant takes on or trades an HRV pattern with another. This may have occurred

more than was actually identified, but it was identified in 6 out of 28 sittings. Five of these were with myself as sitter. The other one was with Cynthia.

Coherence. The evidence of the effect of relationship could be seen most clearly in the review of coherence scores for patients. While overall coherence results were summarized above, a few additional observations are made there with respect to particular relationships.

The most profound evidence of relationship was seen in review of the coherence analysis for Pamela (Patient C). Pamela had the lowest coherence of any of the patients and seemed to not be influenced by others in her presence. The total coherence for Pamela ranged from one to six percent, with little significant difference between sitters. Further, the coherence score of the sitter did not seem to have a significant impact on her coherence. Indeed Pamela's average score was lowest with the sitter whose average coherence score was highest. However Pamela's coherence score with her husband, Larry, was over nine times greater than the average score with sitters (28%), even though Larry's coherence itself was relatively low (8%). This result seems to strongly suggest that there is a factor of loving relationship that has a positive effect on heart coherence, but is not causally related to another's coherence.

The second evidence of a relationship and its effect on coherence could be seen in the exploration of Anna and Beth. In sitter interviews, Beth stated her strong attraction to and fascination with Anna. Examination of Anna's coherence scores (See Appendix K - Table K1) shows that Anna had approximately twice the coherence with Beth as any other sitter. In terms of technical averages, Beth showed her highest coherence with Maureen, however this was primarily a result of her last sitting with Maureen in which she had unusually high

coherence. Beth's coherence with Anna was more consistent and was higher than her overall average for sittings. Unfortunately there were no pre-sitting baselines done for these sittings that might have shown Beth's influence on Anna more clearly.

The third evidence of relationship seen in coherence analysis was subtle but could be seen after an examination of Karen's coherence data with myself, Sitter Z. I had been working with Karen for about 10 months as a hospice volunteer and had paid her 20 visits prior to the project beginning. I had never known her in a non-comatose state, however there were many times where I perceived that we had a good connection, a perception I gained through my own meditative state (see description below). Though my averages with her were in fact higher than other sitters, it does not appear to be a large difference. However, two things should be noted in reviewing these numerical averages.

First, Karen died approximately six weeks after my last sitting with her (Sitting #13) after many years in a brain damaged and comatose state. This last sitting, in which there was very little coherence (combined coherence of 3%), took place over two months after the main body of all other sittings with Karen. There is a considerable contrast between this last sitting and Sitting #9 with me (combined patient coherence of 19%) which was markedly different than her scores with other sitters or her baseline figures. It seems very possible that her near-death state may have lowered her capacity to demonstrate heart coherence at a level that is recognized by the Freeze-Framer. If this were true, it would have negatively influenced her average coherence figure with me.

A second curious occurrence between Karen and myself also underlined the possible effect of relationship and may have distorted calculated figures. In Sitting #7 with Sitter A, Karen demonstrated her maximum coherence peak when I walked near her bed to make an

adjustment 17 minutes into the session. This accounted for at least half of the coherence that Karen demonstrated in that session. The other half was demonstrated in the first few minutes of the session when I was also nearby. It seems unlikely to me that this was a coincidence. Since this was recorded as coherence with Sitter A (Beth), this probably inadvertently distorted these comparisons. If these factors were to be removed (ignoring her last session with me and reducing Beth's coherence in Sitting #7 by 50%), Karen's total coherence with me would be approximately four times that of other sitters.

Changes in Peak Spectrum. Peak spectrum data was reviewed and compared with baseline patterns. I considered it interesting that the peak frequency in the patient's spectrum moved toward the sitter's in 16 of 28 sittings. There was no change in 9 of 28 sittings and a move away from the sitter's peak frequency in only 3 of 28 sittings. Whether this is meaningful or not is not clear. HeartMath researcher, Rollin McCraty has expressed his opinion that peak spectrum data for this population is probably not meaningful because there are too many factors or "artifacts" interfering with the production of this spectrum (such as mechanical respiration and the effects of brain damage) (R. McCraty, personal communication, April 21, 2006).

Changes in Patient Amplitudes During Sitter Coherence. An interesting phenomenon observed in this study was that typical amplitudes of patients would often change, either decrease or increase during periods of sitter coherence. For example, the "jagged hill" pattern of Karen would often flatten. Or, at times the nearly flat pattern of Pamela would begin to have a long slow hill pattern.

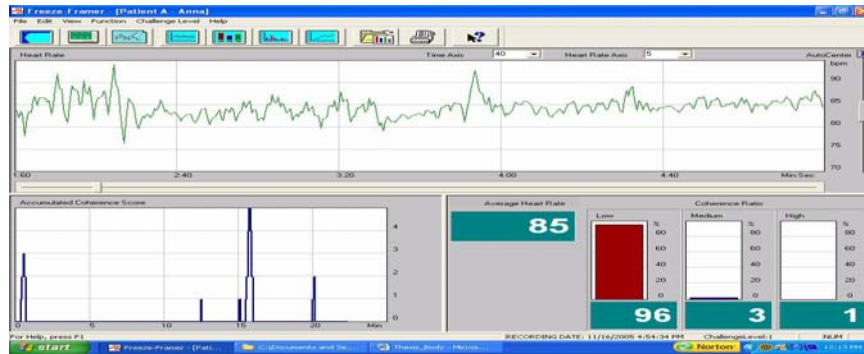


Illustration 1a - Patient A with Sitter B in Sitting # 2

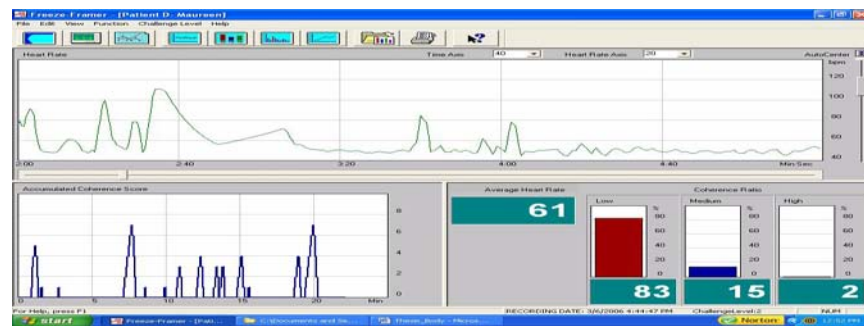


Illustration 1b - Patient D with Sitter D in Sitting #28

Examples of Flattening during Sitter Coherence Period

Though many examples were not as clear as these, this type of shift was noted in 17 out of 24 decipherable sessions. It was not noted in 7 out of 24 sessions. Four sessions were indecipherable.

Changes in PNS Mediated Responses. A PNS mediated response is a response due to the fact that the PNS is suddenly activated or interrupted, and which results in a sudden change in heart rate. The presence of this type of pattern is usually considered a sign of incoherence or a negative state. It is often an indicator of stress or anxiety (McCraty & Atkinson, 1996). Generally the reduction of this erratic activity is considered positive in ordinary populations. The graphs were reviewed for signs of whether PNS mediation

increased or decreased during the sitting. In 24 decipherable sittings, PNS mediation was decreased in nine sittings. There was no change in PNS mediated patterns in eight sittings. There was an increase in PNS mediation in six sittings. In three sittings, there was a mix of responses, including both decrease and increase.

Discussions with IHM researcher, Rollin McCraty, pointed out the fact that in the state of overall instability that this population exhibits in HRV, even the smallest stimulation could provoke PNS-mediated responses, even if they were a result of excitement. His opinion was that this was not necessarily a negative response, but rather a sign of the nervous system attempting to activate the body (R. McCraty, personal communication, April 24, 2006).

One interesting thing to note concerning Maureen is that she exhibited more overall capacity for reactivity to sitters in her presence than other patients. She was also the patient who demonstrated the highest coherence in baseline measurements, and who had the greatest amount of loving contact and family relationship in her life. All of these facts seem to confirm the assertion of IHM that people who are in loving relationship are “better able to receive cardiac signals from others” (McCraty and Atkins, 2003, p.12).

Other Evidence of Relationship. Further evidences of relationship could be seen in the exploration of touch, prayer and meditation in sittings. These findings will be discussed further below.

Phenomenon of Cross-influence

In numerous examples in this study there were situations in which it appeared that the sitter took on patterns or characteristics of the patient’s HRV, such as shifting to more PNS

mediation, taking on similar amplitude and quality oscillations, shifting to similar peak spectrum ranges or heart rates. In some cases the patient simultaneously seemed to benefit from this shift, either by becoming more coherent or by experiencing a more normalized HRV pattern, for example with less PNS mediation. I am choosing to call this phenomenon “cross-influence”.

The first and most dramatic observation of this occurred when I was present as a sitter, therefore watching laptops during the sitting (See Appendix H – Table H7). Because I am somewhat proficient at coming into coherence using the Freeze-Framer, when I noticed that I was not in a coherent pattern I tried to come into one by deepening my breath and focusing on my heart. I was able to do this, but I noticed that in order to do this I had to interrupt compassionate focus on the patient, remove my focus from her and put it onto myself. When I became aware of her again, my coherence level instantaneously dropped. Later in the same session when I was again in a coherent pattern, the patient began to show signs of intense discomfort of some kind, which did not seem to me to be physical. I chose to make physical contact with her and placed my hand on her leg. At the same minute that contact was made, my HRV became incoherent, and the patient technically (by Freeze-Framer) came into coherence and exhibited reduced HRV amplitudes, though the patterns did not appear to be sinusoidal. That pattern was repeated in a later episode within the same sitting. See Illustration No. 2 below.

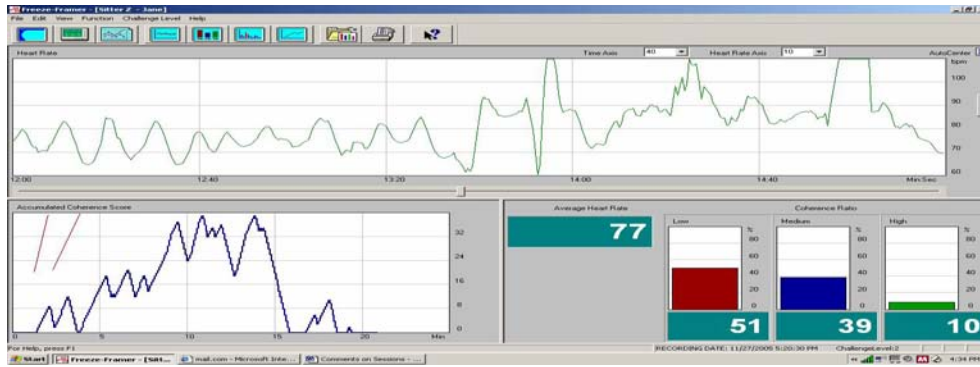


Illustration No. 2a – Sitter Z with Patient A – Sitting #6

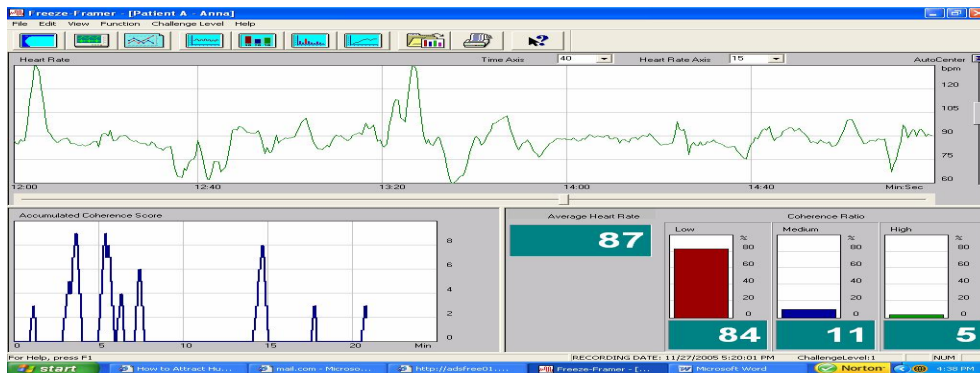


Illustration No. 2b – Patient A with Sitter Z – Sitting #6

Note that my pattern became similar to Anna’s as if I were “taking it on”, while Anna’s amplitudes shift to a range similar to mine previous to contact. It is perhaps unfortunate that these effects occurred with myself, as researcher, in the role of the sitter. However, if I had not been the sitter and therefore monitoring the laptop while also doing the sitting, I probably would not have been able to experience the simultaneity of these events as observer of both inner experience and external readings.

It seemed that this effect was more likely to happen with certain sitters than with others. Cynthia and I were the sitters with whom this phenomenon was identified.

Effect of Touch

As noted above, there were times during this study when touch was used, either to respond to a perceived patient need, or was deliberately added at the end of a session as a part of the investigation. There were usually clear responses to touch, in patient and/or sitter. Generally, touch created a destabilization of the patient's HRV pattern and an increase in amplitudes. Often a destabilization of the sitter's HRV pattern would also occur. Most commonly, the HRV amplitudes would increase at the moment of touch and for some period afterwards. See Illustration No. 2 below. This pattern might be considered a negative response, indicating possible startle, but it is not clear that disruption of HRV is a long-term effect of touch in either sitter or patient. Note that touch was introduced at the end of the session at or near 20 minutes.



**Illustration No. 3 – Example of Patient Response to Touch
Sitting #2**

Touch was noted with time correlates in a total of 15 sessions. Patient response was noted in 9 out of these 15 sessions. In five of these sessions I was unable to determine a response or it was unclear for some reason, such as finger sensor placement. In one session

there appeared to be no response. Sitter HRV response to touch was also noted in 9 out of 15 sessions. Sitter and patient demonstrated a simultaneous response to touch in six sittings.

Unfortunately, many of the examples of touch were used at the end of the sittings, added experimentally to non-contact sittings. As a result, there are not good examples of the effects of touch over time. The example given below in the case of touch used with meditation (see Illustration 5a and 5b below) does seem to indicate a possibility that the startle response might at some point give way, or that touch might be a source of comfort in the context of a trusting relationship. This may have been a part of the relatively high coherence of Pamela with her husband, who was continuously stroking her nose during his sitting with her.

Effect of Prayer and Meditation

Though there was not originally an intention to explore the effect of this parameter in this study, as the study ran its course different questions emerged. The effect of prayer and meditation came into the study because I have regularly used meditation at the bedside of non-communicative patients in order to establish a mode of communication with them. This was a normal form of my bedside sitting. As the study progressed with myself as a sitter, I began to become curious about the effect of this activity on patient HRV. This technique was not one that I could easily describe for other sitters to explore. However, the use of prayer at the bedside of patients is widely used as a method for helping the dying in many spiritual traditions. Many people have a working understanding and active practice of prayer. Cynthia in particular, an interfaith minister, had a strong connection to the use of prayer as spiritual practice. For these reasons I asked three sitters to experiment with the introduction of prayer at some point in their sittings.

The introduction of silent prayer was explored in seven sittings in the later part of the study period, one with Karen (Sitting 13) and six with Maureen (Sittings Nos. 21, 22, 23, 25a, 25b and 28). The instructions for this prayer were for the sitter to simply to ask silently for spiritual help for themselves and the patient using any spiritual images, identities or words that felt sacred to them.

Sitter responses to prayer were noted in five out of seven readable sittings. Patient responses were noted in six out of six readable sittings. All but one of these responses appeared to be in the direction of increased regularity and evenness of HRV oscillation, though there was often an initial disturbance or increase in amplitudes around the time of the prayer. See Illustrations 4 and 5 below. In most cases, prayer had the effect of lowering and evening amplitudes for sitters. However, in one example below when meditation was used with touch it had the effect of increasing amplitudes (See Illustration 6a). It is noted that this increased amplitude was within a coherent pattern. This is generally a positive shift.

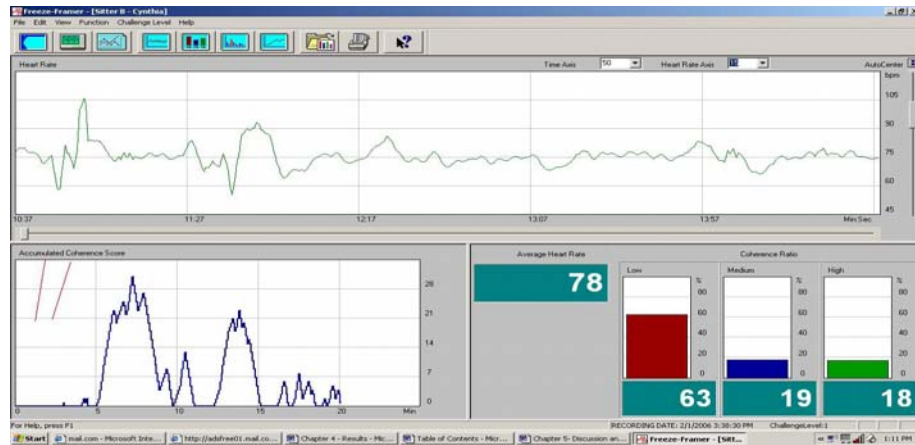


Illustration 4a – Effect of Prayer on Sitter B-Sitting 23

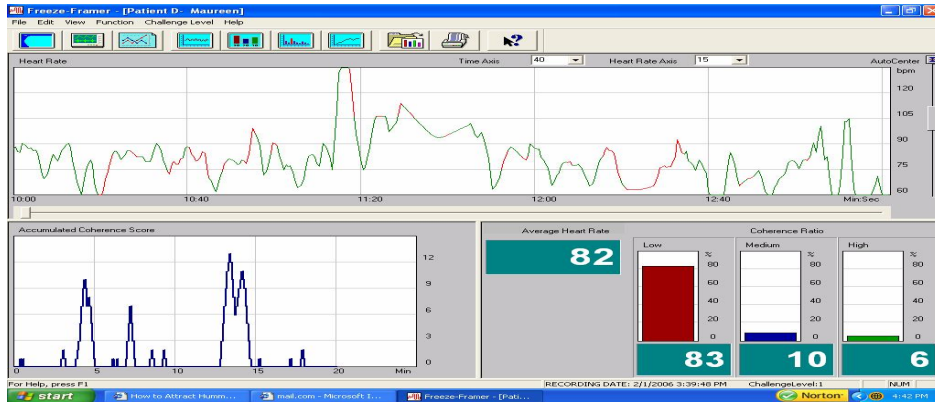


Illustration 4b - Effect of Prayer on Patient D – Sitting 23

Prayer was noted to have been introduced near 12 minutes. Note that these illustrations are one frame apart, so that the peak in the Patient HRV occurs just before the peak in the sitter’s HRV.



Illustration 5a - Effect of Prayer on Patient D- Sitting 28

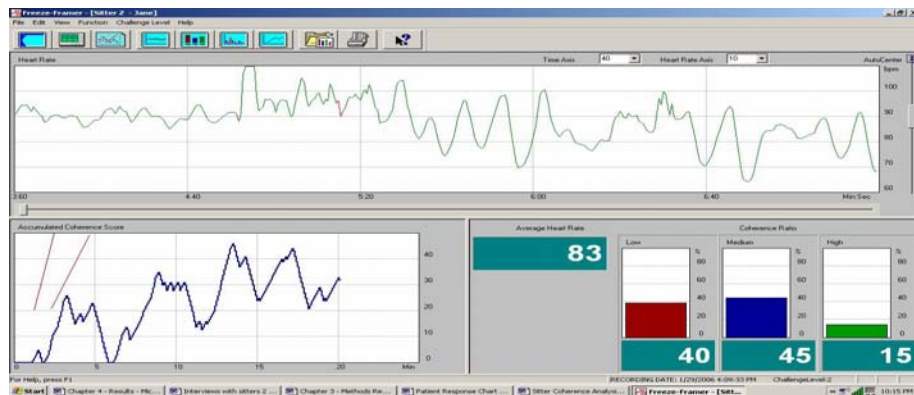


Illustration 5b - Effect of Prayer on Sitter D- Sitting 28

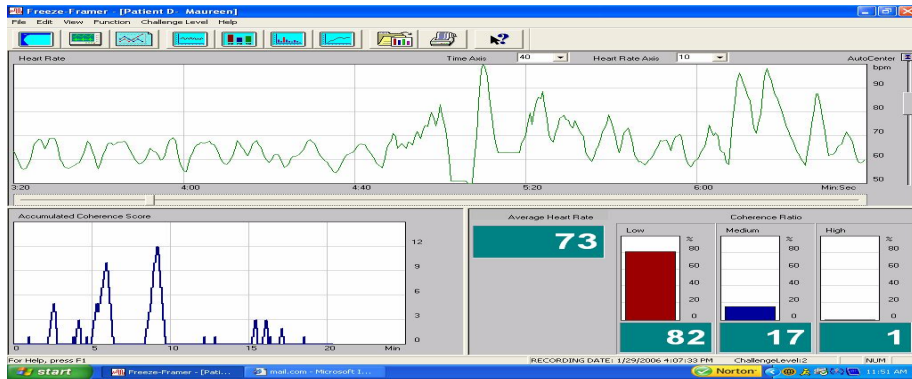
Prayer was initiated between 11 and 11:30 minutes in Sitting 28. Note that sitter response appears as a low, jagged pattern. In both examples given above, Patient D seemed to have anticipated the prayer offering and exhibited higher amplitude oscillations or peaking before the sitter actually offered the prayer. During this interval I would have been near both sitter and patient prompting the sitter that this might be a good time to consider offering a prayer. My proximity could also have been a factor in this response.

One of the most interesting anecdotes concerning the use of prayer was observed in Sitting 25, the sitting in which there was not technically a positive response. In this sitting between Cynthia and Maureen, Cynthia offered a prayer that was later reported to include affirmations of infinite love, God, and invocations of Jesus and Mary. At just this point, Maureen made a loud and articulate exclamation: “Be quiet!” While this may have been coincidental, it was very unusual for Maureen to use clear, discernable speech and her response seemed poignantly related to the subject matter. Cynthia had no idea that Maureen was reported by her husband to have become resistant to Christian religious figures and rituals. In a later prayer in the same sitting, Maureen shifted into coherence. Cynthia reported her perception that Maureen seemed to “relax into it and fell asleep.” These experiences obviously seemed to raise the possibility that patients not only might be positively affected by the introduction of prayer, but that they may be sensitive to the actual content and imagery used in prayer and may also have extremely personal responses to the content. While the sitter showed a sharp increase in amplitude at the point of this prayer, it is possible that this response was a response to Maureen’s unexpected words rather than to the prayer itself.

The meditation technique that I have used with hospice patients as a volunteer was noted in a total of eight sessions (Sessions 3, 6, 9, 12A, 13, 17A, 21 and 26). This technique involved finding a mental image of the patient and observing the patient within this meditative state, as well as my interaction with her. Unfortunately, because this type of tracking was not an original focus of this investigation, a timeline correlation with this technique was made in only two later sittings (Sittings 13 and 21). There was an observable change in the my HRV with Karen in Sitting 13, and a probable shift in Karen's at about the time of this introduction of both prayer and meditation. In Sitting 21 with Maureen (See Illustration 5a and 5b below), there was a shift in both patient and sitter HRV. Note the disruption of sitter pattern at five minutes when touch was reported and prayer was begun, and that within approximately 30 seconds the pattern changed to a deeper, more coherent sinusoidal pattern.



Touch and Meditation Used Together
Illustration No. 6a - Sitter Z with Patient D – Sitting 21



Touch and Meditation Used Together

Illustration No. 6b - Patient D with Sitter Z – Sitting 21

In sum, though it was necessary to screen these sittings with an expanded timeline, there seemed to be significant evidence that touch, prayer and meditation all have the capacity to influence the dying in ways that were generally positive for the patients and sitters investigated in this study.

Evidence of Long-term Effect of Sitting Contact

Patients. Possible evidence of longer-term effect of sittings was gathered through family and caregiver interviews and my own knowledge of patient outcomes. See Appendix I for the results of these interviews. What is known about each patient will be discussed individually.

Unfortunately because a caregiver interview could not be completed with informed consent forms for Anna’s Hospice Aide, few comments can be made here. It is known that Anna’s condition did improve after the project period and that she was removed from Hospice care about four months after the last sitting with her. She did not become more communicative; however, her physical condition stabilized and was improved.

The interview conducted with Karen's hospice aide after the main body of sittings with her did not indicate her awareness of any obvious changes in Karen or her condition during the study period. However, Karen died approximately six weeks after the last sitting with her after many years in a bed-ridden and comatose state. There is no way of knowing whether this project or her participation in it exerted any influence on her completion with life and her dying. It is my hope that it did.

The interview with Pamela's husband similarly reported that he had seen no changes in Pamela concurrent with the study period. He noted that she was heavily medicated. I note that Pamela was removed from Hospice care about five weeks after the last sitting with her because her condition had stabilized. No further information was available about her state.

Most interestingly, Maureen's husband, Fred without any knowledge that I was asking about any effect that the project might have had on his wife, volunteered that Marie had been unusually jovial and happy during a two-week period that coincided with the study. This mood was described as loving and accepting. "She talked a lot, not that I understand her, and was accepting of everything." During the week between the end of study and the interview Maureen took a turn, becoming very irritable. She remained so until the interview. Asked if this kind of mood swing was normal for her, he responded that it was not. Fred was clearly distressed about it. "It isn't like her. She won't even let me hold her hand." Fred generally sees Maureen right after she is moved and cleaned in the morning. He felt that Maureen's irritability had to do with her displeasure at being changed and handled by aides because "she was a very private person all her life". However, Maureen has had this care for years. It is not clear why her response to this would have changed so suddenly. Some of this behavior may have been manifesting in

the last session with Maureen during which she was unhappy with the finger sensor and more challenging to work with. Whether this is the result of coincidence or causality is not clear, but the fact is curious.

It should be noted that I continued as Maureen's hospice volunteer after the project ended, however contact was much less frequent than it had been during the two weeks of study. I followed up with Fred about nine weeks after the last sitting with her. Marie had continued to decline during this period in Fred's eyes. She was no longer babbling and was not able to say occasional words that could be understood. She was sleeping most of the time.

Sitters. The longer-term impacts of the sitting activity on sitters were assessed from Sitter Interviews after the project completion and have been discussed above in *Sitter's Response to Sittings*. In sum, the results of these interviews indicated that most sitters were aware that they had some degree of discomfort or struggle with the experience. However, they had managed to process discomfort as part of the contemplation of their own mortality, an expansion of their awareness of life and death, or as an examination of their current spiritual ideas. With the exception of Ellen, most had arrived at the conclusion that this activity had been meaningful to them in some personal way and that they would do it again. Sally offered to organize a group to compare and digest this experience and seemed interested in pursuing the issues it had provoked within herself with others.

Conclusions

Review of HRV data, reports and interviews, seems to provide evidence of interaction between sitter and patient in these sittings as well as probable influence of techniques such as prayer, touch and focused meditation on HRV. These results were sometimes calculable, such as information that was generated by the Freeze-Framer coherence analysis, but more often were observed by a close, simultaneous investigation of the HRV patterns of patient and sitter.

In sum these results seemed to suggest the following ideas:

- 1) Patients near death have highly unstable HRV patterns. Changes in these patterns seem to indicate significant sensitivity to people in their environment.
- 2) Even profoundly brain-injured patients seem to differentiate between caregivers that they are familiar with and those that they are not familiar with.
- 3) Patients may be affected by very subtle aspects of the people in their environment, such as their thoughts and intentions.
- 4) Loving relationship appears to be a significant factor in a patient's response to a sitter regardless of the sitter's level of coherence.
- 5) Relationship may be developed with caregivers even if the caregiver has only known the patient while they were in a non-communicative state.
- 6) The heart coherence of sitters is significantly reduced when engaging in compassionate presence with people near death. This reduction may be related to nature of the care environment, the level of concentrated distress patients have in a care environment, or it may be an aspect of the activity of compassionate presence itself.

7) The interventions of touch, prayer and meditation in sittings appears to have a significant effect on the HRV patterns of patients and sitters in many cases .

A discussion of these findings and conclusions follows in Chapter 5 below.

Chapter 5: Discussion and Conclusions

Coherence as an Instrument for Investigating the Near-death State

Ultimately, though much was discovered about the HRV patterns of patients near death, the intention of this study was to use the parameter of coherence to evaluate contact and influence of one person on another in this state. It seems important to evaluate how well the tool, Freeze-Framer, and the measurement of coherence worked toward this end in the study of this population.

The Study of Patient Coherence

Conversations with HearthMath researchers at the conclusion of this study helped me to understand that there are many complications of illness processes that interfere with the production of coherent HRV patterns. Beyond that, medical interventions, such as the mechanical respirator Pamela had, significantly interferes with a patient's ability to develop an HRV response (Rollin McCraty, April 17, 2006, personal communication). It is unfortunate that I did not have more awareness of these limitations before the study began as I might have made patient selections differently. Second, patterns such as Karen had (the jagged hill pattern) were indicative of either her severely brain damaged state or the sign of heart failure, and most likely governed by her brain stem. There was understandable difficulty in affecting this pattern. There were certainly somatic shifts that resulted in changes in HRV patterns, such as flattening of the pattern or increase in peaking that was mediated by the PNS. However any expectation that this HRV would rise to the

standards of heart coherence was unrealistic. Many factors such as these will be an aspect of work with the dying population.

My conclusion at the end of evaluation of this method is that coherence measurements are more directly useful in the study of sitter responses than of patient responses because of how disease processes and degeneration of brain functions affect HRV near death. Interesting and significant information about patient responses to sitters was certainly available through the use of the Freeze-Framer heart monitoring system and the graph of data that it produced. This provided an important window into the possibility of understanding somatic communication with this population. However, it was clear that the subtlety of response of these patients might have been more clear to study and monitor with a tool designed specifically for them, one that could analyze the parameters specific to their condition more objectively. The parameter of coherence is probably not such a parameter, in that it measures an offset from a relatively ideal form (the sinusoidal cycle of .1 Hz) generated by a healthy population in ideal circumstances. Death, illness and dying are not such circumstances, or are perhaps governed by their own, different ideal forms.

Coherence scores in this population did not seem to be meaningless, particularly in the evaluation of relationship capacity, but they ultimately did not prove to be a primary factor in evaluating states of emotional or spiritual well-being, as the body may be no longer capable of producing a coherent pattern during this life passage. Indeed, at times technical incoherence seemed like a positive shift out of more primitive brain stem pattern, a kind of response to the excitation of contact with another.

An HRV analysis tool that could identify significant HRV changes for this population might be extremely useful in the advancement of their care. For example, if an

increase or decrease in anxiety response could be measured as a function of increase or decrease of HRV amplitudes and PNS mediated responses, or if there were a way to understand and quantify the evening of the HRV, this might be exceptionally useful to future study. IHM has begun the process of identifying typical HRV for different disease processes. (McCarty and Atkinson, 1996) This has the potential of offering great help in identifying disease and understanding more about the somatic and emotional responses of people who are not able to communicate their experiences directly.

The wide-ranging evidence of response and reactivity that was observed in patients shows fairly clearly that there is sensitivity to persons in their environment and the capacity for relationship. It would be a useful addition to the care of this population to have a tool capable of assessing changes more subtle than coherence for insight into their care.

The Study of Sitter Coherence

Coherence seemed to be a useful parameter for evaluating the somatic responses of caregivers within a care setting. However, it is not completely clear that coherence was a measure of compassion or the presence of loving relationship. Clearly, more research would be helpful in understanding the energy dynamics of care facilities themselves, caregiving and therapeutic activities and the long-term effects of care activity on caregivers. This investigation can only speculate on some of the possible dynamics in these relationships.

Reduction in sitter coherence was one of the most clear and consistent results of this pilot investigation. It suggested the possibility that there may be a phenomenon of group coherence, and that this phenomenon may exert influence on individuals within groups.

However other explanations for this result must also be considered. Reduction of coherence scores could have been a result of the activity itself, the emotional responses to the environment or the state of the patients in them.

Sitter interviews make it clear that each sitter had some degree of struggle with either the environment or contact with the reality of the patients they sat with. This was particularly true of sitters who were with Pamela and Karen as both patients were relatively young and in long-term comatose states. Sitters were often absorbed in speculating about the patients' lives and whether this was or was not a fair situation for them. Sally, Cynthia and Ellen all noted that they became involved with questions of their own mortality and the projection of themselves into this situation during sittings and after. This may have provoked an unconscious anxiety that was not conducive to coherence. Beth's interview did not present this anxiety, although after her first sitting with Karen, her remarks ("There are no words for this.") indicated a possible deeper level of distress with Karen's state than she might have remembered later. If this is the only explanation, however, it does not explain why there is such a wide variation in sitter coherence loss, from 22% to 72%.

Sally's coherence loss of 72% was the most dramatic. One of Sally's first remarks in the interview was that she had never spent any significant time in a nursing home before this project. Sally reported the most detailed and involved thoughts about both the nature of the environment and its effect on her, speculations about how this would be for her, and thoughts about her own mortality and possible end of life. This struggle also showed up in her sitter reports as having been a predominant awareness. For example, after one sitting she wrote: "I was pushing this place away." Nevertheless, Sally seemed fully and actively engaged and connected with the patient in most sittings, particularly Sitting #1. It is noted

that Sally sat only with one of the most challenging patients, Pamela. These factors all may have played a role her loss of coherence. A final note is that Sally was diagnosed with third stage ovarian cancer several months after the project end. If disease processes indeed have an effect on HRV, it is possible that these factors may have played a part in Sally's loss of coherence.

It was particularly unfortunate that Ellen, the most consistently coherent sitter, was only available for three sittings in this study, two of which were with Patient C. With such a small sample of sittings, it is not easy to draw conclusions about why Ellen lost significantly less coherence than other sitters involved with the project. IHM commentary has suggested that people who are more coherent are indeed less vulnerable to the incoherence of their environments.

...when people are able to maintain the physiological coherence mode, they are more internally stable and thus less vulnerable to being negatively affected by the fields emanating from others. (McCraty and Atkinson, 2003, p.12)

IHM also contends that the mode of coherence causes one to “exhibit greater sensitivity in registering the electromagnetic signals and information patterns encoded in the fields radiated by the hearts of other people.” (p. 12)

Certainly Ellen demonstrated similar anxiety about the patient situation as other sitters, if not more than other sitters. She was the only sitter who said that she would not wish to seek this kind of contact as a volunteer again, for example. This raises a possibility that the lower percentage reduction in her coherence scores may have also occurred in part as a self-protective response. It was my intuitive observation that Ellen did not have the easiest time making deep contact with patients. In reviewing Ellen's three sittings with Pamela and Maureen, I noted that the session in which Ellen had the greatest loss of

coherence was also a session in which the patient had a meaningful coherence increase (See Appendix H – Table H36). This was a session in which Ellen reported feeling frustration with the environment and interruptions of staff. Maureen’s coherence in that sitting may have had nothing to do with Ellen. It would take a much larger sample to draw a conclusion. However, my speculation is that Ellen may have had a deeper effect on patient coherence when she was more vulnerable herself. This may have had the effect of lowering her own coherence. This interpretation was influenced by my own experience as a sitter in which I noticed difficulty focusing on the patient while holding a coherent state. The possibility that contact may sometimes be inversely related to coherence in situations like this is discussed further below.

In analyzing my own coherence loss (-57%), I note that my experience was significantly different than other sitters and was probably influenced by different factors. It was clear from observing session recordings that my own coherence loss was affected by acting as both sitter and project administrator. It is likely that my coherence would have been different had I not been interrupted during sittings by the activities of adjusting patient finger sensors, monitoring the power supply of two laptops or answering the questions of staff members. I was very aware that it was more difficult for me to make contact with patients while being digitally monitored than in a typical hospice visit. On the other hand, I began the project with much more experience with patients in this state than other sitters. I was already accustomed to sitting with the comatose, to the experience of being in both locations and of sitting with two of the four patients. It seems likely that there is a learning and exposure curve associated with this activity that influenced this outcome as well as a

factor of relationship building. Many of the issues other sitters found distracting as part of a new experience did not provoke the same response in me.

Cross-influence and the relationship between compassion and coherence

A preliminary assumption of this study was that heart coherence, or the achievement of states of well-being, gratitude, or appreciation, is in some way related to states of compassionate presence and loving relationship. However, this study opened the possibility that there may be fundamental differences between the dynamic of compassion and personal HRV coherence that were not fully anticipated. Compassion by its very nature may require a measure of resonance with, experience of, or perhaps even an energetic “taking on” of another’s pain and suffering similar to the Buddhist practice of Tonglen (Sogyal Rinpoche, 1992). It does not seem difficult to imagine that this would have a short-term effect of destabilizing a sitter’s personal sense of well-being as he or she contacts the experience of suffering, particularly in environments where there is overall lack of coherence. In this situation the dynamic of coherence did not seem to be simply modeled as one person directly drawing another into their coherence by simple entrainment. Coherence is an ideal physiological state. This state may be influenced by the coherence of others in the presence of relationship, but it did not, on its own, seem to indicate a capacity for relationship.

If one person’s willingness to be affected by the suffering of another is a true dynamic of compassion, it raises important questions. First, it raises the question of whether this experience has an enduring negative effect on a helper’s HRV, or whether ultimately this contact can engender positive growth leading to an expanded heart and a

more coherent HRV, as the theory of Tonglen suggests. When a patient appeared to have a negative response to a sitter or reduced coherence in a sitting, it was unclear whether this was simply short-term destabilization (such as a startle reflex, the sign of excitement or the adjustment to an unknown person in their presence) which ultimately had a positive influence on the patient as the relationship developed, or whether it was a simple negative response that contributed to a longer-term degradation of the sense of well-being. These questions are raised, but not fully explored in this study except in sitter and family interviews and two post-sitting baselines that were done. Though the sample is inadequate, these seem to indicate a possibility that effects of these sittings may have endured beyond the theoretical limits of the project, and that these effects may have been positive for some sitters and patients regardless of the short-term response.

If this is the case, the question of what it is that allows the disruption of coherence to be processed into positive growth for some caregivers and patients becomes particularly interesting, especially at a time when the causes of emotional burnout, or energetic depletion, for caregivers in institutions such as these are being actively researched and debated (Brotheridge & Grandey, 2002; Alderidge, 1994; Bolton, 2000) More study on the somatic effects of this issue would be a very worthy endeavor with implications far outside of the care of the dying. My speculation on this issue is that without relationship and the ability to feel into and recognize another's pain, as well as the capacity to feel the truth of our own pain in their presence, there is probably little that we can do for them on an energetic level even with perfect coherence. On the other hand, without a way to work through emotional responses to the other's pain, or some way to process the pain that is encountered in this experience into personal growth, these experiences may become

difficult for a caregiver to sustain. The increasingly intense and rigid requirements of institutional care facilities on caregivers do not commonly allow for or promote this type of self-care within the workplace. Some aspect of a caregiver's energetic structure that might normally be sustaining and enervating, may shut down in response to the daily experiences as a result. Feeling deeply in response to others in a context of positive self-care may be part of what allows caregivers to maintain and expand their capacity for helping. Another possible theory is that the requirements for rigid perfectionism of any kind, including the requirement to be in an optimum coherence state, may create a bind or a split when confronted with the reality of a person suffering or in the process of dying. To enter into the experience and resonate with pain is perhaps a natural, indeed healthy, function of the human heart. To deny this capacity in the face of another may create a split that in the long run depletes enthusiasm for the activity of caring.

Most nurses and aides are now in the situation in which they must perform on many physical and administrative levels, but are very rarely able to be with the patients in such a way as to bring compassionate, human comfort to the other. As one hospice nurse on the approval board for this project stated "I don't think that we *ever* are with patients when we aren't doing something else with them." It seems likely that this could create a bind or stress at some level for the caretaker. The design of caregiving environments at present seldom takes into account these levels of need in both caregiver and patient.

The Capacity for Relationship Near Death

Though the sample was too small to draw firm conclusions, the apparent effect of relationship in this investigation did not seem coincidental. This fact should be investigated more deeply with this population in further studies for several reasons. First,

clearly, there is an advantage to understanding more about patient needs and care in this state. There is a strong indication that relationships exist up to the point of death and that there may be need for compassionate relationship and support at this juncture. Second, if the responses of the two spouses I worked with were an indication, this information could provide tremendous relief and hope to family members of people in non-communicative states near death. The question “Does she know that I am here?” weighed very heavily on the hearts of the family members that I worked with in this project. Understanding more about how people in these states perceive and respond could greatly enrich the sense of meaning and the depth of exchange at this point of life.

Families commonly feel that their loved ones know them and comment on their loved one’s preferences and emotions. It is also unfortunately common for family members to be told that their loved ones cannot possibly perceive their presence due to neurological damage or intellectual impairment. Both husbands that I worked with had had very difficult experiences of this nature that had caused them to doubt their felt sense of connection to their spouse. Both men independently reported depression and anger that lasted a significant period of time after these incidents. Even if this study had no net influence on patients, the confirmation of enduring family ties and of the validity of felt senses in relationship is itself an important reason to pursue further work in this area.

Beyond the help that end-of-life relationship studies might give patients and families is one more reason to pursue them. The facts of this investigation point to the possibility that deeply compromised patients not only have a somatic recognition of family members retained from previous stages of life, but that they have recognition of others in their presence and the capacity to develop new relationship with caregivers while in this

state. Further, it seemed true that even very debilitated patients exhibited signs of attraction to certain sitters in their presence. This provides a basis for confirming intuitive experience of volunteers, nurses and other hospice caregivers, and for reconsidering the institutional care of people in this state.

Though many caregivers intuitively know how to develop rapport with their patients, it is still also common for hospice volunteers and others to be reluctant to sit with non-communicative patients because of the perception that the patient does not know or care that they are there. Beth spoke of this feeling when I asked her to compare the experience with her experience with more verbal patients.

It was easier to sit with a non-communicative person knowing that I was doing something useful than it would have been if I hadn't been a part of this study. It would have been different if it weren't a study and there was no monitor. I would not have felt there was validity in what I was doing.

She added that the machines made her feel that the exchange was real, otherwise she would not have taken it seriously. Ellen, too, noted feeling her concern and discomfort that patients did not know that she was there.

Because non-verbal or somatic communication is not regularly confirmed as a factor of care within a medical model, it is often neglected in the structure of care for this population, even among people trained to do hospice work. A clear picture of their perceptual abilities and sensitivities would be of help to challenging these resistances, and might help volunteers, families, clergy and others meet the relational needs of people close to death and in other non-communicative states.

The Use of Prayer and Meditation

On reflection, it strikes me that the use of prayer in these sittings was possibly controversial, though its introduction was explored quite organically. The word prayer can easily stimulate images from religious training, fears of spiritual violation and many other associations both positive and negative. This instruction clearly was uncomfortable to Beth in the first sitting she was asked to do this. For Beth the idea of prayer had negative associations with her religious background. For others, however, it was completely natural addition to compassionate presence. Because prayer is one of the most widely used interventions at the bedside of the sick or dying, it seemed useful to explore its effects. The short-term effects on HRV appeared to be clear, particularly on patients. The degree to which this was true was surprising. A better controlled experiment of the somatic effects of prayer would be exceptionally interesting and useful, particularly given the number of prayer studies now being debated (Benson et. al., 2006; Byrd, 1988; Targ et. al., 1998). Most likely, study with this instrument will not demonstrate the long-term effects of prayer, but only the short-term energetic shifting of HRV that might occur before, during and after a prayer, similar to the physiological response to prayer and meditation that has been investigated by Herbert Benson and others, termed the “relaxation response” (Benson & Klipper, 1976). However in this case, prayer is being offered on behalf of others without their conscious volition. It would seem useful to have a working understanding of the patient’s spiritual history and disposition before undertaking such an exploration.

Meditation similarly might be usefully explored for somatic effect. Techniques such as the one that I use with patients might need to be taught or used with people trained in

meditation or healing modalities. A study of practitioners of Tonglen might be particularly interesting in exploring the phenomenon of cross-influence and furthering an understanding of appropriate caregiving, as would a study that targets people such as clergy who are accustomed to sitting with the dying.

The Use of Touch

The effect of physical touch was more difficult to interpret in this study. Because touch is a means of communication that is commonly used with the ill and dying, the importance of looking at its effects seems clear. I did not feel that many conclusions could be drawn from the responses to touch in this investigation, other than that there was often what appeared to be a startle response in both patients and sitters. More investigation of this nature that focuses on the longer-term ramifications of touch would be useful.

Interestingly, off-body or therapeutic touch when introduced often seemed to evoke similar responses as physical touch. This fact seemed to confirm the sensitivity of patients at this point in their life process. However, more deliberate work would need to be done to draw any conclusions about the effect of off-body touch.

The Phenomenon of Short-term Disruptions

The question of whether short-term disruptions in coherence patterns may in fact be necessary and useful in growth and healing processes remains a fascinating one at the conclusion of this study. The fact that techniques such as touch, therapeutic touch and even presence itself often stimulated erratic patterns for some period of time, leading to incoherence, indicates that they have an effect. The question is whether this effect has

value to a patient. As a general principle of healing, it is my best sense that the creation of imbalance is often a necessary precursor to movement of any kind and positive change, in fact often creating a necessary destabilization so that, with support, new patterns can emerge. To deem all destabilizations as negative is to ignore this potent stage of positive transformation. The responses of both sitters and patients after the project conclusion may support the possibility that this principle remains active in all life processes, even end-stage life processes.

Patient Sensitivity

The fact that patients were highly responsive to many sitters, exhibiting response to things like sitter heart rate accelerations, HRV coherence, touch, prayer, meditative states, and others in proximity of their beds seems to confirm the Buddhist premise that patients near death, rather than being unaware or “out of it”, are highly sensitive to the influences of their companions. No direct information was gathered about patient sensitivity to the environment itself or the other patients in it. However if patients are sensitive to sitters whom they have never met, it seems reasonable to assume that the state of other roommates, other patients, nurses, and aides who have a daily influence on their care would also exert a large influence on the patient’s sense of well-being.

Reflections on the Nature of Caregiving and the Caregiving Environment

The largest unanswered questions left by this thesis for myself are questions about appropriate and inappropriate caregiving, the nature of caregiving environments and the long-term care of caregivers. Even within a small sample such as this one, there were

different models of care and concepts of caregiving brought by every sitter as well as different states of presence. The idiosyncrasies of each caregiver in such a small sample make evaluations of appropriate or inappropriate care, or presence, nearly impossible. Each person had a very unique offering. Still, I offer my own observations and interpretations.

The model of care held by researchers at the HeartMath institute are that holding a state of coherence itself is possibly an optimum model of caregiving, in that he or she will automatically create conditions for others to come into such states. Fear, frustration and anxiety are negative emotions to be overcome with positive attitudes, reflections on love and gratitude (Childre & Martin, 1999). Indeed these are powerful techniques for people to use in their own process of growth and it is hard to argue that these actions do not have a profound effect on others who are fully engaged with life. However, this project was reflecting on a different state of being and a different process than the one of self-improvement, or the project of coming expansively into life and productivity. It is difficult to expand a model of self-improvement into an over-reaching model of healing or helping near death.

In my own experience as a healing practitioner and hospice worker, healing does not have to do only with the accomplishment of expansion and order, but includes a traditionally shamanic penetration into a world of distortion, chaos, darkness and pain, including the facts of death and dying. The facilitation of other people's healing has to do with providing compassionate presence through these processes. Compassion and presence in this view may require helpers to have a demonstrated capacity to go into these states themselves, and the capacity to come out of them again in a renewed state. In short,

healing processes and optimization processes are both useful and in their essence may be different. It seems likely to me that we will find that patterns of HRV coherence, while a very useful parameter, must be meaningfully qualified or redefined in order to be applied as an evaluative tool within a relational healing or helping construct.

The capacity for sitters to be emotionally and somatically affected by their environment or the patients they encounter does not appear to me to be necessarily negative, nor necessarily an indication of over-care as IHM defines it, a definition which includes ideas like worry, anxiety and over-attachment (Childre & Martin, 1999). In fact, in my view, somatic-emotional presence and response is probably a natural and healthy response to people at end of life if appropriate boundaries are maintained and helpers have opportunities to integrate their experiences, thereby stimulating their own growth. Indeed, it seems most likely to me that there are multiple valid models and techniques for helping that should be explored with tools such as the one that IHM has developed. Entrainment of others into a more coherent field is one valid model of helping. Resonance with others on a somatic-emotional level, or feeling deeply with them in a way that may compromise short-term coherence, may be another.

Optimally, caregiving environments would be supportive of the longer-term needs of caregivers, families and patients. In terms of patient needs, this investigation suggests that patients may be best served by smaller, less concentrated environments (such as low density rooms, private homes or smaller hospice facilities) that are particularly designed for their needs and the needs of their caregivers. Indeed, an English study showing that elderly people envision an environment with home-like qualities as their preferred place of dying seems to confirm the idea that the energetic constructs of the care environment are

significant to people approaching end-of-life (Gott, Seymour, Bellamy, Clark & Ahmedzai; 2004).

Patients appear to need supportive relationship with regular, loving caregivers. It seems obvious that this contact would be enhanced if the caregivers understood and felt that patients were aware of them. Another need is for care to be taken of the extreme sensitivity that patients have near death. This would include the reduction of unnecessary startling or disharmonious noises, such as shouting, loud televisions, cleaning equipment, as well as gentleness and courtesy when touching or moving these patients. An environment of peace, courtesy and respect is optimum. Because patients appear to be so sensitive to the states of others in their presence and their sudden introduction, it might also be best for people entering rooms of the dying to have a method for preparing themselves and becoming attuned to the patient before entering. Support of families and caregivers might include things like rooms for their rest and rejuvenation and counseling support for the expression and exploration of their experiences.

Suggestions for further research:

It seems important to pursue studies of this nature with the dying as non-invasive techniques become available for observing subtle interactions of the human being during critical stages. The experience of the dying person and information on how we affect them are important mysteries to explore. Several things would have made this a stronger study and I would make part of any further or expanded study of this kind.

1. Finger sensors were problematic with this population. Patients' fingers in Hospice are often contracted so that sometimes the sensor does not fit exceptionally well.

Occasionally the sensor seemed to be annoying to them. It was not uncommon for them to move their hand in response, knock it off, or squeeze it too tightly to get an accurate reading. In one case the finger sensor seemed to induce significant irritation and stress, which seemed to influence results. Finger sensors were used because UHR requested them, however ear sensors should be explored for use in any future work with this population.

2. One of the most unfortunate structural issues with this study is that the first twelve sittings did not have pre-sitting baselines for comparison. Any further study should have pre- and post-sitting baselines to provide for more meaningful comparisons.
3. The reduction of sitter coherence with patients was the clearest finding of this investigation. More work should be done to identify the contributing factors in this result. Comparisons of sitter scores outside of care facilities, within care facilities in the absence of patient contact, and in other care environments would help to identify the cause of this reduction. It would also be useful to work with patients in home environments to see how this differs from responses in institutionalized care. Questions that might be explored are: Do home care patients have a different profile of reactivity or coherence? Do sitters have different coherence levels in a home over an institutional setting?
4. The role of relationship was indicated by this investigation, however the factors that influence patient responsiveness in relationship were not clear. It would be useful to conduct a study of this nature with family members interacting with patients, as well as others who work regularly with patients, such as caregivers, clergy and

- long-term hospice volunteers. This might help establish different levels of patient sensitivity and the capacity for aversion and attraction.
5. Touch, prayer and meditation characteristically influenced HRV of both patient and sitter when explored in this study. These interventions and their somatic effects might be explored more systematically in future studies. Specifically, with respect to touch, it would be useful to explore the longer-term effects of touch within a sitting. It would be useful to explore the differences between touch from a family member and someone who is unfamiliar. In terms of prayer and meditation, it would be useful to explore the introduction of this intervention more systematically and with sitters who are comfortable with this as part of training and an ongoing spiritual practice.

Conclusion

This pilot investigation attempted to expand understanding of the role of the heart through the passage of end-of-life and the influence that compassionate presence can have on those near death. This project used research developed by the Institute of HeartMath and the heart monitoring system, Freeze-Framer, which was developed to track the heart's variability patterns. Results were interpreted using HeartMath research, which links emotional states with heart rate variability behavior. The work of this study has also been guided and the results interpreted by the experience of the hospice and death and dying movements and the writings, teachings and practices of Tibetan Buddhism.

This pilot investigation indicates that patients are sensitive to relationships and people in proximity at end-of-life. It also indicated that patients are capable of forming

new relationships, even in non-communicative states, and are reactive to interventions such as touch, prayer and meditation. That the environment in which caregiving occurs has an effect on caregivers also seemed to be strongly suggested by this investigation. This investigation raised questions about the nature of caregiving environments on patients and discussed different thoughts about caregiving for this population.

The governing role of the human energetic heart through the process of dying is one that has been noted by esoteric traditions such as Tibetan Buddhism. It has also been witnessed by many people's work with the dying, as well as those of many caregivers and families. The human heart, in its physical and energetic forms, appears to be a crucible that holds the potential of transforming our mental, emotional and physical bodies during our lives, and of facilitating their great change in form from one state to the other during death.

The processes of death are certainly not insignificant to life processes or the living, as we are always undergoing these processes if we are fully engaged with life. To quote Stanley Keleman:

There are general patterns of biological activity observable in most everyone's life that reflect elements indicative of being in one dying process or another. For example some people seem to have trouble getting out of bed and others have trouble getting into it....The myths of societies try to ensure that we do not die meaningless deaths....Each of us lives our variations on these mythologies of dying which are expressed at turning points in our lives overtly or implicitly (1974, pp.15-17).

If these patterns are true, the study of the human heart through the end-of-life passage may be significant in developing an understanding of the transformation of the human spirit at all ages, and advancing the mythologies of death and the promotion of meaning. Indeed, though this idea is not widely held in western culture, the idea that the

dying are in fact doing something of great importance in the larger world, and that it is exceptionally important to support them in doing this work well is a tenet of Tibetan Buddhism. As the Phowa prayer (presented by Sogyal Rinpoche) reads:

May I accomplish this profound practice of phowa, and die a good and peaceful death,
And through the triumph of my death, may I be able to benefit all other beings living or dead. (2002, p. 215).

At the very least, deepening our understanding of this process is important to the comfort and care of the dying and their caregivers. Since a comatose state is a passage experienced by the vast majority human beings before they die, this may be reason enough to pursue an understanding of relationship with people in non-verbal states near death.

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