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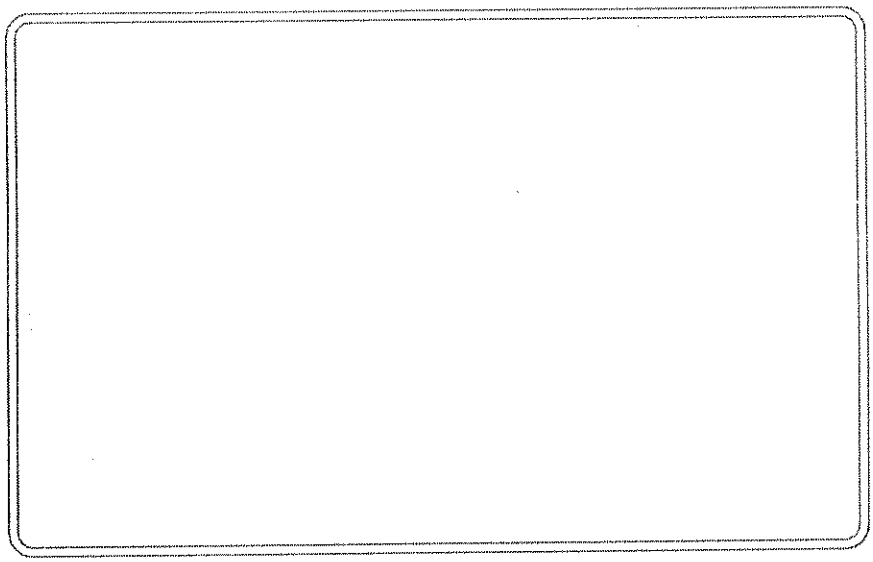
Visions



Infinite Potentials

The Journal of Rogerian Nursing Science

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Back issues of the journal are available for $15 a copy. The 1993 issue has been reprinted and spiral bound. It is available for $20.00. If you would like to purchase a back issue, contact Sheila Cheema at the address above.

Editorial

In the premiere issue of this journal, which appeared in 1993, Dr. Martha Rogers had the following to say about the birth of *Visions*:

> The journal is a very significant move forward, and I'm delighted! There will be considerable future development and enhancement of the journal and its contents, along with increasing frequency of issues. The debut of the journal represents a significant step in the evolution of the Society of Rogerian Scholars, especially as the society emerges and takes on increasing international aspects...SRS is a membership organization striving to move forward into a new reality and a new understanding of human life in outer space as well as on this planet. The journal will provide a forum to assist in transmitting ideas, creating new ways of thinking, and making new knowledge readily available to more people. I've been getting letters from people interested in this world view from around the planet. To the extent people have information about this nursing science they are using it to enhance the well-being of the people with whom they work. The journal is an expression of SRS and will facilitate the process of sharing information already set in motion. (p. 3)

In that same issue, Dr. Sarah Gueldner, then president of SRS, wrote the following:

> This premiere issue of our refereed journal represents yet another developmental landmark toward the development of the Rogerian conceptual system. Through this sophisticated avenue the eversearching and highly refined written discourse of both our most respected theorists and our courageous developing scientists will be presented for review and critique by the universal community of scholars. Through this process the finest thinking will emerge and the language of our science will become increasingly clear and precise. The journal will allow us to communicate with the widest possible audience of Rogerians, and to attract the attention world wide of nurses and others who dare to think beyond parts, the visible body, and clock time, even beyond the imaginary confines of our galaxy, to a grander reality. I am indeed proud to be president of the Society of Rogerian Scholars on the occasion of this special and historic event. If I may quote our esteemed leader, who started all of this in the first place, "Enjoy!" (p. 6)

In 2001 the editors are wondering about the viability of *Visions*, due to the dearth of quality manuscripts reflecting nursing within the perspective of the Science of Unitary Human Beings. What happens with manuscripts over the next year, as we approach the 10th year of publication, will determine whether we publish another issue or recommend to the board of SRS that publication be terminated.

HUMAN CHANGE AND INDIVIDUATION IN PIVOTAL LIFE SITUATIONS: DEVELOPMENT AND TESTING THE THEORY OF ENLIGHTENMENT

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ABSTRACT

A mid-range theory of enlightenment was developed from Rogers' Science of Unitary Human Beings. The phenomenon of enlightenment emerged from clinical observation. The process of theory development was then conducted from Rogers' Science of Unitary Human Beings. The three principles of homeodynamics provided the overall structure guiding the theory development process. Three manifestations of human field patterning (awareness, wakefulness, and human field motion) plus the concept of well-being made up the concepts of the theory.

Acausal propositions of the theory of enlightenment were developed in accordance with Rogers' world view. Four propositions proposed seven possible relationships. The literature review supported five of these relationships.

The theory was tested using a descriptive correlational design with a random sample of 323 women who had 6-month-old infants and who had exclusively breast-fed for some time. Psychometric properties of all but the wakefulness measure were adequate. Six of the seven relationships of the theory of enlightenment were supported by the study findings. The last hypothesis was partially supported. A strong pattern of relationships among awareness, wakefulness, human field motion and well-being was identified. Direct support for the theory of enlightenment and indirect support for Rogers' principles of homeodynamics were obtained. The theory offers a way to describe the process of human change and individuation in pivotal life situations.

Nurses encounter people during episodes of difficult and challenging pivotal life situations. These challenges can lead to significant human individuation or differentiation processes and enhanced well-being. This phenomenon has been documented in patients with breast cancer (Pelusi, 1997) and breast-feeding mothers (Wrigley & Hutchinson, 1990). The nurse's recognition and facilitation of the individuation process related to these experiences can make a significant difference in pivotal life situations. Basic research is significant for (a) developing nursing knowledge (Alligood & Fawcett, 1999); (b) establishing a scientific base in nursing (Phillips, 1992; Silva, 1986); and (c) enhancing the understanding of a phenomenon (Crawford, Dufault & Rudy, 1979). Silva analyzed 62 theory-based studies and found that only 9 explicitly tested nursing theory. Silva and Phillips both stated that basic research improves nursing theory, research and practice.

Fawcett and Downs' (1986) conceptual-theoretical-empirical structure was used to guide the development of the mid-range theory of enlightenment from Rogers' con-

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ceptual model. Enlightenment was defined as a positive, dynamic experience manifested as expanded awareness, increased wakefulness, higher levels of human field motion, and higher levels of well-being. Enlightenment was considered to represent the process of human unfolding described by Rogers' three principles of homeodynamics. The three principles of homeodynamics, helicy, resonancy, and integrality, provided the overarching structure from which the theory was deduced. The manifestations of field patterning served as manifestations of the principles of homeodynamics and provided the next level of structure. Three manifestations of field patterning (awareness, wakefulness, and human field motion) plus the concept of well-being constituted the concepts of the mid-range theory.

The structure and assumptions of Rogers' model also served to guide the process of theory development. Propositions were stated in terms of relationships. No causality was proposed. Enlightenment was identified as the phenomenon for study. A formal process of theory development was then used to identify and refine the concepts and propositions of the mid-range theory. Support for the use of each concept and for each proposition was identified from Rogers' writing or from experts in the Science of Unitary Human Beings [SUHB]. The research literature was then reviewed in order to identify the existing level of support for the proposed relationships between the concepts.

The study designed to test the theory also indirectly tested Rogers' SUHB. The three principles of homeodynamics, helicy, resonancy and integrality, describe different aspects of a single process of change. Each should therefore be significantly related to the others. The study findings described the relationships among selected manifestations of field patterning as manifestations of the principles of homeodynamics.

The study directly tested the theory of enlightenment developed from Rogers' SUHB. The conceptualization and measurement of the concept of enlightenment contributes to the development of nursing knowledge, particularly in the area of "principles and laws that govern the life processes, well-being and optimum functioning of human beings – sick or well" (Donaldson & Crowley, 1978, p. 113). The theory of enlightenment provides a new area for research, a new theory for continued testing and development, and a new way to identify and describe processes that enhance human individuation.

Development of the Theory

The idea of enlightenment as a concept for theory development and research evolved from clinical practice. The theory of enlightenment was developed from Rogers' principles of homeodynamics; the manifestations of field patterning plus well-being constituted the concepts of the theory. The propositions were developed to represent Rogers' acausal worldview.

The Phenomenon: Enlightenment

Enlightenment was considered to be a process of human change and individuation. It was defined as a positive, dynamic experience manifested as expanded awareness, increased wakefulness, higher levels of human field motion, and higher levels of well-being.

Clinical Observation

As a clinical specialist from 1975 to 1994 on a multidisciplinary team serving 250 families who had a child born with myelomeningocele, the first author observed parents and their children struggle with the meaning of this birth defect in their daily lives. As they overcame obstacles and lived their dreams, they would report deeper insights and awareness, a greater sense of harmony, and an enthusiastic commitment

to actively participate in their own process of human individuation.

One of these children, a school-age boy, was paralyzed from the waist down. He struggled with mobility and the meaning of doing things differently from his peers. He wanted to participate in a school dance. His mother was compassionately committed to a "normalized lifestyle." His dream came to life when his mother took him to see a demonstration of wheelchair dancing performed by an able-bodied young man dancing with a young woman in a wheel chair. They invited the audience to participate, and he joined in.

This experience brought the child a new image of possibilities for himself, greater courage to participate in dancing, and a greater sense of harmony and joy. He attended the school dance and danced with able-bodied peers, just as his siblings had done. This young boy's expanded awareness of possibilities, increased consciousness of what he could do, active participation in his dream, and greater sense of joy manifested the meaning of enlightenment as conceptualized by this author. Barrett's (1986, p. 174) concept of power as "the capacity to knowingly participate in the nature of change" captures the meaning of this experience. The concept of enlightenment is similar to that of power in that knowing participation is part of the process of enlightenment. It is different, however, in that enlightenment is a discovery process, often accompanied by an "aha," light, or insight that occurs within the person.

Definition of an Enlightening Experience. An enlightening experience was defined as "anything which [fosters reflection and] involves a compassionate commitment to oneself, to others, or to both self and others" (Hills, 1998, p. 12). An enlightening experience may occur whether or not a person chooses the experience, but does face a major life change that is accompanied by a compassionate commitment to something that fosters reflection.

Breast Feeding as an Enlightening Experience. A population of breast-feeding mothers was selected to test the theory of enlightenment. Breast-feeding was considered to be a pivotal life situation with the potential to be characterized by accelerating change. The long term breast-feeding mother chooses to be the lifeline to her infant and in making this choice, all aspects of her life change. The compassionate commitment to oneself or others is similar to Smith's (1994) definition of spirituality in that the person feels "confident that life is meaningful," [is committed to] "actualization of positive potential in all aspects of life," [is] "aware of the interconnectedness of life," [and believes that] "contact with a transcendent dimension is beneficial" (p. 37). Enlightenment differs from spirituality in that the experience is a discovery process accompanied by new insight.

Development of the Theory from Rogers' Conceptual Model

Rogers' (1990) conceptual model focuses on both the potential of human beings and continuous change throughout the life span. The human energy field, integral with its environmental field, that is, people in mutual process with their environment, is the phenomenon of concern in Rogers' (1992) worldview. The person cannot be considered independently of his or her own unique environment. The human and environmental field is characterized by pandimensionality. Human and environmental energy fields are pandimensional in that they have no limit in space, in time, or in dimensions of meaning. They are posited to be in continuous mutual process and distinguished by pattern. Although pattern is an unobservable abstraction, manifestations of the human/environmental field process are observable events as manifestations of field patterning.

Principles of Homeodynamics

Three principles of homeodynamics describe the nature of change in unitary human beings. The principle of helicy refers to the nature of change, resonancy to the process of change, and integrality to the context of change (Malinski, 1994). Helicy is defined as "continuous innovative, unpredictable, increasing diversity of the human and environmental field pattern" (Rogers, 1990, p. 8). Resonancy is described as "continuous change from lower to higher frequency field patterns in human and environmental fields" (Rogers, p. 8). Integrality is defined as the "continuous mutual human field and environmental field process" (Rogers,p.8).

Relationships between the principles. Helicy, resonancy and integrality describe different aspects of a single process of change. Each should, therefore, be related to the other two.

Helicy and resonancy. The relationship between helicy and resonancy is evident in examples of diversity of rhythms. Increasingly diverse rhythms are manifested through changing field patterning. This dynamic process is characteristic of all living things. Rogers (1986) stated "individual differences point up the significance of relative diversity" (p.6) .

Resonancy and integrality. The relationship between resonancy and integrality is such that movement or change in the human and environmental field is manifested in the rhythms of the human-environmental field (as a whole). Rogers (1986) described manifestations of changing field rhythms as "coordinate with higher frequency field pattern" (p.7).

Helicy and integrality. The relationship between helicy and integrality is such that "pattern and organization . . . give unity to diversity and reflect a dynamic and creative universe" (Rogers, 1970, p. 65). The evolution of unitary human beings, which is increasing diversity, emanates out of the human- environmental field mutual process (Rogers,1990).

Manifestations of Field Patterning

Manifestations of field patterning arise from the mutual process of person and environment and are represented on a continuum of lesser to greater diversity. They are observable occurrences and postulated to describe the process of human change or evolution of unitary human beings (Rogers, 1983). Rogers (1992) identified six manifestations of field patterning. Three are directly related to the study, lesser diversity [to] greater diversity, slower motion [to] faster motion [to] seems continuous, [and] longer sleeping [to] longer waking [to] beyond waking"(Rogers,1992,p.31).

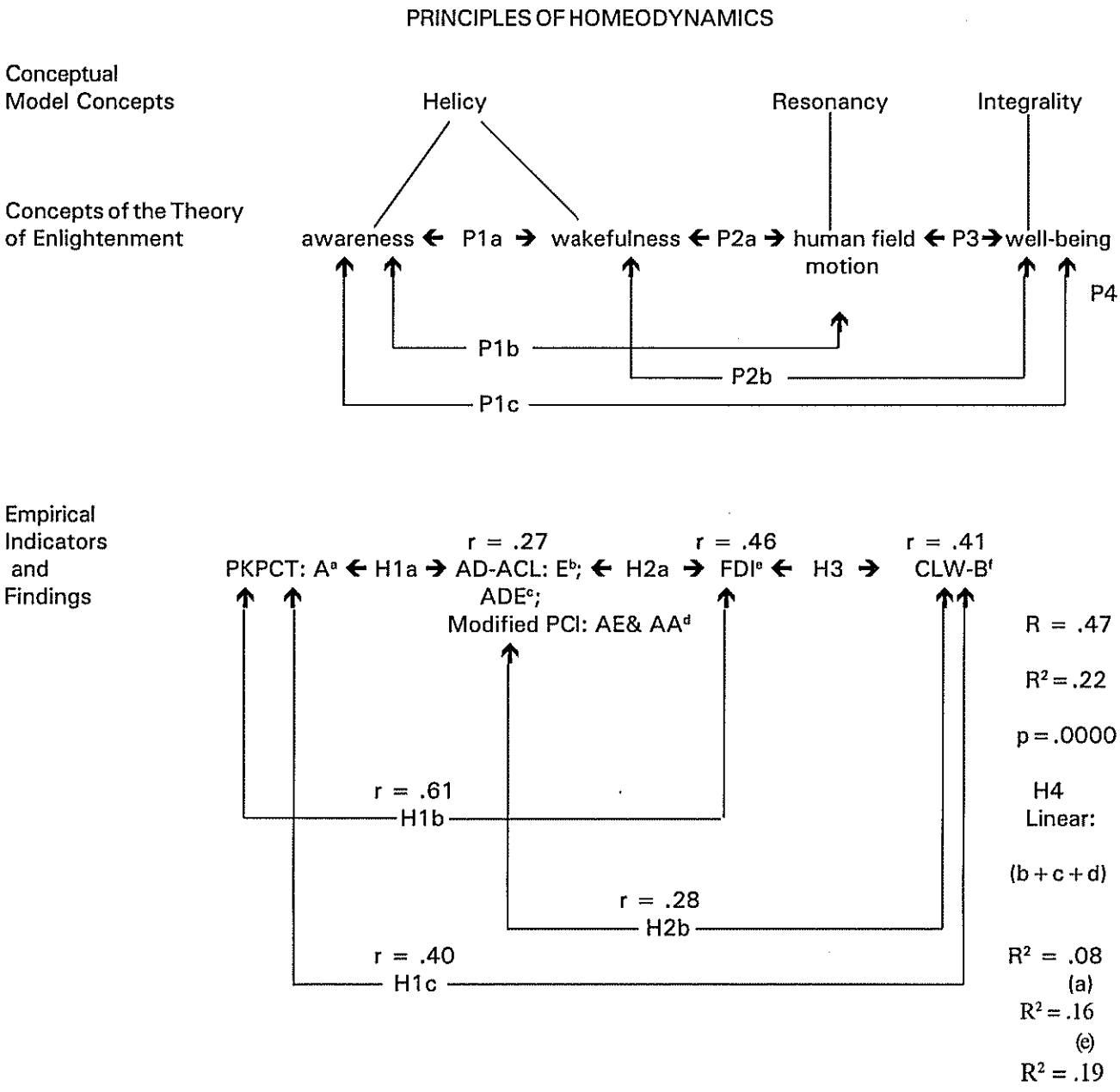
Theory of Enlightenment

The concepts of the theory of enlightenment are awareness, wakefulness, human field motion and well-being. Rogers (1992) described three of these concepts in the manifestations of field patterning. The fourth concept, well-being, was deduced from integrality.

Barrett (1983) defined awareness as "attention on that which one is capable of perceiving and a reflection of something of the flow of the organism" (p.28). For the purpose of this study, wakefulness was defined as experience of states of sleep (dreaming), awake (arousal), and beyond waking (altered state experiences). Human field motion was defined as "manifestation of the pandimensional pattern of energy fields both human and environmental" (Gueldner, as cited in Hindman, 1993, p. 15). Well-being was defined as the individual's sense of harmony and overall satisfaction with life. The horizontal links between these concepts and two principles of homeodynamics (helicy and resonancy) were developed and are described below.

Figure 1

Structure And Testing Of The Theory Of Enlightenment



Note. r refers to correlation (N = 323), all p's ****; P refers to proposition; H refers to hypothesis.
a. Awareness subscale of the Power-As-Knowing-Participation-In-Change-Test; b. Energy factor of the Activation Deactivation-Adjective Check List; c. Assessment of Dream Experience; d. Altered experience and altered state of awareness dimensions of the Phenomenology of Consciousness Inventory; e. Field Dynamics Index; f. Cantril's Ladder for Well-Being.
* $p \leq .05$. ** $p < .01$. *** $p < .001$. **** $p < .0001$.

Relationships between the Principles of Homeodynamics and the Concepts of the Theory

Rogers (1992) stated change is manifested in "...evidences of human potential in the process of actualization" (p. 32). Awareness and wakefulness were considered to be manifestations of helicy. Human field motion was considered to be a manifestation of resonancy. Well-being was considered to be an instance of integrality.

Awareness and helicy. Awareness, as a manifestation of "lesser diversity [to] greater diversity" (Rogers, 1992, p. 31) in the human field pattern was considered to be an instance of helicy. Rogers' (1970) original work postulated that expanding awareness is an expression of increasing diversity. Her later (1992) writings indicated that the development of new knowledge, ideas, and feelings represent increasing diversity. Increasing awareness expresses greater diversity and, as such, is consistent with helicy. For this study, levels of awareness were assumed to be a continuously changing manifestation of increasing diversity of the human field.

Wakefulness and helicy. Wakefulness as a manifestation of "longer sleeping [to] longer waking [to] beyond waking" (Rogers, 1992, p. 31) field patterning was considered to be a manifestation of helicy. Increasing wakefulness also represents new levels of diversity. Rogers (1992) noted, "sleep/wake continuities are increasingly diverse" (p. 32). She referred to meditative modalities as examples of the beyond waking experience. Watson (1993, 1997) cited Rogers' definition of beyond waking experiences as "complex human field phenomena that occur during periods of waking and sleeping, yet transcend both and involve the perception of pandimensional realities in 'an infinite domain without limit' (Rogers, 1992, p. 31)" (pp. 132-133). In the theory of enlightenment, wakefulness as a manifestation of relative diversity was assumed to change from longer sleeping to longer waking and beyond waking experiences.

Human field motion and resonancy. Human field motion describes the ever-changing pace of human field rhythms. Human field motion as a manifestation of "slower motion [to] faster motion [to] seems continuous" (Rogers, 1992, p. 31) field patterning was considered to be a manifestation of resonancy. Rogers (1980) described accelerating motion as "proceeding in the direction of higher frequency field pattern" (p. 334). Ference (1979, 1986) characterized higher frequency motion as a zest for living or a sense of exuberance, feeling revitalized and at times relaxed. Hindman (1993) defined the motion of the energy field as "an intense absorption and awareness of self without regard to time or space" (p. 20). The theory of enlightenment assumes that personal change is expressed in movement from lower to higher frequency wave patterns.

Well-being and integrality. Well-being was deduced from integrality. According to Rogers (1970), well-being is a manifestation of the life process of the integral human and environmental field. It is a manifestation of the principle of integrality.

Propositions of the Theory as Reflections of the Principles of Homeodynamics as a Single Process

In Rogers' SUHB, the three principles of helicy, resonancy, and integrality represent different aspects of a single process of human unfolding. Similarly, in the theory of enlightenment, awareness, wakefulness, human field motion and well-being represent aspects of enlightenment as one process of human becoming. Therefore, each concept of the theory was proposed to be positively related to the others. All four concepts were proposed to be related such that taken together, awareness, wakefulness, and human field motion were pro-

posed to be more strongly associated with well-being than any one alone.

Awareness and wakefulness. Awareness and wakefulness, as manifestations of relative diversity in the process of unfolding (helicy), were proposed to be positively related to each other. As a person experiences an expansion of awareness he or she also experiences higher levels of arousal and beyond waking experiences.

Awareness, wakefulness, and human field motion. Human field motion was deduced from resonancy by Ference (1979). Therefore, it was proposed that since helicy and resonancy are related as aspects of a single process, then awareness and wakefulness as instances of helicy and human field motion as a manifestation of resonancy are positively related to each other. As the person experiences the expansion of awareness and wakefulness, he or she also experiences the perception of faster motion.

Awareness, wakefulness, and well-being. Well-being was deduced from integrality. It was proposed that since integrality and helicy are related, awareness and wakefulness as manifestations of relative diversity would be positively related to well-being as an instance of helicy. As one experiences increasing awareness and wakefulness in general, he or she also experiences increasing well-being.

Human field motion and well-being. Because resonancy and integrality are related, human field motion as an instance of resonancy and well-being deduced from integrality should be positively related to each other. As one experiences a perception of faster motion he or she also experiences an increase in well-being.

Enlightenment in breast-feeding mothers

Enlightenment represents the process of human unfolding described by Rogers' principles of homeodynamics. Therefore it was proposed that awareness, wakefulness, human field motion, and well-being all change consonantly in the process of human unfolding. As one experiences expanded awareness and wakefulness, he or she also experiences perception of faster motion and an increase in well-being. Breast-feeding mothers who commit themselves to nourishing their infants experience major life changes. The breast-feeding experience becomes one of greater awareness and well-being as the mother infant relationship evolves. Expanding consciousness unfolds in the process. The mother develops an enormous zest for living, and clock time becomes meaningless as she responds unconditionally to her infant's "call."

Propositions

Among mothers who exclusively breast-fed their infants for some duration of time:

1. Awareness is positively related to wakefulness, human field motion, and well-being.
2. Wakefulness is positively related to human field motion and well-being.
3. Human field motion is positively related to well-being.
4. Awareness, wakefulness, and human field motion together explain more variance in well-being than any one alone.

The tools selected to measure the variables consisted of the awareness subscale of Barrett's (1983) Power as Knowing Participation in Change Test [PKPCT: A] for awareness; the energy factor of the Activation-Deactivation Adjective Check List [AD-ACL: E]; Watson's (1993, 1999) Assessment of Dream Experience [ADE]; Altered Experience and Altered State of Awareness dimensions of the Phenomenology of Consciousness Inventory [modified PCI: AE&AA] for wakefulness; the Field Dynamics Index [FDI] for human field motion; and Cantril's Ladder for WellBeing [CLW-B] well-being.

Hypotheses

The hypotheses are stated in terms of

the relationships between the variables (Fawcett & Downs, 1986).

1. Scores on the PKPCT: A will be positively related to scores on the: (a) AD-ACL: E, ADE, and modified PCI: AE & AA; (b) FDI; and (c) CLW-B.

2. Scores on the AD-ACL: E, ADE, and modified PCI: AE &AA will be positively related to scores on the: (a) FDI, and (b) CLW-B.

3. Scores on the FDI will be positively related to scores on the CLW-B.

4. Scores on the PKPCT: A, AD-ACL: E, ADE, modified PCI: AE & AA, taken together, will describe more of the variance in scores on the CLW-B than any one alone.

Literature Review

Awareness and well-being. Morris (1991) reported a significant positive correlation between awareness, as measured by the awareness subscale of Barrett's (1983) Power-As-Knowing-Participation-In-Change-Test [PKPCT], and well-being as measured by Cantril's (1965) Ladder for Well-Being [CLW-B] ($r = .37$, $p < .01$). An adequate sample ($N = 61$) of older adults (ages 61-97) was used to explore perceptions of power and well-being. The relationship of each of the power subscales to well-being was analyzed.

Wakefulness and both awareness and well-being. In this study, wakefulness was defined as the experience of sleep measured as diversity of dreaming; awake measured as levels of arousal; and beyond waking measured as altered state experiences. No studies were found that defined wakefulness in this way. However, support was found for the relationship between dreams and both awareness and well-being (Brown & Donderi, 1986; Wolpin, Marston, Randoloh & Clothier, 1992); altered states and awareness (Pekala & Wegner, 1983); and arousal and well-being (Briones et al., 1996; Ryan & Frederick, 1997). Brown and Donderi's study had limited validity due to inadequate instrument reliabilities with split half reliabilities ranging from .53 to .93 and inter-rater reliabilities ranging from 66% to 100%.

Human field motion and both wakefulness and well-being. Partial support was found for the relationship between human field motion and beyond waking (altered state) and arousal components of wakefulness but not for the sleeping component. Allen (1988) found a positive relationship between human field motion and altered state experiences. Subjects ($n = 8$) who had clearly experienced clairvoyance scored significantly higher on all factors of the Human Field Motion Test [HFMT] than those who had not ($n = 9$). Low internal consistency reliability (.16) for the clairvoyance scale limited validity. Assumptions of the t-test were violated due to small group sizes, however, Hays (1988) noted the t-test is robust to violations of the assumptions, "provided the sample size is not extremely small" (p.303).

The relationship between human field motion and well-being was supported by two studies. Daffron (1988) reported a significant positive correlation between human field motion and health, as measured by the Life Satisfaction Index A, in 65 to 75 year old adults. Sample size was marginally adequate (power = .76). Yarcheski and Mahon (1995) reported a significant positive correlation between human field motion as measured by the Perceived Field Motion Scale and health as measured by the General Health Rating Index. Three samples of early, middle, and late adolescents were used with sample sizes adequate to achieve a power of better than .83. The positive relationships found between human field motion and health (well-being) support the proposed relationship between human field motion and well-being for this study. Well-being was considered a manifestation of health.

All of the above human field motion studies except Yarcheski and Mahon's (1995) study had limited validity due to marginal reliabilities on the human field motion measure. This study of enlightenment used a more recent version of the human field motion instrument, Gueldner's (as cited in Hindman, 1993) Field Dynamics Index [FDI], which has more adequate psychometric properties (see reliability and validity under Instruments heading).

Well-being and wakefulness. Mason (1988) addressed well-being in relationship to arousal. Thayer's (1978) Activation Deactivation Adjective Check List [AD-ACL] was used to measure activation rhythms. Well-being was measured by the General Well-being Questionnaire. The hypothesis that activation rhythms would be positively correlated with well-being was not supported. This may have been due to the low power as a result of inadequate sample size (N = 18). The current study used a large enough sample to achieve a power greater than .80.

Support was found in the literature for five of the proposed relationships. No studies of the relationship between awareness and human field motion, or of the associations among awareness, wakefulness, human field motion and well-being were found.

Method

Design

A descriptive correlational design was used to test the relationships between and among awareness, wakefulness, human field motion and well-being. This design is consistent with Rogers' conceptual model and with the descriptive theory developed for the study because it explores relationships among variables demonstrating patterned mutual change rather than causality (Cowling, 1986; Fawcett & Downs, 1986).

Sample. A random sample of 323 healthy mothers who vaginally delivered healthy infants six months prior to the initial mailing and who had exclusively breast-fed for some period of time (range = .03 to 8.75 months; M = 4.05) was obtained. The data were cleaned for analysis. One subject was dropped due to excessive influence, yielding a final sample of 322 and a power of .99 when calculated for multiple regression (small effect size of .10 and an alpha of .05.)

Subjects were recruited from Certificate of Live Birth records at the Colorado Department of Public Health and Environment. A systematic random sampling technique was used with an initial random start followed by the selection of every fourth case. A modified version of Dillman's (1978) total design method was used for the mail survey. An information sheet served as informed consent and was sent out in the survey packet. Confidentiality was maintained by using codes rather than names on the forms.

The sample obtained can be characterized as middle class, married, Caucasian (86.6%) women with an average of two children. The mean age of the mothers was 30.1 years. African Americans (1.86%) and Hispanics (7.43%) were underrepresented in this sample, based on the ethnic distribution for Colorado in the 1990 Census (*1990 Census of Population*, 1993). The remaining (4.11%) identified themselves as mixed ethnicity, Asian, and American Indians.

Instruments. One instrument was used to measure each of three concepts of the theory. Three instruments were used for wakefulness, one for each of its three components.

Awareness. Perception of awareness was measured by the awareness subscale of Barrett's (1983) PKPCT, a 7-point semantic differential scale composed of 12 bipolar adjectives and one retest item. The PKPCT was designed to measure power as knowing participation in change and awareness was identified as an integral component of power.

No instrument was found that specifically measured awareness as a self-perceived, wholistic, diversifying process, so the awareness subscale was selected. Reported test-retest reliabilities on the awareness subscale ranged from .56 to .84 and Cronbach's alpha from .66 to .88 in samples of adults (Hills, 1998). Subjects older in age and subjects with less than high school education have had the greatest difficulty with the adjectives used on the PKPCT scale which includes the awareness subscale (Barrett, 1983; Hills, 1998). A Cronbach's alpha of .89 and immediate test-retest of .81 on the one retest item were obtained from this study sample on the awareness subscale (Hills, 1998).

Wakefulness. Wakefulness was measured as a combination of Watson's (1993, 1999) Assessment of Dream Experience [ADE], the energy subscale of Thayer's (1978) AD-ACL, and the altered experience and altered state of awareness subscales of Pekala's (1991) Modified Phenomenology of Consciousness Inventory [PCI]. This combination of measures was used in order to measure wakefulness as conceptually defined. The reliability and validity of the new measure was assessed because wakefulness had not been measured in this way before. A Cronbach's alpha of .86 was obtained from this study sample. Principle components factor analysis of the 41 items in the new measure yielded 9 factors accounting for 60.4% of the shared variance and adequate communality with h^2's ranging from .45 to .73 (Hills, 1998; Noruses, 1993). The nine factors imply multiple concepts were being measured.

Human Field Motion. Human Field Motion was measured by Gueldner's FDI (as cited in Hindman, 1993), an 18 item pictorial semantic differential 7-point scale. Internal consistency reliabilities ranged from .87 to .95 in adults (Hindman, 1993). A Cronbach's alpha of .95 was obtained from this study sample (Hills, 1998). Adequate construct ($r = .70$) and criterion referenced ($r = .60$) validity were reported with the Human Field Image Metaphor Scale and Ference's HFMT, respectively (Johnston, 1993).

Well-Being. Perception of well-being was measured by Cantril's CLW-B, a self-defined, single item, 11-point scale. The CLW-B had an estimated construct validity of .7 (Andrews & Withey, 1976).

Data analysis. The first three hypotheses proposed a positive association among the major variables, resulting in six hypothesized relationships. Pearson product moment correlation was used to analyze each association. Significance ($a = .05$) was tested using a one tailed t-test.

The last hypothesis proposed that the measures of awareness, wakefulness and human field motion explained more of the variance in well-being that any one alone. Simultaneous and linear regressions were used for the analysis. Level of significance for difference between the amounts of explained variance was determined with a $\overline{Z}$ test which was selected because it can be used to compare sets of independent variables (Tabachnick & Fidell, 1996).

Findings

The first six hypothesized relationships were supported with significant correlations ($p's < .0001$; See Table 1.). The last hypothesis was partially supported. All of the variables together explained a significantly greater amount of variance in well-being ($R^2 = .22, p < .00001$) than wakefulness alone ($R^2 = .08, \overline{Z} = 3.12$; critical value $\pm$ 1.96). Although all of the variables together were associated with more of the variance than awareness ($R^2 = .16$, $\overline{Z} = 1.21$; critical value $\pm$ 1.96) or human field motion ($R^2 = .19, \overline{Z} = .59$; critical value $\pm$ 1.96) alone, these differences were not significant. That is, both awareness and human field motion each were associated

with as much variance in well-being as were all three (wakefulness, awareness, and human field motion) together, but not so for wakefulness.

Table 1.

Correlation Matrix of the Main Study Variables for the Simultaneous Multiple Regression (above the diagonal; n = 322[a]) and for the Pearson Product Moment Correlation (below the diagonal; N = 323)

Variables	1	2	3	4
1. awareness	--	.27****	.62****	.40****
2. wakefulness	.27****	--	.47****	.28****
3. human field motion	.61****	.46****	--	.44****
4. well-being	.40****	.28****	.41****	--

a. One outlier was removed for the multiple regression analysis.

**** $p < .0001$.

Conclusions and Implications

This is the first study of enlightenment using this combination of variables. Support was found for the relationships between: (a) awareness and each of the concepts: wakefulness, human field motion, and well-being; (b) wakefulness and both human field motion and well-being; and (c) human field motion and well-being. This provides support for conceptualizing enlightenment with this combination of concepts that varied positively together. Support was also provided by the finding that awareness, wakefulness, and human field motion were associated with a significant amount of variance in well-being. Enlightenment as a positive change experience should be associated with well-being. The finding that awareness and human field motion were each associated with as much variance in well-being as all three together suggests the theory of enlightenment needs further development.

Rogers' Conceptual Model

The high levels of significance found among the variables measuring awareness and wakefulness, human field motion, and well-being lend indirect support for the relationships among helicy, resonancy, and integrality. This supports Rogers' principles of homeodynamics as three aspects of a single change process (See Figure 1.). The finding that awareness, wakefulness and human field motion taken together did not have a significantly greater association with well-being than any one variable alone was contrary to what was proposed in the theory of enlightenment. However this finding also supports Rogers' SUHB with the idea of three aspects of a single change process.

The Theory of Enlightenment

Significant positive relationships were found among all measures of the concepts of the theory of enlightenment. The large random sample of a population of breast feeding mothers enhances the credibility of the findings.

Implications

The findings from this study provide implications for practice, research, and education. The theory of enlightenment needs critical consideration and further refinement.

Practice. The study findings offer a way to identify human individuation in clients within the change process. Enlightening experiences are positive change experi-

ences characterized by a personal commitment and compassionate involvement in the reflective process and may include overcoming loss, near death experiences, or survival of devastating experiences.

Research. Further research is needed to verify the theory of enlightenment among persons who have undergone a variety of pivotal life experiences. Testing the theory with a longitudinal design among those who have had a powerful enlightening experience is also needed to capture the change process. In addition, the wakefulness measure needs further modification and development due to the results of the factor analysis, which revealed minimal correlations between the combined subscales and the ADE scale.

Education. The theory of enlightenment can be used by educators in theory courses to demonstrate middle range theory derived from Rogers' model and the derivation process of theory development. Alerting nursing students to the dynamic change potential of pivotal life experiences will enhance their ability to facilitate their future patients' individuation through the change process.

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AN EXPLORATION OF INDIVIDUAL PREFERENCES FOR AUDIO ENHANCEMENT OF THE DYING ENVIRONMENT

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ABSTRACT

Much is known about the experience of dying. However little has been written about the importance of environmental audio enhancement for dying persons. Commonly, an environment that is perceived as being restful, quiet, and respectful is provided for the dying by both family members and caregivers. Often, persons who are dying are able to hear and respond emotionally to sound, but are unable to communicate this fact to others. Sound may be the only sensory stimulation received by the dying person. This exploratory study was undertaken to identify the perceived preferences of a convenience sample of men and women aged 18 - 82 (N = 77) for sounds that they would like to have included in their own hypothetical dying environments. The theoretical framework for the study was the Rogerian Science of Unitary Human Beings. Music Thanatology also provided theoretical guidance. An investigator-designed questionnaire was used to collect the data. Analysis of the data revealed a strong preference for auditory stimulation related to one's spirituality and a strong rejection of an environment characterized by silence. Strong preference for conversations of family and friends was also indicated. Discussion of the findings and implications for future research are included.

Much has been written about the importance of the environment in promotion of healing. However, little is in the literature concerning the potential for prescribed, environmental audio enhancement of the dying experience. Traditionally, the environment of the dying person, particularly in a hospital setting, has been one of whispers and silence. One may be justified in stating that silence is the "default mode" that will be provided in the absence of other stated preferences. However, there is no research base to support the assumption that silence, particularly a preponderance of silence, would be desired by the dying patient. Often the terms *healing environment* and *dying environment* are seen as contradictory. Many families and caregivers provide a subdued environment for the dying that is characterized by stillness, low voices, and silence because they assume that this is the desirable, appropriate environment that is required to provide rest and to show respect for the dying person. Many individuals have tried to exert some control over their own dying through the use of advanced directives; however these documents only address such things as nutrition, technology, and life support. Few, if any, have given any thought to the sounds that they would like to have surrounding them during their dying hours. A belief in the integral, inseparable nature of the human and environmental fields is basic to Rogers' Science of Unitary Human Beings (Rogers, 1992). Thus nurses who practice within this scientific framework recognize the importance of the environment in both the healing and the dying process and understand the desirability of a harmonious mutual process of the human

Key Words Audio enhancement, dying environment, healing environment, field patterning, integrality

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and environmental fields. The purpose of this study was to explore the range of perceived preferences for auditory stimulation that individuals would identify as being desirable for the audio enhancement of their own future dying environments, particularly those in which they were unable to express their own conscious desires due to cognitive incapacity.

Review of the Literature

The need to manage the acoustic environment of the sick and dying was recognized by Nightingale (Pope, 1995). Schroeder-Sheker (1994) described music-thanatology as a therapeutic modality dating back to the 11th century that employs prescriptive (individualized) music therapy to enhance the auditory environment and thus help meet the physical and spiritual needs of the dying. It is well documented that cognitively incapacitated, comatose patients retain their sense of hearing and their ability to interpret and respond emotionally to what is heard (Lawrence, 1995). The sensory modality of hearing has been utilized therapeutically to provide contextual enrichment for comatose patients (Oliver & Hill, 1993). Bartol (1998) reflected upon the individual nature of what she termed a healing environment and suggested that what may be healing to one may be disturbing to another, thus leading to the conclusion that the best healing environment is one that is created in partnership with the patient.

The concept of a healing environment is supported by Rogers' understanding of the unique nature of human and environmental fields and their unique patterns of mutual process (Rogers, 1992). Many Rogerian scholars have made contributions to the body of knowledge concerning the relationship between human and environmental fields and concerning the conceptualization of the unitary experience of dying as a developmental process that involves a continuous mutual process of human and environmental fields. Nursing practice that is conceptually congruent with Rogerian science was proposed by Cowling & Barrett (1990). Cowling described a process of pattern appraisal and deliberate mutual patterning as a means of nursing assessment and intervention. Barrett (1990) identified health patterning as a means of helping clients knowingly participate in change. She described health patterning as a means of helping clients "transform themselves in creative mutual process with their environments" (p 33). Malinski (1994), in a discussion of her application of Rogerian principles in private practice, spoke of the importance of a healing environment, asserting that sound is one of the wave phenomena involved in the environmental patterning process. In her study of the experience of dying, McEvoy (1990) conceptualized dying as a developmental, transitional process during which the human and environmental energy fields are in mutual process and in which the individual can knowingly participate. Rawnsley (1986), in her study of time perception, also conceptualized the dying process as an "irreversible developmental stage of the life process" (p. 81). Madrid (1994) related her practice experience of participating in the process of deliberative mutual patterning as she shared the dying experience with a young client, and in doing so helped her to knowingly participate in her own dying.

Many types of environmental stimulation have been reported in the Rogerian literature. Auditory stimulation within the environmental field was addressed by Horvath (1994), who suggested that music may be viewed as a metaphor for the dynamic process of unitary patterning. Talley (1994) reported in a reflective poem her observation of a family member's apparent response to loving, reminiscent conversation in the period preceding his death. Butcher (1990) described the use of pleasant guided

imagery as energy that was generated within the environmental field that resulted in pleasant visualizations within the human energy field, and he stated that this description supported the conceptualization of human and environmental fields being integral to one another.

Theoretical Framework

The theoretical framework for this study was Rogers' Science of Unitary Human Beings. Rogers (1994) described human beings as pandimensional energy fields who are integral with and in constant mutual process with their environmental energy fields which are identified by pattern. Rogers' principle of integrality, or continuous, mutual human and environmental field process, defines this relationship (Rogers (1992). The principle of helicy describes the continuous, innovative, unpredictable nature of human and environmental field patterns (Rogers, 1992). It is these two principles that provide the foundation for this study. Within this study, *audio enhancement* is defined as a deliberate process of environmental patterning in which an individual knowingly participates in choosing a preferred auditory environment in which to spend his or her dying hours. *Dying* is conceptualized as a unitary developmental experience.

According to McEvoy (1990), Rogers "conceptualized the *dying process* as a developmental phase of the life process characterized by a transformation of the human-environmental field pattern of complexity and diversity." (p.213)

In addition to the assumptions inherent in the Science of Unitary Human Beings, additional theoretical assumptions were drawn from music-thanatology (Schroeder-Sheker, 1994). Music-thanatology is a palliative modality that employs the use of individualized music therapy to enhance the healing environment of the dying. The prescriptive nature of the music is based upon the belief that each individual death experience is unique in time, content, and context. The following assumptions are drawn from those that undergird music-thanatology: 1) there can be healing without curing; 2) death is not always an enemy; 3) the way in which a person dies is as important as the way in which he or she lived; 4) death is a very personal process; and 5) each person receives audio enhancement differently and on a variety of physical, emotional, mental, and/or spiritual levels.These assumptions are consistent with those of the Science of Unitary Human Beings; therefore they helped provide the theoretical framework for this study.

Method

This exploratory study sought to identify the perceived preferences of individuals for a variety of external auditory stimuli in a hypothetical dying environment in which they were unable to communicate their preferences to others. Participants were asked to imagine themselves in this context after being informed of the scientific belief that, even when one is unconscious and unable to respond, one can still hear, interpret, and respond to sound. After receiving this information, they were asked to complete a short paper and pencil questionnaire.

Sample

The convenience sample consisted of 77 apparently healthy individuals ranging in age from 18 - 82. The participants were predominantly female (57), Caucasian (53), protestant (54), and adhering to a belief in an afterlife (56). Most had at least a high school education or higher. Income was fairly evenly spread between less than $10,000 to over $65,000 yearly income. The sample was drawn from a variety of civic and church groups. Each participant signed an informed consent form that had been approved, as had the study, by an institutional review board.

Data Collection

Data were collected using an investigator-designed questionnaire. Instructions at the beginning of the questionnaire read as follows:

> It is generally believed that our sense of hearing is the last sense that we lose. Even unconscious persons retain this sense of hearing and respond emotionally to what they hear. In this questionnaire, you are asked to imagine yourself during the last days of your life. Thoughtfully consider what you would like to hear, or would find comforting, during this final time in your life. Some suggestions are offered below for your consider ation. Feel free to add other ideas of your own. (Johnston,Baril,& Pearsall, 1999, p.1.)

The questionnaire offered six categories of auditory stimulation: 1) music; 2) television or radio; 3) reading aloud; 4) conversation; 5) spiritual enrichment; and 6) silence. Each category was subdivided into more specific choices which are discussed in more depth in the following section. A Likert scale with responses including a) *would not like;* b) *probably not like*; c) *not sure*; d) *might like*; and e) *would definitely like* was used. A section at the end of the questionnaire was provided in which the participant was invited to add any further comments.

This qualitative input was solicited as a means of adding to the richness of the data.

Data Analysis

To facilitate discussion, and because the items were not going to be submitted to a rigorous statistical analysis, the responses to the questionnaire were reduced to two categories, *like* and *dislike*. These categories were formed through the combination of *would not like* and *probably would not like* to form the *dislike* category and *would definitely like* and *might like* to form the *like* category. Percentages were used to provide a framework of reference for the raw numbers, but since rounding was used for clarity and simplicity of reading, the percentages do not total exactly 100% as would be expected in a more precise statistical analysis. In addition, since individual participants had the option of not responding to any of the choices, the percentages provided are reflective of the number who indicated a choice for each option rather than of the total sample. For these reasons, the responses to each category are reported as both number of responses and percentage of those responding.

While many choices revealed clear majorities, the responses ranged widely. A strong preference for spiritual enrichment was seen, with 66 persons (86%) choosing hymns, 38 persons (49%) choosing religious radio and television shows, 44 persons (57%) desiring reading aloud of sacred literature, and 69 persons (89.6%) requesting prayers and encouragement from ministers and priests. Although, at the present time, silence seems to be the most common auditory environment selected by nurses and families to surround the dying patient, it was significant to note that 50 persons (64.9%) of those surveyed indicated that they would not like this option all of the time, whereas 48 persons (62%) would like to be in silence part of the time.

In addition to a preference for spiritual enrichment, respondents indicated a strong preference for the presence of family and friends in their dying environments. Seventy-eight persons (91%) indicated that they would like to have the conversations of family and friends surrounding them in their last hours, and 57 persons in this group (74%) would like for the conversations to include sharing of feelings. Thirty-eight of the respondents (49 %) indicated that they would like to hear their families and friends

discussing plans for the future, and 30 persons (40%) indicated their desire to hear discussions of current events. Thirty-four persons (44%) indicated that they would like to have unresolved conflict addressed through some form of conflict resolution, although the nature of the conflict (one involving themselves or conflicts between others) was not assessed.

While this sample indicated a strong preference for religious radio and television programming, only one other type of programming was indicated. Thirty-four persons (44%) thought that they would enjoy hearing television movies; however news programs, game shows, and situation comedies were not selected. Thirty-four persons (44%) thought that they would like to hear someone reading a novel aloud, and 25 persons (32%) thought that they would like to hear someone reading from magazines and journals.

While qualitative responses were not actively solicited other than a section labeled *comments*, the reflections provided by many of the respondents provided an expanded and enriched source of data. One respondent stated, "I would like to hear the sounds of nature...falling rain, running water, birds singing." Several others wished to hear the sounds of children and grandchildren. "I'd like to hear my children's and grandchildren's voices," and "I'd like to hear the happy sound of children playing" were among the preferences stated. Another poignantly responded, "I'd like visits from children. You can see that life goes on and you won't be forgotten." Another reflected upon the pleasure of being surrounded by family stating "I have always thought that it would be comforting to hear stories of those who have gone before me." Another reflected the general preference for spiritual enrichment in her comment "I'd like to hear hymns, even when others are present, just playing in the background. At least part of the time." One verbal comment that was not actively solicited, but which nevertheless was enlightening, came from spouses of several participants who had shared their responses with their partners. Each of these persons expressed surprise at their spouse's choices, stating "I never would have thought about you wanting that!"

Humor was evident in several of the responses, even while reflecting upon what most people consider a very serious topic. One respondent emphatically stated, "No tears allowed! Jokes welcomed!" Another whimsically pled, "Don't do and say things that you *know* I would want to respond to or my frustration will overwhelm me!" Another gave a somewhat tongue-in-cheek response asking "If you are supposed to be unconscious, how are you supposed to be carrying on a conversation, anyway?"

Discussion

The results of this study indicated that individual perceived preferences for the types of auditory stimulation that would be desired in a dying situation varied widely. Although preferences related to spirituality were the predominant choices made by the participants, all of the choices were desired by at least some individuals. This wide variety of preferences is consistent with the philosophical stance of the Science of Unitary Human Beings as it underscores the uniqueness of every human/environmental field. Also of interest was the fact that very few participants indicated a preference for dying in total silence, although this is commonly the environment that nurses and families provide for the dying patient. While most participants rejected the idea of being surrounded by total silence, many acknowledged that intervals of silence interspersed with auditory stimulation would be desirable. Also noteworthy was the desire of the majority of participants to be surrounded by the voices of friends and family. The wide variety of auditory choices selected, coupled

with the fact that several spouses were unaware of the preferences of their loved ones, emphasizes the need for each individual to be actively engaged in making his or her preferences known to those family members, friends, and health care providers who will be involved in the creation and maintenance of their dying environments.

Anecdotal evidence supplied by the participants and, in some cases, by their spouses, indicated that most persons had never thought about this topic; most were very interested in having the chance to express their choices; most desired a copy of the questionnaire to put with their important papers; and many spouses were very surprised at the choices made by their loved ones. Many also expressed gratitude for the opportunity to have this type of thoughtful conversation with loved ones, and expressed relief that they now felt that they had some control over their own future dying environments.

Implications for Practice

Rogers' vision of nursing was one of an "independent, health-promoting, noninvasive, energy-based therapeutic system" (Rogers, 1994, p. xvii). Nurses are closely involved with dying patients and their families on a regular basis. They are uniquely positioned to have meaningful interactions with people during one of the most intensely personal, complex periods of their lives, their dying experiences. Nurses have significant influence over the structure and quality of the environments in which people die. Building on the knowledge reported in this study, nurses can educate patients and their families concerning a) the types of choices to be made concerning their future dying environments; b) the importance of thoughtful reflection as to their own individual preferences for audio enhancement of their personal dying environments; and c) the need to communicate those preferences to their loved ones well in advance of the time when such information may be necessary. When the nurse encounters situations in which the patient is dying and unable to communicate his or her wishes, the nurse can use this knowledge to help the family create and maintain an enriched audio environment of the family's choosing. A few moments helping the family reflect upon who their loved one was, and what his or her interests, values, and beliefs were can help guide them through the process of defining the type of enrichment to provide. Sharing this information with patients and families can increase the number of persons who are able to spend their final hours surrounded by an enriched environment of their own or their family's choosing, rather than dying in an environment characterized by silence. The nurse's influence in this manner allows each client and family to knowingly participate in the patterning of his or her own unique environmental field, thus providing a harmony and balance of human and environmental fields throughout the dying experience.

Suggestions for Further Research

This small, exploratory study lays the groundwork for further research concerning the environments in which persons may die. It raises questions concerning the congruence between the generally perceived appropriate dying environment of silence and minimum stimulation and the preferences expressed by participants in this study. Further research is needed to identify any barriers that may exist that would prevent individuals and their families from sharing this type of information with each other, or barriers that may prevent nurses from raising these questions with clients and families. Comparisons of the choices of individuals with the choices that their spouses or other loved ones would indicate for them would be helpful in determining the accuracy of one person's understanding of another's preferences. Comparisons of

patient choices for audio enhancement with choices made by nurses and other caregivers would also be relevant research for nursing. Research is also needed in the area of nursing education to determine the manner in which nursing students are being prepared (or not prepared) to assist clients and families to participate in the patterning of their dying environments. An exploration of the impact of cultural and religious influences upon the expressed preferences for the nature of one's dying environment would also be helpful in today's diverse society.

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RELATION OF MAGNETIC FIELD THERAPY TO PAIN AND POWER OVER TIME IN PERSONS WITH CHRONIC PRIMARY HEADACHE: A PILOT STUDY

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ABSTRACT

This researcher used Rogers' Science of Unitary Human Beings (1992) to study changes in pain and power over five points in time in 19 persons with chronic primary headache who were randomized to the magnet, placebo and standard groups. Magnetic field therapy was administered through a headband using permanent magnets. Pain was measured using the Visual Analogue Scale (VAS) (Chapman et al., 1985), and power was measured using the Power as Knowing Participation in Change Test, Version II (PKPCT, VII) (Barrett, 1990). A statistically significant effect of time on pain was found [$F(4, 64) = 5.65$, $p = .001$] indicating an overall decrease in headache in all three groups without any significant differences among the three groups. In addition, the amount of analgesics used for headache decreased 6.7% for the total sample at the end of the study. The change in power was not statistically significant among the three groups. All three groups had a similar high level of power throughout the study. Replication of the present study with two groups (magnet and placebo) in a larger sample size is recommended for future research. Through the unitary nature of human and environmental field patterning process, nurses can facilitate clients to mobilize their potentials for well-being.

The goal of nursing is to promote health and well-being for all human beings (Rogers, 1990). Magnetic field therapy is a noninvasive health promoting modality which has been used since ancient times. The history of magnetic fields used for healing dates as far back as 100,000 years, as suggested by evidence in African bloodstone mines where lodestones (natural magnets) were ground up and used in potions and topical applications for healing (Washnis & Hricak, 1993). Magnetic field therapy uses magnetic energy that is produced by the motion of electrical and electronic charge (Hewitt, 1989; Whitaker & Adderly, 1998). Thus, the idea of movement or motion inherent in magnetic energy suggests the potential of magnetic fields to facilitate change toward health through the mutual process of people and their environments.

Key words Science of Unitary Human Beings, magnetic field therapy, pain, power
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Health promotion entails relieving pain (Gropper, 1992), since pain is associated with decreased sense of well-being. Headache is one of the most common types of pain people experience on a daily basis, with a lifetime prevalence of over 90% (Rasmussen, 1995). Migraine and tension headache are considered to be the two most serious primary headaches, due to their effect on high utilization of medical services and work ineffectiveness (Schwartz, Stewart & Lipton, 1997; Silberstein & Lipton, 1996). According to P. D. Wall (1979), the purpose of pain is to promote healing. From a Rogerian perspective, pain can be understood as participation in the patterning process, as persons with pain engage in activities toward relieving their pain.

Derived from Rogers' (1970) postulate of knowing participation, Barrett (1983) identified power as one way that humans participate in patterning their potentials toward well-being. Barrett defined knowing participation as "being aware of what one is choosing to do, feeling free to do it, and doing it intentionally" (Barrett, 1986, p. 175). As individuals with primary headache seek various modalities to relieve their headache pain, they participate knowingly in patterning their human and environmental fields in different ways. Since the experiences of pain and power are different manifestations of well-being, which evolve through an individual's mutual process with the environment, the individual's choice of strategies to change pain and power must take into account different environmental factors such as magnetic field therapy. Therefore, the purpose of this study was to explore pain and power over time among persons with chronic primary headache who were randomized to participate in magnetic field therapy, placebo therapy or standard therapy.

Theoretical Rationale

Martha E. Rogers' Science of Unitary Human Beings (1970, 1992) provided a theoretical basis for this study for understanding the relations of human beings and their environment through a nursing intervention to promote health and well-being. The principles of resonancy, helicy and integrality characterize the nature and process of change which is continuous, innovative, diverse and unpredictable (Rogers, 1990). Human beings and their environment as energy fields are dynamic, irreducible wholes in a constant mutual process. Manifestations of this mutual human-environmental field process, known also as field patterning, denote the nature of change and can be observed. According to Rogers (1970), the focus of nursing intervention should be in assisting individuals to mobilize their resources so that potentials can be maximized. This study explored the potential of magnetic field therapy as a nursing intervention, a manifestation of the environmental energy field, within the context of this human-environment patterning process. This study explored the relation between pain and power, manifestations of human energy field pattern, and magnetic field therapy, a manifestation of environmental energy field pattern.

Davis and Rawls'(1974) theory of magnetic fields provided the rationale for the magnetic field therapy. Their theory of magnetic fields encompasses four characteristics which are different from the conventional theory of magnetic fields: (1) magnetic fields flow in a broken eight (8) figure fashion from one pole to the other rather than flowing in a semi-circle fashion; (2) the vortex of magnetic fields travels in both directions, south pole to the north pole and vice versa instead of travelling from the south pole to the north pole; (3) the flow of the magnetic fields of each pole is opposite rather than the same directional flow; and (4) the north and south pole magnetic fields are two separate energies which have different functions rather than being the same. Four concepts of motion, order, change and unity can be derived from this theory of magnetism. As electrons in a magnet spin, they create motion. There is an order as each magnetic pole aligns its motion in the same direction. As each magnetic pole alters its direction of flow at the center of the magnet, there is change. The unity of the magnetic field is manifested by the existence of two pole energies at the same time.

Related Literature

Magnetic Field Therapy. Magnetic field therapy uses magnetic fields to promote health. A magnetic field is described as "the space around a magnet" (Montgomery, Frankel, & Schwartz, 1985). Each human

being is considered to be a magnet as evidenced by diagnostic tests such as magnetic resonance imaging (MRI) (Slater, 1995) or magnetoencephalography (MEG) (Cohen, 1972). The source of magnetic fields can be either electromagnet or permanent magnet (magnet is called permanent magnet since the field strength of a magnet generally lasts for a long time). In the following studies of magnetic field therapy, use of permanent magnets is reviewed. Liu, Chen, Hou, Wang and Wang (1991) investigated the effect of magnetic fields on nausea and vomiting in 206 patients with cancer during chemotherapy administration with cisplatin. Patients were divided into 3 groups: magnetotherapy (n = 161), nonmagnetotherapy (n = 23) and point compression group (n = 22). A flat magnetic disc 5mm thick and 20mm in diameter with surface strength of 60mTesla was applied by a band to the wrist that was not receiving infusion, with the negative pole of the magnet exactly on Neiguan point, an acupuncture meridian in the wrist, for an average duration of 6 to 8 hours. Statistically significant group differences were found with an effectiveness rate of 89.4% in magnetotherapy group.

Kim and Lee (1994) studied the relation between magnetic field therapy and pain in 23 individuals with primary dysmenorrhea who were randomly assigned to either a magnetic group (n = 11) or to a placebo group (n = 12). The treatment group used magnets of 800 to 1200 gauss strength, 3mm thick and 22mm in diameter with a 6mm central hole. Percentages of pain relief in the magnetic group and placebo group were 91% and 42%, respectively immediately after applying the magnets for 3 hours, and 82% and 58%, respectively, at 3 hours after removing the magnets. These differences were statistically significant (p < .05). Vallbona, Hazlewood, and Jurida (1997) performed a double-blind clinical trial to study the response of pain to permanent magnetic fields in 50 patients with postpolio syndrome who were randomized either to active magnetic devices (n = 29) or inactive devices (n = 21). The magnetic devices used were bipolar (North/South) flexible magnets in different sizes with surface strength of 300 to 500 gauss. These investigators found a significant and prompt relief of pain after applying the magnets for 45 minutes.

Weintraub (1999) compared the effectiveness of magnetic therapy in 19 patients with diabetic peripheral neuropathy (DPN) (n = 10) to other patients with neuropathy (N-DPN) (n= 9) over four months using double-crossover design. A bipolar magnetic footpad insole of 475 gauss strength was used as an active device. Patients were instructed to wear foot insoles for 24 hours a day (awake and sleep). Of the 10 DPN patients, 90% displayed statistically significant reductions and/or resolutions of neuropathic pain and burning compared to the 9 N-DPN patients (33%) at the end of four months (p < .05), indicating a higher sensitivity of patients with diabetic neuropathic pain to magnet therapy. Collacott, Zimmerman, White ,and Rindone (2000) used a randomized, double blind, crossover design to compare changes in pain in 20 patients with chronic low back pain. Active device consisted of a bipolar flexible magnet, trapezoid in shape (19 x 11.5 x 14 cm) and 2mm thick, with surface strength of 300 gauss. Patients applied the device 6 hours per day, 3 days per week for 2 weeks using an abdominal binder. No statistical differences were found in mean VAS scores between real and placebo magnets or change in VAS scores from baseline to post treatment. This empirical literature on magnetic field therapy and its relation to healing is not consistent. Generalizations cannot be made from one study to another given the diverse nature of these studies.

Pain. Since no study was found which examined permanent magnets for the relief of primary headache, studies of Transcutaneous Electrical Nerve Stimulation (TENS), a form of electromagnetic field therapy (Mobily, Herr & Nicholson, 1994), and primary headache pain were reviewed. Solomon and Guglielmo (1985) investigated the efficacy of TENS in 58 patients with primary headache who were randomized into one of three modalities: TENS just above the patient's ability to perceive the stimuli (perceived TENS) ($n = 18$), TENS just below the perception threshold (subliminal TENS) ($n = 18$) and electrodes applied without electrical stimulation (placebo) ($n = 22$). TENS or placebo was applied for 15 minutes during the headache experience. A significant lessening of the pain in the perceived TENS group (55% improvement) compared to the placebo group (18% improvement) ($p < .05$) was found. Farina and colleagues (1986) evaluated the efficacy of TENS in 60 patients with headache. Treatment was administered in daily sessions of 30 to 60 minutes each for 10 days. Headache improvement of greater than 60% was obtained in 70-80% of all patients. Reich (1989) studied the long-term effects of TENS in 703 patients with chronic primary headache who were randomly assigned to one of four treatment groups: Relaxation group ($n = 173$), Electrical (TENS) group ($n = 161$), Biofeedback group ($n = 178$) and Multi-modal (a combination of these treatments) group ($n = 191$). Patients in the Electric group were administered the TENS or microelectrical therapy (MET) prophylactically once daily for 30 minutes. The degree of pain was lower for all groups at the completion of 15 sessions, and this pattern persisted to 36 months post treatment. These studies indicate a tentative, yet positive relation between magnetic field therapy and relief of both migraine and tension headache pain.

Power. No studies to date have examined the relation between magnetic field therapy and power. Since a magnetic field is characterized by motion, studies of motion and power are examined. In her study of 625 adults, Barrett (1983) demonstrated the relation between human field motion and power. Barrett described the flow of human field motion as an indicator of the process of human field pattern change and power as an indicator of a change in participation. In her study of human field motion and power in persons with ($n = 113$) and without ($n = 113$) chronic pain, Matas (1997) found a significant positive correlation between human field motion and power within the chronic pain group ($r = .71$, $p < .001$) as well as within the group without chronic pain ($r = .78$, $p < .001$). Individuals with chronic pain demonstrated significantly lower scores of power and motion as measured by Barrett's PKPCT, Version II, suggesting a negative relation between power, motion, and pain.

Since magnetic field therapy is a form of alternative therapy, studies in which the relation between alternative therapies and power were explored are examined. Wynd (1989) investigated differences in smoking behavior in 84 adult smokers who participated in one of three treatment conditions: power imagery ($n = 28$), relaxation imagery ($n = 29$), and waitlist no-treatment control ($n = 27$) by attending weekly, 90-minute stop-smoking sessions for six weeks during the study. Power was measured by Barrett's PKPCT, Version I pre- and post-treatment. Wynd (1989) found both power and relaxation imagery treatments were equally effective in lowering smoking rates at the completion of all six sessions. Schneider (1995) interviewed three women who used different alternative therapies and experienced healing from their medical conditions (uterine fibroids, back pain and Hashimoto's hypothyroidism). Schneider identified the

central concept in the healing process as "focusing awareness" (p. 35) and concluded that Barrett's power theory explained this process most closely. L. M. Wall (1999) investigated the relation of a preoperative exercise program to hope and power among 97 lung cancer patients who were randomized either to exercise group (n = 49) or no exercise group (n = 48) over 12 to 18 days. Power was measured by the Power as Knowing Participation in Change Test, Version II over three points in time. L. M. Wall found statistically significant increases in power over time for the exercise group as compared to those in the no exercise group.

In summary, the literature supports tentative relations of magnetic field therapy to primary headache pain and power. While electromagnetic field therapy has been studied in both migraine and tension headaches (Farina et al., 1986; Reich, 1989; Solomon & Guglielmo, 1985), no study has investigated magnetic field therapy using permanent magnets. Permanent magnets are safe and easy to use. In addition, their portability allows complete freedom for the individual's choice of time and place to use. Considering these advantages of permanent magnets and their potential for health promotion, a study is warranted.

Research Questions

1. Does pain change over time in adults with chronic primary headache who participate in a magnetic field therapy compared to a placebo therapy and a standard therapy?

2. Does power change over time in adults with chronic primary headache who participate in a magnetic field therapy compared to a placebo therapy and a standard therapy?

Methods

Sample. Twenty-six adult volunteers were recruited from outpatient clinics of a large medical center and from the general population in New York City. Eligibility criteria included: (1) at least 18 years old with chronic primary headache; (2) not engaged in any other formal treatment program for headache relief during the study period; (3) no use of narcotic analgesics for pain relief during the previous year and during the study; (4) no pacemakers, defibrillators or any other metal prosthesis in the body; (5) if women, not pregnant or not planning to become pregnant during the study; (6) at least a high school education; and (7) fluent in reading and speaking of the English language.

Research Design. A randomized, double blind design was used. Participants were randomized to one of three groups, magnet, placebo, or standard, by the project director using random numbers generated by a table of random numbers. If participants were randomized either to magnet or placebo group, appropriate headbands and instructions as to how to use the headbands were given to the participant by the project director. Participants and the researcher were kept blind as to the group assignment of participants during the study. Pain and power at five points in time were evaluated by repeated measure ANOVA design. Data were analyzed using the Statistical Package for the Social Sciences, Version 6.1.2 for Windows (SPSS) (1995).

Instruments.

Magnetic Headband. A specially designed headband was used for an external application of magnetic fields for headache. The headband contained two 3950 interior gauss strength (equivalent of surface strength of approximately 850 to 1100 gauss), 1.5 by 3/8th inch thick with ¼ pound weight of ceramic magnetic discs (Enviro-Tech) in the bitemporal area with the negative pole facing the individual's head. Individuals randomized either to the magnet or placebo group were instructed to wear the headband for 30 minutes daily for four weeks at a regular time. The principal factors limiting exposure to static magnetic

fields are the presence of metallic or electrical inclusions or implants in the person's body (Athey, 1992; Shellock & Kanal, 1994; Stark, 1992; Tranter, 1995). Magnetic fields are potentially dangerous in the presence of such objects because of the possibility of displacement or reorientation of such objects, leading to injury. As described in the participant selection criteria in the study, individuals with these implants in their body were excluded from the sample.

Visual Analogue Scale (VAS). Pain was measured by the Visual Analogue Scale (VAS) (Chapman, Casey, Dubner, Foley, Gracely & Reading, 1985). All participants rated the intensity of their headache on a 100mm horizontal VAS at each point in time (T1, T2, T3, T4 and T5). The VAS scores obtained by participant's summary ratings for the past two weeks were used for data analyses. For construct validity, correlations between the horizontal VAS and a verbal descriptor scale have been .78 (Downie et al., 1978), .79 (Meehan, 1985), .80 (Wallenstein et al., 1980), .81 (Ohnhaus & Adler, 1975) and .82 (Wallenstein et al., 1980). A high correlation of .91 was found between the horizontal VAS and the numerical rating scale (Downie et al., 1978) as well. Reliability of the VAS also revealed a high correlation when the scale was administered by the same observer (r = .76) and when administered by two different observers (r = .86) (Haslock & Yung, 1976). A significant correlation (r = .60) was found between the change in pain scores using the VAS and the change scores using the simple descriptive scale after six months of treatment (Scott & Huskisson, 1976).

Power as Knowing Participation in Change Test, Version II (PKPCT, VII). Power was measured by the Power as Knowing Participation in Change Test, Version II (PKPCT, VII) (Barrett, 1990) at each point in time (T1, T2, T3, T4 and T5). The PKPCT, VII is a 52-item semantic differential test that measures the individual's capacity to participate knowingly in change. The instrument contains four dimensions each consisting of 12 pairs of bipolar adjectives that measure the four concepts of "awareness," "choices," "freedom to act intentionally," and "involvement in creating changes." One bipolar pair appears twice for each concept constituting retest reliability items. Each scale of the PKPCT has a value of 1 to 7 in the direction of lower to higher power with 4 representing a neutral response. The range of scores for the total instrument is 48 to 336, with higher scores indicating greater power. Recently, the instructions of the PKPCT were evaluated to increase clarity and a new set of instructions was developed (Barrett, Farren, Kim, Larkin & Mahoney, 1998). The current study used the new set of instructions.

Content validity was initially established by conducting two judges' studies. Following their suggestions, a pilot study (N = 267) was conducted using a voluntary national sample with a minimal educational level of high school. Construct validity of the scales was established by the loadings of the scales on factors that supported Barrett's conceptualizations (Barrett, 1983). Following the pilot study, scales that loaded on more or less than one factor were eliminated. Coefficients of stability on the retest items ranged from .57 to .90. Construct validity of the scales was again supported by factor analysis in a national validation study (N = 625) (Barrett, 1990). Barrett reported factor loadings as validity coefficients of .56 to .70 for the validation study. In both studies, one factor with an eigenvalue greater than 1.0 emerged, accounting for 43% of the variance in the pilot study and 48% of the variance in the validation study. Reliability data for the PKPCT, Version II indicate high internal homogeneity. Cronbach's alpha coefficients reported for the total 48-item PKPCT for Version II have

been .94 (Matas, 1997; Rizzo, 1990), .95 (Caroselli-Dervan, 1991), .96 (Mahoney, 1998) and .97 (Smith, 1992; L. M. Wall, 1999). In this study, the internal consistency of the PKPCT, VII was high for the total measure at all five times (.91 at T1; .97 at T2; .97 at T3; .98 at T4 and .99 at T5).

Analgesic Medication Use.In order to determine the role of analgesics used for headache pain relief, participants were asked to record their analgesic medication intake for their headache in their daily logs throughout the study period. Since participants were excluded from sample selection and throughout the study period, who used narcotic analgesics, non-narcotic analgesic doses were calculated equivalent to 1,000mg of acetaminophen taken in the last two weeks. In clinical trials where various analgesics used by patients with primary headache have been compared, aspirin 650mg was found to be comparable to ibuprofen 400mg (Diamond, 1983; Schachtel, Furey & Thoden, 1996), acetaminophen 1,000mg (Peters, Fraim & Masel, 1983; Schachtel, Thoden, Konerman, Brown & Chaing, 1991), and naproxen 550mg (Lange & Lentz, 1995; Miller, Talbot, Simpton & Korey, 1987).

Data Collection Procedures . The research protocol was approved by the Committee for Protection of Human Subjects at

Table 1.

Time Line of Study Procedures

WEEK NUMBER	0	1	2	3	4	5	6	7	8
VISIT NUMBER	1	2					3		4
TELEPHONE CALL NUMBER	1			2	3	4		5	
Completion of Screening Questionnaire	X								
Explanation of Study & Consent	X								
Medical/Neurological H & P	X								X
Pregnancy/Menstrual History	X		X		X				X
Explanation of the Daily Log	X								
Completion of VAS	X		X		X		X		X
Completion of PKPCT	X		X		X		X		X
Completion of Headache Questionnaire	X								
Completion of Demographic Questionnaire	X								
Review of Daily Log Completion		X	X	X	X	X	X	X	
Collection of Completed Daily Log and Review			X				X		X
Randomization of the Participant			X						
Instruction on Wearing the Headband			X						
Intervention				X	X	X	X		
Review Instructions on Wearing the Headband				X	X	X			
Collection of the Headband							X		

the participating hospital. Timeline for the data collection procedures during the 8-week study period which included a 2-week pre- and post-intervention and a 4-week intervention period is shown in Table 1. At study entry (T1) written consent was obtained. Medical and neurological histories and examinations were performed by an attending neurologist. Participants completed the VAS, PKPCT and Demographic information. During the second visit (T2), after completion of the VAS and PKPCT, participants were randomized to one of three groups by the project director. During the third visit (T4) participants completed the VAS and PKPCT. Headbands were collected by the project director. Finally, during the last visit (T6), participants completed the VAS and PKPCT. The project director performed a neurological examination and discussed with the participants other available treatments for chronic headache. At each visit the daily log for the previous weeks were reviewed and collected. The researcher made weekly telephone calls to participants to discuss any concerns. Data were collected from August 1997 to February 1999.

Results

Description of the Sample. Of the 26 participants who entered the study, 19 participants completed the study, 6 in the magnet group, 8 in the placebo group and 5 in the standard group. A chi-square analysis of group assignment revealed no statistically significant differences among the magnet group, placebo group, and standard group in age, gender, ethnicity, marital status, educational and employment status. Ages of the participants ranged from 21 to 71 years with a median age of 44 years. The majority (92.3%) of participants' age ranged from 21 to 59. The female (84.6%) to male (15.4%) ratio was 5.5 to 1, which is much higher than the 2:1 (Pryse-Phillips et al., 1992; Wong et al., 1995) to 3:1 (Rasmussen, 1995; Rasmussen et al., 1991) ratio found in general population studies for both tension and migraine headaches. More than half of the participants were caucasians (57.7%) and half (50%) were single. All participants had a minimum of a high school diploma (or equivalent), and 46.2% held a baccalaureate degree or higher. The majority of the participants (84.6%) were employed, either full time (57.7%) or part time (26.9%). Participants held a variety of occupations ranging from student, clerical, nanny, home health aide, managerial, business owner to professional categories.

For headache characteristics, the largest number of the participants (42.3%) had a mixed type of migraine and tension headache, followed by tension headache (30.8%) and migraine (26.9%). A chi-square analysis of headache type revealed no statistically significant difference among the magnet, placebo and standard groups. Duration of headache history ranged from seven months to 57 years with a mean of 15.4 years. More than half of participants (53.8%) experienced their headache three to six times a week with each episode lasting about four hours. Participants described their headaches as pulsating or throbbing (30.8%), pressing or tightening (26.9%), throbbing and pressing (19.2%), and of very painful intensity (61.5%). More than two thirds (69.2%) of the participants stated their headache was related to stress, corroborating other research findings (Ficek & Wittrock, 1995; Rasmussen, 1993; Scharff et al., 1995).

Main Analysis.

Research Question One: Does pain change over time in adults with chronic primary headache who participate in a magnetic field therapy compared to a placebo therapy and a standard therapy?

As seen in Table 2, a repeated measure

ANOVA revealed a statistically significant effect of time on pain [F (4, 64) = 5.65, p = .001]. The degree of time effect size was moderate (f = .26), reflecting 26% variance accounted for pain as it related to participating in the study. There was no significant difference between treatment groups nor was there a significant interaction effect. The pattern of change for the magnet, placebo and standard groups is demonstrated in Figure 1. To determine the magnitude of change in headache pain over time in the magnet, placebo and standard groups, the mean differences were computed using the mean VAS scores. The findings indicate all three groups' VAS scores decreased at the completion of the study. Participants in the magnet group experienced the highest improvement in their headache (60.2%) followed by the placebo group (47.9%) and the standard group (31.2%).

Table 2.

Summary of Analysis of Variance for the Magnet Group, the Placebo Group and the Standard Group with Repeated Measures on Pain
(N = 19)

Source	SS	df	MS	F	p	f
Between-Subjects						
Treatment	3,018.38	2	1,509.19	1.92	.179	.193
Error	12,595.96	16	787.25			
Within-Subjects						
Time	8,200.69	4	2,050.17	5.65	.001	.261
Time*Treatment	1,022.10	8	127.76	.35	.941	.042
Error	23,229.36	64	362.96			

Table 3.

Summary of Analysis of Variance for the Magnet Group, the Placebo Group and the Standard Group with Repeated Measures on Power
(N = 19)

Source	SS	df	MS	F	p	f
Between-Subjects						
Treatment	38,741.25	2	19,370.63	2.90	.084	.266
Error	106,801.51	16	6,675.09			
Within-Subjects						
Time	2,442.91	4	610.73	1.49	.214	.085
Time*Treatment	1,583.18	8	197.90	.48	.863	.057
Error	26,155.74	64	408.68			

Research Question Two: Does power change over time in adults with chronic primary headache who participate in a magnetic field therapy compared to a placebo therapy and a standard therapy?

A repeated measure ANOVA revealed no statistically significant effect of therapy condition, time or interaction effect of therapy condition and time on power. The results of this analysis are shown in Table 3. As seen in figure 2, the mean power scores for all three groups were high at each of the five time points, indicating participants' knowing participation in change throughout the study period.

From T2 to T5, the amount of analgesics used for headache decreased 6.7% for the total sample. A more specific analysis revealed a decrease in analgesic use in the magnet (36.1%) and standard (26%) groups, but an increase (9.6%) in the placebo group. Multivariate ANOVA revealed no significant differences among the magnet, placebo, and standard groups in terms of the amount of analgesics used [Wilk's Lambda = .56, F (8, 26) = 1.08, p = .41]. A repeated measure ANOVA revealed no significant effect of time on the amount of analgesics used [F (3, 48) = 2.31, p = .09] either. These findings support that

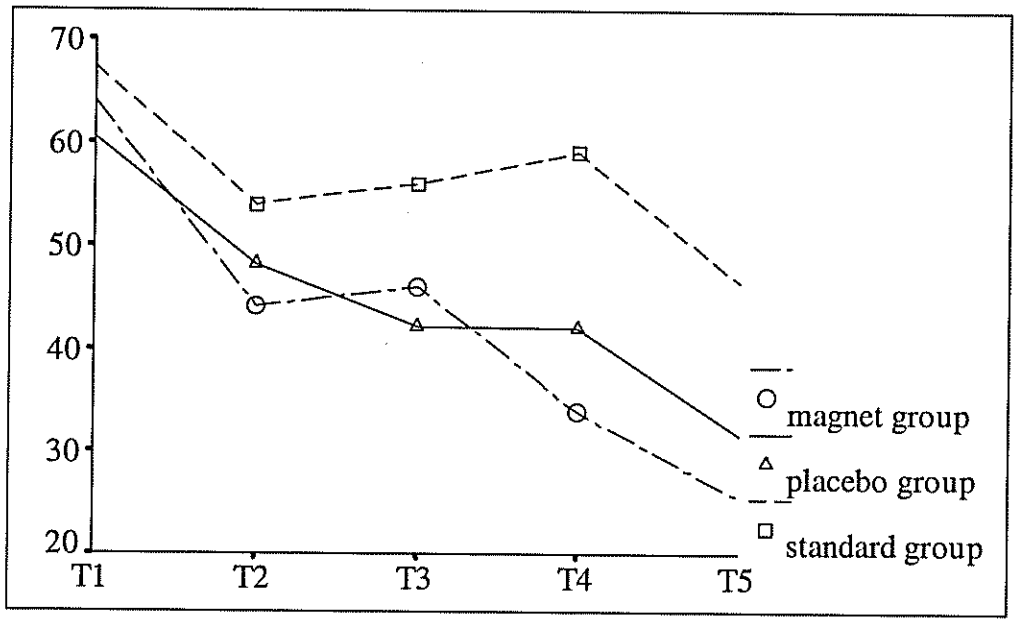

Figure 1. Pain Over Five Points in Time for the Magnet Group, the Placebo Group and the Standard Group Using Mean Pain Scores

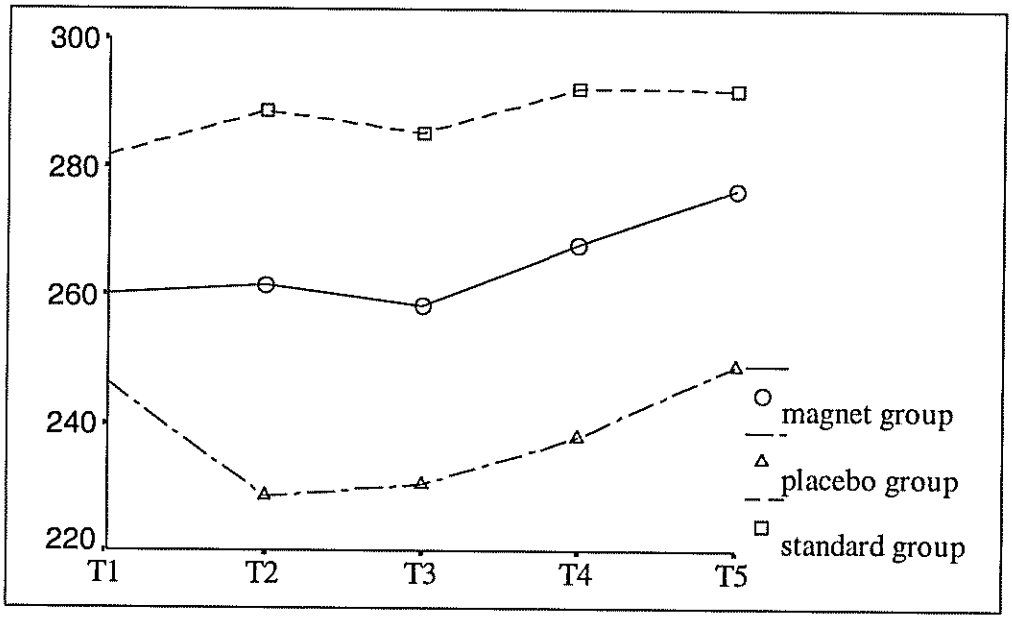

Figure 2. Power Over Five Points in Time for the Magnet Group, the Placebo Group and the Standard Group Using Mean Power Scores

participants experienced decrease in headache despite having used less analgesics for their headache relief.

Discussions and Conclusions

Participants in all three groups experienced a decrease in their headache over the 8-week study period, with time accounting for 26% of the variance in relation to participating in the study. The moderate effect size (f = .26) found with time effect provides some clinical significance of a decrease in headache pain. Participants in the magnetic field therapy group manifested the greatest degree of decrease in headache (60.2%), followed by the placebo group (47.9%) and the standard group (31.2%). In addition participants as a whole used 6.7% less analgesic medications at the end of the study. These findings suggest further exploration of magnetic field therapy using permanent magnets as nursing intervention toward maximizing the potential for pain relief in individuals with chronic primary headache in a larger sample size.

Within the Science of Unitary Human Beings (Rogers, 1992), the findings of this study seem to help explain the change over time that emerged out of the mutual process of human and environmental field patterning. As individuals participated knowingly in the mutual patterning process, changes occurred. A similarity in headache decrease among three groups over time indicates an example of the principle of integrality, the mutual process of human and environmental field patterning. The different manifestations of a human field pattern among the magnet, placebo, and standard group illustrates the principle of helicy which recognizes diversity of human and environmental field patterns. Since the manifestations of environmental field patterns were different (magnet, placebo, and standard groups), the manifestations of human field patterns (headache) would be different. The percent improvement in headache in the magnet group was larger (60.2%) followed by the placebo group (47.9%) and the standard group (31.2%).

Findings from this study are consistent with other studies of primary headache where electromagnetic fields have been used (Farina, et al., 1986; Reich, 1989; Solomon & Guglielmo, 1985). In these studies, participants in general experienced a 28% to 60% reduction in headache with electromagnetic field treatment and an 18% reduction with a placebo treatment. When permanent magnetic fields were used for other painful conditions, the rate of improvement ranged from 33% to 90% with an active device and from 19% to 58% with a placebo device (Collacott, et al., 2000; Kim & Lee, 1994; Liu, et al., 1991; Vallbona, et al., 1997; Weintraub, 1999). The relatively high response with magnetic field therapy, as well as with the placebo and standard therapy found in this study, can be explained through the principles of homeodynamics (Rogers, 1992). Integrality explains the unitary nature of human and environmental field patterning process. Resonancy explains the non-repeating rhythmic wave pattern frequency in the human and environmental field patterning. Helicy characterizes the change emerging out of the human-environmental mutual process as diverse, innovative and unpredictable. The fact that improvement in headache emerged in relation to the magnetic field therapy program (resonancy) suggests that participants in all three groups perceived their therapies as an opportunity to change their headache (integrality). Helicy helps one to explain, describe and understand the first research question. The patterns manifested by three groups were different since the environmental pattern for each group was different.

Magnetic field therapy used in this study was based on Davis and Rawls' (1975, 1979) concepts of magnetic fields, where they specify the positive and negative poles

of permanent magnets are different in their direction of motion. Negative (north pole) magnetic energy spins to the left (counterclockwise) and will assist amino acids in offsetting disease by increasing alkalinity and relaxation, whereas positive (south pole) magnetic energy spins to the right (clockwise), increasing acidity and stimulation. However, a north magnetic pole never exists without the presence of south pole and vice versa. This unitary concept of both poles' existence at the same time in a natural state of harmony is consistent with the concept of energy field in the Science of Unitary Human Beings. The magnetic headband used in this study was designed so that the participants would have the negative pole of the magnets in direct contact with their scalp. No consistent patterns were identified in the literature where permanent magnets were utilized as a healing modality. Liu et al. (1991) used the negative pole to relieve nausea and vomiting in cancer patients who were receiving chemotherapies. However, Kim and Lee (1994), Vallbona et al. (1997), Weintraub (1999) and Collacott et al. (2000) used bipolar magnets in their studies to reduce the pain associated with primary dysmenorrhea, postpolio syndrome, neuropathic pain and chronic back pain, respectively.

In the experimental research framework, the placebo was used as a measure to control the external conditions in the belief that only the active substance or therapy itself varies (Kiene, 1996). Brown (1998) sees placebo as a healing environment, which includes a thorough medical evaluation, a chance to discuss their condition, a diagnosis and a plausible treatment plan, the enthusiasm, effort, commitment and respect of their doctors and nurses, as well as the inactive substance or therapy itself. In the newer world view, placebo responses are "indeterminacy effects" (Dossey, 1999, p. 105) which are not eradicable in humans. Even the simple act of being in the presence of another person, exchanging glances or touching one another, changes each of us (Dossey, 1999). In Rogerian science, the concept of placebo incorporates the individual's self-healing potential and involves a mutually participatory process of the individual and her/his environment (Malinski, 1997).

Like pain, while statistical significance was approached ($p = .084$), no statistically significant differences were found among therapy groups (magnet, placebo and standard) and power. But unlike pain, no statistically significant differences were found between time and power, either. This finding might be a reflection of a small sample size. Power as conceptualized by Barrett (1983) is about knowing participation in change. Participants in the study considered magnetic field therapy, placebo therapy and standard therapy, respectively, as one way to knowingly participate in actualizing their potentials for well-being. While there were no significant changes in power throughout the study, the fact that all participants regardless of their group assignment maintained high power scores throughout the study period illustrates the prominence of the mutual relation of the human-environment field process. It would appear that participants may have been aware of the choices available to them, felt free to make choices, and were actively involved in changing their pain.

The findings from a study done by Schneider (1995) support this concept of knowing participation in change. In her study of persons who used alternative therapies and experienced spontaneous remissions of disease without medical treatment, Schneider (1995) identified the concept of focusing awareness as "becoming increasingly aware and using that awareness to make decisions and to participate more fully in the healing process" (p. 35). The level of

power in this study (M = 5.4) is higher than the level of power in a group of persons experiencing chronic pain in Matas' (1997) study (M = 5.1). Differences in patient characteristics in regards to pain location, precipitating event and treatment program might have contributed to the different power score. In Matas' (1997) study the pain location in the chronic pain group was predominantly back and leg(s) (68.1%). In addition, individuals in the chronic pain group were recruited from both outpatient and inpatient settings. However, in view of the small sample size in the current study further studies are needed in a larger sample size to understand the relation of pain and power.

The pattern of change in power in this study differs from the findings of L. M. Wall (1999) and Wynd (1989). L. M. Wall (1999) found statistically significant increases in power over time for individuals with lung cancer who participated in a preoperative exercise program (n = 49) as compared to those in the no-exercise group (n = 48) during their perioperative period. Wynd (1989) found participants in the guided power imagery group (n = 28) had the highest mean power score, followed by relaxation imagery group (n = 29), then the control group (n = 27). The findings of this study did not confirm the benefits of magnet therapy. However, since the sample size was limited, it may be reasonable to replicate the study in a larger sample, and with other types of pain.

Since the standard group did not wear headbands, the double blind study design could not be carried out completely, suggesting only magnet and placebo groups be considered in future studies. While three participants reported their headbands were too tight in the first couple of weeks, most participants reported no adverse effects with wearing magnetic headband daily for 30 minutes for four weeks. This finding is consistent with other study findings where permanent magnets were used for 45 minutes (Vallbona et al., 1997), for 6 to 8 hours (Liu et al., 1991), 6 hours a day, three times a week (Collacott et al., 2000) or for 24 hours a day for three months (Weintraub, 1999.)

Implications for Future Research and Practice

Based on the findings of this study and insights gained during the research, the following recommendations are proposed for further study. It is recommended that the present study be replicated with two groups (magnet and placebo) in a larger sample size to determine whether magnetic field therapy is significantly related to pain and power. Further, it is recommended that the headband be redesigned so that it can be adjusted according to the individual preference in the future studies. It is also recommended that the present study be replicated with two groups (magnet and placebo) in individuals with different chronic pain conditions such as chronic back pain or chronic arthritis pain. It would be important to see the relation of pain and power in these individuals. Magnets to be used in these studies would be designed appropriate to different pain conditions. Further use of Rogers' (1992) Science of Unitary Human Beings to investigate health patterning modalities will enrich the scientific knowledge base for nursing interventions.

Nurses need to be especially cognizant of individual differences and diverse ways people manifest their human field patterning, including their healing patterns. All participants regardless of their group assignment decreased their headache pain and maintained high power throughout the study period, illustrating the unitary nature of human and environmental field patterning process. Nurses can play an important role

in facilitating clients to mobilize their potentials for well-being by strengthening the human-environment relations.

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THE COMPARISON OF UNIVERSITY STAFF EMPLOYEES, FACULTY, AND ADMINISTRATORS ON POWER AS KNOWING PARTICIPATION IN CHANGE

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ABSTRACT

The purpose of this study was twofold: The first was to examine the perceived difference in power as measured by the Power as Knowing Participation in Change in Tool (PKPCT) Barrett, 1984. 1987, 1998) among university administrators, faculty, and staff. The second purpose examined whether the new instructions to the PKPCT were easy to understand to facilitate completion of the instrument by university administrators, faculty, and staff. Using a descriptive comparative design with a convenience sample from a private mid-sized teaching university located in New Jersey, this researcher found no significant differences between the total power score among administrators, faculty, and staff. Only one subscale, awareness, was statistically significant between faculty and staff employees. Seventy percent of the participants found the instructions to the PKPCT easy to understand to facilitate completion of the instrument. Studies of this nature can assist authors of instruments by providing them with evidenced-based findings to guide further development in instrument instruction.

The purpose of this study was to see if there were any differences in Power as Knowing Participation in Change among University administrators, faculty, and staff. The second purpose of this study was to see if the new instructions for the Power as Knowing Participation in Change tool (PKPCT version II) (Barrett, 1984, 1987,1998) were easy to understand by various groups of employees. Rogers' Science of Unitary Human Beings (1994) provided the framework for this study.

Clear instructions are essential to the completion of all measurement instruments. Although there are many research studies conducted for the development of valid and reliable instruments, a minuscule amount of evidence-based research exists in regards to instructions for instruments.

Any change in the instructions may bring about varying results to the study. Due to the complex nature of the semantic differential technique, the instructions should include a clear explanation of how to complete the assignment while answering the items in reference to one's own unique meaning (Osgood, Succci, & Tannenbaum, 1957).

The PKPCT v II instrument is a 52 item semantic differential self-report pencil and paper instrument designed to measure an individual's capacity to participate knowingly in change. The instrument is composed of four subscales, each consisting of 12 pairs of bipolar adjectives. Item 13 serves as a retest item for each subscale. The range of scores is from a low of 48 to

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a high of 336. Higher scores indicate higher power. The total power score is obtained by summing the four subscales scores minus the four retest items. The tool explores four indicators of power: awareness, choices, freedom to act intentionally, and involvement in creating changes (Barrett, 1983). Barrett states, "awareness and freedom to act intentionally may be the knowing which guides participation in choices and involvement in creating changes in one's own field and one's environmental field (Barrett, 1983, p. 30). "Power is being aware of what one is choosing to do, feeling free to do it, and doing it intentionally" (p. 138). Power is viewed as a field manifestation that emerges out of the human-environmental mutual process.

Previous researchers who have used the PKPCT modified the instructions. Researchers have developed their own instructions (Moore, 1995; Rapacz, 1991), used abbreviated versions (McNiff, 1995), and used the original instructions (Rizzo, 1990). A standardized instruction was developed by Barrett (the author of the PKPCT instrument), Farren, Larkin, Kim, and Mahoney (1997) after conducting a five-phase collaboration research study. The study resulted in new instructions which were hoped to be used effectively by a broad range of research participants (Caroselli & Barrett, 1998). The new instructions were used for the first time in Mahoney's (1998) study which examined the relationship of power and actualization to job satisfaction in female home health care nurses. At that time the new instructions presented no problems to this group of nurses, and instruments were returned completed. Since there were no problems detected with a sample of nurses, future recommendation included testing the new instructions with other types of populations, i.e., layperson.

The PKPCT has been used in the past with staff nurses, home health care nurses, and nurse administrators, as well as countless numbers of patients with various kinds of health problems. The results from the studies conducted on nurses seem to suggest an association in the degree to which one feels free to make decisions and the kinds of choices one makes. For example, Caroselli-Dervan (1991) examined nurse executives (N = 89) in regards to power and feminism and found the mean total score for power to be 289.05 (SD = 25.9). Caroselli-Dervan also found freedom to act intentionally was significant and positively related to feminism. Moulton (1994) examined the relationship between power and empathy in 182 nurse executives. Of the four hypotheses tested, two were supported and two were not. Using the Pearson product moment correlation test, the correlation between nurse executives' empathic concern subscale score and power score was not significant, nor was the relationship of nurse executives' fantasy subscale score and power score. The correlation between the two remaining subscales, the nurse executives' perspective-taking score and power score ,1817, as well as the correlation between the nurse executives' personal distress and power scores, -.1467 were significant at the .05 level. The total power scores for the acute care executives, long term care executives, and home care nurse executives were 291.62 SD (25.81), 286.74 SD (24.50), and 290.87 SD 19.72), respectively. In both, the Caroselli-Dervan and Moulton studies, the total power scores were relatively high considering that the highest possible score for the PKPCT is 336.

Trangenstein (1988), on the other hand, studied staff nurses (N = 326) 80% of whom worked in the hospital environment. She looked at the relations of power and job diversity to job satisfaction and job involvement. Power and job diversity correlated significantly. "The canonical correlation of .53 reflected an independent dimension of

relationship between the predictor variables of power and job diversity and the criterion variables of job satisfaction and job involvement. This canonical correlation was statistically significant at the .001 level" (p. 63). "Participants who perceived themselves to be knowing participants in a diverse job tended to have a feeling of well-being and identification with their jobs" (Caroselli & Barrett, 1998, p. 10). The total power score was 262 (SD = 34.70).

Moore (1995) examined power in registered nurses who provide direct patient care in patient focused care environments and non-patient focused care environments in obstetrical-gynecological, critical care, and medical surgical units. The patient focused care delivery model is a model of patient care delivery in which organizational and physical changes are made to center work activities around patients. Each patient room is designed to support patient care activities from admission through discharge including telephones, computers, and nurse-servers containing supplies, medications and linens. Work is carried out by cross-trained and cross-functional work groups with a decentralized management (Lathrop, 1991). The total power score for the three practice areas was 274.01 (SD 45.83) for the patient focused environment (n = 73) and 266.29 (SD 47.10) for the non-patient focused environment (n = 66). Contrary to expected results, Moore did not show a significant difference in perception of power in nurses practicing in patient focused care environments from those practicing in non-focused care environments.

Mahoney (1998) studied the relationship of power and actualization to job satisfaction in 118 female home health care nurses and found their mean total power score to be 264.00 (SD 30.00). Using Pearson product moment correlation and multiple regression tests, the relationship of power and job satisfaction was significant at the $p < .0001$ level in this sample of female home health care nurses.

Registered nurses working in the role of staff nurse (Trangenstein, 1988) and home health care nurse (Mahoney, 1998) showed scores that ranged from 262 to 274 with a SD of 30.00 to 47.10. Nurse executives' scores ranged from 286.74 to 291.63 with a SD of 19.73 to 25.81 (Caroselli-Dervan, 1991; Moulton, (1994). Staff nurses and home health care nurses' scores were about the same in power, whereas nurse executives' total mean power score was considerably higher. (See table 1). Speculatively, perhaps nurse executives have a greater degree of freedom to make decisions, which equates to the kinds and potency of those choices. When one considers the role of nurse executive,with choices that usually impact the lives of large groups of people, one must ask whether power is perceived differently from those who make choices for themselves. Taking into consideration the ten year time span in which the studies were conducted and the numerous changes in the health care system, including managed care models and restructuring, the total scores for nurse executives continue to be higher than staff nurses.

This researcher suspects that when one considers the role of the university administrators, it is apparent that the choices inherent in this role are different from those of faculty or staff employees. Usually, the choices administrators frequently make have far-reaching ramifications for the entire university, similar to nurse executives in health care settings. Barrett (1983) stated that "the intensity, frequency, and form in which power manifests itself varies" p. 139). Prehaps power manifests itself differently in people when choices are made on behalf of others. Administrators are faced with the responsibility for managing re-

Table 1

A comparison of Studies using Nurse Executives and Staff Nurses

Year/Study	n	M	SD
Executives			
1991 Caroselli-Dervan	89	289.05	25.98
1994 Moulton			
Acute Care	71	291.63	25.81
Long Term	51	286.74	24.50
Home Care	60	290.87	19.73
Staff			
1988 Trangenstein	326	262.00	34.70
1995 Moore			
Patient Focused	73	274.00	45.83
Non-Pt. Focused	66	266.29	47.10
1998 Mahoney	118	264.00	30.00

sources and employees within an ever changing educational environment which requires quality and cost containment. Administrators must be receptive to the subtle nuances of change within the environment and act appropriately. Again, the similarity to nurse executives is evident.

The research questions for this study were: (1) Is there is a difference in perceived power, as measured by the Power as Knowing Participation in Change Tool (Barrett, 1984, 1987, 1998), among administrators, faculty, and staff working in a university setting? (2) Are the new PKPCT instructions easy to understand to facilitate completion of the instrument by administrators, faculty, and staff working in a university setting?

Methodology

For this study, this researcher selected a descriptive comparative design using a convenience sample. All employees from a private mid-sized teaching university were invited to participate. An introductory letter, the PKPCT v II instrument with the new instructions, and a demographic data sheet were distributed by interoffice mail. Employees were asked to fill out the packet at their convenience and return by a certain date. Employees were classified into three groups. Job description titles designated the employees as either an administrator, faculty, or staff employee. Anonymity was assured and consent was implied by return of the questionnaire. University approval was obtained from administration, faculty council, and union representation.

Sample Description

Out of 937 employees, 157 packets were received for a return rate of 17%. One hundred thirty-four were useable. Twenty-three were incomplete. Incomplete returns included: incomplete demographic sheets and PKPCT,(reverse side

Table 2

Comparison of Sex, Age, Marital Status, Education, Full-time/part-time, Income, and Questionnaire Items

(N = 134)

Group	Numbers and percent							
Sex								
Administrators	male	14	34.1%	female	27	65.9%		
Faculty	male	19	42.2%	female	25	55.6%	other	12.2%
Staff	male	4	8.3%	female	44	91.7%		
Age (49 or less)								
Administrators	34		82.9%					
Faculty	24		53.3%					
Staff	24		50.0%					
Married			Single		Widowed		Divorced	
Administrators	28		9		1		3	
Faculty	35		3		2		5	
Staff	32		2		2		11	
Education								
Administrators	39		95.1%	(4 yrs. college or more)				
Faculty	44		97.8%	(Masters & Doctorates)				
Staff	16		33.4%	(4yrs college or more)				
Full-time								
Administrators	37		90.2%	part-time	4	9.8%		
Faculty	25		55.6%	part-time	16	35.6%	adj. 5	8.9%
Staff	38		79.2%	part-time	9	18.8%	adj.1	2.1%
Income (39,999 or less)								
Administrators	26	63.4%	15	36.6%	$50,000 to	$100,000		
Faculty	12	26.7%	33	73.3%	$50,000 to over	$100,000		
Staff	38	79.2%	10	20.8%	$50,000 to	$99,999		
Questionnaire easy to understand (strongly agree to agree)								
Administrators	31		75.6%					
Faculty	31		68.9%					
Staff	36		75.0%					
Questionnaire easy to understand (undecided)								
Administrators	6		14.6%					
Faculty	6		13.3%					
Staff	3		6.3%					
Questionnaire easy to understand (disagree to strongly disagree)								
Administrators	4		10%					
Faculty	8		17.7%					
Staff	9		19%					

not filled in) . A small return rate of 17% is a limitation to this study. The packets were distributed two weeks before graduation making follow-up difficult since most faculty leave campus for the summer months. The Total Design Method (Dillman, 1978), which includes sending reminders to participants at two, three, and six weeks time intervals, is recommended for future studies.

From 224 administrators, 41 questionnaires were received for an 18% return rate. From 377 faculty members 45 questionnaires were received for a 12% return rate, and from 336 staff employees, 48 questionnaires were received for a 14% return rate. More than half of the administrators responding to the study were female, slightly more females than males were represented from the faculty, and the majority of staff employees were female. The majority of all participants were Caucasian and married. Just about every denomination of religion was represented in all three groups. The majority of administrators worked full-time, more than three-fourths of the staff worked full-time, and more than half of the faculty worked full-time. Seventy percent of the participants found the instructions to the PKPCT easy to understand to facilitate completion of the instruction. (See table 2 for a condensed version of selected demographic data).

Data Analysis

The Cronbach Alpha for the PKPCT v II for this study was .93. Reliability scores for the four subscales were awareness .86, choices .58, freedom to act intentionally .91, and involvement in creating change .92. The reliability for the four retest items were: awareness .79, choices .83, freedom to act intentionally .63, and involvement in creating change .71. The total mean scores for administrators, faculty, and staff ranged from 255.02 to 266.82. (See table 3).

Table 3

PKPCT Means and Standard Deviations for Administrators Faculty, and Staff Employees (N = 134)

Group	M	SD	n
Administrators	260.95	32.54	41
Faculty	266.82	32.00	45
Staff Employees	255.02	33.19	48

Test for homogeneity of variance – Levene's Test - was not significant, which made the analysis of variance (ANOVA) the appropriate test to use to detect significant differences among the groups. A one-way analysis detected non-significant findings ($F = 1.52, p = .22$). There were no significant differences detected between administrators, faculty, and staff with regards to perceiving Power as Knowing Participation in Change. A one-way analysis of variance using Scheffé post-hoc tests were used to examine the four subscales. The analysis revealed one of the four subscales, awareness, to be statistically significant. Group 2, (faculty) was found to be significantly different from Group 3 (staff employees) at the $p = .05$ level (Table 4 and 5).

Space was provided on the demographic data sheet for additional comments. Seventy-five percent of the administrators and staff and 69% of the faculty participants from each sample group agreed to strongly agreed to the PKPCT instructions being easy to understand, which resulted in completion of the instrument. The majority of the written comments regarding the instructions pertained to the instrument itself. Only one person thought that the phrasing was

Table 4

One-way Analysis of Variance of the PKPCT subscale Awareness by Groups

N = 134

Source	df	SS	MS	F
Between Groups	2	525.6008	262.8004	3.4595
Within Groups	131	9951.4813	75.9655	
Total	133	10477.0821		

* p <.03

Table 5

Post Hoc Scheffé Contrasts

Group	n	Mean
Staff	48	63.2708
Administrators	41	65.7805
Faculty	45	68.0222

* p < .05 for pair wise difference

confusing in the statement = "place an "X" in the space along the line that best describes the meaning of the indicator (AWARENESS, CHOICES, FREEDOM TO ACT INTENTIONALLY, AND INVOLVEMENT IN CREATING CHANGE") for you at this time. This comment suggests there might be another interpretation. Although this person felt confused by the phrase, the entire instrument was completed.

Some participants in the administrator group and faculty group wanted the indicators to be defined, while a few faculty members found the repetition of the bipolar adjectives monotonous, although necessary. Participants from all three groups directed questions concerning the indicators and their relationship to the bipolar adjective. For example, one person wrote, "how can awareness be intentional and unintentional?" This person may not have understood the directions or she/he would have known that awareness is somewhere between intentional and unintentional. One staff employee wrote, "I felt intimidated by the official white paper, but felt relieved when I read there were no right or wrong answers." This person also suggested using pink stationary. It is noteworthy to point out that the original instrument is a two-page booklet printed on glossy white, purple trimmed stationary. The original instrument looks attractive and non-threatening to this researcher. Perhaps the color of paper instruments are printed on is an area for future study. Higher frequency colors, like purple, may be perceived differently by people, thereby influencing a participants response when compared to an instrument printed on a lower frequency color, like gray or off-white.

Ten respondents representing all three groups wanted to know if the answers to the questionnaire needed to be related to their "personal life, professional life, own life or larger picture, occupation, home life, work place, both home and work life or life in general." Osgood, Succi, and Tannenbaum (1957) speak to this issue and simply want people to interpret the meaning in their own way.

Barrett developed this instrument over 15 years ago. An extensive review of the literature on Power as Knowing Participation in Change from its original development over the ensuing years can be found in Barrett (1983) and Caroselli and Barrett (1998). According to Barrett, the PKPCT is designed to help a participant describe the meaning-of day-to-day changes in their life. Since that time the instrument has been developed into two versions. Version I included contexts. The contexts were re-

lated to self, family, and occupation. Initially and over the years, Barrett (1983, 1986) found that the data remained unchanged over contexts and no statistically significant differences were detected. There has been extensive research conducted with and on the PKPCT instrument. Version II, which is a duplicate of Version I without the contexts, is used by most researchers today.

Summary and Recommendations

The purpose for this study was twofold. First, the study investigated whether there were differences in perceived power among administrators, faculty, and staff employees in a university setting. No statistical significance was found in the total score for power. Perhaps the perceptions of power are about the same. However, there was statistical significance found in one subscale: awareness. Faculty were found to perceive higher awareness than staff employees. A possible reason for higher awareness in faculty may be related to the availability of information and technological resources. Another possible reason may be related to the academic freedom faculty possess. Superiors usually tell staff employees what is required of them, whereas faculty are often encouraged to be creative.

This researcher expected administrators to perceive higher total power scores when compared to faculty and staff employees. On the contrary, the faculty demonstrated the highest total mean power score of 266.82, followed by administrators with a score of 260.95, and staff employees showing a score of 255.02. The analysis of variance detected no significant differences. Due to the types of choices administrators make on behalf of large groups and the impact of those choices on large constituencies, this researcher believed there would be differences in power. The findings from this sample reject Barrett's (1983) observation that power may vary in potency and in scope. In this study, power varied within groups, although not between groups. Having just said this, one must keep in mind that this study has limitations. The power was low therefore increasing the likelihood of making a type two error. The return rate of 17% was low. The sample was not random (all university employees were invited to participate). Generalizations made from this study's findings must be made cautiously. Although the highest mean power score in this study represented faculty at 266.95, this score was not as high as nurse executives in previous studies. Could the reason for the higher scores in nurse executives be related to the kinds of choices nurses make regarding health care matters. Solving problems dealing with life and death situations, ethical decisions, employment matters, and patient concerns may require a higher degree of power.

Supplementary findings did not detect any statistically significant differences in power and the demographic variables i.e., sex, age, marital status, ethnicity, education, working full-time or part-time, length of employment, or family income. This is not contradictory to the power theory (Barrett, written communication, August 30, 1999).

Secondly, about 70% of the participants found the instructions to the PKPCT version II easy to understand. The other 30% represented the undecided, disagree and strongly disagree group. The majority of the written comments were addressed toward the instrument, not the instructions. This study supports the idea that the standardized instructions developed in 1997 are useful and easy to understand. There is a scarcity of information regarding instrument instruction development. Studies of this nature can assist authors of instruments by providing them with evidenced-based findings to guide further development in instrument instruction. The findings from this study, although small, contribute to such information by providing evidence for

completeness of the Power as Knowing Participation in change (PKPCT version II) instrument. Further testing of the instructions is needed in large random samples with diverse populations. Perhaps offering an incentive will increase the response rate. Future studies could benefit from the use of the Total Design Method (Dillman, 1978). The instructions seem to provide enough information for thorough understanding in completing the instrument. Since there was only one significant finding in this study, a replication study is recommended using a random sample to further verify or refute this study's findings.

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PANDIMENSIONAL AWARENESS, PURPOSEFUL CHANGE AND THE KALEIDOSCOPIC COSMOS

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Previously I posited that the universe as a whole is purposeful. I also stated that I could not entirely reconcile the idea of knowing participation in change with the apparent purposiveness of things all around me (Todaro-Franceschi, 1997, 1999). As an alternative to our constant knowing participation in change, I suggested that we often participate *un*knowingly, although the changes are still purposeful. This paper briefly explores the idea of awareness (or consciousness as some call it), especially pandimensional awareness and its relation to knowing participation in change. I will then fire up the controversy by proposing that there is an inherent relation between the ideas of pandimensional awareness and purposeful change.

Knowing Participation In Change

Rogers (1988) wrote, "People participate in the process of change but not necessarily with knowledge and wisdom" (p. 102). Is it possible to participate without knowledge but yet knowingly? Or is it a matter of degrees of awareness? It would seem that one cannot be both *un*aware and participate *knowingly*. Most Rogerian nurses would agree that when we knowingly participate (in change) our actions are purposeful. There is intent in our actions. We choose to do some things rather than others. We do, whatever it is we do, for a reason. However, it is possible that even when we seem to be unaware and unknowingly participating in change, on some level we *are* participating knowingly. If this is so, it means that even when we are unaware we are *purposefully* participating in change—there is a reason why we are doing whatever it is we are doing.

Pandimensionality

Rogers (1992) defined pandimensionality as a nonlinear domain without spacial or temporal attributes, a kind of here-there-everywhere, all-at-once. She used the term pandimensionality to emphasize that human and environmental energy fields are not limited in space or time. There is growing support for the notion that the universe/multiverse is pandimensional (Butcher, 1998). A pandimensional universe implies the existence of innumerable dimensions and an underlying interconnectedness, a basic oneness, which is accompanied by an orderliness that is sometimes, but not always, discernible. Indeed, rarely are most of us totally aware of, nor do we sense, the multiple dimensions or their basic oneness.

Levels of Awareness and Knowing Participation

Barrett (1990) stated , "Health patterning evolves as clients participate more knowingly in the changes occurring in their lives, including health care decision making" (p. 108). The key word here is ***more***. One can be *more* aware and thus participate *more* knowingly in change. Conversely, one can be *less* aware and participate *less* knowingly, and perhaps at times ostensibly *un*knowingly, in change. Thus, there are different levels of awareness: "normal" everyday awareness (is this perhaps *un*-awareness?), "paranormal" awareness (beyond waking, out of the ordinary, pandimensional), and then there are the "more" and "less" subtle differences in both normal and paranormal awareness[1].

Pandimensional Awareness

Watson (1998) defined beyond waking experiences as "complex human field phenomena that occur during periods of waking

and sleeping, yet transcend both, and involve the perception of pandimensional realities in 'an infinite domain without limit', (p. 42). Obviously, perceiving pandimensional realities entails being *more* aware. Different manifestations of pandimensional awareness such as psi, telepathy (mind-to-mind), clairvoyance (seeing objects or actions beyond the range of natural vision), and precognition (knowledge of future events), along with other para-phenomena such as near-death experiences and mystical awareness, can be explained in terms of non-spatial and/or non-temporal barriers to knowing. Generally speaking, in Rogerian science, any kind of *foreknowledge* would be an indication of pandimensional awareness. Yet this poses a dilemma. Foreknowledge implies that a specific change is going to come about, *no matter what.*

Purposeful Change and Pandimensional Awareness

I propose that the Rogerian idea of pandimensional awareness is intricately linked with purposeful change and thus is congruent with Aristotle's (n.d./1984) idea of final cause. Aristotle described final cause as the "that for the sake of which" (p. 1658).[2]According to Aristotle a purpose needs to precede any act (ion), otherwise an act (ion) would never occur. Though the word *cause* is used here, and seems to imply mechanism, the term "final cause" does not indicate causality in *any* modern sense. A final cause is simply the reason why something tends to become what it does; a creative tendency in things that connotes purpose in any progression from potential to actual. Aristotle firmly held that final cause(s) exist in every aspect of nature—including human nature.

Throughout Eastern and Western history, many people have suggested that *all* things are actualizing potentials in a purposeful manner—that the *universe* as a whole is purposive. Many ancient philosophers' writings express or imply the belief that all things are in some way alive and capable of choosing the manner in which they actualize their potentials. Often referred to as some kind of "ism" (for example, vitalism, animism, or panpsychism), I have posited that many of these views are consistent with Rogerian science (Todaro-Franceschi, 1997, 1999).

Rogers described both human being and environment as pandimensional energy fields. They are integral, inseparable, although they manifest in different ways, ways that are never the same from moment to moment. Accordingly, if the human energy field is pandimensionally aware, the environmental field must also be pandimensionally aware. This would entail the inference that *all* things are somehow aware and have the ability to make choices. Modern scientists and philosophers continue to voice these beliefs. Theories of the universe, life and non-life abound, wherein some kind of "hidden variable" is proposed to account for the way things seem to work together so well, so harmoniously.

Energy & Consciousness

Most "hidden variable" theories lead to the idea of a universal consciousness. For example, Pierre Teilhard de Chardin (1959) wrote that consciousness existed at every level from the smallest, basic atom to the most complex—human beings. He posited that there must be one single energy operating in the universe which is the foundation for all else and wrote that this "energy is psychic in nature" (p. 64).

More recently, Edgar Mitchell (1996) and Mark Woodhouse (1996) proposed theories similar to that of Teilhard de Chardin. They each imply that some kind of knowing (or consciousness) is an innate characteristic of the universe. While Teilhard de Chardin proposed that *one* thing—energy—accounted for the purposeful nature of the

universe, both Mitchell and Woodhouse posit that everything is made of two things. In Mitchell's (1996) dyadic model the two things are energy (existence) and information (knowing). Similarly, in Woodhouse's (1996) theory of energy monism, the two things are energy and consciousness. Despite their differences, these authors suggest the possibility of some kind of awareness on a universal scale.

Pattern & Order

Chaos theory and the related theory of dissipative structures (certain chemical reactions that self-organize into complex patterns) also indirectly support the notion that both inanimate and animate things are capable of pandimensional awareness. Erich Jantsch (1980) reflected that dissipative structures seem to act purposefully, stating that, "a dissipative structure "knows" indeed what it has to import and export in order to maintain and renew itself" (p. 40).

From chaos and disorder, order always seems to emerge. But *why* does order emerge from disorder? Why is it that granules of sand, when set into motion, tend to self-organize into complex patterns? (see Browne, 1996). Briggs and Peat (1999) note that "the scientific term 'chaos' refers to an underlying interconnectedness that exists in apparently random events" (p. 2). The underlying interconnectedness is not necessarily observable; however, perceptible patterns with obvious order emerge (manifest) from what we perceive to be random chance events in nature.

Synchronicity: Human-Environmental Field Pandimensional Awareness

Carl Jung (1973) coined the term synchronicity as a catchall term for various psi events that couldn't be explained in causal terms. The defining characteristics of synchronicity are (a) an acausal orderedness, and (b) a meaningful relation between two or more apparently unrelated events. More recently a number of contemporary philosophers and scientists have referred to synchronicity as meaningful coincidence. In the context of Rogerian science I have defined synchronicity as a meaningful, purposeful manifestation of human-environmental field pattern arising from universal communal process (Todaro-Franceschi, 1997, 1999).

Jung (1973) provided us with an example of synchronicity that is often used in the literature as a starting point for discussions of synchronicity: the story of a woman who dreamt of someone giving her a golden scarab. The woman was a client of Jung's and as she recounted the dream during a psychotherapy session, a scarabaeid beetle tapped on the window. Jung opened the window and the beetle flew into the darkened room—despite its usual propensity to fly out in the light. Jung noted that psychotherapy sessions hadn't helped the woman at all until the time she had this experience of synchronicity. Once she had this experience she overtly began to heal.

It could be said that the scarab knew (was pandimensionally aware) that it needed to come into the room for the sake of the woman who needed to heal. Is that feasible? If not, then, did the woman on some pandimensional level (in her dream) *will* the scarab to come to her in order to help her heal? Thus, the beetle later came to her? This is causal and in fact very similar to Jung's (1973) explanation of archetypes and, of course, it isn't consistent with Rogerian science. Or, did the woman have *foreknowledge* of the beetle coming to visit with her—was she pandimensionally aware?

Jung (1973) noted that "final causes, twist them how we will, postulate a *foreknowledge of some kind*" (p. 77). If the woman was pandimensionally aware that the beetle was coming to visit, then are we saying that the purpose was there all along? (Why did it materialize? Why did she dream of it?) Can we deny the existence of an

underlying purpose in the human-environmental field and instead attribute it to chance? Or is it simply a question of "seeing" the patterns—the underlying order? Jung (1973) noted that, "...the word 'underlying' despite its causalistic connotation, does not refer to anything causal, but simply to an existing quality, an irreducible contingency which is 'Just-So' " (p. 99-100). "Just-so" doesn't mean a thing is simply because it is, it means that there is something *inherent* in the thing, a natural acausal orderedness, that is to be almost expected, if not predicted.

Pandimensional Awareness: A Rogerian Final Cause

What we deem to be experiences of pandimensional awareness (or perceiving pandimensional realities) are just glimpses of the underlying order that we occasionally get. Why do these experiences of enhanced awareness occur? What is the purpose? For existentialists, the answer might be that the purpose emerges out of the person's interpretation of the experience. However, that answer seems to somehow fall short, since by the very experience itself, all is somehow changed, not just the life of the one who experienced it.

Essential to synchronicity is the ability to *recognize* a particular manifestation of pattern as meaningful since we often discount these experiences and attribute them to chance. Sometimes it is only in hindsight that we recognize the meaning of an event. And sometimes we don't recognize an event as meaningful at all, even though every act in nature, through communal process, is not an isolated event and thus transforms the whole—whether or not we perceive it. It appears that even when we think we are *un*aware of pandimensional realities, there is something at work in nature; some "thing" directing things to become what they do. The brush of one's shoulder against another, or against a tree, the opening of a door—little things we take for granted, are part of the mutual human-environmental change process and forever transform the universe. All change, all acts, transform every nook, cranny and corner of the cosmos.

Paul Kammerer (cited in Koestler, 1971 from *Das Gesetz der Serie*, 1919), the first person to study synchronicity, came to the conclusion that there was some kind of acausal organizing principle which he referred to as seriality. As translated by Arthur Koestler (1971), Kammerer noted, "We thus arrive at the image of a world-mosaic or cosmic kaleidoscope, which, in spite of constant shufflings and arrangements, also takes care of bringing like and like together" (p. 141). A kaleidoscope has an underlying pattern that changes as it is turned yet it would be foolish to insist that the changes one sees are purely random chance events. The mosaic of colors, the changing pattern reflected in a kaleidoscope, is inherently and inseparably related to the purposeful changes occurring while it turns. As George Johnson (1996) notes, patterns are regularities that are "unlikely to have occurred by chance" (p. 323).

The entire cosmos, as unpredictable as it seems, can be viewed as a kaleidoscope, shuffling, rearranging, and yet still creating discernible patterns. Surely, then, we must recognize that some form of order is implicit, that change is occurring not randomly, but rather purposefully. Indeed, David Bohm (1980) based the whole of his work on the idea of an implicit order from which all else is derived. He denied that disorder existed on any level and noted that, " 'disorder' is merely an inappropriate name for what is actually a certain rather complex kind of order that is difficult to describe in full detail" (Bohm, 1998, p. 8). In this light, one can view the whole kaleidoscopic cosmos as a synchronicity.

Conclusion

Mystics are often considered to have insight into the central mystery or the high

level orderedness and interrelated nature of all things in the universe. Scientists are becoming more and more aware of an underlying order, so much so, that "hidden variable" theories abound in the various sciences—all of which are trying to account for the harmony, the beauty, the mysterious "perfect fit" of things throughout the cosmos (Todaro-Franceschi, 1999). It seems that a fundamental purposeful change process accompanies even the most ostensibly random acts of nature.

The three dimensional view of a causal mechanistic universe is slowly changing, and in its stead the view of a dynamic, increasingly diverse and timeless beauty is emerging. Accompanied by the emerging view of this innovative cosmos, many of the scientists in multiple disciplines are seeing—perhaps for the first time since the days of Newton—what the mystics and sages saw all along. They are seeing the patterns—patterns of underlying order and harmony. This in turn has led to an increase in the dialogue between science and spirituality.

In conclusion, once again I propose that *purpose* is an underlying factor in the human-environmental field change process, and that it cannot be limited to the intention or reasoning of humans alone. Being pandimensionally aware suggests that one is: (a) *more* in tune with the harmonious nature of the cosmos, (b) *more* aware of the *"underlying"* order, (c) *more* knowingly participating in change, and that (d) one may have a *foreknowledge* of *purposeful* changes in the human-environmental field.

On the other hand, to discount the underlying purposeful nature of an experience when one might be pandimensionally aware and attribute it instead to chance, would be associated with participating *less* knowingly in change, being *less* aware of the harmonious *underlying* order, and having no *foreknowledge*. And perhaps this could be equated with a three dimensional view of the universe where things are viewed as purely causally related—or not related at all.

If we were to agree that *all* things are, at least some of the time, pandimensionally aware, it seems to me that it leads to another teleological explanation for the universe. Certainly we would be acknowledging that there is *inherent* purpose in the cosmos, for there would be no other reason to posit that *all* things are pandimensionally aware. I have no problem with this, for as I have said previously, "Purpose does not imply cause and effect; it implies meaning and intention" (Todaro-Franceschi, 1999, p. 105). Things tend to become what they do become, for some inherent reason, some purpose.

Bohm (1998) proposed that "there is a creative intelligence underlying the whole" (p. 107). Maybe what seems like unknowing participation is *actually* knowing participation on some level unbeknownst to us. Perhaps it's the creative intelligence underlying the whole.

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[1]For lack of a better term and because it is consistant with the term "more knowingly participating" I have chosen the terms *more* and *less*. More and less aware should be taken within the same context as the idea of higher and lower frequencies, which is simply to say that they are different.

[2]Bekker code: Metaphysics IX 6, 1050[a] 6-10

Note: Much thanks to Effie Hanchett for her time and insight.

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IMAGINATION COLUMN

MARTHA ROGERS AND THE POLAR BEARS: A CROSS-CULTURAL STUDY SESSION ON THE PRINCIPLES OF HOMEODYNAMICS

Azumi Hikosaka, Naoko Hiramatsu, Madoka Oikawa, Mari Shibata, Effie Hanchett,RN;PhD, and others

It was a hot summer evening. The students were gathered around a low coffee table in the air-conditioned lounge of the nursing building. The professor walked in and stopped to say "konnichi wa" (one of very few Japanese words she had learned) on her way to her office. The students said that they were studying for their nursing theory quiz, and they had some questions about the material. Would it be okay to ask? "Of course," said the instructor. The students said, "We would like to gain a better understanding of helicy, resonancy, and integrality."

We began pretty formally - a question, an answer - but soon it became more complicated, and with essentially no Japanese language skills on the professor's side and little English on the part of most of the Japanese students, we got stuck. "So," said the professor, "let's go to my office – and we'll get out the Japanese-English dictionaries." Some of us had done that before. It was slow, but it worked. So we took the elevator up to the floor where the office was, turned on the light in the dark hallway, reset the thermostat to a comfortable setting, spread out the books and papers on the table, and began on the more difficult questions. Soon that, too, became more complicated as our enthusiasm grew and the questions became increasingly complex. We were working with what little we knew of each other's language, the bilingual dictionaries, a hand-held word translator that looked like a little calculator, paper and magic markers for drawing, and a pace that sometimes lagged behind the rapid flow of ideas but increasingly did not.

"Let's suppose," said the instructor, "that once upon a time, long, long ago, there was a group of people who lived north of the Arctic Circle. There were long 24-hour days of sunlight in the summer and seemingly longer 24-hour days of darkness in the winter. It was very cold, especially in the winter, and the people got very hungry." One of the students drew a polar bear. We all looked at the marvelous, happy- looking bear and we smiled. The students leaned forward; one got out the little word translator/calculator and found the words for polar bear. "Yes," she said, "a polar bear would provide many meals!" "Well," said the instructor, "even though it was very difficult to go out on the ice to catch polar bears, the Northern Lights glimmered and the people felt increasingly energized and more and more hopeful of catching a polar bear and getting some food to ease their own hunger and that of the people in their village." One of the students translated many of the words, another drew the people with their spears, and yet another added the Northern Lights to the picture. Everybody leaned forward, looked at the drawings, smiled, and nodded their understanding.

"That's like resonancy. The pace of the rhythms of the environment: rhythms of light, of air molecules (manifested in the air temperature), of the flow of water under the ice. All of these together - even our bodies and ourselves - all taken together are sort of a wave soup. We are part of that wave soup. Human and environmental rhythms are significant in the human health experience. It is important to notice them."

Patients at the hospital where the students would soon begin their clinical experience were often seen walking around the grounds. I (the professor) had even seen a patient, with IV pole in tow, standing outside with his arms stretched up toward the sun. I said we do not do that in the United States, probably due to legal constraints. It would be wonderful to see it begin to happen. Nightingale said it was important for patients to have access to sunlight. It is still true. Allowing and encouraging patients to find their own most comfortable environmental rhythms of color, light, and heat is one way of applying the principle of resonancy in practice. It isn't just "nice," it works, it's therapeutic. It contributes to the patient's health and/or well-being.

I said, "So let's imagine that the next year the winter was much warmer, and it was not safe to go out on the ice." A student drew a kayak. "The people learned to build boats and were able to hunt from the boat and catch polar bears. However, the year after that there were no polar bears to be found, and the people were not able to hunt, and they were very, very hungry that year."

A student drew some fishes. Another student said, "Yes, fish could provide food for the winter, but what if there aren't any fish to catch?"

"So the next summer the people caught extra fish, and the women dried them in the sun on racks made of wood. They did that so that they would have enough to eat during the winter, even if they were not able to catch any polar bears or any fish during the winter. That's helicy. It is the continuous emergence of new patterns in the environment, new ideas and new ways of doing things. It is seen in the creativity of persons dealing with new challenges. It is applied in practice in honoring and facilitating the creativity and solutions of the person who is a patient and those of his or her own family."

One would see patients and their family members in the hospital cafeteria. The family members often brought in the patient's favorite foods for meals. Another patient might seek out someone to share her craft work with when she needed company and distraction from her illness. Both are creative solutions that emerge from the unique and ever-changing patient-environment situation.

Integrality simply describes the fact that the ongoing emergence of creative solutions (helicy) from the wave soup of ourselves and our environment (resonancy) is a single process. The person/environment wave frequency soup is simply soup. We cannot look at the person as something separate from the environment. We cannot look at the environment as something separate from the person. We have to see both as a single unit. The patient standing in the sun with his IV pole is not just the patient nor just the environment — it is the patient and the environment together that are important. Just as drawings emerge from the availability of markers and paper, the markers and paper wouldn't have been here or brought out if the students didn't like to draw. There would not have been drawings without persons or without paper and markers. However, the drawings emerge as a single process encompassing person, paper and pen. Similarly, the sharing and development of ideas emerged as the experience of a single process. That experience incorporated the comfortable temperature and the physical space to spread out the dictionaries to find the words and the drawings to express the ideas of all the people present. However, the experience itself was of the whole fabric of the experience as a single occasion.

All of us sitting around the table on a warm summer evening sharing ideas, interest and enthusiasm constituted a single

[integral] process. The pace of rhythms of light, temperature, ideas, and even the chirp of the insects on the windowsill, can be thought of as a single symphony of group and environmental rhythms [resonancy]. This process of continuously emerging [helicy] new ideas, interest, and enthusiasm describes this growth process as an aspect of change.

Notes: (1) Many liberties were taken with the exact sequence of the discussion. At the time of the discussion, Dr. Hanchett was Professor of Nursing at Kochi Medical School, Japan.

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INSTRUMENTATION/METHODOLOGY COLUMN

A STUDY OF THE PKPCT INSTRUCTIONS

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Although clear instructions are essential to the performance of any measurement instrument, it is particularly important when using the semantic differential approach due to the abstract nature of the technique (Osgood, Succi, & Tannenbaum, 1967). The Power as Knowing Participation in Change Tool Version II (PKPCT) (Barrett, 1998) is a 52 item semantic differential used to measure power as knowing participation in change (Barrett, 1983).

Questions and ideas that needed clarification arose in a small group of doctoral students meeting to discuss Barrett's theory of power and the use of the PKPCT. The group contacted Barrett. The outcomes of the consultation included a series of meetings and the formation of a research team to conduct a collaborative study of the PKPCT instructions. In this column, a brief overview of the semantic differential technique, a description of the PKPCT, and a report of the collaborative study of the instructions for the PKPCT will be presented.

The Semantic Differential

The semantic differential technique is intended to measure the meaning of the concept under study (Osgood, & Succi, 1969; Osgood, Succi, & Tannenbaum, 1967). The development of this approach was influenced by learning and language theories. Semantic differential scales use bipolar adjectives as scale anchors along a linear representation made up of five to nine possible locations (Guliksen, 1969; Osgood & Succi, 1969). Osgood and colleagues suggest varying the anchors so those anchors with a positive or negative connotation are not consistently located on one end of the scale. A summated score is calculated. The scale yields interval level data.

Osgood, Succi, and Tannenbaum (1967) recommend clear instructions for the instrument. It is suggested that the instructions include "orientation to the general nature of the task, the significance of the scale positions and how to mark them, and the attitude to be taken toward the task [speed, first impressions, but true impressions]" (Osgood, Succi, & Tannenbaum, 1967, p. 82). Polit and Hungler (1995) echo the importance of clear instructions for instruments using semantic differential techniques.

Given the importance of the instructions which Osgood, his colleagues, and nurse researcher experts suggest, there is a paucity of literature on the subject of instrument instructions. A concern of any researcher is the performance of the instruments chosen to measure the concepts under study. As each member of the research team chose to study power as knowing participation in change, there was interest in knowing as much about the performance of the PKPCT as possible.

Need for the Study of the Instructions

The need for the study emerged from two areas: anecdotal reports from other researchers and the research literature. Anecdotal reports suggested that some study participants completing the PKPCT had difficulty understanding the instructions. The reports led the research team to look more closely at the instructions. While performing literature reviews of previous research regarding power as knowing participation in change, the research team

noted that researchers varied in their use of the instructions for the PKPCT.

Barrett developed her own abbreviated instructions for Version I and Version II subsequent to her original research. These instructions appeared in the body of the instrument and consisted of two sentences that appeared before each subscale. Some researchers used the Version II instructions as printed on the instrument (McNiff, 1995; Rush, 1996). Others combined the Version II instructions with additional instructions for the completion of the instrument (Rapacz, 1991; Rizzo, 1990). In addition to the Version II instructions developed by Barrett, Rizzo (1990) added instructions similar to those originally used by Barrett (1983) with the PKPCT Version I. Rapacz (1991) wrote brief instructions of her own in addition to the instructions on the PKPCT Version II.

The research team discussed the advantages of the consistent use of the PKPCT Version II instructions. Before making any recommendations about which instructions future researchers should use, the team decided that a study of the instructions would assist in learning more about how respondents viewed the instructions. The research team was also interested in feedback from researchers who had used the instrument in their research and those who were considered measurement experts. A study of the instructions would make it possible to provide research-based recommendations.

The Power as Knowing Participation in Change Tool. (PKPCT)

The PKPCT has been used over the past 15 years by nurse researchers interested in power as conceptualized by Barrett (1983) within the frame of Rogerian Science (Barrett, 1983, 1990). The instrument has two versions; both are currently being used. The original form (Version I) included contexts. However, Barrett (1983, 1986) found that the data remained the same over contexts and no statistically significant differences in the congruence coefficients were noted. As no new information was provided and reliability estimates were unaffected, a version of the tool without the contexts was developed (Version II) in an effort to simplify the instrument.

Reliability estimates for the instrument, generally > .90, are reported in detail in Barrett and Caroselli (1998) and Caroselli and Barrett (1998). Content validity was addressed using a panel of experts (Barrett, 1983). Concurrent validity was supported by statistically significant correlations (r = .37 to .46, $p < .01$) between a Cantril ladder power measure and the PKPCT subscales (Morris, 1991). Finally, evidence of construct validity has been found using exploratory factor analysis with factor loadings of .56 to .70 (Barrett, 1983). Additional information about validity evaluations of the PKPCT can be found in Barrett and Caroselli.

The PKPCT Version II is comprised of four subscales, i.e., awareness, choices, freedom to act intentionally, and involvement in creating change. There are 12 pairs of bipolar adjectives for each subscale. The respondent is asked to consider the meaning of the bipolar adjectives in relation to the subscale concept and place an "X" in the space along the line which most accurately describes the meaning for that individual. As Osgood et al. (1967) suggest, bipolar adjectives are not in the same order, nor do they always appear on the same side of the scale. A retest item is presented as the 13th item for each subscale (a total of 4 retest items). Version I is identical to Version II except that in Version I each concept is considered in relation to one of three (self, family, occupation) contexts (Barrett, 1983).

The power scores are calculated for each subscale by reversing negatively scored items, adding all items, and subtracting the retest items. A total power score is obtained by summating the four

subscale scores. The total power scores range from 48 to 336 with higher scores indicating higher power.

Phase I of the Collaborative Study

After discussion, the research team, including Barrett, decided to draft a new set of instructions. The newly developed instructions were to be compared to the PKPCT Version II instructions. The Version II instructions are those that are offered before each subscale. A six item, Likert type evaluation tool was also developed (see Box 1).

Box 1 Phase I Evaluation Tool

Please indicate how you would evaluate the PKPCT instrument by circling the appropriate number.

1 = strongly disagree
2 = disagree
3 = undecided
4 = agree
5 = strongly agree

1. The instructions on how to complete the instrument were clear.
2. The instructions were easy to understand.
3. The instructions were vague.
4. The instructions were given in an organized manner.
5. The length of the instructions were just right.
6. The instructions were complete.

"If not, please explain" appeared after each stem. At the end of the evaluation tool, the respondant was invited to share any additional comments they wish regarding the PKPCT instructions.

Following approval from the institutional review board at Hunter College/City University of New York, data collection included the distribution of 175 questionnaires to graduate and undergraduate students. Participants were randomly assigned to receive either the Version II instructions or the newly developed instructions. One hundred seventy-one usable questionnaires were returned (68 of the Version II instructions and 103 newly developed instructions). An alpha reliability coefficient for the evaluation tool was calculated (.81). Descriptive statistics for the Version II group and the newly developed group were obtained (see Table 1).

Table 1

Descriptive Statistics

Instructions	Version II	Newly Developed
N	68	103
Mean	22.63	22.51
Standard Deviation	4.029	4.307

Prior to testing group comparisons, a Levene's test of homogeneity of variance (F = .158, p =. 691) was performed. The results indicated equal variance in the two groups. An independent t-test (t = -1.33, df = 169, p = .185) was performed which indicated that there were no statistically significant differences between the Version II instructions or the newly developed instructions.

Phase II of the Collaborative Study

During this phase, the research team had to digest the meaning of the results and consider any further course of action. The findings in Phase I could have indicated that the two instructions were equally as adequate or equally as difficult. The research team decided to further develop and refine the newly developed instructions. The instructions produced by revision will be referred to as the newly revised instructions. The evaluation tool (see Box 1) was also reviewed. A seventh item was added, "The instructions facilitate completion of the instrument."

In Phase II of the collaborative study, the research team requested the participation of 20 experts. The research team defined experts as either Rogerian scholars, researchers who used the PKPCT, and/or those with instrumentation/ instrument

development expertise. The 20 experts were asked to review and evaluate three versions of the instructions (Version II, the newly developed instructions, and the newly revised instructions).

Phase III of the Collaborative Study

A cover letter and three packets (randomly ordered) were sent to each expert. Each packet contained either the Version II (group 1), newly developed (group 2), or the newly revised (group 3) instructions. The evaluation tool (the seven item version) and the PKPCT were included in each packet. The experts were asked to evaluate each set of instructions independently. Seventeen out of 20 experts responded. The revised (seven item) evaluation tool had an alpha reliability coefficient of .90. One-way analysis of variance (ANOVA) ($F = 9.52, df = 2, p = .000$) based on the evaluation tool score was statistically significant indicating a difference between the instructions.

Scheffe and Bonferroni post hoc comparisons were carried out to locate where the differences occurred. The newly developed instructions were significantly different from the other versions of the instructions. Each of the seven items on the evaluation tool was examined using one-way ANOVA. The results indicated that the newly developed instructions were found to be clearer, more complete, of adequate length, and easier to understand than either the Version II instructions or the newly revised instructions.

Phase IV of the Collaborative Study

The research team met to reflect on the meaning of the results. In addition to the quantitative data, some of the experts made comments and suggestions. For example, the instructions reminded the potential respondent to be as honest as possible. Some experts found the honesty phrase troubling. Another expert recommended giving potential respondents a time frame for completing the instrument. The newly developed instructions were modified to address the experts' recommendations and concerns. The modified instructions were sent to the experts for their review. Four experts returned the modified instructions with comments. No additional suggestions or recommendations were made in relation to the contents of the modified instructions. The experts who responded provided supportive comments regarding the research team's work and conveyed wishes for success.

Phase V of the Collaborative Study

The research team reflected on the work that had been done and adopted the modified instructions. The outcome of this five-phase collaborative study can be illustrated by two events. First, Barrett reprinted the instrument with the adopted instructions and is distributing the instrument to researchers requesting permission to use the PKPCT (see Appendix A). Second, Mahoney (1998), was the first to use the instructions successfully for her dissertation research entitled, *The Relationship of Power and Actualization to Job Satisfaction in Female Home Health Care Nurses.*

Summary

The research team has reported on a five-phase collaborative study of the PKPCT instructions that evolved from collaboration among the theorist/instrument author, Barrett, and a group of doctoral students interested in Barrett's theory and instrument. Two data collection phases were carried out. The results of each phase were reflected upon and used to plan future action. The outcome of the study is a research-based set of instructions for the PKPCT, a tool using the semantic differential technique, to measure the meaning of power as knowing participation in change. Furthermore, this collaborative study demonstrates the value of providing feedback to instrument authors about the practical

experiences encountered while using instruments. Such feedback to the author of any instrument provides an opportunity to address practical issues and to contribute to the measurement of concepts of interest to the discipline of nursing.

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APPENDIX A
BARRETT PKPCT (1998) INSTRUCTIONS
INTRODUCTION TO BARRETT'S PKPCT

The PKPCT is designed to help you describe the meaning of day-to-day change in your life. Four indicators of experiencing change are:

AWARENESS
CHOICES
FREEDOM TO ACT INTENTIONALLY
INVOLVEMENT IN CREATING CHANGE

It takes about 10 minutes to complete the PKPCT.

INSTRUCTIONS FOR COMPLETING BARRETT'S PKPCT

For each indicator there are 13 lines. There are words at both ends of the line. The meaning of the words are opposite to each other. There are 7 spaces between each pair of words which provide a range of possible responses. Place an "X" in the space along the line that best describes the meaning of the indicator (AWARENESS, CHOICES, FREEDOM TO ACT INTENTIONALLY, or INVOLVEMENT IN CREATING CHANGE) for you at this time.

For example:
Under the indicator CHOICES, if your CHOICES are quite closely described as "informed," your answer might look like this:

informed __|_X_|__|__|__|__|__ uninformed

If your CHOICES are quite closely described as "uninformed," your answer might look like this:

informed __|__|__|__|__|_X_|__ uninformed

If your CHOICES are equally "informed" and "uninformed," your answer might look like this:

informed __|__|__|_X_|__|__|__ uninformed

REMEMBER:
There are no right or wrong answers.
Record your first impression for **each** pair of words.
You can place an "X" in any space along the line that best describes the meaning the indicator has for you at this time.
Mark only one "X" for each pair of words.
Mark an "X" for every pair of words.
PLEASE BEGIN TO MARK YOUR X'S ON BARRETT'S PKPCT

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