RESILIENCE AMONG ELEMENTARY EDUCATORS AS MEASURED BY THE PERSONAL AND ORGANIZATIONAL QUALITY ASSESSMENT-REVISED AND THE EMOTIONAL QUOTIENT INVENTORY: SHORT

A Dissertation
presented to
the Faculty of the Graduate School
at the University of Missouri-Columbia

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy, Educational & Counseling Psychology

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by
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DECEMBER 2006

The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

RESILIENCE AMONG ELEMENTARY EDUCATORS AS MEASURED BY THE PERSONAL AND ORGANIZATIONAL ASSESSMENTS-REVISED AND THE EMOTIONAL QUOTIENT INVENTORY: SHORT

presented by Susan Stockton,

a candidate for the degree of Doctor of Philosophy

and hereby certify that, in their opinion, it is worthy of acceptance.

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DEDICATION

Dominus optimo maximo

To the Lord, the best and greatest

To the love of my husband-Mark, parents-Bill and Donna Clark, children-Jacob and Jarod, grandson-Andrew, relatives-Dorothy Sims, Lynn and Jackie Harmon, Judy Yancey and their families, church family and friends, and others not mentioned specifically by name, who were ever vigilant in prayer and faithful in understanding during this adventure otherwise known as doctoral education, to them is this work dedicated. Sursum corda (lift up your hearts).

ACKNOWLEDGMENTS

Dr. Alex Waigandt and his dedication to student success, as well as his innate kindness, made this work and the learning extant, not only possible but probable. The other committee members who provided expert advice and counsel on conducting this research and gave of that most precious commodity-their time, were also instrumental in the accomplishment of this project.

All University of Missouri, Columbia Faculty that taught classes for this program of study were helpful in offering suggestions and stimulating ideas for this research. Especially helpful with the statistical analysis and data organization were Ze Wang and Ray Bacon, their patience, understanding and sincerity were a blessing beyond measure.

Dr. Marilyn Grechus, coordinator for Health Education, department of Health and Human Performance, College of Education and Human Services, University of Central Missouri, mentor and friend, provided invaluable feedback, friendship, and encouragement for completing this journey, words can not express how much her collegiality facilitated this work. Appreciation to other faculty and staff from the University of Central Missouri, Dr. Rick Sluder; Dr. J. Dirk Nelson; Dr. Scott Strohmeyer; Dr. Ruth Nyhus; Andy King, ABD; Dr. Dennis Docheff; and Dr. David Kreiner who gave constructive and timely criticism. A special thanks to Dr. Karen Bradley for her supreme patience with reading the multiplicity of iterations with the qualitative data, to her my most humble accolades and respect are offered. To Mary Brinkley, who has been supportive and considerate with her clerical skills, friendly and humorous in discourse, and wise in counsel with formatting and completing the established requirements of this document, my appreciation is abundant.

Thanks to the superintendents and school districts that granted access to their teachers for conducting this research. Appreciation is expressed to Health Management Systems for allowing a student discount on the EQi:S. Heartfelt gratitude to the research and other personal with the Institute of HeartMath-especially Dr. Rollin McCraty, Dr. Mike Atkinson, Christiana Bishop, and Jeff Goelitz, for their incalculable insight, feedback, cooperation, and friendship, as well as their very generous discount on the POQA-R instruments, analysis, and colorful summary reports, which were all foundational to the completion of this work.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

RESILIENCE AMONG ELEMENTARY EDUCATORS
AS MEASURED BY THE POQA-R
AND EQi:S

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ABSTRACT

Purpose: The purpose of this study was to examine the effect of time on the indices within the Personal and Organizational Assessment-Revised (POQA-R, Institute of HeartMath, 1999-2004) among rural, elementary educators (N=26). This study also evaluated an overall emotional intelligence score using the Emotional Quotient inventory; Short form (EQi:S, BarOn, 2002). The time points were fall, spring, and summer over one academic year.

Procedures: Two rural school districts were contacted and elected to participate in the study. POQA-R instruments were proctored three times over the academic year, fall, spring, and summer. During the spring the EQi:S was administered electronically.

Findings: Frequency and descriptive statistics, one-way repeated measures ANOVA, and pairwise comparisons using Bonferroni correction were used to analyze data. All data were tested at the $p<.05$ level of significance. The null hypothesis that all time points would be similar on all indices was rejected for calmness and freedom of expression. These indices were significantly greater during the summer compared to the fall.

CHAPTER 1

INTRODUCTION

Greek anatomist, Herophilus of Chalcedon (ca.320-unknown BC.), is credited with the expression "when health is absent, wisdom cannot reveal itself, art cannot become manifest, strength cannot be exerted; wealth is useless and reason powerless" (Weisstein, 2003). His statement indicates that any accomplishment or pursuit requires a modicum of health for successful and satisfactory execution. Attaining health, according to the World Health Organization, while determined largely by behavior and genetics, is accomplished by incorporating a full range of physical, mental, and *emotional* (emphasis added) capabilities in the lived experience and not merely the absence of disease (Insel & Roth, 2006). Likewise, the overarching goals of the United States Healthy People 2010 (http://www.healthypeople.gov) are to increase the *quality* (emphasis added) and years of healthy life and eliminate health disparities (U.S. Dept. of Health & Human Services, 2005; CDC, 2005). Recognizing these healthy life qualities, Dr. Bill Hettler, Cofounder and President of the Board of Directors of the National Wellness Institute (2006), developed the six dimensions of Wellness Model. This interdependent model provides the cursory categories from which health educators build curriculum, community and academic health promotion specialists design programs, and health-related research investigations, such as this, continue today.

According to Dr. Hettler and the National Wellness Institute (2006), the six dimensions of Wellness include optimal health in each category, i.e., social, spiritual, emotional, physical, occupational, and intellectual (see Definitions section for a complete description). While most health reference books contain these dimensions as introduced by Dr. Hettler, (Donatelle, 2002; Teague, Mackenzie, & Rosenthal, D., 2007; Hales, 2007; Insel & Roth, 2006) they use environmental health in place of occupational and one (Insel & Roth, 2006) included the Ten Warning Signs of Wellness adapted from the Ten warning signs of good health (Mind/Body Health Newsletter, 1996). Six of the "warning signs" can be directly linked to *emotional* health and include chronic, positive expectations; episodic outbreaks of joyful, happy experiences; a sense of spiritual involvement; a tendency to identify and communicate feelings; repeated episodes of gratitude and generosity; and a persistent sense of humor.

Physicians are documenting the impact on health, as well as healing prognoses, by the degree to which their patients are feeling positive or negative emotions (Dossey, 2000; Northrup, 2002; Groopman, 2004; Guarneri, 2006). Christiane Northrup, M.D., (2002) lists the following physiological changes that occur when one holds positive feelings of thankfulness for as little as 15-20 seconds:

- Stress hormone levels of cortisol and norephinephrine decrease, creating a cascade of beneficial metabolic changes targeting the immune system;
- Coronary arteries relax, increasing blood supply to the heart;
- Heart rhythm becomes more harmonious, which creates a positive feedback signal to the nervous system and elevates general mood; and
- Breathing becomes deeper, increasing oxygen availability to tissues.

Similar health statistics are addressing the emotional realm in relation to current and future trends on morbidity, mortality, and quality of life (Hamilton, & Malcarne, 2004; Osowiecki & Compas, 1999; Hamilton, Karoly, & Kitzman, 2004; Zautra, Hamilton, & Burke, 1999; Carver & Scheier,1990; Janssen & Leiden, 2002; Kabat-Zinn, 1990; Siegle, Moore, & Thase, 2004; Siegle, Steinhauer, Thase, Stenger, & Carter, 2002; Siegle & Thayer, 2004; Gordon, Gazella, & Snyder, 2006; Waigandt, 2006). Emotions have been described primarily within the context of cognition as any strong manifestation or event affecting the conscious or unconscious mind, primarily considered involuntary and resulting in complex physiological changes (Cannon, 1936; Funk & Wagnells, 1978; Guyton, 1986; Mott, 1908; Webster, 1989). Thus by definition emotions impact physiology-the physical functioning dimension of health/wellness, whether this influence is predictable, modifiable, related to the degree of positive versus negative affect experienced, and generated from the organism as a whole or within confined spaces are issues involved with this research.

Emotional health and emotional intelligence share many of the same attributes, i.e., appreciation of self, ability to accurately interpret feelings, genuine care for self and others, stress resilience, impulse control, adaptability, problem-solving ability, positive outlook, self-actualization, happiness, independence, and social engagement (Bar-On, 2000; Gilbert, 2006). Until the last 20 years, the majority of research on emotional health has been in relation to negative affect (Eisenberg, Champion, & Ma, 2006; Isen, 2000). Only recently have studies examined the physiology of positive affect on human function (Childre & Rozman, 2005; Guarneri, 2006 McCraty, 2004; Seligman, 1990). Although health statistics reveal potential health risks based on activity, lifestyle, age, sex, race, ethnicity and occupation, the impact of emotions is critical as well (Insel & Roth, 2006). With these facts, available strategies that recognize the emotional pattern or history of individuals may be utilized to create health promotion programs to increase behavior change toward increasing quality of life. Unlike health promotion, health education has proven that information alone seldom results in changing health behaviors (Harrison, Mullen, and Green, 1992; O'Donnell, 1986, 2002; Waigandt, 2006).

Emotional health behaviors may contribute significantly to at least one or more of the leading causes of mortality for those over age 35, which include cancer, heart disease and accidents (Waigandt, 2006). Heart disease may be thought of as a chronic, stress-related illness in that progression may proceed undetected for many years and culminate with a sudden cardiac death event. Along with cardiac risk factors, new methods of measuring health status in relation to the heart are available. Heart rate variability (HRV) is becoming a standard indicator for risk of sudden cardiac death in middle-aged men (Gorman & Sloan, 2000; Jouven, 2001), in depressive and anxiety disorder patients (Gorman & Sloan, 2000), and when combined with other variables, e.g., left ventricular ejection fraction (Kleiger, Stein, & Bigger, 2005). A study examining the eye-blink startle response (stress simulation) when exposed to positive and negative affective cues found significant differences between responses and HRV levels. Those with higher HRV had lower startle magnitude and those with lower HRV had higher startle magnitude, which implies that the state of the heart using HRV may predict the likelihood of experiencing a cardiac event among individuals with an accentuated stress response (Ruiz-Padial, Sollers, Vila, & Thayer, 2003).

Uncontrollable emotional health risk behaviors may result from brain injury (The Merck Manual of Diagnosis and Therapy, 1987), alexithymia, heart transplant (Pearsall, 1998) or early socialization opportunities provided by a primary care-giver (Conway, 2005; Eysenck & Eysenck, 1983; Izard, 2002). The terms modifiable (controllable) risk factors have typically been associated with heart disease (Shaw, Raggi, Schisterman, Berman, & Callister, 2003; Guthrie Health Systems, retrieved August 6, 2006 from www.guthrie.org/Services/cardiac/Prevention.asp; Massachusetts General Hospital, retrieved August 6, 2006 from www.mgh.harvard.edu/cardiology/cardiology/preventive.html). These cardiac health risk factors include genetics, hypercholesterolemia, smoking, hypertension, overweight and/or obesity, Type II diabetes, physical inactivity, *uncontrolled stress* and personality classification (Type A and/or Type D). Controllable risk factors for emotional health are collectively those factors influencing response habits. These habits are expressed between peers, community, and family members, and are especially cogent in terms of communication skills. Personal experiences with positive and negative affect and their associated outcomes flavor the neural circuitry for future emotional responses. These responses contribute to the perception of every subsequent experience and are responsible for the degree of stress or resilience with which the experience is encountered.

Defined by Hans Selye (1978), stress is the non-specific response of the body to any demand placed upon it (Kreitner & Kinicki, 1992) and includes events considered either unpleasant (distress, usually inferred with the term stress) or pleasant (eustress, not usually inferred with the term stress). Stress[1] contributes between 75-90 percent of complaints necessitating visits to primary care physicians (Childre & Rozman, 2005; Guaneri, 2006; Rosch, 1991). According to a Harvard study, individuals living in a state of high anxiety are four and one-half times more likely to suffer sudden cardiac death than non-anxious people (Bove, 1977; Jouven, 2001; Kawachi, Sparrow, Vokonas, &

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[1] Stress is defined as any event or condition in humans or animals, which causes the functioning of the organism to depart significantly from equilibrium (Insel & Roth, 2006).

Weiss, 1994). Another feature of the stress response is initiated from individuals experiencing a loss of feeling in control of a situation[2]. This may occur due to personal, occupational, or societal conditions. Feelings of autonomy that prompt positive action in terms of self and society are being taught as part of the curriculum in some areas (www.CASEL.org). Educators involved with social and emotional learning express the degree of students' academic success is directly linked to attitude and relationship issues (Izard, 2002).

Studies examining the mechanisms by which distress results in psychological/mental, behavioral, and physically altered states are extensive in the literature (Demaree, Schmeichel, Robinson, & Everhart, 2004; Downing, 2000; Nelson, Franks, Brose, Raven, Williamson, et al., 2004; Pressman & Cohen, 2005; Suls & Bunde, 2005). Understanding perception as the pivotal aspect resulting in an event or situation producing these stressful conditions is essential to modifying behavior with the end result alleviation of these deleterious consequences (Sher, 2005). Several stress reduction practices focus on the concept of relaxation and methods that allow escape, distraction, reflection, or distance from the causative agent (Burns, 2000; Davis, Eshelman, & McKay, 2000; Heppner, 2006; Seaward, 2003).

A different approach to the perception/experience of stress involves specific practices and tools that interrupt a previous, possibly habitual, stress response and offer options to address the stress stimulus in the moment perceived. This program was developed by the Institute of HeartMath, LLC and consists of tools called Neutral, Heart Lock-In, Heart-Rhythm training, and Freeze-Framer (www.heartmath.org 2006). These

[2] The link between sense of control or autonomy and emotions is high confidence (increased sense of autonomy) promotes persistent behavior whereas low confidence (decreased sense of autonomy) leads to cessation of desired behavior according to Johnson, Chang, and Lord (2006).

tools are designed to be used in any situation perceived as stressful. These tools are based on the practice of focusing the conscious mind (attention) on the area of the heart and placing potentially volatile emotions in Neutral, similar to placing an automobile in neutral, this diminishes the likelihood of stressful hormone release into the system. Heart Lock-In advances on the practice of Neutral by regulating respiration into a slow, even pattern while activating a sincere feeling of positive affect. Heart Lock-In builds on the steps of heart focus and placing one's emotions in neutral used with the Neutral tool. The practice of Heart-Rhythm training utilizes a computer generated feedback program revealing the graphic pattern of the HRV wave and yielding a coherence score of low, medium or high. The designation of low, medium or high corresponds to a total numeric score of 100 and is a reflection to the user of successfully practicing the Heart Lock-In tool. To use Freeze-Framer involves applying the steps of Heart Lock-In to a stressful situation and occurs as follows:

1. recognize the situation as becoming potentially stressful or as stressful;
2. focus attention on the anatomic location of the heart;
3. breath slowly and evenly;
4. activate a sincere feeling of love, care, or appreciation for someone or something;
5. ask the question "what would be a better way of handling this situation?" and wait for the new option or idea to occur.

The name HeartMath was coined by the founder of the Institute of HeartMath company Doc Childre and was based on the idea that the power of the heart (the Heart in HeartMath) to influence health, stress, emotions, intra- and interpersonal relationships, etc., could be scientifically validated (the Math in HeartMath). Research in the area of HRV, intuition, stress reduction, and academic performance are ongoing based on the principle of positive emotions, heart focus, and regulated breathing using Neutral, Heart Lock-In, or Freeze-Framer.[3]

Perception may be thought of as an attitude, understanding based on what is observed, or thought, usually based on the senses, and similar in concept with awareness, sensitivity, opinion, insight and acuity (Eriksen & Eriksen, 1972). Continuous monitoring of environmental and intrinsic stimuli to the human system for integration and processing is viewed in context with previous experience and present mood. Thus perceptions are somewhat filtered through the emotional history and experiences of the individual (McCraty, 2004). Emotional patterns established through this process become habitual (IHM, 2005; Northrup, 2002). Changing this emotional pattern may be possible through increasing awareness of baseline emotions/perceptions and feedback information by way of the autonomic nervous system (ANS) that empower individuals to restructure and reformulate emotional responses creating a new habitual schema (Culbert, Martin, & McCraty, 2004; Weins, 2006). Positive emotions may be the key to optimal functioning, enhancing nearly all spheres of human experience while negative emotions mediate undesirable physiologic changes creating or exacerbating health problems such as heart disease, hypertension, headaches, strokes, depression, and sleep disorders (Culbert, Martin, & McCraty, 2004; Pressman & Cohen, 2005). Given the impact of the emotional dimension of health toward optimal human function, educators also recognize the critical role of emotions to the learning process (Culbert, Martin, & McCraty, 2004).

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[3]Neutral, Heart Lock-In, Heart rhythm coherence training, and Freeze-Framer are trademark names used by the Institute of HeartMath.

Teaching, as a profession, is generally considered moderate to high-stress depending on the area, teaching load, extra-curricular demands, and age and character of students. Teachers' state feelings of depression, fatigue, little control over administrative issues, little time to perform job requirements, increasing demands of tasks and paperwork, indicate little social support from colleagues, friends, and family (Medica, 1997). School administration creates stress for teachers due to principals' leadership styles. Low teacher stress is experienced in those schools where lines of communication were clear, communication was clear on the vision of the institution, interpersonal relations between teachers, staff, and principal were considered close, strong social support, and a buffer provided by the principal all contributed to reducing teachers' job-related tension (Harris, 1999). In beginning teachers, self-defeating beliefs and self-imposed high standards create situations of emotional and physical exhaustion (Friedman, 2000). The result of stress in the educational setting and among educators, particularly elementary school educators, creates a dual impediment, compromised emotional health and decreased stress resiliency in teachers and impaired ability to model emotional health and stress resiliency for their students.

Statement of the Problem

Addressing the future health and performance of the nation's citizens may rest not only with physicians but also with elementary school educators. According to Aristotle, the definition of the term doctor was teacher. Today the combined efforts of those in general medical practice and academics may have the greatest potential to stem the tide of an increasingly sick population (Mokdad, Ford, Bowman, Dietz, Vinicor, et al., 2003).

Establishing health practices from early in a child's life with parents, teachers, and the family physician could create a synergist force for optimal health and human functioning, particularly those practices that promote positive emotional health. Creating an efficacious, non-invasive, non-intrusive, alexipharmic system for distress that encourages behavior change in teachers, for both personal and professional benefits, which might also allow carryover to their students, potentially increasing positive affect and stress resilience in both populations is the problem addressed with this study.

Purpose of the Study

The original purpose of this study was to compare two groups of elementary school teachers from different districts with similar student populations and composed of similar members in terms of numbers, race, sex, and age in the area of stress resilience. The study aimed to identify if a stress transformation protocol (HeartMath) would result in improved attitudes about personal and organizational qualities as measured by the Personal and Organizational Quality Assessment-Revised (POQA-R) between groups. Also including in the study was an estimate of perceptions of stress resilience using an Emotional Quotient inventory: Short (EQi:S) electronic survey. The experimental design aimed to compare those receiving this training (treatment group) with those not receiving the training (control group) over the course of one academic school year. Observing the changes that may take place in attitude and perception between the different time points involved was also considered should insufficient data be provided for a between subjects evaluation.

Hypotheses

The primary hypothesis in this study is that there will be significant differences in scores on the POQA-R and EQ-i:S between treatment and control groups with the treatment group displaying higher scores in personal and organizational quality and emotional intelligence compared with control. Also that the differences over time within the treatment and control groups will not be significantly different at time one but will show a marked discrepancy between data collection time 2 and time 3 after HeartMath training. Provisional evaluation of data will include pooling treatment and control groups and evaluating changes in the POQA-R and EQ-i:S over time with a separate evaluation of HeartMath among the treatment group of subjects between time 1 and time 2. This provision is based on anticipating attrition and non-compliance among treatment group subjects, which will negatively influence study results with regard to the ability to make causal statements and generalizability. A brief qualitative explanation will be included with the Methods section of this research.

Research Questions

Research questions associated with this study address the degree to which elementary school teachers feel stress impacts their perception or attitude about their personal and organizational quality domains. To determine if elementary teachers feel modifying their emotional landscape can create a new skill for empowering their previous coping strategies using the HeartMath training system and will this be reflected in the scores from the POQA-R and EQ-i:S, original research questions include:

1. Does HeartMath training significantly alter POQA-R and EQ-i:S scores between groups?
2. Do HeartMath skills carryover from the fall to the spring of one academic year?
3. Is there a difference between initial and subsequent exposure to HeartMath tools (Heart Lock-In and Heart Rhythm training, within group effects)?

Provisional questions include:

1. What are the mean score differences over time on the POQA-R?
2. Is there a correlation between POQA-R results and overall group EQ-i:S?

Elementary school educators are selected for this study due to the assumption that adults have a significant impact on children's social, emotional, intellectual, physical, spiritual, and environmental wellness. In particular, the influence teachers have on the emotional development of their students as a reflection of their own personal degree of emotional health. Teachers selected were members of small, rural public elementary schools. They are less likely to have had experience with the HeartMath protocol and were available and willing to participate in this study. The original title of this proposed research was Resilience among elementary educators exposed to HeartMath training as measured by the Personal and Organizational Quality Assessment-Revised. Due to the small sample size, missing data, and invalid scores the title and design were modified to allow for data analysis and reflects the current description of the study conducted- Resilience among elementary educators as measured by the Personal and Organizational Quality Assessment-Revised and the Emotional Quotient inventory: Short. Both the qualitative and EQi:S were added after evidence that subject non-compliance was going to negatively impact the original design of the study.

Definitions

Auto or self-regulation-as defined by Posner & Rothbart (2000) self-regulation is the single most crucial goal for advancing an understanding of development and psychopathology. A specific form of self-regulation, emotion regulation involves dynamic processes that modulate emotional expression in current situations and influence cognitive processes (Campos, Mumme, Kermoian, & Campos, 1994).

Coherence- is the quality of being logically or aesthetically consistent, with all separate parts fitting together to form a harmonious or credible whole. When applied to the systems of the body this term is representative of homeostasis between all functional units and can be reflected within the ANS as increased range of the HRV wave pattern with a sinusoidal depiction of the graph mode. In other words, an ordered constructive distribution of power within a single waveform with the more stable the frequency and shape of the waveform the higher the coherence revealed. A sine wave is a coherent wave. In addition because there are multiple oscillatory systems in the body when these systems are more rhythmic and stable they may oscillate at the same frequency. The benefits to the system coherence confers result in increased cardiac output in conjunction with increased efficiency in fluid exchange, filtration , and absorption between the capillaries and tissues; increased ability of the cardiovascular system to adapt to circulatory requirements; and increased temporal synchronization of cells throughout the body, ultimately providing increased energy system-wide and metabolic energy reserve increase (IHM, 2004).

Dimensions of Wellness (James Madison University, Department of Health Sciences, 2006)

Emotional Dimension-Emotional development emphasize an awareness and acceptance of one's feelings. Emotional wellness includes the degree to which one feels positive and enthusiastic about oneself and life. It includes the capacity to appropriately control one's feelings and related behaviors including the realistic assessment of one's limitations, development of autonomy, and ability to cope effectively with stress. The emotionally well person maintains satisfying relationships with others**.** Emotional wellness follows these tenets: It is better to be aware of and accept one's feelings than to deny them. It is better to be optimistic in one's approach to life than pessimistic.

Intellectual Dimension-Intellectual development encourages creative, stimulating mental activities. An intellectually well person uses resources available to expand her/his knowledge in improved skills along with expanding potential for sharing with others. An intellectually well person uses the intellectual and cultural activities in the classroom and beyond with the human and learning resources available within the university community and the larger community. Intellectual wellness follows these tenets: It is better to stretch and challenge the mind with intellectual and creative pursuits than to become self-satisfied and unproductive. It is better to identify potential problems and choose appropriate courses of action based on available information than to wait, worry and contend with major concerns later.

OccupationalDimension-Occupational development is preparing for work in which one will gain personal satisfaction and find enrichment in one's life through work. Occupational development is related to one's attitude about her/his work. Traveling a path toward occupational wellness, allows for contributing unique gifts, skills and talents to work that is both personally meaningful and rewarding. Occupational wellness follows these tenets: It is better to choose a career which is consistent with personal values, interests, and beliefs than to select one that is unrewarding. It is better to develop functional, transferable skills through structured involvement opportunities than to remain inactive and uninvolved.

Physical Dimension-Physical development encourages cardiovascular, flexibility and strength training as well as knowledge about food and nutrition. The physical dimension also encourages efforts to protect one's self from physical hazards and discourages the use of tobacco, drugs and excessive alcohol consumption. It encourages consumption and activities, which contribute to high level wellness including medical self-care and appropriate use of the medical system. Physical wellness follows these tenets: It is better to consume foods and beverages that enhance good health rather than those which impair it. It is better to be physically fit than inactive. Social-Social development encourages contributing to one's human and physical environment to the common welfare of one's community. It emphasizes the interdependence with others and nature. It includes the pursuit of harmony in one's family. Social wellness follows these tenets: It is better to contribute to the common welfare of the community than to think only self-centeredly. It is better to live in harmony with others and the environment than to live in conflict with them.

SpiritualDimension-Spiritual development involves seeking meaning and purpose in human existence. It includes efforts to develop one's personal philosophy as well as the development of a deep appreciation for the depth and expanse of life and natural forces that exist in the universe. Spiritual wellness follows these tenets: It is better to ponder the meaning of life for ourselves and to be tolerant of the beliefs of others than to close our minds and become intolerant. It is better to live each day in a way that is consistent with our values and beliefs than to do otherwise.

Emotion/s- may be considered synonymous with stimulus perception and ANS integration for identification of a state to the body. For the purpose of this study emotions are not generated exclusively in the CNS but have a significant contribution from both the organism as a whole body (soma), psyche (mind) and the cardiac system (heart).

Emotional abilities- refers to those skills that promote the full expression of the components of emotional intelligence. In this investigation emotional abilities are manipulated through a specific set of procedures designed to facilitate positive affective emotion production for the purpose of transforming stressful situations in the moment to safeguard health, to improve cognitive function, to facilitate creativity, memory, and emotional history re-patterning of neurological pathways.

Emotional intelligence-as described by Mayer and Salovey (1997) the ability to perceive accurately, appraise and express emotion; the ability to assess as well as generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth (p. 10). These authors delineate emotional intelligence as four main branches with eight subsets; 1) emotional perception, involves registering, attending to, and deciphering emotional messages as they are expressed in facial expressions, tone of voice, objects in view or other cultural artifacts, 2) emotional integration recognizes emotions as complex organizations of the physiological emotional-experiential, cognitive, and conscious aspects of mental life, 3) emotional understanding, someone capable of deciphering meaning from emotions, having the capacity to understand fundamental truths of human nature and inter-individual relationships, 4) emotional management, thoughts promote emotional, intellectual and personal growth. Bar-On (2000, p. 364) defines emotional intelligence as a component of the wider area of social and emotional intelligence and is comprised of the following elements; self-regard, emotional self-awareness, assertiveness, empathy, interpersonal relationship, stress tolerance, impulse control, reality testing, flexibility, problem-solving, optimism, self-actualization, happiness, independence, and social responsibility. Concisely stated Bar-On feels that emotional intelligence is a multi-factorial array of interrelated emotional, personal, and social abilities that influence the overall ability to actively and effectively cope with daily demands and pressures (2000, p. 385). Graczk, Weissberg, Payton, Elias, Greenberg, and Zins (Handbook of Emotional Intelligence, 2000, p.395) express two categories for students' protective factors: those pertaining to the environment and those pertaining to the child. Of interest for this research are those pertaining to the child that include social and emotional competencies such as interpersonal skills, a pleasant disposition, good problem-solving abilities, self-efficacy, positive sense of self, effective communication skills, and high aspirations. They are pertinent due to the connection with these competencies being displayed by the teachers of these students in the context of this study.

Matthews and Zeidner model their definition of emotional intelligence along those of Lazarus and Folkman (1984) in terms of: underlying *processes* that support emotional management, regarded as labeling somatic sensations, selecting verbal descriptors; *behaviors* that implement emotion management, in terms of emotional expression or avoidance; and *outcomes* of emotional management such as the degree of harm resulting from an encounter, an individual's feelings of satisfaction or dissatisfaction, and the extent of physical health problems that may develop over time.

Heart rate variability-as a physiological indicator of the ability to create by conscious focus and re-creation of positive affective emotions a level of HRV depicted by high frequency, with smooth sine-wave like graphic representation.

Positive affect-encouraging behavior, especially in the young, that is considered morally good, a positive role model, something that shows agreement, support, or affirmation and includes terms such as love, care, appreciation, gratitude, forgiveness, thankfulness, acceptance, patience, kindness, diligence.

Resilience in education is defined as those successful fostering, empowering, enthusiastic attributes that create life-long learners among students and applies to how well students and teachers bounce back from stress, trauma, or risk in their lives, especially those events considered negative and the strategies used to combat these experiences, while becoming stronger in the process (Henderson & Milstein, 2003). In the Handbook of Emotional Intelligence (2000) Topping, Bremner, and Holmes state that social competence is a major component of resilience, those socially competent and integrated are more likely to be able to withstand the stresses of life and avoid those temptations involved in self-damaging behavior thus children need to feel valued and secure as well as teachers.

Stress-for the purposes of this study stress will be considered those events or perceptions that appear to stimulate strain, anxiety, constant worry, tension, trauma, hassle, pressure, dis-ease/uneasiness, embarrassment, disgust, nervous tension, fatigue, exhaustion, aggravation, or any similar emotion that causes an imbalance in the ANS homeostatic balance.

Stress Resilience-the rapid response and recovery of the stress response systems (i.e., SNS, cardiac, respiratory, integumentary, immune, etc.) to repeated challenges, the ability to bounce back from negative emotional experiences (Tugade, 2001).

Delimitations

This study is delimited to a predominately-female population of subjects between the ages of 22 and 60, as these are the members within the school districts selected. The study is delimited to survey collection within the academic year, spaced to meet the previous designation of fall, spring, and summer. The final data collection session will be at the discretion of the teachers (given a week to complete and return to their school mailbox). All other data collection will be conducted under researcher supervision. Sample population includes elementary teachers from two small, mid-Western school districts. Instruments used include the Personal and Organizational Quality Assessment-Revised (POQA-R) and the Emotional Quotient-inventory: Short, (EQi:S). Both groups will be administered the POQA-R one time during the fall, spring, and summer. There will be two administration of the EQ-i:S to both groups in spring and summer. Data will be analyzed using SPSS version 13.0. SPSS methods may include those for analyzing data (outliers, normality-skew, kurtosis, K-S test, and histogram, as well as power and effect sizes) univariate analysis of repeated measures and for descriptive statistic determination.

Limitations

Small, non-random, selective sample size will limit generalizability to similar environments and groups. The ability to detect significance may be compromised by the number of subjects who complete the program as described, providing valid cases. Comprehension of the purpose and process of the study by all teachers in the treatment group may not be uniform and may influence data results. Self-report inventories in this case may be adequate due to the integrity of the EQi:S ability to measure emotional knowledge and the attitude quality being measured with the POQA-R being established with adequate reliability values using Cronbach's coefficient alpha. The POQA-R achieved acceptable score reliability ranging from 0.65 to 0.90 on all dimensions. The POQA-R was determined to have adequate face validity. Other factors occurring concurrently may influence study data, i.e., knowledge of disasters affecting native as well as foreign lands, may have affected how individuals responded to questions about their quality of life differently than if they had not known about those affected by such catastrophes. Non-blind study may have produced bias from the primary investigator and unduly compromise study findings. A repeated measures design will have improved power but is not immune to potential alpha inflation.

Assumptions

Although the independent variable (HeartMath training) consists of only one level it may be that using univariate repeated-measures analysis of variance (ANOVA) may not meet the assumption of sphericity. To address this possibility Greenhouse-Geisser, as described in Tabachnick and Fidell (2001) for violation of sphericity with univariate repeated-measures analysis, and Huynh-Feldt tests will be performed. If sphericity is violated and the multivariate approach is nullified due to small sample size in this study, a trend analysis option exists to explore findings with this research. If the sample size is too small for meaningful data analysis, control and treatment groups will be combined and mean differences over time will be examined on the POQA-R instrument. Means on the EQi:S will be compared between study sample and normative reference values.

Summary

. In conclusion, this research is aimed at quantifying the impact of a stress transformation system (HeartMath) on elementary educators' stress-resilience and quality of life as measured by the POQA-R. The goal of this research is to introduce the HeartMath system to this test group, and provided significant influences are found, have elementary teachers better qualified and empowered to teach stress-resilience skills, as formulated by HeartMath, to their students. The benefit of elementary teachers being aware of this heart-focused, positive-affect emotional tool allows early school-based introduction and access to this intervention that may significantly improve student health, relationships, and academic performance, ultimately shaping the course of health education, learning, health behavior, and ultimately the nation's health in a constructive direction.

CHAPTER 2

REVIEW OF LITERATURE

Introduction

Determining the extent to which a heart-focused, positive affective based intervention has influence on elementary teachers' attitudes about their personal and professional quality domains (resiliency) as measured by the POQA-R between treatment and control groups is the problem in this study. Discovering the relationship between self-report emotional intelligence ratings during two different time points of the academic year as measured by the EQ-i:S is also investigated. Evaluation of changes in POQA-R scores over three time points of the school year will be combined between treatment and control groups should attrition, non-compliance, and small sample size prohibit comparative data analysis between the two groups. Comparing the initial to subsequent practice of the HeartMath program with one group may be evaluated for significant effect of time should sufficient valid cases be available.

The intervention in this study uses a computer software program that provides HRV feedback as a biomarker of successful accomplishment and *coherence*[1] scores also supporting successful reproduction of a positive, heart-generated feeling. The result of this ability to reproduce positive emotions from heart visualization/focus, particularly appreciation, including regulated breathing, resulting in positive modification of physiology (coherence) is proposed by the Institute of HeartMath Quality Instructor Program (2005). The tenets of this program and their elements contributing to this research endeavor will be examined in this chapter.

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[1] The term coherence relates to the entrainment of oscillatory systems in the body which facilitate synergistic functioning and beneficial results for the entire organism.

Dimensions of Wellness

The foundation of this research is the premise that resilient health is vital to optimal human existence and that the quality of that resilience depends heavily upon acknowledging all the dimensions of well-being, not only the mental and physical but also the spirit and emotions (CDC, 2005; Chek, 2004; Davis et al, 2000; http://www.healthypeople.gov; U.S. Dept. of Health & Human Services, 2005; Seaward, 2003; WHO Insel & Roth, 2005;). These two facets have not been as frequently pursued in Western medicine until the past two decades (Seaward, 2003). Formulating measurements for the emotional dimensions are being pursued (Bar-On, 1997; Mayer & Salovey, 1997; Schutte, Malouff, Hall, Haggerty, Cooper, Golden, & Dornheim, 1998).

Inspecting the literature for the relationship between emotions (positive and negative) and health in terms of morbidity, mortality, and immunity (specific immune cells lines, e.g., secretory immunoglobulin A, cytokines) as well as the impact on the endocrine system via cortisol levels (Pressman & Cohen, 2005) will be presented. Relating research on cardiac physiology, the ‘heart-brain’, intuition, heart signaling potential and heart parameters for health status, e.g., HRV is addressed. The last component of this chapter will address the construct of resilience (stress-resilience), positive emotions, and the educational system, specifically targeting elementary school educators.

While acknowledging the modern foundational definition of human health as more than the absence of disease, this view does not readily equate to global acceptance of dimensions of wellness created by Hettler (2006)(Balog, 2005). A search using EBM reviews, dissertation abstracts and CINAHL (Cumulative Index of Nursing and Allied

Health Literature) returned 43 articles relating quality of life with the dimensions of health and 45 articles when comparing quality of life with domains of health. Varying numbers of dimensions (3-10), using the term domain in place of dimension, and validation research between different health-related quality of life instruments among English speaking countries and among non-English speaking nationalities, constituted the major theme among these 88 articles. Brown, Kazis, & Spitz, (1984) used physical disability, psychological disability and pain as their dimensions of health outcomes. Swallen, Reither, Haas, & Meier (2005) included school functioning in their health-related quality of life assessment of adolescents. Others used dimensional terms relating to specific populations or specific disease states, e.g., the elderly, osteoporosis, HIV, giant cell arteritis, etc. (Hellmann, Uhlfelder, Stone, Jenckes, Cid, Guillevin, et al., 2003; Kessenich & Guyatt, 1998; Noël, Williams, Unützer, Worchel, Lee, Cornell, et al., 2004; Ostbye, Krause, Norton, Tschanz, Sanders, Hayden, et al., 2006; Turner, Page-Shafer, Chin, Osmond, Mossar, Marstein, et al., 2001). Searching PsycINFO using the terms "dimensions of health" resulted in 21 articles, which also fit within the categories mentioned previously.

Selecting only one dimension of health and searching the literature with PsychINFO from 1806 to July week 2/2006, using the terms positive affect and dimensions of health, 2 articles were found. Research conducted by Ng, Yau, Chan, Chan, and Ho (2005), based on their Body-Mind-Spirit model of health promotion (Chan, Ho, & Chow, 2002), who developed the Body-Mind-Spirit Well-Being Inventory (BMSWBI), comprised of four scales: Physical Distress, Daily Functioning, Affect, and Spirituality (differentiated from religiosity and conceived as ecumenical). They had 674 Chinese adults from Hong

Kong complete the BMSWBI via the Internet. Their results indicate that all four scales have high reliability (alpha coefficients ranging from .87 to .92), and concurrent validity.

In earlier work by Hays and Stewart (1990) a multidimensional model of self-reported health status in 1,980 patients with 1 or more chronic medical conditions was evaluated. Two dimensions of health were hypothesized: Physical health was defined by measures of physical functioning, role limitations, satisfaction with physical ability, and mobility; mental health was defined by depression, positive affect, anxiety, and feelings of belonging. Physical and mental health was correlated but distinct, sharing about 20% of variance. They concluded that self-reports of physical and mental health was distinguishable and that both constructs need representation for comprehensive assessment of health status. Ng et al (2005) placed Affect as a separate scale whereas Hays and Stewart subsume affect within the area of mental health.

Emotional Influence on Wellness

The melding of mind-body into a systems approach for healing has been examined extensively within the last thirty years (Ader, 1983; Gazella & Snyder, 2006; Jacobs, 1996) as psychoneuroimmunology (PNI). Adding positive emotions to this concept of PNI reveals one investigation (Marshall, O'Hara, & Steinberg, 2002) relating to seasonal allergies. Numerous studies of PNI exist in the context of health and negative affect or stress (Glaser, 2005; Jemmott, 1985; Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002; Lovallo, 2005; SchuIz, Heesen, & Gold, 2005; Tosevski & Milovancevic, 2006). Before evaluating the health literature explicitly on positive and negative emotional influences, background information on views distinguishing emotions from cognition, will be addressed.

According to Funk and Wagnalls dictionary (1978) an emotion is any strong manifestation or disturbance of the conscious or the unconscious mind, usually non-volitional and often leading to complex bodily changes and forms of behavior; an act or state of excited feeling, the power of feeling which may or may not lead to a corresponding set of activities. Though this depiction may be somewhat dated, the contributors to Dalgleish and Power's Handbook of Cognition and Emotion (1999) appear to support this description.

Zajonc (1980) states affective judgments may be independent of, *and occur before,* the thinking associated with those affective judgments. His views were opposed by Lazarus (1991) who feels emotions require both cognition and motivation to occur, and in fact only occur in response to meaning. Lazarus (1999, p. 10) does express a real difference existing between emotion, cognition, and motivation, stating that without motivation, thought is emotionless, motivation without thought is drive or energy without direction, and these three constructs are not equivalent as emotion is an amalgam of the other two. The combined meanings of separate appraisal components are the proximal cause of an emotion, referring to the significance of a transaction between person and environment for <u>well-being</u> (Johnson, Chang, & Lord, 2006; Lazarus, 1999; Pope, 2005) and is the infrastructure determining most of what is felt and performed.

While supporting Lazarus view of the interconnectedness of cognition and emotion Lewis (1992) states primary emotions such as fear, interest, anger, disgust, sadness, and joy do not require introspection or self-consciousness and thus cognitive involvement is limited but more complex emotions of jealousy, envy, empathy, embarrassment, shame, pride and guilt do require elaborate cognitive processing. Dissecting these different emotions Davidson, Ekman, Saron, Senulis, & Friesen (1990) and LeDoux (1992) provide evidence for unique physiological patterns for each. Supporting these researchers Ekman (1999, p. 54) describes similar characteristics that guide distinctions between the basic four emotions recognized in cultures around the world (anger, fear, sadness, and joy). These distinctions include universal signals, distinctive physiology, automatic appraisal influenced by ontogenetic and phylogenic history, and commonalities in antecedent events, which precipitate the emotion.

Emotions link to psychological and physical health, school performance, group and organizational productivity, work relationships, and social-emotional learning has and is being investigated in the literature (Druskat & Wolff, 2001; Goleman, 1995; LeDoux, 1999; Matthews & Zeidner, 2000; Mayer & Salovey, 1990; Payton, Wardlaw, Graczyk, Bloodworth, Tompsett, & Weisberg, 2000; Pressman & Cohen, 2005; Saarni, 1999; Southwick, Vythilingam, & Charney, 2005; Sternberg, 2001). Determining the extent to which individuals cope with life events also relates to emotions and emotional development (Saarni, 1997; Zeidner, Matthews, Roberts, & MacCann, 2003). Saarni and others (1999) feel emotional competence skill attainment results in three consequences; skill in managing emotions, a sense of subjective well-being, and adaptive resilience (Asher & Rose, 1997; Compas, Worsham, & Ey, 1992; Crick & Dodge, 1994; Denham, 1999; Fox, 1994; Garber, Braafladt, & Zeman, 1991; Parke, Cassidy, Burks, Carson, & Boyum, 1992; Thompson, 1991; Wolchik & Sandler, 1997). Examining emotions from the developmental standpoint, Saarni (1999) describes eight specific skills signifying emotional competence.

1. Awareness of an emotional state, or multiple feelings being experienced while acknowledging feelings due to unconscious dynamics or selective inattention.
2. Skill in emotional empathy, based on situational and expressive cues, possibly culturally dependent as to their emotional meaning.
3. Skill in lexithymia, developing at mature levels cultural scripts linking emotion with social roles.
4. Capacity for empathic and sympathetic involvement with other's emotional experiences.
5. Skill in emotional expression such that what is felt is not reflected in the outward expression and how emotional-expressive behavior may influence others. The ability to use this understanding in self-presentation strategies.
6. Skill in adaptive coping with aversive or distressing emotions by using self-regulatory strategies (such as 'stress hardiness') that restructure the intensity or temporal duration of such emotional states.
7. Awareness that the nature of relationships is partly defined by degree of emotional immediacy or genuineness of expressive display as well as by the degree of reciprocity within the relationship. A mature intimacy may be defined by reciprocal sharing of genuine emotions, whereas parent-child relationships may have asymmetric sharing of genuine emotions.
8. Capacity for emotional self-efficacy in which individuals view themselves as feeling, overall, the way they want to feel. Emotional self-efficacy means

accepting emotional experiences, whether novel and eccentric or within cultural norms. Acceptance aligns with the individual beliefs about what constitutes desirable emotional homeostasis.

Construct of Emotional Intelligence

In comparison to emotional competence, Mayer and Salovey (1990) developed the construct of emotional intelligence. Although they feel emotional intelligence operates across both cognitive and emotional systems, in a somewhat unitary fashion, it holds four domains or branches (Mayer & Salovey, 1990). This four-branch model is composed of a) emotional perception and identification where there is recognition and information input from the emotional system; b) emotional facilitation of thought; c) emotional understanding, in which both emotional thought facilitation and understanding involve further information processing, aimed towards the goal of problem solving; and d) emotional management of self and others emotions. These authors do not consider the terms emotion and intelligence related to such mechanisms as motivation, or such traits as optimism, sociability, or good relationships.

Building on this model of emotional intelligence Goleman (1995, p. 43) stated that a five part model defines this construct. The first part of his model is *knowing emotions*, self-awareness of a feeling as it happens and emotional changes from moment to moment. The second part and third parts are *managing emotions*, the emotional skill of handling emotions appropriately and *motivating oneself*, directing emotions in the service of a goal, which is essential for paying attention, for self-motivation and mastery, and for creativity. The fourth and fifth parts are *recognizing emotions in others*, empathy kindling altruism, and being tuned to others needs or wants and *handling relationships*, the skill of handling emotions in others. Emotional handling and relationships has been applied recently in the school and industry setting (Bocchino, 1999; Cohen, 2001;Druskat, & Wolf, 2001; Elias & Arnold, 2006; Erricker, 1999; Hake, 2005; Harris, 1998; McCraty, 2005).

Similar to Goleman (1995) Bar-On (1997, 1999, p. 147) has developed essential skills and subsets of competencies for a five part model of non-cognitive intelligences, which also provide skills or competencies within each: Intrapersonal skills (emotional self-awareness, assertiveness, self-regard, self-actualization, and independence), Interpersonal skills (interpersonal relationships, social responsibility, empathy), Adaptability (problem solving, reality testing, flexibility), Stress management (stress tolerance, impulse control), and General mood (happiness, optimism). Bar-On (1999, p.385) describes emotional intelligence as emotional and social intelligence that function as a multifactorial array of interrelated emotional, personal, and social abilities. These abilities influence our capacity to actively and effectively cope with daily demands and pressures. Matthews and Wells (1996) concur with this deduction, i.e., successful coping with stressful encounters being central to any construct of emotional intelligence but disagree that the level of emotional intelligence correlates with the degree of stress experienced. Elias and Arnold (2006) list 4 essential skill domains for social-emotional learning with competencies within each (Table 1).

Expanding on the emotional and social intelligence as described by Bar-On (1999) Arnold (2005) states the theory of empathic intelligence is relevant to person-centered situations and professional contexts, e.g., teaching and learning, by explaining some of the skills, abilities, and attitudes that bolster effectiveness in these areas, such as enthusiasm, expertise, the capacity to engage, and empathy. Her central arguments center on enhancing learning by recognizing how thoughts and feelings work together to enhance both intellectual and emotional maturity. She distinguishes empathic intelligence from emotional intelligence based on two key issues, 1) empathic intelligence relies on a dynamic between both cognitive and emotional intelligence, and 2) the ethical intention associated with empathic intelligence, applying cognitive and emotional intelligence toward a creative or beneficial outcome, even if the outcome may not be entirely altruistic (Table 1). Teaching health behaviors is most effective when caring educators are empathic to their students (Hattie, 2003) and results in more caring generated within students (Arnold, 2005; Bobek, 2002; Doll, Zucker, & Brehm, 2004).

Positive Affect and Health

Clark, Watson, & Leeka (1989) have defined positive affect (PA) as those feelings reflecting a level of pleasurable engagement with the environment, such as enthusiasm, contentment, joy, excitement, and happiness. Pressman and Cohen (2005) have reviewed health outcomes influenced by PA stating the need to distinguish between trait and state PA. Trait PA, being a more stable disposition-like emotional condition, would relate to development of disease outcomes that take a long time to appear, like chronic diseases and overall mortality. State PA, referring to short-term feelings of positive emotions, having their influence on events or bouts of ongoing disease processes, as in asthma or heart disease. They inspected studies in regards to PA and mortality, morbidity, survival,

Table 1

From The Educator's Guide to Emotional Intelligence and Academic Achievement; Social-Emotional Learning in the Classsroom. Maurice J. Elias and Harriett Arnold. The Collaborative for Academic, Social, and Emotional Learning's Essential Skills for Academic and Social-Emotional Learning

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♥ **Know Self and Others**
-identify feelings by recognizing and labeling one's feelings
-be responsible by understanding one's obligation to engage in ethical, safe, and legal behaviors
-recognize strengths of character by identifying and cultivating positive qualities

♥ **Make Responsible Decisions**
-manage emotions by regulating feelings so they aid rather than impede handling of situations
-understand situations by accurately interpreting circumstances
-set goals and make plans by establishing and working toward achievement of specific short- and long-term outcomes
-solve problems creatively by engaging in creative, disciplined processes of exploring alternative possibilities that lead to responsible, goal-directed action, including overcoming obstacles to plans

♥ **Care for Others**
-showing empathy by identifying and understanding the thoughts and feelings of others
-respect for others by believing that others deserve to be treated with kindness and compassion as part of our shared humanity
-appreciate diversity by understanding that individual and group differences complement one another and add strength and adaptability to the world around us

♥ **Know How to Act**
-communicate effectively using verbal and nonverbal skills to express oneself and promote effective exchanges with others
-build relationships by establishing and maintaining healthy and rewarding connections with individuals and groups
-negotiate fairly thereby achieving mutually satisfactory resolutions to to conflict by addressing the needs of all concerned
-refuse provocations by conveying and following through effectively
-with one's decision not to engage in unwanted, unsafe, or unethical behavior
-seek help by identifying the need for and accessing appropriate assistance
-act ethically which involves guiding decisions and actions by a set of principles or standards derived from recognized legal and professional codes or faith-based systems of conduct

disease severity and physical functioning, PA and self-reported health status, in relation to cardiovascular effects, endocrine function, and immune function.

Results for PA and mortality are dependent on baseline measures of health, age of subjects, and degree of PA-extreme PA associated with increased mortality. PA and morbidity was unanimously supported for association between higher levels of PA and health (Cohen, Doyle, Turner, Alper, & Skoner, 2003; Ostir, Goodwin, Markides, Ottenbacher, Balfour, & Guralnik, 2002; Smith, Stuart, Wiese-Bjornstal, & Gunnon, 1997). Survival studies were too inconsistent and few in number to have conclusions drawn. Disease severity and physical functioning data suggests possibility that the association of PA and health outcomes vary with the extremity of the affective response, most likely due to effects on arousal level. Extreme PA had detrimental effects and thus PA may most be associated with improvement of health outcomes subject to motivation and self-report bias. Self-report measures provide evidence linking PA to reported fewer incidence of symptoms, less pain, and better health but may reflect inaccurate perception of the actual somatic condition rather than the affect-elicited changes in physiological processes (Cohen & Williamson, 1991; Mechanic, 1977; Pennebaker, 1982).

PA and cardiovascular effects indicate a key role of arousal. High energy PA in experimental studies of heart rate and blood pressure and correlational studies of blood pressure only revealed increases in cardiovascular response. This response may be due to the influence of PA on both the withdrawal or activation mechanisms of the parasympathetic nervous system (the dampening system to the sympathetic nervous system). Endocrine influence via natural environment studies disclose an association between lower cortisol, epinephrine, and norepinephrine levels and high trait and state

PA (Berk, Tan, Fry, Napier, Lee, Hubbard, et al, 1989; Codispoti, Gerra, Montebarocci, Zaimovic, Raggi, & Baldaro, 2003; Cohen et al, 2003), and some report no change in adrenal hormones epinephrine, norepinephrine, and cortisol with state PA (Ryff, Singer, & Dienberg Love, 2004; Szczepanski, Napolitano, Feaganes, Barefoot, Luecken, Swoap, et al, 1997). Codispoti et al (2003) also found increases of prolactin and Berk et al (1989) found increases in growth hormone with PA. Increases of these hormones thought to be associated with improved health.

Immune function studies show secretory immunoglobulin A (SIgA), an antibody associated with defense of mucosal surfaces, in response to a positive mood induction via movies, music, or self-referent statements, increased (Dillon, Minchoff, & Baker, 1985; Hucklebridge, Lambert, Clow, Warburton, Evans, & Sherwood, 2000; Labott, Ahleman, Wolever, & Martin, 1990; Lambert & Lambert, 1995; Lefcourt, Davidson-Katz, & Kueneman, 1990; McClelland & Cheriff, 1997; McCraty, Atkinson, Rein, & Watkins, 1996; Njus, Nitschke, & Bryant, 1996; Perera, Sabin, Nelson, & Lowe, 1998). There is evidence for induced PA and increased chemical messengers, cytokines, interleukin (IL)-2 and IL-3 and decrease of tumor necrosis factor alpha (Mittwoch-Jaffe, Shalit, Srendi, & Yehuda, 1995).

From their review, Pressman and Cohen (2005) indicate two possible mechanisms linking PA to health outcomes, one is the direct effects of PA on behavior and physiological systems (most associated with trait or enduring state PA) and the other is that psychological stress triggers behavior and physiological responses inimical to health and PA impacts health because it aids people in coping with stressful events (stress buffer). Support for their psychological stress trigger model is Fredrickson's (1998) "broaden and build" theory where positive emotions encourage exploration and creativity and result in building social, intellectual, and physical resources and Salovey, Rothman, Detweiler, & Steward's (2000) suggestions that positive emotions generate psychological resources by promoting resilience, endurance, and optimism. Lyubomirsky, King, and Diener (2005) evaluated cross-sectional, longitudinal, and experimental evidence of PA and success. Their results indicate happiness is associated with and precedes numerous successful outcomes and behaviors. They denote PA as the hallmark of well-being and state it may be the cause of many desirable characteristics, resources, and successes correlated with happiness, i.e., fulfilling marriages and relationships, high incomes, superior work performance, community involvement, robust health, temporal longevity, optimism, energy, originality, and altruism (Lyubomirsky, King, & Diener, 2005). Studies of negative emotions, like hostility, anger, and depression, effects on health in the literature are void of attempts to account for the potential confound of positive emotions, thus should be studied in conjunction with one another (Pressman & Cohen, 2005). Childre, Martin, & Beech (1994) created the term HeartMath to describe the positive emotional qualities associated with the word heart, i.e., love, courage, strength, passion, wisdom examined scientifically viz. the math part.

HeartMath

Key elements proposed in HeartMath Solution (Childre, Martin, & Beech, 2004) include heart intelligence described as discerning the difference between cognition within the brain and intellect within the heart and how this distinction alters perception and stress reduction based on changing perception toward a coherent function. Coherent individuals thrive mentally, emotionally, and physically with power to adapt and innovate. Other critical elements included managing emotions and applying knowledge to life, personally, professionally, and socially. As the major tenets of the HeartMath intervention in this research is based on PA that is heart generated, particular emphasis will address this unit of human anatomy. Specific parameters of heart function reviewed will include, HRV, heart rate (HR), neuronal and hormonal signaling from the heart, and the effect of positive and negative emotions on physiology. As the dichotomous relationship of the branches of the autonomic nervous system (ANS) influence heart function so the constructs of stress and stress-resiliency, via their activation of the ANS and other pathways, will be investigated for their impact on heart physiology. Although paced breathing is also a component of the intervention model it is not quantified singly, only as a constituent within HRV. Heart function as a biomarker of resiliency will be examined and what parameters of the heart are used in health/ stress-resiliency evaluation.

Neurocardiology

HRV is the interval between consecutive heart beats being analyzed rather than the heart rate per se (Arguelles, McCraty, & Rees, 2003; Armour & Ardell, 2004; Morner, Wiklund, Rask, Olofsson, Kazzam & Waldernstrom, 2005). According to the Task force of the European Society of Cardiology and the North American Pacing Electrophysiology Committee Report (1996) HRV is measured according to four criteria, when time domain is the experimental protocol, (1) standard deviation of normal-to-normal intervals (SDNN) which estimates overall HRV, (2) triangular index of normal-to-normal intervals which also estimates overall HRV, (3) average SDNN which estimate long-term components of HRV, and (4) square root of the mean squared differences of successive NN which estimates the short-term components of HRV. In the literature NN and RR are designates for consecutive interval distances between heart beats. Frequency domain methods exist for measuring HRV and provide the basic information of how power (variance) distributes as a function of frequency. The high frequency oscillations are associated with the parasympathetic nervous system (PSNS). High frequency refers to a larger degree of difference between the speeding up and slowing down of HRV. When depicted graphically would be revealed as the difference between the peak and the nadir of a series of accelerated and decelerated heart beats. This supports the known influence of the PSNS to slow heart rate. Conversely, the sympathetic nervous system (SNS) yields low frequency oscillations. The rate may be increased but the degree of difference between peak and nadir is reduced which supports the known action of the SNS to elevate heart rate (Carney, Freedland, & Stein, 2000).

To standardize physiological and clinical studies two types of recordings should be used whenever possible: (a) short-term recordings of 5 minutes made under physiologically stable conditions processed by frequency domain methods-power spectrum density win which mathematical calculations classified as nonparametric or parametric provide comparable results and/or (b) nominal 24-hour recording processed by time-domain methods (Task Force, 1996). The intervention in this study examined HRV feedback under physiologically stable conditions for short durations (5-10 minutes). PSNS mediates heart rate by acetylcholine release from the vagus nerve, SNS via catecholamine (norepinephrine and epinephrine) release. Homeostasis is maintained by acetylcholinesterase release from the sinus node for modification of PSNS activity and

SNS is counterbalance by cholinergically induce reduction of norepinephrine as well as cholinergic attenuation of adrenergic stimulation (Task Force, 1996). The neurogenic signals from the SNS and PSNS maintain discharge largely synchronous with each cardiac cycle and these can be modulated by central (vasomotor and respiratory centers) and peripheral (oscillation in arterial pressure and respiratory movements) oscillators. Both long- and short-term oscillations are generated by these oscillators and analysis of these rhythms permit inferences on the state and function of centrally generated oscillators, autonomic efferent activity, vascular factors, and the sino-atrial node (SA-node). In regards to autonomic efferent activity the low (LF) to high frequency ratio (HF) is considered to mirror sympathovagal balance or to reflect sympathetic modulations (Task Force, 1996) Autonomic withdrawal or sympathetic excess result in diminished HRV (Malpas, 2002; Rosenbaum & Levin, 2001; Tang, Chander, & Schramm, 2003; Wehrens, Lehnert, & Marks, 2005; Yun, Bazar, Gerber, Patrick, & Daniel, 2005).

Opposing the view of HRV as an acceptable and reliable measurement technique for autonomic and cardiac event risk are the views of Malpas (2002) and Sandercock, Bromley, and Brodie (2005). They feel this is a gross oversimplification due to the heterogenous nature and reliability of studies as well as the lack of longitudinal studies to confirm HRV as a reliable measure for prediction and correlation in connection with heart-related morbidity and mortality. They report the trend of reduced reliability of HRV in clinical populations compared to healthy subjects. For investigators wishing to use HRV these authors suggest reference to literature concerning measures similar to those they wish to employ, in terms of data collection, data treatment, and study population. Reliability coefficients must be included and calculated if not available with the study. The conditions, timing of measurement, and population used must also be specific to the study. Another study by Pinna, Maestri, LaRovere, Gobbi, & Fafulla, (2005) indicates no influence on HRV by paced breathing in a group of 40 supine, middle-aged volunteers. Their table of findings showed significance of $p<0.05$ between paced breathing subjects HF power of systolic arterial pressure and HF diastolic arterial pressure, compared to freely breathing controls and explained this finding as a peculiarity of the computational method. Conflate mitigate

Supporting HRV as a relevant biomarker Arguelles, McCraty, and Rees (2003) report RR changes in heart rate are reflective of heart-brain interactions and ANS dynamics. Loss of cardiac autonomic innervation by the brain is a strong predictor of sudden cardiac death (Gorman & Sloan, 2000; Kleiger, Stein, & Bigger, 2005). Heart rate and blood pressure have also been used as indices of sudden cardiac mortality (Jouven, Empana, Schwartz, Desnos, Courbon, & Ducimetiere, 2005) and baroreflex sensitivity (La Rovere, Bigger, Marcus, Mortara, & Schwartz, 1998; La Rovere, Pinna, Hohnloser, Marcus, Mortara, Norhara, Bigger, Camm, Schwartz & ATRAMI investigators, 2001).

The functional identification of afferent nerve cell bodies within the intrinsic cardiac nervous system permits the development of the *little brain* theory on the heart modulating regional cardiodynamics an a beat-to-beat basis (Armour, 1991; Randall, Wurster, Randall, & Xi-Moy, 1996). According to Armour (1991) this little brain on the heart consists of redundantly connected communities of excitatory and inhibitory neurons, which networks can generate a variety of behaviors (Kember, Fenton, Collier, & Armour, 2000). The interaction of this network is considered to operate in a hysteretic fashion which offers an explanation for neuronal memory (Armour, 1986).

Cardiovascular afferent neurons provide the ANS with hematological information (blood pressure, blood volume, blood gas levels) as well as mechanical and chemical status. These afferent neurons lie within the heart, lungs, and great thoracic vessels (Ardell, Butler, Smith, Hopkins, & Armour, 1991; Armour, 1983, 1986; Bosnjak & Kampine, 1989; Cheng, Powley, Schwaaber, & Doyle, 1997). Chemicals released into the cardiac interstitial fluid space associated with stimulation of the SNS include angiotensin II (ANG II) norepinephrine, epinephrine (Berecek & Brody, 1982; Farrel, Wei, Tallaj, Ardell, Armour, Hageman, Bradley, & Dell'Italia; Majewski, Rand, & Tung, 1981; Schmidt, Schurr, Hedler, & Majewski, 1984; Schwartz & Eikenburg, 1986).

Chemical release may be triggered by a variety of stresses, exercise, injury, blood loss, which signals an increased need for cardiac output and is met by commensurate increase in adrenergic drive (Dell'Italia & Ardell, 2004). Norepinephrine is released from sympathetic nerve endings in the heart resulting in elevated heart rate, rate of electrical conduction, and force of contraction. A sustained activation of the SNS results in increased ventricular wall stress, direct myocytes toxicity, myocardial fibrosis and lowering of ventricular fibrillation threshold (Dell'Italia & Ardell, 2004) The pattern of these RR changes is also sensitive to emotional states (McCraty, Atkinson, Tiller, Rein, & Watkins, 1995; McCraty, Barrios-Choplin, Rozman, Atkinson, & Watkins, 1998; McCraty, Atkinson, Tomasino, Goelitz, and Mayrovitz, 1999; Watkins, Krishnan, Blumenthal, & Grossman, 2000).

Putative deleterious influences of the mind on heart disease consist of type A behavior pattern (TABP), hostility, anger, depression, vital exhaustion, anxiety, mental stress, low social support, and lifestyle factors such as diet, exercise, amount and time of sleep (Gagnon, Ramachandruni, Bragdon, & Sheps, 2004). Characteristics of TABP include competitiveness, hostility, and exaggerated commitment to work and have been proposed as a separate risk factor for coronary atherosclerosis and coronary artery disease (CAD) (Rosenman, Brand, Jenkins, Friedman, Straus, & Wurm, 1975). Another feature of TABP suggested as being more problematic and representative of predicting cardiac disease is a constellation of traits consisting of aggravation, irritation, anger, and impatience (AIAI) in which higher levels of AIAI were observed in patients with multiple vessel CAD compared to those with single vessel disease (Ketterer, 1990).

Hostility incorporates traits of anger, cynicism, and mistrust (Dembroski, MacDougall, Costa, & Grandits, 1989). High hostility is associated with increased body mass index (BMI), poor pulmonary function, higher concentration of unhealthy lifestyle behaviors such as smoking, poor diet, obesity, alcoholism, higher heart rate and blood pressure responses to physiological and psychological stimuli (mental tasks) as well as higher ambulatory blood pressure during activities of daily life (Suarez & Blumenthal, 1991; Sul & Wan, 1993). Blood chemistries variance among hostile individuals include hypercortisolemia, higher circulating levels of catecholamines, decreased mononuclear leukocyte beta-adrenergic receptor function, increased platelet reactivity, and diminished vagal modulation of heart function (Fukudo, Lane, Anderson, Kuhn, Schanberg, McCown, et al., 1992; Markovitz, Matthews, Kiss, & Smitherman, 1996; Nelson, Franks, Brose, Raven, Williamson, Shi, et al., 2005; Pope & Smith, 1991; Suarez, Kuhn, Schanberg, Williams, & Zimmermann, 1998; Suarez, Shiller, Kuhn, Schanberg, Williams, & Zimmermann, 1997)

An angry temperament appears to predispose to CAD more readily than reactive anger (Williams, Paton, Siegler, Eigenbrodt, Nieto, & Tyroler, 2000). Anger, but not other mood states such as anxiety, worry, sadness, happiness, challenge, feeling in control, and degree of interest, caused arrhythmias in patients with implantable cardioverter defibrillators (Lambert, Joska, Burg, Batsford, McPherson, & Jain, 2002). One study found greater risk for ischemic heart disease in individuals who suppress anger (Gallacher, Yarnell, Sweetnam, Elwood, & Stansfeld, 1999) two others report greater incidence of CAD in those expressing versus repressing their anger (Rosenberg, Ekman, Jiang, Babyak, Coleman, Hanson, et al., 2001; Siegman, 1993).

Depression and vital exhaustion present mixed results in the literature, with failure to find a correlation between depression and cardiac events (Ruberman, Weinblatt, Goldberg, & Chaudhary, 1984) and substantial evidence for depression and cardiovascular disease. Positive connections between depression and cardiovascular disease was based on three observations a) high incidence of depression post-MI, b) depression adversely affects cardiac disease prognosis, and c) affected patients have higher-than-expected rates of sudden cardiac death (Anda, Williamson, Jones, Macera, Eaker, et al., 1993; Penninx, Beekman, Honig, Deeg, Schoevers, et al., 2000; Roose & Dalack, 1992; Ruberman et al, 1984;). Vital exhaustion has been considered separate from depression due to the association with short-term risk versus depression with long-term risk relation with CAD (Barefoot & Schroll, 1996). A possible psychobiological mechanism for vital exhaustion is the finding of excess cytokine production in the brain that may contribute to this psychological state by over stimulating the hypothalamic-pituitary-adrenal axis (Goodkin & Appels, 1997). Suls and Bunde (2005) indicate the overlap between anger-hostility, anxiety, and depression necessitating more complex affect-disease models and may implicate the case for trait negative affect rather than a specific negative affect on cardiovascular disease risk

Anxiety is associated with amplified CAD risk and may present a positive feedback mechanism for exacerbation of high blood pressure, smoking, alcohol use and the progression of atherosclerosis (Whitehead, Blackwell, De Silva, & Robinson, 1997). A substudy from the Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteris (GUSTO) trial suggested that acute MI patients with high in-hospital anxiety levels had almost a fivefold increase is risk for recurrent ischemia, reinfarction, or death compared to low anxiety MI patients (Moser & Dracup, 1996). Anxious symptomatology is associated with SNS hyperactivation resulting in tunica intima damage, inducement of amplified heart rate and blood pressure to behavior stimuli (Ablad, Bjorkman, Gustafsson, Hansson, Ostlun-Lindquist, & Petterson, 1988; Barnett, Spence, Manuck, & Jennings, 1997; Kamarck, Everson, Kaplan, Manuck, Jennings, et al., 1997; Nesse, Cameron, Curtis, McCann, & Huber-Smith, 1984; Petterson, Bejne, Bjork, Stawn, & Bondjers, 1990).

Stress, Positive Emotions, and Health

Stress may be defined as the discrepancy between physical and or psychological demands and the resources available for meeting those demands. Stress results in increased heart rate, blood pressure, respiration, muscle tension, perspiration, elevated levels of adrenal corticosteroids and catecholamines (Grignani, Pacchiarini, Zucchella, Tacconi, Canevari, et al., 1992; Pickering, 2001). Chronic high stress produces elevations of catecholamines and corticosteroids that damage arteries, contribute to the development of atherosclerosis, hypertension, and arteriosclerosis, and may precipitate MI (Kaprio, Koskenvuo, & Rita, 1987). Experiences of stress or negative emotions such as, anxiety, frustration, and anger are reflected by a RR wave pattern that is erratic and disordered which indicates desynchronization between PSNS and SNS as shown in Figure (IHM, 2004-requested).

Decreased PSNS tone may be a final common pathway linking negative affective states and disease conditions and disordered information processing (Hamilton, Karoly, & Kitzman, 2004; Hamilton & Malcarne, 2004; Thayer & Brosschot, 1994). Eisenberg, Champion and Ma (2004) relate PSNS activity with high-frequency HRV and effortful control on behavioral tasks and SNS involvement with reactive control, e.g., passive avoidance, avoidance of punishment, and low reward dominance and decreased HRV (Mezzacappa, Kindlon, Saul, & Earls, 1998). While positive emotions such as appreciation, love, and compassion, are associated with a highly ordered, coherent patterns in HRV, representing synchronization between the PSNS and SNS (Childre & Rozman, 2005, p. 15; Demaree, Schmeichel, & Robinson, 2004; Gallo, Chaed, & Bracken, 2004; Tiller, McCraty, & Atkinson, 1996). Positive emotional support (social interaction) is inversely correlated with CAD mortality and morbidity indicating those with small social networks have an elevated risk of CAD mortality and may be at greater risk for future cardiac events, especially among men with low availability of emotional support, social participation and living alone (Brummett, Barefoot, Siegler, Clapp-

Channing, Lytle, Bosworth, et al., 2001; Eriksen, 1994; Greenwood, Muir, Packham, & Madeley, 1996; Hansen, Isaacson, Janzon, & Lindell, 1989; House, Robbins, & Netzner, 1982; Kristenson, Kucinskiene, Bergdahl, Calkauskas, Urmonas, & Orth-Gomer, 1998; Orth-Gomer, Rosengren, & Wilhelmsen, 1993; Wolosin, Schwartz, Tosteson, Chang, Wright, et al., 1997). Emotional support may also mitigate the latent damaging effects of negative emotional interactions on neuroendocrine and physiological regulatory systems by means of dampening physiological responses to psychological challenges/stressors (Cohen, Rohta, Lavery, Muller, & Mittleman, 1997; Gerin, Milner, Chawla, & Pickering, 1995; Seeman, Berkman, Blazer, & Rowe, 1994).

Although CAD continues to be the number one cause of mortality in the United States and developed nations of the world mortality rates have declined by region and may be related to lifestyle modification and socioeconomic status (Gleichmann, Gleichmann, Manneback, & Baller, 1998; Lloyd, 1994; Marmot & Syme, 1976; Zafari & Wenger, 1998). Because cardiovascular risk factors accumulate from childhood, it is imperative to interrupt and prevent risk factors as early as possible (Berg, Halle, Bauer, Korsten-Reck, & Keul, 1994).

Synchronization patterns of heart rhythm and nervous system activity influence brain synchronization, which is the basis for perception, cognition and higher-ordered thinking (Arguelles, McCraty, & Rees, 2003). Thus when the heart is experiencing emotional stress a disordered signal is sent to the brain; the nervous system activity is chaotic and desynchronized resulting in inhibition of higher cognitive ability with limitation on clarity of thought, concentration, memory, learning, creativity, and reasoning. Conversely, positive heart-felt emotion signals from the cardiac organ to the brain transmit ordered, coherent messages to harmonize nervous system activity and facilitate higher cognitive functions (Armour & Ardell, 1994; Russek & Schwartz, 1996; Childre, 1998; McCraty & Childre, 2002; McCraty, 2005).

Studies examining the effects of positive emotions, such as forgiveness, gratitude, love, joy, and positive emotional management skills, provided by friends or family members, have found that students and young adults have improved psychosocial functioning, focus, interpersonal relationship with peers and teachers, use forgiveness as a problem-solving strategy, have broad-minded coping-the ability to consider different ways to deal with problems, and socioemotional learning programs significantly improve students' academic performance (Folkman & Moskowitz, 2000; Fredrickson & Joiner, 2001; Luecken, Rodriguez, & Appelhans, 2005; Luskin, 2005; Matheson, Kelly, Cole, Tannenbaum, Dodd, & Anisman, 2005; McCraty, Atkinson, Tomasino, Goelitz, & Mayrovitz, 1999; Shriver & Weissberg, 2005).

Work by Izard (2002) condenses the emotion-related aspects of preventive intervention in children's lives into 7 principles: utilization of positive and negative emotions, emotion modulation as a mediator of emotion utilization, emotion patterns in states and traits, different processes of emotion activation, emotion communication early in life, and the development of connections for the modular and relatively independent emotions and cognitive systems. She states these principles are intended to address children within the first 12 years of life to enhance their socioemotional competence and prevent the development of behavior problems and psychopathology (Fonagy, Gergely, Jurist, & Target, 2002; Izard, 2002). Also suggested with her prevention intervention model is that school based programs focus on training in social skills and problem-focused techniques or provide discrete emotion components as in anger management, and do not 'capture the central theme that motivation and adaptiveness are the core defining features of emotions' (Abe & Izard, 1999; Ackerman, Abe, & Izard, 1998; Cornelius, 1996; Izard, 1977, 1993; Izard, Ackerman, Schoff, & Fine, 2000; Izard & Malatesta, 1987; LaFreniere, 2000).

One study examined the discrete positive emotion of gratitude suggesting that gratitude may foster important insights into the connections between personality, emotion-especially the development of positive emotions, socialization, and psychological well-being (Emmons & Crumpler, 2000; McCullough, Kilpatrick, Emmons, & Larson, 2001; McCullough, Tsang, & Emmons, 2002, 2004). Another investigation indicated that unforgiveness was a negative emotion associated with stress and that forgiveness may be an effective emotion-focused coping strategy reducing the stressful reaction to a perceived transgression (Al-Mabuk, Enright, & Cardis, 1995; Exline, Worthington, Hill, & McCullough, 2003; Worthington & Scherer, 2003).

In an extensive examination of problem-solving, Heppner, Witty, and Dixon, (2004) state:

> ..the constellation of evidence from the accumulated research can be interpreted as suggesting that perceived effective problem solvers have better psychological and physical health, better coping effectiveness, and better vocational adjustment in general. This pattern of findings is found across a very wide range of adjustment indices, cognitive and affective processes, behavioral observations or measures, research designs (e.g., between groups, cross-sectional, prospective,

longitudinal, qualitatively oriented process analyses),and at least nine different cultures.

This characteristic of effective problem solving relates to individuals possessing a variety of strategies for coping flexibility in response to life's challenges/stressors. Those with flexible, effective, and contextually appropriate strategies (Cheng, 2001; Fisher, 1990; Tugade, 2001) exhibit high levels of adjustment and low levels of depression, whereas those exhibiting rigid repertoires demonstrate much higher levels of negative affect and depression (Conway, 2005).

Deciphering the psychobiology of depression, Southwick, Vythilingam, and Charney (2005) relate the neurobiology of chemical messengers, hormones, catecholamines, and cerebral and somatic receptors in relation to the brain regions involved in stress, depression, and resilience to stress. They incorporate 7 psychosocial factors associated with depression, stress, and stress resilience; positive emotions (optimism and humor), cognitive flexibility (positive cognitive explanatory style, positive appraisal, and acceptance), spirituality (religion, spirituality, and altruism), social support (encompassing role models), coping style (active coping strategy and exercise), and resilience (capacity to recover from negative events).

Positive emotions and optimism are generally aligned in resilient individuals (Block & Kremen, 1996; Klohnen, 1996), have greater life satisfaction (Chang, Maydeu-Olivares, & D'Zurilla, 1997) and an increased sense of psychological well-being and health (Affleck & Tennen, 1996; Goldman, Kraemer, & Salovey, 1996). According to Fredrickson (2001) positive emotions tend to decrease autonomic arousal and allow expansion of attention with reliance on creativity, exploration, and flexibility in thinking

(Folkman & Moskowitz, 2000; Isen, Daubman, & Nowicki, 1987). Conversely, depressed individuals typically experience anhedonia, low levels of positive emotion, diminished responsiveness to pleasurable stimuli, and attentional bias toward depression-congruent information, e.g., sad, unpleasant, and negative words, facial expressions, and memories (Hasler, Drevets, Manji, & Charney, 2004). Humor is also an attribute of stress-resilient individuals, Vietnam combat veterans, (Hendin & Haas, 1984), surgical patients (Carver, Pozo, Harris, Noriega, & Scheier, 1993), cancer patients (Culver, Arena, Antoni, & Carver, 2002), and at risk children (Werner & Smith, 1992; Wolin & Wolin, 1993) and an important coping mechanism that reduces the threatening nature of perceived stressful situations through cognitive reappraisal (Martin, 2003). Cortical regions involved with the experience of humor revealed activation of the amygdala, ventral striatum/nucleus accumbens, ventral tegmental area, anterior thalamus, and subadjacent hypothalamus (Mobbs, Greicius, Abdel-Azim, & Menon, 2003; Moran, Wig, Adams, Janata, & Kelly, 2004).

Emotional Management, Coping, and Resilience

Skinner, Edge, Altman, & Sherwood (2003) have identified at least four hundred ways of coping from the scientific literature categorized as problem- versus emotion-focused and approach versus avoidance coping. In general depression and passive (avoidance, emotion-focused) coping styles and resilience and active (approach, problem-focused) coping are conflated in the literature (Moos & Schaefer, 1993; Maddi, 1999, 1999). Neural mechanisms of active coping indicate this style may prevent fear conditioning or decrease the intensity of already established fear-conditioned memories and responses and by so doing may inhibit the likelihood of developing stress/trauma-related anxiety and mood disorders or stress/trauma-related functional impairment (LeDoux & Gorman, 2001). Realizing stress is a threat to health, increasing all disease risks, is reason enough to address the possibility of modification through positive heart-generated emotions, but the additional impact on cognitive abilities, as well as relationships between students and teachers, makes this approach expedient. A possible antidote to stress includes factors that allow homeostatic balance to recover quickly and prevent prolonged exposure to an allostatic load, (Insel & Roth, 2005; Tugade, 2001). Stress coping strategies have been implemented in the educational system under the construct of resilience, e.g., resilient classrooms, schools and teachers (Doll, Zucker, & Brehm, 2004; Henderson & Milstein, 2003; Richardson & Waite, 2002).

Different authorities have proposed a myriad of resiliency components. According to Wolin and Wolin (1993) resiliencies are clusters of strengths that include: insight, asking tough questions and giving honest answers; independence, distancing emotionally and physically from the sources of trouble in one's life; relationships, making fulfilling connections to other people; initiative, taking charge of problems; creativity, using imagination and expressing oneself in art forms; humor, finding the comic in the tragic; and morality, acting on the basis of an informed conscience. They recommend using these resiliencies as tools for teachers, clinicians and prevention workers. Others describe resiliency as trait-based called ego-resiliency. Being able to modify the characteristic level of ego-control and be resourceful and adaptive when confronted by new situations (Block & Kremen, 1996; Cicchetti, 2002). Figley (2006) describes high and low levels of resiliency according to tendencies of care-giver practitioners, i.e., low resiliency practitioners have low self-care tendencies and often absorb and over generalize the pain of clients while high resiliency practitioners have high self-care tendencies but sometimes at the expense of neglecting client suffering/helplessness. Henderson and Milstein (2003) portray resiliency as a six-step strategy providing for both environmental and individual protective factors. They illustrated the six-step model as a Resiliency Wheel (Henderson & Milstein, 2003). Three components addressed mitigating risks in the environment: increase pro-social bonding, set clear, consistent boundaries, and teach life skills. The other three are designed to build resiliency with the most important of all six being to provide care and support, which is, unconditional positive regard and encouragement; set and communicate high expectations; and provide opportunities for meaningful participation, which completes the wheel. The Institute of HeartMath (IHM) has developed an instrument to assess attitude about personal and organizational life with positive affect dimensions which may be applied in determining degree of resilience including: positive outlook, gratitude, motivation, calmness, productivity, confidence, communication effectiveness, and support system (POQA-R, 1999-2002). These authors combined factors to uphold a construct (resiliency) from primarily a cognitive orientation (Chang, 2002; Matthews & Zeidner, 2000). IHM (1999-2004) posited the cardiac center as the orientation for factors contributing to resilience and that feelings or emotions themselves constitute the driving force for resilience.

Although not completely understood a growing interest in the psychophysiology of emotions and health outcomes exists (Andreassi, 2000; IHM, 2005; Kenny & Carlson, 2000; McCraty, Barrios-Choplin, Rozman, Atkinson, and Watkins, 1998; McCraty & Childre, 2003). Understanding the psychophysiological ingredients of emotions, their interaction to create mood and their power on health is influencing fields of psychology, sociology, cardiology, and education (Guarneri, 2006; Henderson & Milstein, 2003; Matthews & Zeidner, 2000; Wagner & Manstead, 1989). Emotional generation may be interpreted to occur via two pathways, either as a collection of perceived stimuli that produce physiological changes interpreted cognitively as a particular emotion **or** feeling the emotion in the body and having nervous system confirmation/interpretation (Wagner & Silber, 2004; Weins, 2006). Emotions are found to influence hormonal, nervous, immune and cardiac systems (IHM, 2004; Weins, 2006). Using self-generated emotions in different settings is being investigated (Bocchino, 1999; CSEE, 2006; Henderson & Milstein, 2003; Matthews & Zeidner; 2000; McCraty, 2002). Emotions as modifiers of cognitive processing in the academic setting have been examined (Bar-on, Matthews, & Zeidner, 2000; Handbook of Emotional Intelligence, Bar-on & Parker, eds. 2000; Topping, Bremner, & Holmes; Saarni, 2000). The preponderance of findings from these researchers suggested that emotions are an integral part of optimal human functioning and may be a valid means of assessing performance in terms of emotional and social intelligence, resilience, and health. According to Matthews and Zeidner (2000) the best hope for future research, in terms of emotional intelligence and impact of stress (offsetting stress effects via resilience building strategies), is in training individuals in generic self-regulation skills that facilitate adaptation to a variety of stressors. Extending this concept is the idea of stress transformation rather than adaptation purportedly more efficacious in coping/resilience practices (Childre & Rozman, 2005, 2006).

Stress Transformation

Measurement of the ability to transform stress using positive emotions is the putative model of IHM (2005) using HRV as the criterion for successful accomplishment and positive emotion generation ability. Studies that suggested control of HRV by way of feedback to control HRV report serious problems with either contingent or non-contingent feedback methods (Harrison & Raskin, 1976). The purpose in this study is not to modify HRV directly only to use this physiologic parameter to assess positive emotion generation. Pignotti and Steinberg (2001) used HRV as an outcome measure for Thought Field Therapy and found that lowering Subjective Units of Distress scale scores was in most cases associated with improvement in HRV. Work by Conklin, Bradley and Westen (2006) using informant approach with clinicians and randomly selected patients with borderline personality disorder (BPD) found that affect type and regulation are critical constructs in these patients. Negative affect and affect dysregulation are both present in patients with BPD and pose relevance for treatment. Similarly a study among nursing home residents found using paced breathing and HRV biofeedback were able to reduce self-reports of anxiety, depression and degree of pain (Strine, 2004). A report by Intrator and Kunzman (2006) suggested inversion of Maslow's hierarchy of needs (1943) is necessary to best serve educators today. Poutiatine (2005) stated teachers involved in renewal programs found a renewed sense of passion for their work, focused on creating hospitable learning environments for students, were more devoted to framing good questions and listening to students, clarified and renewed core beliefs about students and learning, were committed to accepting leadership roles, and deepened their *appreciation* for collegial relationships. Supporting these findings are the conclusions by Weins (2006) that emotion is an act of self-perception that is affected by attention focus. Thus intrinsic emotional manipulation to produce positive emotional states is possible and may prove a successful intervention in changing the perception of stress and negating its health destructive affects.

Conclusion

Using self-report and HRV parameters to measure the ability to generate positive emotions, particularly love, care, or appreciation towards the outcome of stress reduction and improved health and performance, i.e., resilience, among elementary educators has merit in the literature (Mayer, Caruso, & Salovey, 2000; Bar-On, 2000; McCraty, 2004). The common threads discovered in this review indicate that resilience can not exist without emotional intelligence and emotional intelligence alone can not function without emotional flexibility and selection. The protocol for this study allows for measurement of emotional intelligence and ability with feedback that reinforces progress and mastery of the skills and competencies associated with resilience for educators (Henderson & Milstein, 2003). For the population in this study (elementary school educators) the importance their resilience competence and emotional regulation may play is not only in affecting their ability to reduce stress and improve resilience but also in the modeling of this ability/behavior to students. The far-reaching import of such ability may create a healthier and better cognitively equipped generation of students. The current trends of health statistics indicate that such actions are necessary to safeguard individual and collective health now as well as in the future.

CHAPTER 3

METHOD

Introduction

The quasi-experimental design of this research was to obtain matched groups of elementary educators, randomly assign them to treatment or control conditions, pre-test both groups using the POQA-R, apply the intervention of HeartMath training, and post-test both groups immediately after the four-week HeartMath training and again six months post-test. Due to missing data and small sample size of rural mid-Western Missouri elementary educators selected for this research, the groups were combined to evaluate the effect of time on the 24 dimensions of the POQA-R. The EQi:S was added to discover if a significant difference between this sample and the normative group mean for emotional intelligence existed.

Specific details of the research method executed for this study are addressed herein. First, the characteristics of participants involved in the study will be described. Next, the software program produced by HeartMath™ will be explained as well as the psychometric properties of the Personal and Organizational Quality Assessment-Revised (POQA-R) and the Emotional Quotient Inventory, Short (EQ-i:S). The POQA-R will be used to measure attitudes about quality of life, both personal and professional among elementary educators. The rational for selecting the EQ-i:S will be included. The EQ-i:S will be used to measure emotional intelligence based on five measurement scales including intrapersonal, interpersonal, adaptability, stress management, and general mood. The third area of this chapter will explain the procedures of data collection. Finally, although the design of this study qualifies for profile analysis of repeated measures, univariate repeated measures will be discussed. Due to the number of cases in the smallest group not exceeding the number of dependent variables, POQA-R with 24 factors and EQ-i:S with 15 factors, limits the ability to perform factor analysis (as the number in the smallest group is 24).

The justification for the components of each of the four sections listed above will be included with the appropriate area. Constructs evaluated by the method employed in this research addresses factors contributing to stress, attitudes about quality of life-both personal and professional, emotional intelligence, resiliency and positive affect. The intervention in this research is specifically designed to evaluate the effects of positive emotional training and determine this influence by the measurement scales utilized. The training program intervention, as measured by the self-report results from the POQA-R and EQ-i:S, is the premise of this research method. The treatment and control groups data may be combined and evaluation made of the changes over time in subjects response to both the POQA-R and EQ-i:S. Examining within groups variance of initial and post eight-week exposure to the HeartMath program will be reviewed.

Participants

Power analysis using G*Power revealed a sample size requirement of 54 participants based on a large effect size (0.80), alpha (0.01) and desired power (0.70). Approximately 76 elementary/intermediate school educators from two of the seven local Midwestern school districts were invited to participate in this study. The teacher demographic information will include gender, age, and average years teaching experience from each district for the academic year 2005-2006[1]. District one has 25 female and 2 male certified educators in ages ranging from 23-60 years. Education levels at this district extend from bachelors to masters. Nine teachers have over 5 years experience with this district. District two has 37 female and 3 male certified educators in ages ranging from 23-50 years. Education levels at this district extend from bachelors to masters degree. Fifteen teachers have over 5 years experience with this district. At both districts the average contact time between teachers and students is seven hours per day. District one teachers instruct students in grades kindergarten to 5th grade. District two teachers instruct students in grades kindergarten to 6th grade. Each district also has one principal and one guidance counselor.

The districts were nonrandomly selected and then randomly assigned to treatment or control conditions. Superintendents from three local districts were contacted for permission to recruit their teachers. These districts were selected based on the homogeneity present between demographics as described previously. Also, based upon males as an often-underrepresented group within the field of elementary education, these districts were selected. The outline of the study includes administration of the POQA-R to both treatment and control groups at the beginning of the academic year, again during the fall of the year, and during the spring of a school year. The EQ-i:S was given during the spring and summer months but as only four subjects responded these results were discarded. The treatment group (District one) was given training in the HeartMath™ software program and asked to practice this program on a regular basis for one month during the fall. The control group (District 2) did not receive training in HeartMath™.

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[1] Demographic information was obtained from primary documents published on the World Wide Web by the respective school districts.

The instruments used will be described including name, author, references, number of items and type, factor/subscale definitions, scoring direction and meaning, reliability estimates and validity estimates.

Instrumentation

Measures

The Personal and Organizational Quality Assessment-Revised (POQA-R)[2]

The POQA-R (Institute of HeartMath and Caring Management Consulting, 1999-2002) is an 85-item measure with a 7-point Likert-type response format that measures an estimate of resiliency based upon the degree of key psychological and workplace elements that contribute to the overall quality of an organization, that of personal quality and organizational quality. Within the personal quality topic area are scales that directly reflect stress-related symptoms, attitudes, and day-to-day moods. Stress-related items are valid measures of stress, which can exert a negative impact on employee (teacher) health, performance and degree of resilience, which may be thought of as stress resistance or stress hardiness. Organizational quality scales address such areas as strategic understating, goal clarity and work attitude, these areas influence employee (teacher) job involvement, performance and are important factors relating to attitudes toward work, behavior, and ability to perform well. The instrument has approximately 40 item response choices of not at all, once in awhile, sometimes, fairly often, often, very often, and always, with higher scores indicating greater affiliation with a quality, i.e., gratitude, motivation, depression, or fatigue for how frequently an item is experienced. The other items, about 40, range from strongly disagree, disagree, slightly disagree, neutral, slightly

[2] An actual POQA-R form is included as Appendix A in this document.

agree, agree, and strongly agree for how much someone corresponds with the item, i.e., “I feel good about what I do at work”.

As the POQA-R is a relatively new measurement (1999-2002) research is ongoing to provide reference group standards and applicability. References values from this report are based on a large data set (1569 working adults). Because the items used to evaluate attitudes about quality of life, both factors associated with positive outcomes as well as negative, contribute to the degree and level of resilience[3] experienced by an individual this instrument was selected. Examples of personal and organizational items include positive outlook, gratitude, motivation, calmness, fatigue, anxiety, depression, anger management, resentfulness, and stress symptoms, value of contributions to the organization, morale issues, productivity, and freedom of expression, time pressure, work intensity, communication effectiveness, job challenge and confidence in the organization.

Standardized scores enable comparisons of performance levels of either individual teachers or groups with a relevant reference value. These scales also provide meaningful comparison of an individual, or group as well as status within one domain compared to another, e.g., anxiety versus depression. The normative summary displays a group’s average standardized score in quartiles. Quartiles (25^{th}, 50^{th}, and 75^{th} percentiles) divide the data into four sections. Quartiles are labeled as substantially below average $<25^{th}$, below average $25^{th-}49.9^{th}$, above average 50^{th}-74.9^{th}, and substantially above average 75^{th}-100^{th}.

Reliability and validity of the POQA-R was based on a population of 1568 working adults with a Cronbach’s coefficient alpha of .65 (goal clarity and morale issues) ranging

[3] Defined as the degree to which, or ability, to recover quickly from setbacks and is synonymous with the terms flexibility, buoyancy, hardiness, and spirit.

to .90 (fatigue). All other scales were between these values and represent an adequate alpha coefficient for internal consistency with the sample under investigation. The format of this instrument was revised to provide better face validity and then the dimensions were reconfirmed using factor analysis. Although the POQA-R has not been used to measure resiliency the components of this instrument contain elements closely linked to this construct. In particular stress symptoms negative effect can drain the ability to bounce back or maintain a certain buoyancy in the day-to-day events of life (Childre & Rozman, 2005, p. 97). Childre and Rozman (2005) report that positive emotions transform into buoyancy and resilience and allow people to regularly appreciate good things in life, they do not let their problems become overwhelming or disproportionate. People who are resilient are able to choose positive attitudes and feelings when faced with challenges, thus quickly improving their biochemistry and are found to possess strong commitments to core heart values[4], a sense of control over the outcome of their life, both personally and professionally, and maintain an abundance of energy (Childre & Rozman, p. 97). A large part of the teacher's day is spent at work with students, colleagues, parents, or administrators or working on items relating to their profession, the POQA-R was selected to capture the feelings about personal and organizational attitudes that may influence resilience by the components of scales represented.

EQ-i: S[5] (Bar-On & Parker, 2002) is a 51-item inventory which reflects the ways a person interacts with and applies his or her knowledge to daily life. This instrument

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[4] Positive affective emotions such as sincere love, care, compassion, appreciation, or gratitude and their connectivity to physiological changes in the body may be thought of as heart values (Childre & Rozman, 2005, p. 14).

[5] Actual EQ-i:S can be reviewed in Appendix B of this document.

consists of a 5-part Likert-type scale ranging from (1) very seldom or not true of me, to (5) very often true of me or true of me in which participants are asked to respond on each item and addresses the emotional, personal, social and survival dimensions of intelligence. Emotional intelligence may be thought of as how well individuals understand themselves and others, how well they relate to others, their ability to adapt and cope with the immediate surroundings with the intent to be more successful in dealing with environmental demands[6]. For the educational setting the aspect of coping with academic demands or other school related issues in dealing with students is also applicable.

According to Dawda and Hart (2000) the EQ total score may be a good overall index of emotional intelligence, especially in regards to gender bias which showed a similar pattern of validity between men and women. Impara and Plake (2001) reviewed the EQ and found it to be a sound measure of emotional intelligence and acknowledge that inclusion of this instrument in the Buros Mental Measurement Yearbook is indicative of psychometric quality and is a very important marker of proper test development. Composite scales (numbers 1-5 below) and subscales (letters a-e) deal with 1) Intrapersonal scales, a. emotional self-awareness, b. assertiveness, c. self-regard, d. self-actualization, e. independence, 2) Interpersonal scales, a. interpersonal relationship, b. social responsibility, c. empathy, 3) Adaptability scales, a. problem solving, b. reality testing, c. flexibility, 4) Stress management scales, a. stress tolerance, b. impulse control, and 5) General Mood, a. happiness, and optimism.

The EQ-I technical manual provides information on the background and underlying theoretical concepts used in development of this instrument, as well as case study examples of the applicability of this test over a variety of settings. According to the

[6] Synonymous with a functional definition of resiliency as explained in the Introduction section

BarOn EQ-i brochure published by Multi-Health Systems the internal consistency scales show a desirable level of statistical accuracy in measuring the constructs they were developed to measure. They also report that test-retest reliability demonstrates temporal stability. Validity studies, including content, factor, construct, convergent, divergent, criterion-group, discriminant, and predictive all reveal psychometric soundness.

This instrument was selected based on its integrity in measuring emotional intelligence and because the major tenet of the HeartMath training concerns positive affective emotional manipulation. With this instrument the emotional intelligence between treatment and control groups can be reviewed and scores can be compared with the POQA-R results over time for correlation between personal and organizational attitudes and emotional intelligence-feelings about day-to-day events, for similarity between these instruments.

Procedures

Prior to initiating this research a small pilot study was conducting using college students enrolled in personal health courses to see if significant differences in biological markers of temperature, pulse, respiratory rate, blood pressure, or perceived level of stress existed between groups that did not participate in HeartMath training and those that were instructed in this system. The results of this study indicated no difference between treatment and control groups for this 4-week study conducted at a Midwestern 4-year university. This experience revealed that control of data collection, incentive to participate and comprehension from participants may have contributed to study results.

In August, 2005 this investigator attended and was awarded certificate status during a 5-day training seminar sponsored by the institute of HeartMath on becoming quality instructor trained via their Resilient Educator program. This seminar was designed to equip individuals to present the HeartMath program specifically to an educational audience. Qualification as a resilient educator included receiving presentation materials, reference documents, and presentation techniques, and sample strategies to encourage participation with the HeartMath protocol, and to interact with other providers of education and employee wellness at this 32-hour certification training course. This protocol is aligned with stress transformation and improved health via stress reduction and positive emotional modification.

Research with educators was selected for investigation due to the ability of educators to influence the lives of young people. According to Dr. Sandra Sandy, Center for Social and Emotional Education (2006) two bases of logic support this decision. One, if students are expected to learn how to handle stress (become more resilient by increasing their emotional and academic knowledge intelligence, respond appropriately to school demands/challenges) to improve their health, then they need to have those practices modeled (preferably by all adults in their lives but assuredly by their teachers) that are most efficacious. Two, students that are not exposed to the *appropriate* ways to handle stress and frustration are often labeled by the time they are in sixth grade[7] and from this point it is very hard for them, even with demonstration of changed behavior, to overcome the stigma from before the changed behavior.

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[7] Some practicing elementary educators feel this may occur at an even younger age by the student's peers, whom are even less likely to recognize and accept improved behavior (interview with one teacher, March 3, 2006).

Knowing that most schools have times of the year that are more stressful than others this study attempts to compare responses to the POQA-R over the course of the academic year (2005-2006) and evaluate the extent to which the HeartMath training displays extinction. During the summer of 2005 superintendents of local districts were contacted to inquire if any of their teachers were currently using the HeartMath system. This was necessary to establish baseline data and prevent bias among participants prior to the treatment intervention using HeartMath. Two districts were found that had not been exposed to the HeartMath training. These superintendents were given the research proposal, either in person or over the phone, and written copies of informed consent documents for evaluation were delivered in person or using electronic relay. After superintendents granted access to their teachers via building principals, principals were contacted by phone to inquire if the superintendents had discussed the study with them and to determine if they would cooperate with the outline of the study. These principals were very cooperative and supportive of the research and timelines, specific dates for obtaining data were scheduled. Guidelines established by the University of Missouri, Columbia Institutional Review Board for the treatment of human subjects were obtained. The purpose of this approval is to protect participant's information, inform them of any risk by being a participant in the study and to inform them of their rights as members of a research study[8].

Teachers were given copies of the consent form which detailed the steps, purpose, and requirements of the research, included contact information and a statement which allowed them the ability to withdraw at any time without penalty. Minimal incentive to

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[8] Actual documents for recruiting subjects and written consent forms may be reviewed in Appendix C and D of this study.

participate was provided to either group and consisted of food items (yoghurt, orange juice, breakfast sandwich) and the possibility of winning a gift certificate from a local merchant at the conclusion of data collection for the treatment group. For the control group, incentive to participate was the promise of this investigator to share the training that was provided to the treatment group from the beginning of the study.

The treatment group was assembled for the regular in-service activities prior to the first day of class with students. This investigator was given the opportunity to recruit teachers for the study at this time. The recruitment letter was distributed and consent forms made available. Those teachers agreeing to participate were then given a 3-hour training session on the use of the HeartMath program. This was conducted in the library resource room of the elementary building of this district from approximately 9am-12:00pm. During this time teachers were shown how to use the HeartMath program, questions were answered and a review of the study timeline was discussed. Announcements were sent by way of the building principal to alert teachers to data collection dates in fall, spring and summer of the 2005-2006 academic year.

Similar orientation with teachers of the control group with the exclusion of the HeartMath training was provided. Teachers would arrive individually or in pairs after school around 3:15pm in the library resource room on the collection date to be recruited for participation, be given their copy of the consent to participate form and for those agreeing asked to complete the POQA-R and offered a food item (pizza). This process was repeated for the corresponding seasonal time period collections. One data collection was under the supervision of this investigator the other two were at the subjects discretion, i.e., instruments were placed in their school mailbox with instructions for completing the instruments as before and with the addition of the EQi:S instruction for completing this instrument electronically during a one month time frame.

Intervention

All information shared in this section will be taken from the Resilient Educator Training program™ (2004) and related as was shared with the treatment group.
A powerpoint presentation[9] was delivered in the library resources room. Twenty-seven teachers were given the article "No Emotion Left Behind" by Shriver and Weissberg (2005), paper and pencils for notes during the presentation, and were seated in the students' chairs in a horse-shoe configuration around the room. The first 2 hours were delivered in lecture format with discussion and question/answer time over material. The last hour was in practicing the tools and techniques provided by the HeartMath Institute in the computer lab area of the library resource room. The material was shared in the following order; introductions, ice-breaker activity, definition of resiliency, sharing teaching experience and determining why they chose a teaching profession, what obstacles exist to their teaching and the impact of those obstacles, discussing stress, describing neural processing of information via the slow-track and the fast track, explanation of the Neutral Tool and heart rate variability, emotions and heart rhythms, the power of appreciation and the Freeze-Frame Technique prior to moving to the lab to practice the HeartMath tools with the aid of computer generated feedback assessing teachers ability to navigate the software and practice the tools. Emphasis of the presentation was to allow participants to realize the impact of emotions on their lives,

[9] This presentation was developed by the Institute of HeartMath™ and required per the certification agreement. An abbreviated version was delivered to meet time constraints of the teachers' schedule and may be viewed in this document as Appendix E.

their teaching and their students learning. The connection between their emotional landscape and how to shift the negative consequences of stress and perceived threats in the moment they occur was also a major topic relayed to the teachers. Other information supporting the main focus was concerning the physiology of stress, the impact of emotions, the neural patterning/reprogramming that can occur under conscious feeling shifts, the effects of cortisol and dehydroepiandrosterone (DHEA) on the body and how HeartMath had developed tools to improve health and resilience.

Resilience was defined as the ability to recover from and adapt to change and misfortune and was the overarching topic for the presentation with two objectives and three subsets addressed. Objective one: to understand how perceptions, emotions, and attitudes affect physiology, health, and performance. Objective two: to learn how to apply a set of research-based tools that; neutralize stressful emotions and boost resilience, increase the ability to think clearly and solve problems, enhance communication effectiveness thereby improving the ability to build collaborative relationships.

According to the Institute of HeartMath (2004) stress is emotional unease. The internal feeling or perception of lack of control is usually experienced as stress and may result in emotional unease described as anxiety, irritation, anger, or some kind or degree of pressure. Important to understand that stress and other emotions not be labeled as good or bad but as positive or negative based on the physiologic end result. Emotional memories are created from one of two pathways, the slow-track and the fast track. Traditionally the slow track was considered the mechanism by which emotions were generated. Sensory information was relayed to the cortex, for conscious awareness of input processing, and then sent to the amygdala for significance determination and is the basis for positive thinking strategies, i.e., change the thought pattern to change the emotional response. Fast-track processing establishes the amygdala as a filter for information ascending via the thalamus such that emotional responses can be triggered and activation of the autonomic nervous system can occur, with concomitant stress hormone release, before information has time to reach the cortex. Not to say that the slow-track can not be engaged to stop the stress response after initiation. Based on this understanding of neurology and how information is processed, reveals that all perceptions are influenced by emotional memory. The equation E + R = O stands for an event plus a response equals the outcome. As the event is usually not controllable the major influence on the outcome is through the response item.

Plotting an emotional landscape can be accomplished by designating the y-axis as the autonomic nervous system (ANS) with sympathetic stimulation above zero and parasympathetic activation below zero. The x-axis depicts the release of hormones cortisol to the left or less than zero and DHEA above zero. Each quadrant represents a degree of activation and hormone release, in other words, the upper right quadrant reflects high-energy positive emotions with DHEA release, upper left are the high-energy negative emotions with cortisol released, lower right low-energy positive (DHEA) and lower left low-energy negative (cortisol). Each day there is migration through all the quadrants but for teachers it is important to realize the impact hormones have on feeling depleted (energy drain) or renewed (energy supply). While the hormone release system is fast-acting it is not as fast as the ANS such that the hormones take longer to process through the body and are therefore circulating for long periods of time. Chronic stress results in accelerated aging, chronic DHEA results in longevity[10]. HeartMath techniques are not psychologically invasive and promote self-generation of DHEA by encouraging those emotions related to the right side of the grid.

The Neutral Tool can be employed anytime stress is perceived and being experienced. Neutral allows a separation from the emotionally charged situation for time to calm down and allow the thinking brain to see more options with greater clarity, this is not positive thinking or relaxation but a way to maintain objectivity in the moment. Steps include: 1) take a time out from your emotional reaction and breathe slowly, evenly through your heart, imagine your breath entering and leaving from this area of your chest, use this step as soon as an emotional charge threatening homeostatic balance/objectivity is felt. With heart breathing the energy is drawn away from the head where negative thoughts and feelings are amplified. 2) disengage stressful thoughts and feelings while continuing to breathe slowly and evenly, the intention to disengage in itself will diminish the emotional intensity. 3) continue this process until the emotional charge around the issue has been neutralized allowing stress accumulation to halt.

Heart rate variability (HRV) was explained as the beat-to-beat changes in pulse that occur every moment whether waking or sleeping. The ability of the heart to speed up and slow down efficiently maintains health and flexibility, if the heart did not speed up the ability to climb stairs would not exist, if the heart did not slow down sleeping would be impossible. As heart rate variability depicts a degree of flexibility, low ranges in this biomarker increases the risk for cardiovascular disease and other potentially serious health problems. Emotions have a profound effect on how your heart changes its pulse rate (Wood, 1998). Others have reported on HRV in relation to risk of sudden cardiac

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[10] Information was taken from slide number 16 of the Resilient Educator™ (2004) available in Appendix E.

death and all-cause mortality (Singer, 1988; Framingham Heart Study, 1994) and in relation to fitness levels (Gallagher, 1992). Not only is the amount of variability an indicator of health but the character of the HRV wave pattern. The peaks and nadirs change character depending on the emotion being experienced and reflect the synchronization of activity between the sympathetic (SNS) and parasympathetic (PSNS) branches of the ANS. A positive emotional state will create a smooth rolling trace or sinusoidal curve referred to as a coherent heart rhythm. A negative emotion will create a chaotic pattern, very sharp peaks and nadirs, called an incoherent heart rhythm. Cortical facilitation is achieved with the coherent heart rhythm and cortical inhibition occurs during incoherent heart rhythms. In comparing different emotional states the HRV power spectral analysis reveals increased SNS during anger and increased PSNS during relaxation. The effect of appreciation appeared centered between the two, thus creating a balanced effect on physiology between these two systems. Relaxation may bring the body to neutral but does not create the renewing energy provided by appreciation according to the HRV power spectral analysis[11]. An emotional shift provides the power for physiological changes, not thoughts alone. Important factor is to feel emotions; not just think about them or visualize them, the sincere feeling anchors HRV coherence.

The heart's role in physiology is well understood but as a perceptual, experiential, emotional organ, research is ongoing. Signals from the heart to the brain affect many cortical areas, the thalamus and amygdala as have been mentioned. When the signals from the heart travel to the thalamus in an incoherent pattern interference is created in the thalamus functioning ability. This interference in the thalamus results in cortical

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[11] Slide 24 depicts the different wave patterns during frustration and appreciation. All slide references can be viewed in Appendix E.

inhibition-a state in which the brain's working ability is diminished, i.e., reactions are slowed, information processing if impaired. This explains inappropriate language or behavior when experiencing anger or being upset and the inability of children to perform well when anxious about an exam. Coherent heart signals result in cortical facilitation, optimal brain function, clarity of thought, and creativity in problem-solving transpires. Heart signals also traverse the amygdala and elucidate for the brain what the body is feeling. When the heart rhythms are incoherent, the emotional centers interpret the message as stressful, feeling anxious, frustrated, under pressure, etc. Learning to shift the heart rhythms to a coherent pattern signals the brain that everything is OK and working in harmony.

Stress becomes a pattern through the repeated emotions and heart rhythms experienced. If the pattern is anxiety, anger or depression this is interpreted as familiar and therefore comfortable termed the "maladapted pattern". The brain will do everything possible to maintain what is comfortable. The integration of facial expression, body posture, heart rhythm coherence all create a degree of match or miss-match within the emotional climate and the difference between the smooth and rapid integration of information or the agony and frustration of impeded comprehension.

Increasing the ability to think clearly and solve problems is addressed through application of the Freeze-Frame™ tool. This tool is design to interrupt a challenging or stressful event to allow a different perspective to emerge. It is built upon the Neutral tool and encourages an effective attitude or action to help resolve an issue. The name is based on the power available to freeze the frame (life as a movie analogy) of the stressful event at that moment, similar to pressing the pause bottom on the VCR/DVD. After editing the 'frame', resuming the 'movie' recognition of a more stress-free perception and possibly a different outcome may result. Each time a stressful event is altered with this procedure a new pattern is reinforced that creates more energy and saves time. The steps and description of the Freeze-Frame technique are: 1) identify the problem or issue and the FEELINGS about it, pause the mental turmoil for a moment and recognize the feelings around the problem or issue, positive thinking alone will not resolve the stressful feelings, 2) breathe through the heart with a neutral attitude to become more detached from the problem, same procedure as described with the Neutral tool, 3) make a sincere effort to activate a positive feeling, this can be love, care, appreciation for someone or something, positive emotions stimulate the release of healthy hormones to maintain and sustain resilience, 4) ask (yourself) what would be an efficient, effective attitude or action to resolve the issue, and 5) be aware of any change in perception or insight that comes to mind.

Throughout the content delivery session time was allowed for questions, comments, and discussion. The step by step instruction for using the Freeze-Framer computer software program was conducted the last hour of the training session. Teachers worked with partners due to the limited number of computers available. Freeze-Framer[12] software had been installed on all computers in the lab upon provisional (60-day) license at this site[13]. Proper connection to the ear sensor device was demonstrated. Instruction in opening the program and use of tool bar icons for navigating between screens was described. Caution was given to not expect a high coherence score with the first session

[12] Freeze-Framer® Interactive Learning System Workshop Demonstrations outline is included as Appendix F of this document.
[13] Permission to allow treatment group teachers to use the program and ear sensor devices was granted while attending the Resilient Educator Quality Instructor Program, August 2005, Boulder Creek, California.

and that a level of less than 50 in the low coherence was necessary to be successful with playing any of the games. Heart rhythm display, meadow game, rainbow game, balloon game, review session, progress report, options, tutorial and exit are navigational headings on the main page. Once the graph was opened (figure 1) for teachers to use and to practice the steps of neutral and heart rhythm coherence building, they were instructed on entering a password, gender, and age data for retrieval and progress documentation of sessions. Figure 2 provides a close-up view of the HRV wave pattern during the experiences of frustration and appreciation. Teachers were asked to practice the skills for about 30 minutes to experiment with the program, navigate through different topics and icons alternating between partners at five-minute intervals. Teachers were asked to save their initial data between trials and could practice at liberty for the remainder of the training. Options for viewing individual physiology during the training were demonstrated. Images from the games and the instructions for each were shared. Teachers were encouraged to play the games with the caution that their success was dependent on their ability to focus attention on the heart, breathe evenly imagining the breath entering and leaving through the solar plexus and ability to capture a positive experience.

Prior to concluding this initial training session the teachers were reminded about the details of the study which asked them to practice these tools and procedures as often as possible and to use the computer to record values from the Heart Rhythm display during the one month period during the fall. During this month of practice computer sessions were designed to take 5-15 minutes and teachers were requested to retain one copy of the printout from the program during this time.

Figure 1

SAMPLE DISPLAY FROM A HEART RHYTHM COHERENCE TRAINING SESSION USING FREEZE-FRAMER® TECHNOLOGY.

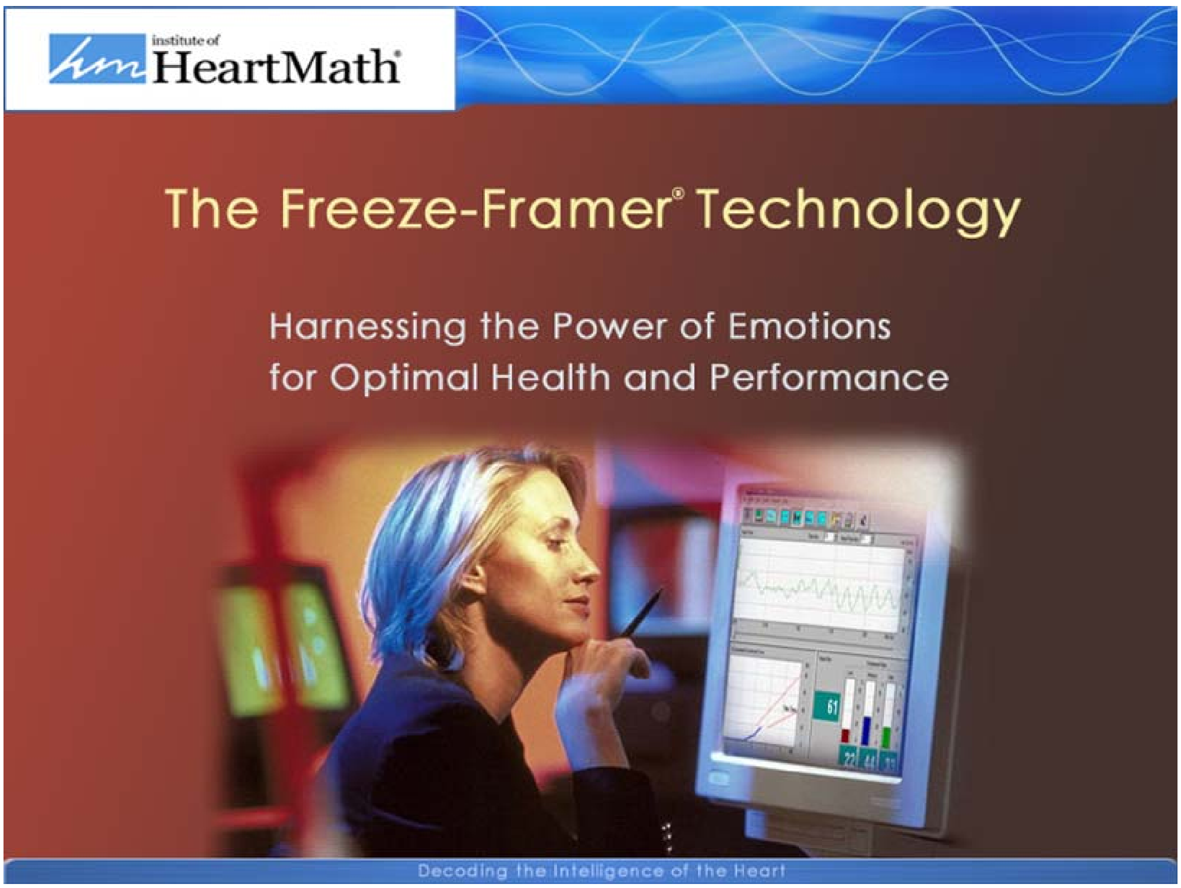
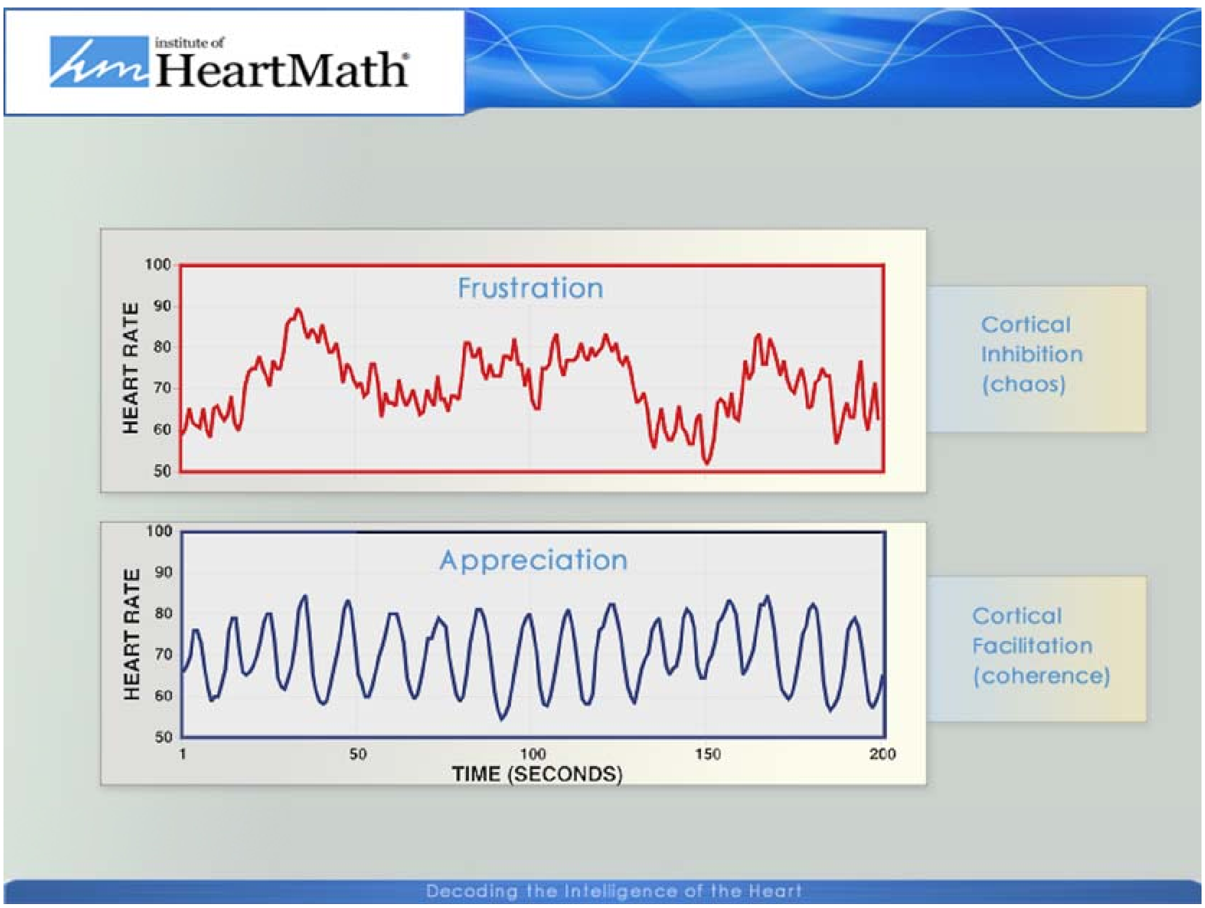


Figure 2

HRV WAVE PATTERN DURING EXPERIENCES OF FRUSTRATION AND APPRECIATION.



These documents were collected by this investigator at the conclusion of the one month computer practice session. Teachers were informed that prior to the practice month the ear sensors would be made available from the library resource information desk and that any questions or concerns about the research would be answered by contacting this investigator. Time was granted for any questions or concerns before the end of this training session. Contact was made with the building principal to determine if there were any questions from teachers and if another training session was necessary, this offer was declined. Of the 27 teachers approached one declined to participate and 12 failed to complete the requirements of the study as requested.

An amendment to the original research was requested to include the EQ-i:S during the final collection session as this instrument was found to most closely match constructs under investigation and meet the a priori qualifications. This instrument is available electronically and teachers in both groups were given written instructions on how to enter their password and submit data. They were also told that the length of the EQ-i:S would require between 10 and 15 minutes for completion and they would be allowed to complete this inventory during the school day. The timeline for completing this inventory was granted from the last week in March until the last week in April, 2006 and requested again prior to school starting in August, 2006.

Additionally, a qualitative amendment was requested from the University Institutional Review Board to allow interviewing the treatment group. Consent forms, sample interview questions, and protocol for this qualitative inquiry are found in Appendix C. The request was made in order to determine teacher’s views as being involved in a research project, their opinion about a positive emotion approach to stress alleviation, and determine what prevented their compliance with the study as originally agreed. The full qualitative report is included following the statistical analysis portion of this chapter for clarity about subjects views and justification of the use of the EQ-i:S with this quantitative research design.

Data collected from three POQA-R administrations, time one-fall, time two-spring, and time three-summer, and EQ-i:S collected twice during the course of the study, time three-same as time three for the POQA-R. Data from these instruments will be analyzed and discussed in the next chapter. Statistical assumptions and description of variables will be examined.

Statistical Analysis

Compromise power analysis is used for cases in which pragmatic constraints prohibit investigation from following recommendations derived from a priori power analysis[14]. If sample size is considered fixed and effect size is desired to be large it is necessary to consider both alpha and beta error probabilities of equal seriousness. Using the online program g*power to determine a priori sample size indicated with a large effect size (0.08), alpha (0.05) and power (.95) a sample size of 76 would be required. Changing the alpha to 0.01 and power to 0.70 resulted in a sample size of 54, with a critical $t(52)=2.4002$.

The dimensions of the Eq-i:S were listed previously (p. 61). The dimensions for comparisons between groups from the POQA-R include the following:

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[14] Axel Buchner, Franz Faul, or Edgar Erdfelder. Retrieved from http://www.psycho.uni-duesseldorf.de/aap/projects/gpower/reference/reference_manual_03.html#compromise March 4, 2006 at 2:51pm.

positive outlook; gratitude; motivation; calmness; fatigue; anxiety; depression; anger management; resentfulness; physical stress symptoms; work attitude; strategic understanding; confidence in the organization; managerial support; goal clarity; job challenge; value of contributions; freedom of expression; work intensity; communication effectiveness; productivity; time pressure; morale issues; and intention to quit.
These instruments will be used to determine the extent of the intervention HeartMath training and practice (independent variable) on the dependent variable-POQA-R at time two and three. Time one will be to establish equality of variance between groups with this instrument. The EQ-i:S will be used to compare groups during a typically highly emotional and intense period for teachers in the academic year (time two). Within-groups variance will also be examined for both treatment and control.

The assumptions that must be met for rigor using univariate repeated-measures analysis of variance (ANOVA) is that of sphericity. To address this possibility Greenhouse-Geisser[15] and Huynh-Feldt tests will be performed. If sphericity is violated and the multivariate approach is nullified due to small sample size a trend analysis option exists to explore with this study. Trend analysis lends itself to the study design because statistical tests of trends and other contrasts use a single degree of freedom of the within-subjects independent variable (IV), there is no possibility of violation of sphericity and none of the assumptions of the multivariate approach need be met. (Tabachnick & Fidell, 2001).

Data from the POQA-R time one will also allow for comparison between groups on variables of age, gender, and level of education, income, years with the district, socio-

[15] As described in Tabachnick and Fidell (2001) for violation of sphericity with univariate repeated-measures analysis.

economic status (SES), and number of work hours per week These variables will be evaluated to better understand and describe statistical results. Although a two-way repeated measure statistical analysis was required with the original design this study was changed to a one-way repeated measures design due to missing and invalid cases, resulting in too few subjects for the original analysis. Also due to this finding after the one month trial period using HeartMath a qualitative inquiry was conducted to determine subjects feelings about being involved in research and their views of the HeartMath procedures.

Qualitative Inquiry Report

Heart is cause, resiliency is effect. Using letters in the word *resilience* to form an acronym for defining its meaning in relationship to *heart*=***res***ponding, not reacting, ***i***mmediately, ***l***ovingly-heart generated positive affective emotion***, i***ntelligently, [to] ***e***very, ***n***egative/***c***onflicting, ***e***vent. Resilience is also described as the ability to recover quickly from setbacks and the ability of matter to spring back quickly into shape after being bent, stretched, or deformed (Encarta Dictionary, 2006). Similarly, Oliver Wendall Holmes stated that the mind once stretched by a new idea never regains its original dimension. Indicating this conformational adaptation was a positive phenomenon. In this sense adversity (however stretching, bending, or deforming feels to you) is requisite for resiliency (Egeland, Carlson, and Sroufe, 1993). Determining how teachers' felt in response to resiliency research (the stretching, bending, and deforming agents in this study) and what they experienced with a new approach to stress (HeartMath) is the focus of this research paper.

My original research in this area was directed quantitatively towards describing differences between groups of teachers exposed to the HeartMath (HM) program by using standardized test instruments and tracking responses to these instruments over the course of the academic year. From the first meeting with the teachers I was very optimistic about the results of the study. I had the feeling that the teachers, although not compensated in any significant way, were willing to cooperate with the tasks as described and that I would find statistically significant differences between the two rural elementary schools selected for this study. Although the selection of cases was based almost entirely on convenience, which severely limits the possibility of drawing conclusions to other populations of teachers, there was the prerequisite feature of finding a group that was not familiar with or had even heard about the HM Company. Recently this company had been awarded a significant amount from the federal government to address test anxiety in the school setting. Therefore using these relatively small, rural elementary schools helped insure they had not been exposed to or used this method previously.

I was to be sadly awakened to the fact that although the teachers originally expressed an interest and willingness to participate (62 out of 63 Kindergarten through 5th grade educators agreed, i.e., signed informed consent forms to the details of the study) very few of them completed the steps as outlined to them. I discovered this upon collecting the data, when responses were minimal at best to what I was expecting. Why did this happen? Was it my initial presentation, lack of a more structured format, interest in the program, reaction to the new approach to stress, time elements involved, etc? To really determine the breakdown of these areas an additional component (qualitative inquiry) was pursued to discover more accurately what happened, why it happened and what would have been a better plan with this group of research subjects (elementary teachers).

Another way to describe resiliency is the ability to call upon inner resources and strength to bounce back from stress, risks, crises, and trauma (HM, 2006). Characteristics of resilient individuals may include autonomy, resourcefulness, endurance and flexibility (HM, 2006). A qualitative study by Patterson, Collins, and Abbott (2004) described resiliency as using energy productively to achieve school goals in the face of adverse conditions. Similarly Boyd and Ekert (2001) explain resiliency in terms of adversity, i.e., resiliency is the self-righting capacity to learn and grow and change when adversity, stressors, or disruptions occur in our lives. They feel resiliency provides the ability to thrive, not just survive, in the event of adversity or misfortune. Thus, if individuals (teachers) were never challenged by their teaching, students, administrators, parents, themselves, there would be no need for resiliency because there would be nothing to recover from, no need for bending and returning from bending. Did teachers feel this idea (using HeartMath to improve resiliency) was useful to them in their professions? Was it worthwhile to be engaged in a research study? What did they experience during the course of this study? These are examples of questions that will be addressed in this ethnographic case study. A fuller description of the research methodology will be addressed in the Methods section of this narrative.

Qualitative Methods

This qualitative research qualifies as a case study by historical definition[16] and will include at least two layers of investigation. The use of a case study as a means of conducting qualitative research is to capture and communicate individuals' experience of the world in their own words (Patton, 2002, p. 47). This qualitative case study designed research is directed toward elementary school educators perspectives as participants of research, and at their responses to the HM program. The benefits of the case study are that they can contribute important information in program improvement, can be combined to assess different areas and members, and the unique or negative case may provide particularly useful insights into how the program operated and affected participants (Patton, 2002, p. 152). With the elementary educators' responses to this study being primarily negative, examining the few odd positive reported cases will help in program review-finding out exactly what worked for them in comparison to the majority of the others.

Limitations

A limitation to using the case study design may be in the selection of cases as well as with the ability to generalize, which is dependent on the case selection process. Data from this study might be applicable to other mid-Western rural public elementary school teachers but as Robert Stake (1978, 1995, 2000, p. 582) explains "to particularize is the lone distinction of merit," not the ability to generalize. Examining the teachers' responses

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[16] Case studies are particularly valuable in program evaluation when the program is individualized, thus the evaluation needs to be attentive to and capture individual differences among participants, diverse experiences of the program, or unique variations from one program setting to another. A case can be a person, an event, a program, an organization, a time period, a critical incident, or a community while seeking to describe the case in depth and detail, holistically, and in context (Patton, 2002, p. 55). The term case study can refer to either the process of analysis or the product of analysis, or both (Patton, 2002, p. 447).

to being involved in the HM study was conducted with data collection techniques of open-ended interviewing, ethnographic observations,[17] and analysis of primary documents.

Data Collection Technique

The use of open-ended interviewing, ethnographic observation, and analysis of primary documents constitutes a form of triangulation. Triangulation of data sources is comparing and cross-checking the consistency of information derived at different times and by different means within qualitative methods, i.e., comparing observations with interviews, comparing private and public statements, checking for consistency of vocalizations over time, comparing perspectives of people from different points of view, and checking information from interviews with program documents or other written evidence that corroborate interviewees responses (Patton, 2002, p. 559). The use of multiple methods of data collection provides more evidence for empirical reality.

Open-ended interviewing involved asking the teachers feelings about being involved in the research, what they thought about their emotional dimension of health as related to the profession of elementary education, if they were conducting a research study what would they most likely study or perform in that role, and what did they think about the HM program in general. This form of data collection allows detailed, contextual, holistic information gathered in a consistent manner, i.e., asking the same questions, in approximately the same order, in the same setting. Limitations to open-ended interviewing are that less skilled interviewers will not know how to properly conduct an interview and may not be able to encourage divulgence of information

[17] Ethnographic observations are a system used by anthropologists in studying and examining others and have been adapted to include the perspectives of the observed (emic) as well as the observer (etic) views (Patton, 2002, p. 84).

without unduly leading participants, especially participants who may not be willing to share their views. This situation, in which some participants may share a wealth of information and others are more reticent, creates a concern for using open-ended interviewing in determining how conclusions are influenced. Hence, supporting the use of triangulation methods in this qualitative inquiry for validity of the material presented.

A second source of data for this qualitative research is ethnographic observation (EO). Ethnographic observations of elementary teachers were designed to obtain a social, scientific description of them in their professional environment and contextualize their responses to the interviews and instruments used in this investigation. This source of data collection provides a wealth of information for the investigator to describe the appropriateness of this research in determining what is involved in the profession of elementary education and how the HM program may or may not have been the best method to address the needs of this group. Using EO also provided for increasing exposure of the investigator with participants which could contribute to greater rapport, information sharing, and understanding from both perspectives. Limitations to EO may be in the ethnographer's ability to observe, interpret and apply findings from a cultural perspective may restrict breadth and depth of description. This may also limit applicability of findings to the program, improvement options, and ability to conduct research with this group in the future.

Lastly, primary documents used for this study were the homepage web sites from the treatment group school district as well as from HM.[18] These sites from the world wide web provided information about the organizations involved in this research in their own words and can be analyzed for content and coded to reveal themes and

[18] The site names and addresses are not included to protect the identity of participants in this study.

demographics about the teachers in this study. From the HM site will be collected information about their intended mission towards educators and the educational system. Benefits of primary documents include the ability to decipher what these organizations hold in high regard, statistical data, and other information that will contribute to data analysis with this study. The limitations of primary documents may be the complexity with which information is relayed but in these cases the information was straightforward and clear, in so far as what was allowed to be published. Closer evaluation of what they do not report may also indicate characteristics about these entities, the life experience of elementary educators' representative of these institutions, and those of a corporation.

Population Sampling

The population was selected based on their participation in the initial research project. Although this selection was on the basis of convenience, which is neither purposeful nor strategic, it was necessary for program contamination issues. This method (convenience sampling) was used to provide a logistical means of accomplishing the research project while ensuring that the participants had not previously been exposed to HM. Finding populations somewhat homogenous demographically speaking, with geographic location, school size, proportion of male to female teachers and their age ranges, and grade levels taught was a primary consideration. For these reasons a convenience sample was selected.

Conceptualization and Measurement

Measuring the results of the case study requires that the accumulation of field notes adequately cover the material, answer the research questions and fulfill the purpose of the study. The end product of case study analysis is the written final narrative in which a readable, descriptive picture of the teachers and the HM training is made available to the reader with all the necessary information for understanding the case, and all its uniqueness (Patton, 2002, p. 275, 525). The original research was measured by data analysis of the scores from the Personal and Organizational Quality Assessment-Revised survey. This survey consisted of nine demographic questions (SES, hours worked per week, length of time employed with the current employer and job) and 85 Likert scale items of not at all to always or strongly agree to strongly disagree with a qualifier range of seven. These 85 items addressed feelings of positive and negative affect, feelings about employment, work load, and general health. To exemplify the main themes, excerpts will be taken from interviews, observations, and primary documents. The interviews were conducted individually during a teacher workday between 7:45 and 11:45am. Each interview lasted between 10 and 15 minutes in the respective teacher's classroom. The observations were collected during a three-hour afternoon session, and the primary document evaluations were conducted privately at my office.

Validity, Ethics, and Reflexivity

The validity of the case study as a qualitative form of inquiry is achieved by using triangulation, technical rigor, and accuracy in reporting personal and professional information that may have affected data collection, personal awareness of assumptions, analysis and interpretation (Patton, 2002, p. 566). Validity is a property of knowledge and is ultimately dependent on the ability of the inquirer to weigh the evidence carefully, to be open to the possibility that what has been learned most from this study is how best to conduct the research in the future. Aside from complying with the directives of the funding organization or the requirements of the institution governing human subjects' research, ways to determine ethics and truth from any research can be achieved by contacting the investigator and asking questions regarding methods, analysis, conclusions, etc. Also, as references sited within any published work, confirming the information presented in the research with what was quoted from other sources as accurate would also lend to the validity and ethical nature of the investigator and the study itself. Because the researcher is also an instrument in the qualitative report, information about them should be included with the final document.

Reflexivity is a means to reveal to an audience the researchers beliefs about the study and what initiated the work in the first place, what the driving questions about the case were based upon, how those questions were to be investigated and how the findings were presented in a particular way. The purpose and importance of reflexivity is being able to increase self-awareness and allow the study to be not only more penetrating but also more reliable (Myerhoff & Ruby, p. 18). As well as address some of the limitations of a qualitative approach where so much depends on the researcher's interpretation. My reflexive position is concerning the foundational premise of the HM program, i.e., the transformation of the stress response, and not relaxation techniques or stress management practices, in addressing the health detriment know as stress (distress).

This idea of transformation was the driving force for this investigation. The influence of stress on health and relationships has been reported extensively in other areas but not as exhaustively examined among teachers. Questions associated with this group/population are whether they might be the most influential in stemming the tide of the current national health trends, would the teachers find the techniques useful in their personal and professional lives, and how best to share this technique with this group.

These were the motivating elements prompting this research and hopefully will contribute to the literature on the impact of positive emotions, stress reduction, resiliency enhancement, health among elementary teachers, their students and their families, and beyond.

In the next section data analysis will be addressed according to major themes discovered with this qualitative investigation and will include information and reflections from interview results, observations, and primary documents. Within these themes (value, time, communication, competition, competence) evidence from the interviews, observations and primary documents will be included, described, and analyzed. Following the data analysis section will be discussion conclusions from this research and possible implications for future studies with this topic.

CHAPTER 4

RESULTS

The purpose of this study was to determine resiliency among elementary educators maintained over one academic year exposed to the HeartMath system as measured by the POQA-R compared to control responses. The independent variable was time and the dependent variable scores on the POQA-R. The EQi:S was added to measure overall emotional intelligence with this group as the premise of the HeartMath program is positive emotion based. The qualitative inquiry was used to determine deficiencies in approach, process, content, and compliance among researcher and participants. This chapter will address the data collected during the course of this resiliency research among elementary educators using the POQA-R, EQi:S, and qualitative inquiry extending from 2005-2006. A review of the assumptions associated with a repeated measures design will be discussed. Data analysis will address findings from the POQA-R, EQi:S, and qualitative inquiry using statistical software (SPSS 13.0). Included within this analysis will be the following items: data screening for accuracy of data entry, frequency evaluation of subjects' demographic information, decisions regarding missing/ invalid tests, tests for distribution normality using skew and kurtosis values, final sample size, any manipulations to address invalid scores, and explanations regarding confidence level selection.

Initial research held that first, the HeartMath training program (intervention/independent variable) as measured by the POQA-R over time within the treatment group of subjects would reveal a significant difference between time points a, b, and c, and that secondly there would be a significant difference between treatment and control groups after HeartMath training persisting over time. Data was collapsed into one group and the independent variable was categorical, i.e., time points a, b and c. Dependent variable POQA-R scores from a single group of elementary educators were evaluated over time. EQi:S scores were measured to compare mean sample data with normative figures and explain possible correlations between EQi:S and POQA-R findings. The qualitative process was conducted to determine explanations for treatment group involvement with this research protocol.

This quasi-experimental design used subjects expressing a willingness to participate, after the initial protocol of the study was explained and accepted by the respective school district administrators involved. Data collection occurred in a group setting. This research was conducted with an a priori alpha level of $p<.05$.

Data were screened for validity of cases using frequency distribution tables and normal distribution using Skew and Kurtosis values of ≤ 3.0. Any data that violated Skew or Kurtosis, i.e., having a value ≥ 3.0 was examined for character. If there was no platykurtosis the data were included for evaluation, as the *F* test is robust to non-normality. Preliminary decisions regarding the study were based on calculations obtained from G*Power requiring a sample size of 55 for large effect size, alpha .05, and sufficient power (>.70) to identify real differences between groups. Subjects invited to participate in this study totaled 66.

Data Analysis

Frequency distribution for demographic information indicates this sample was predominantly female and married. Subjects ages ranged primarily in the thirties and forties with average income \$30,000-\$39,999.00. The majority of subjects had earned graduate degrees, were working in a professional career a total of 50 hours per work (private and public endeavors). Subjects generally had 10-20 years previous employment and 10 or more years with their current employer as depicted in Table 2. With all descriptive statistic analysis, if a violation of normality was suspect a histogram representation of the data is included (Appendix H) to evaluate the character of data compared to the normal curve. If the character is leptokurtic in nature the data were analyzed without any additional corrections.

One-way repeated measures analysis of variance was conducted for the three time points a, b, and c corresponding to time 1-fall, 2-spring, and 3-summer, respectively on the SPSS output. Table 3 indicates there was a significant main effect of time with the construct of calmness, $F_{Wilks' \ Lambda}$ (2, 9) = 5.137, p<.05, η_p^2 =.533, power =.673. A similar finding occurred with the construct of freedom of expression, $F_{Wilks' \ Lambda}$ (2, 9) = 4.816, p<.05, η_p^2 =.517, power =.643 displayed in Table 4.

Table 2

Statistics-Demographics of Subjects

		GN	MS	Age	Sal	Edu.	Emp.	Hr	Yr	Cur.
N	Valid	23	21	21	21	21	21	21	21	21
	Missing	16	18	18	18	18	18	18	18	18
Mean		1.957	2.238	3.762	3.381	7.571	4.952	4.570	5.762	5.095
Std. Deviation		.2085	.9436	.9436	1.160	.746	.218	.811	1.261	1.513
Skewness		-4.796	2.630	-.263	2.121	-1.464	-4.583	-.254	-.826	-1.612
Std. Error of Skewness		.481	.501	.501	.501	.501	.501	.501	.501	.501
Kurtosis		23.000	6.609	-.692	4.919	.652	21.000	-.129	-.477	1.719
Std. Error of Kurtosis		.935	.972	.972	.972	.972	.972	.972	.972	.972
Minimum		1.00	1.00	2.00	2.00	6.00	4.00	3.00	3.00	1.00
Maximum		2.00	5.00	5.00	7.00	8.00	5.00	6.00	7.00	6.00
Percentiles	25	2.00	2.00	3.00	3.00	7.00	5.00	4.00	4.50	4.00
	50	2.00	2.00	4.00	3.00	8.00	5.00	5.00	6.00	6.00
	75	2.00	2.00	4.50	3.50	8.00	5.00	5.00	7.00	6.00

GN=gender, 1=male 2=female; **MS**=marital status, 1=single 2=married 3=partnered 4=separated 5=divorced 6=widowed; **Age** 1=under 21 2=21-30 3=31-40 4=41-50 5=51-60 6=61-70; **Sal**=salary, 1=under $20K 2=$20-29,999 3=$30-39,999 4=$40-49,999 5=$50-59,999 6=$60-69,999 7=$70-79,999 8=$80-89,999 9=$90-99,999 10=$100-149,999 11=$150,000 or more; **Edu**=education, 1=elem. 2=Jr. Middle Sch. 3=High Sch. 4=Tech. Sch. 5=college/Associates degree 6=BS 7=some graduate work 8=MS 9=PhD; **Emp**=employment status, 1=student 2=laborer 3=skilled/clerical 4=management 5=professional 6=executive 7=engineer/technical 8=retired 9=unemployed 10=other; **Hr**=hours worked per week, 1=less than 25 2=26-35 3=36-40 4=41-50 5=51-59 6=60 or more; **Yr**=years with company or organization, 1=0-6mo. 2=6mo.-1yr. 3=1-2yr. 4=2-5yrs. 5=5-10yrs. 6=10-20yrs. 7=20 or more yrs.; **Cur**=years at current position, same designations as d8.

Table 3

One-way repeated measures ANOVA Effect of Calmness

	Value	F	Hypo.df	Error df	Sig.	Partial η^2	Power (a)
Pillai's Trace	.533	5.137(b)	2.000	9.000	.032	.533	.673
Wilks' Lambda	.467	5.137(b)	2.000	9.000	.032	.533	.673
Hotelling's Trace	1.142	5.137(b)	2.000	9.000	.032	.533	.673
Roy's Largest Root	1.142	5.137(b)	2.000	9.000	.032	.533	.673

a. Computed using alpha=.05
b. Exact statistic

Table 4

One-way repeated measures ANOVA Effect of Freedom of Expression

	Value	F	Hypo.df	Error df	Sig.	Partial η^2	Power (a)
Pillai's Trace	.517	4.816(b)	2.000	9.000	.038	.517	.643
Wilks' Lambda	.483	4.816(b)	2.000	9.000	.038	.517	.643
Hotelling's Trace	1.070	4.816(b)	2.000	9.000	.038	.517	.643
Roy's Largest Root	1.070	4.816(b)	2.000	9.000	.038	.517	.643

a. Computed using alpha = .05
b. Exact statistic

Table 5

One-way repeated measures ANOVA of the POQA-R Personal Dimensions

	Value	*F*	Hypo.df	Error df	Sig.	Partial η^2	Power (a)
Positive Outlook							
Wilks' Lambda	.806	1.085(b)	2.000	9.000	.378	.194	.185
Gratitude							
Wilks' Lambda	.968	.151(b)	2.000	9.000	.862	.032	.067
Motivation							
Wilks' Lambda	.925	.325(b)	2.000	9.000	.731	.075	.086
Calmness							
Wilks' Lambda	.467	5.137(b)	2.000	9.000	.032	.533	.673
Fatigue							
Wilks' Lambda	.730	1.665(b)	2.000	9.000	.243	.270	.263
Anxiety							
Wilks' Lambda	.652	2.402(b)	2.000	9.000	.146	.348	.363
Depression							
Wilks' Lambda	.974	.121(b)	2.000	9.000	.888	.026	.063
Anger Management							
Wilks' Lambda	.536	3.456(b)	2.000	8.000	.083	.464	.480
Resentment							
Wilks' Lambda	.942	.277(b)	2.000	9.000	.764	.058	.082
Stress Symptoms							
Wilks' Lambda	.964	.711(b)	2.000	9.000	.517	.136	.135
General Health							
Wilks' Lambda	.688	1.814(b)	2.000	9.000	.224	.312	.274

Table 5 continued

One-way repeated measures ANOVA of the POQA-R Organizational Dimensions

	Value	*F*	Hypo.df	Error df	Sig.	Partial η^2	Power (a)
Work Attitude							
Wilks' Lambda	.664	2.281(b)	2.000	9.000	.158	.336	.347
Strategic Understanding							
Wilks' Lambda	.589	3.144(b)	2.000	9.000	.092	.411	.459
Confidence in Organization							
Wilks' Lambda	.525	4.075(b)	2.000	9.000	.055	.475	.568
Manager Support							
Wilks' Lambda	.592	3.104(b)	2.000	9.000	.094	.408	.454
Goal Clarity							
Wilks' Lambda	.744	1.549(b)	2.000	9.000	.264	.256	.248
Job Challenge							
Wilks' Lambda	.534	3.927(b)	2.000	9.000	.059	.466	.552
Value of Contribution							
Wilks' Lambda	.640	2.874(b)	2.000	9.000	.108	.390	.425
Freedom of Expression							
Wilks' Lambda	.483	4.816(b)	2.000	9.000	.038	.517	.643
Work Intensity							
Wilks' Lambda	.612	2.850(b)	2.000	9.000	.110	.388	.422
Communication Effectiveness							
Wilks' Lambda	.518	4.189(b)	2.000	9.000	.052	.482	.580

Table 5 continued

One-way repeated measures ANOVA of the POQA-R Organizational Dimensions

	Value	F	Hypo.df	Error df	Sig.	Partial η^2	Power (a)
Productivity							
Wilks' Lambda	.612	2.851(b)	2.000	9.000	.110	.388	.422
Time Pressure							
Wilks' Lambda	.714	1.800(b)	2.000	9.000	.220	.286	.282
Morale Issues							
Wilks' Lambda	.911	.442(b)	2.000	9.000	.656	.089	.102
Intention to Quit							
Wilks' Lambda	.689	2.029(b)	2.000	9.000	.187	.311	.313

a. computed using alpha=.05
b. exact statistic

SPSS pairwise comparisons revealed a significant difference between times one and three using Post hoc tests with the Bonferroni adjustment indicating that subjects calmness (Table 6), freedom of expression (Table 7) were greater at time three compared to time one. Whether these differences were due to real changes in these emotional traits, normal changes associated with the passage of time, or some other factor not identified is not determined.

Table 6

Calmness

Pairwise Comparisons

(I) calm	(J)calm	Mean Difference	Std. Error	Sig.[a]
1	2	-.424	.334	.697
	3	-.909*	.285	.029
2	1	.424	.334	.697
	3	-.485	.260	.274
3	1	.909*	.285	.029
	2	.485	.260	.274

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
[a]. Adjustment for multiple comparisons: Bonferroni.

Table 7

Freedom of Expression

Pairwise Comparisons

(I) freeE	(J)freeE	Mean Difference	Std. Error	Sig.[a]
1	2	-.303	.252	.771
	3	-.667*	.216	.034
2	1	.303	.252	.771
	3	-.364	.198	.290
3	1	.667*	.216	.034
	2	.364	.198	.290

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
[a]. Adjustment for multiple comparisons: Bonferroni.

Reviewing the data from the EQi:S revealed that the raw scores for the inconsistency index was not violated as the minimum and maximum value did not exceed 12 (Bar-On, 2002). Neither the raw data (Appendix I) nor the standard scale items (Table 9) violated normality with all values of Skewness and Kurtosis less than or equal to the absolute value of three. Evaluating the minimum and maximum statistics from the standard scale Descriptives Statistics table (Table 8) indicates that some individuals may have invalidated their responses due to values of over 120 on the positive impression scale which are to be interpreted with caution and scores over 130 indicate so rare an occurrence as to render the test protocol invalid (Bar-On, 2002). Fifty-four percent of responses had positive impression scores greater than or equal to 120. These inflated values may erroneously increase the total EQ score (mean=113.9615) which value

Table 8

Descriptive Statistics of Standard Scale Items EQi:S

	N	Min.	Max	Mean	Std.	Skewness		Kurtosis	
		Stat.	Stat.	Stat.	Stat.	Stat.	Std. Er.	Stat.	Std Er.
StanSc_RA	26	66.00	131.00	102.19	17.20	-.381	.456	.030	.887
StanSc_ER	26	91.00	125.00	110.35	10.48	-.188	.456	-1.054	.887
StanSc_SM	26	98.00	127.00	113.46	9.36	-.094	.456	-1.046	.887
StanSc_AD	26	94.00	136.00	119.27	11.71	-.028	.456	-.842	.887
StanSc_GM	26	73.00	130.00	108.92	15.1	-.654	.456	.105	.887
StanSc_PI	26	85.00	149.00	116.73	16.90	-.136	.456	-.756	.887
StanSc_EQ	26	85.00	139.00	113.96	14.61	-.274	.456	-.639	.887
Valid N (listwise)	26								

indicates this population had a high and well-developed emotional and social capacity (see Table 11). According to Bar-On (2002) Positive Impression scores two standard deviations above the mean (standard score >130) indicate "faking good" which is also referred to as social desirability and a familiar problem with testing. As this test was administered electronically, there was no reassuring of subjects that all responses would be anonymous to help address this possibility. Elevated scores on the positive impression scale can indicate self-deception, a lack of self-awareness or exaggerated self-esteem.

Table 9

Standard Scale Scores: EQi:S

RA	ER	SM	AD	GM	PI	Total EQ
124.00	125.00	109.00	132.00	122.00	120.00	130.00
96.00	125.00	118.00	132.00	114.00	134.00	122.00
116.00	114.00	106.00	125.00	128.00	149.00	124.00
121.00	117.00	115.00	119.00	130.00	113.00	128.00
101.00	97.00	109.00	112.00	103.00	124.00	105.00
66.00	106.00	100.00	108.00	73.00	95.00	85.00
96.00	106.00	109.00	122.00	114.00	124.00	112.00
116.00	117.00	124.00	112.00	119.00	127.00	124.00
86.00	123.00	109.00	105.00	111.00	113.00	109.00
109.00	125.00	115.00	132.00	114.00	120.00	125.00
76.00	94.00	118.00	112.00	89.00	131.00	95.00
94.00	108.00	98.00	94.00	95.00	106.00	97.00
116.00	100.00	115.00	108.00	111.00	134.00	114.00
96.00	108.00	121.00	112.00	106.00	110.00	111.00
101.00	117.00	127.00	136.00	100.00	102.00	120.00
116.00	108.00	127.00	129.00	128.00	120.00	129.00
96.00	100.00	100.00	115.00	100.00	92.00	102.00
89.00	114.00	103.00	112.00	92.00	120.00	102.00
66.00	91.00	109.00	112.00	78.00	85.00	86.00
111.00	123.00	127.00	136.00	122.00	95.00	131.00
96.00	108.00	109.00	119.00	111.00	102.00	111.00
104.00	103.00	121.00	125.00	114.00	131.00	117.00
99.00	106.00	98.00	105.00	103.00	92.00	102.00
131.00	120.00	127.00	136.00	130.00	138.00	139.00
131.00	120.00	121.00	136.00	122.00	141.00	135.00
104.00	94.00	115.00	115.00	103.00	117.00	108.00

RA=the indices of intrapersonal, ER=interpersonal, SM=stress management, AD=adaptability, GM=general mood, PI=positive impression, and total EQ=total emotional intelligence score.

Subjects responses were combined from both districts to give one group of subjects (N=26). Subjects were not evaluated individually by gender and age. Standard scores one or more standard deviations above or below the mean (mean =100, standard deviation = 15) indicate markedly atypical scores and closer examination is needed. Evaluating subjects' scores one standard deviation below the mean revealed three individuals with a significant lack in the index being measured. The first subject had an intrapersonal standard scale score of 66 and general mood of 73. The second subject had intrapersonal of 76, general mood of 89, and the third had intrapersonal of 66, and general mood of 78. As there were three individuals with scores lower than expected and seven individuals displaying scores >130 on the positive impression index the higher scores would seem to have contributed to the somewhat elevated overall EQ (113.9615, Standard Scale score). Comparing the means and standard deviations between this sample and a normative sample can be viewed in Table 10. There were no differences between means when comparing this research sample with established values for indices with the EQ-i:S.

Table 10

Comparison of Means and Standard Deviations for BarOn EQ-i:S Scales by group

Age Group/Female EQi:S Normative Group and Sample	Norm 40-49 yrs Norm (N=384)		Sample =44.5384 yrs Sample (N=26)	
	Mean	SD	Mean	SD
Intrapersonal	39.48	6.61	38.42	6.88
Interpersonal	44.29	4.22	44.69	3.68
Stress Management	31.56	5.01	35.46	3.16
Adaptability	29.07	4.10	30.19	3.41
General Mood	41.01	5.73	42.19	5.53
Positive Impression	14.59	4.73	20.04	4.76
Total EQ	37.08	3.82	38.23	3.83

Appendix I examines the correlation between the different EQ-i:S indices revealing significant positive correlations (N=26, $p<.01$) between intrapersonal and adaptability, general mood, positive impression, and emotional intelligence. Intrapersonal indices were also positively correlated (N=26, $p<.05$) with stress management and negatively correlated (N=26, $p<.05$) with the inconsistency index. These indices support one another (nature of positive correlation) in the overall development and understanding of emotional intelligence and as the intrapersonal ability increases there is a decrease in the inconsistency index (negative correlation).

The interpersonal index reveals positive (N=26, *p*<.01) correlation between general mood and emotional intelligence and (N=26, p<.05) with the intrapersonal index. Negative correlation exists between interpersonal and the inconsistency index (N=26, *p*<.01). Stress management correlates highly (N=26, p<.01) with adaptability and general mood, as well as with the intrapersonal scale (N=26, *p*<.05). Indicating these qualities have a significant impact on promoting stress management. Adaptability correlates positively (N=26, *p*<.01) with intrapersonal, interpersonal, stress management, general mood and overall emotional intelligence. Positive impression correlates well with intrapersonal, general mood, and overall emotional intelligence (N=26, *p*<.01) and negatively with the inconsistency index (N=26, *p*<.01). Five indices correlate negatively with the inconsistency index (N=26, p<.01) including interpersonal, general mood, positive impression, emotional intelligence and intrapersonal (N=26, *p*<.05). General mood and emotional intelligence correlate significantly (N=26, p<.01) with all other indices except the inconsistency index. General mood correlates negatively with the inconsistency index (N=26, *p*<.05) as does emotional intelligence (N=26, *p*<.01).

Figure 3

Interpretive Guidelines for Standard Scores

Range	Guideline
130+	Markedly High---atypically well-developed emotional and social capacity
120-129	Very High---extremely well-developed emotional and social capacity
110-119	High---well-developed emotional and social Capacity
90-109	Average---adequate emotional and social capacity
80-89	Low---underdeveloped emotional and social capacity, with room for improvement
70-79	Very Low---extremely underdeveloped emotional and social capacity, with considerable room for improvement
Under 70	Markedly Low---atypically impaired emotional and social capacity, with extensive room for improvement

Qualitative Results

Ironically the HM Company informed me, when I explained the population of the research study I wanted to conduct, that I was selecting the most difficult group to work with. I chose to interpret that information as what has been the situation in the past but which resistance may or may not apply to all teachers. This was my initial stance, which has since been revised, realizing the HM edict was probably more accurate in assessment of this group as research subjects than my more optimistic initial view.

Given that this research was conducted with adults, who are themselves teachers, it was interesting to hear how several members of this group "*did not understand what they were supposed to be doing*" (communication), "*did not see the purpose of the program"* (time and energy, abstract versus concrete interpretation) *or "did not feel the program had merit from the way it was explained"* (cost-to-benefit ratio). What I discovered in conducting this qualitative investigation was the ambiguity and misunderstanding associated with the terms 'thinking' and 'feeling.' This dilemma presented another question/quandary. How do I conduct research that is emotionally based if I do not have a clear concept of emotions, their origin and impact as a distinct entity within resilience and health? Thus future endeavors will require extensive literature review of the etiology of emotions and their unique contribution to resilience.

Time and Energy

When asked about their impression of the HM program teachers typically responded that the time to accomplish the tasks was too valuable to comply as originally agreed. "*Just didn't take the time to do it, I am so busy once I get to school that the day would be over and I would realize I had not gotten in the lab to practice, Time consuming,* *probably not a lot of time but it took time to go in there, sit down, get things running"*- this was the comment from the one teacher who chose not to participate and stated time was the only reason that she elected not to participate, *"If it was something we could have done in our cars on the way to school that would have helped, If the administration would have given us time during the day to complete the practice I would have done it,"* others remarked that they really saw *no value to it at all*, qualifying this statement with the addendum '*but I really did not put a lot of effort into it either.'* When prompted for more specifics, they explained that they did not *'buy into' the whole breathing through your heart thing or the feelings and that time was always an issue*. "*Always busy, always, always busy and usually very slow at doing things.*" Even though they are reassured that they will not hurt my feelings whatever they say to me, we are back to the same problem encountered at the start of this research in which they may hear (the words) but not <u>understand</u> or <u>believe</u> what I am saying.

This is one of the main issues from the interviews- how interpretation of words and their meanings may make a significant impact on how information is perceived and directions are followed. When presented with a new idea about stress management, in other words do 'positive feelings'- as an entity to be manipulated, make sense to teachers? In addition does involvement in research, which takes time away from the intractable demands of their job, the main concern or does it depend on what the research will provide them, is the time and energy worth it? If they feel that the research has merit than is time not as much of an issue? One suggestion from the interviews was to address time management as a better study for helping teachers in their resilience levels. Although none of the teachers expressed any complaint or comment about being involved in a research study other than the time factor. If I wanted the teachers to 'buy into' the idea of emotions making a remarkable difference in both their personal and professional resilience intensity they must feel that the time and energy will result in significant rewards for said investment. If there is a sincere belief of worth associated with the task the perception of time and energy appears to be remarkably altered.

Cost-to-Benefit Ratio

I arrived on a sunny, brisk, late winter morning around 11:30am to the rural elementary school involved with this research. As directed on the front door all visitors were to check in at the office. Because I have visited this school before I knew where the office was and walked into the office professionals area to be meet by the sound of the phone ringing, the principal speaking on another line, two little children sitting in her office (door was open) and no one in the reception area. Waiting patiently for a few minutes until I could let my presence be known. After hanging up the phone the principal counseled the two trespassers and asked them to please shake hands before returning to the playground. They complied and seemed very relieved about this form of reprimand for their pushing episode just minutes earlier. Seconds after they left a teacher brings in a little girl who was being made fun of in the lunch room and asks the principal if she would mind allowing the student to eat lunch in her office. The principal gladly agreed. After the partners in trouble left I seized my opportunity to let my presence be known and visited with her a few moments about why I was there, the hectic pace she leads on a regular basis, and if she knew of anyone that needed help with any particular project that day. She said just see what you find. She mentioned in this conversation "*three more years, just three more years until I can retire*" so even though she enjoys her job and the students, the daily toll of dealing with an increasing number of details and pressures and demanding parents, they do have an adverse affect on her career longevity. The cost of handling a plethora of minor emergencies on a daily basis is not worth the salary, position, students or faculty's interaction indefinitely. Similarly several teachers remarked on the idea that emotions are really not useful in handling stressful situations and so they did not feel that the HM practice was necessary. *"This program seemed not to address anything seriously, more emotional, This program was not for me, did not see much purpose in it and did not feel that it would benefit my students, I did not understand how feelings could be reflected on the computer and how that was going to help my stress level."*

After my observations of the kindergarten teaching experience I could very much appreciate their statements about the constancy of job demands. If there were an age of student considered high maintenance this would be it. I mention the fact that these teachers were involved with the kindergarten age because of the disparity of responses between those teaching the same demanding level of students. Of the two kindergarten teachers who participated one had very positive things to say, i.e., "*how this was something that could help them personally and professionally, <u>it did not take a lot of time</u>, how cool it was to see how they were feeling compared to how they thought of themselves."* She described her expectations of what would happen with the HM program practice as "*I am so happy I am going to whiz right through this. I do not get negative, and then I could not get it in the blue and I was like, come on, why can I not get it in the blue?*[1] *and then you get frustrated. I was disappointed in myself because I think I*

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[1] The HM software program uses an ear sensor clipped to the ear. Participants can watch the real-time recording of their heart rate variability while practicing the Heart Breathing, Heart Lock-In, or Neutral tools. One area on the page will display a bar graph with the titles Low, Medium, and High Entrainment Ratio. The color associated with the Low is red, Medium is blue, and High is green. Ideally, when the participant

have a happy spirit and it would not show it on the computer." The only comments from the other kindergarten teacher were that first she indicated she did not have time to do it and then concluded that she felt good about being involved with research and doing the program (benefit in participating) as a group but she just did not understand what it was all about, what the purpose was. Leaving me with the impression that how much reinforcement of material is necessary varies between individuals certainly, but may be one of the critical features lacking in teacher compliance with this research, as none of the teachers remarked negatively about being involved in the research. Thus with the dimensions of time and energy as well as cost-to-benefit ratio inexorably connected, allowing a one on one exchange between myself and the teachers prior to actually practicing the HM program, in other words being available to clarify any misunderstandings or answer any questions, could have helped with teacher compliance or confirmed for them that the program did not have usefulness for them. With two females teaching the same grade, one feeling positive and the other negative supports this conclusion that one on one discussions would have helped clarify for each teacher what was being asked, how to do it and why it would be beneficial. Of course there are other factors that may enter into this situation like the teacher's age, familiarity with technology, understanding of their own emotions and how they impact performance or if they feel this idea is valid, feeling as if they were competing with the other teachers since the first practice was conducted as a group, etc. As an example of job demands and time elements all the main corridors in the school are adorned with large, brightly colored stars. This indicates to me that the principal and teachers want to (take the time?) make the

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is activating the positive affective emotion and breathing through the 'heart' the High bar will begin to fill with green, the desired result of HM training and required to achieve a minimum of 50% read or less to be successful at the games.

school environment someplace special that students look forward to coming and sharing in their learning development. They will spend extra time on creating value for their students in the aesthetics of the building does this carry over into the more ethereal/emotional experiences as well? Overall I was impressed by how quiet the building was. If that was due to the control the students expressed or to an architectural feature of the building itself, I do not know but the entire time I was visiting there was very little noise.

Abstract versus Concrete Conceptualization

Many times during the course of these interviews statements were made about the HM computer program and their results. *"I could not get the color to change, The colors would start to change and I would get all excited and then they would disappear and I could not get them to come back, I was very upset because I could not get any color to come up, I tried, but it seemed like it was going to have to take a lot of brainwashing to get the picture to change colors,*[2] *I got discouraged. I am not a game player, never done that, pinball or anything."* Addition comments that support this theme of abstract versus concrete concepts were *"I am just not in to modernized heart-love stuff, Other people were getting the colors to change and I couldn't, I never got the colors to change so I didn't see the point in practicing, I tried but it never worked for me."* One particular interview was unique in that all three of these concepts were mentioned, directly or

[2] A feature of the HM computer program after participants have become proficient at achieving Medium to High Entrainment ratios is playing one of three games in which the ability to activate a sincere feeling of love, care, appreciation or gratitude will allow different things to happen. The shortest 'game' is when the participant has 3 minutes to change a black and white photograph into one with a multitude of colors as well as have animals, a waterfall, and a rainbow appear on the screen. This is the game referred to in the remark about getting the picture to change color.

indirectly within the verbal exchange. During the course of this interview I never felt like I was communicating *with* this teacher. I would ask a question and her statement in reply seemed to have nothing to do with what I was asking her. Whether this was due to the tape recorder, which she did consent to, made her nervous or what the problem was, it was hard to decipher what she meant based upon her replies to my queries. She did not feel that *"the program was helpful and said it was like voodoo or acupuncture."* As I am certified in acupuncture I was curious how she related these two entities so I asked her if belief in something makes a difference and her response was "*If you are depressed or something you have a prescription from a doctor, this seemed like it was…, did not involve anything seriously, it was more emotional.*" To which I stated she was correct in that the whole premise of the program was based upon positive emotions and asked if she felt there was a correlation between emotions and the stress response. She said she was not successful at video games and did not feel that she ever would be. When questioned about being involved in a research study she supported the litany from most of the other teachers that it took time away from other things she could have been doing like working with curriculum and then added that she was *"just not in to modernized heart-love stuff,*" was not something she thought she could use. My last question was concerning what other areas of investigation would have benefited the teachers more and her reply was "*It was just kinda weird. I do not know what else to say."* Assuming she did not know what I meant I then provided her with other options like time management, discipline strategies, classroom management as examples of other areas of research. Her response was *she had no talent for achieving any kind of success and that she could not tell whether she would ever be successful and the time and frustration were not worth the effort, or the* *disappointment and frustration were too much.* In other words being successful at the computer program was the ultimate goal because emotions are not a way to improve stress levels. Although this teacher may have been one of the more seasoned members of this district and not as comfortable with computer programs, it struck me from her comments that we tend to dump everything that is strange or incomprehensible into the same basket (her reference to voodoo and acupuncture in the same category with this program). Here again the idea that this program was going to take time away from the demands of curriculum generation and daily tasks of teaching were listed as the primary negatives as a research subject. She also mentioned being somewhat embarrassed because other people were getting the colors to change and she was not adding to her disappointment in herself and her feeling of incompetence, low benefit to cost involved with this program.

The most positive responses came from a few teachers who felt that it would be interesting to see how much of the program was retained over the school year. They felt that it was very useful and would have liked to see everyone practice the program faithfully, practice once a week for the duration of the school year. They felt that research addressing stress reduction was very apropos and anything that could benefit them personally and professionally was a good idea. They felt the school environment can be a very stressful place between, students and parents. The time restraints on some teachers are somewhat different than the typical classroom teacher and may explain part of why some teachers did not find the requirements excessively time-consuming, or without benefits for the amount of time invested.

Emotions: Thinking versus Feeling

The principal was interviewed to see what her feelings were about the program, even though she was not a participant. I wanted to know how she felt the teachers were responding to being involved in research. She was very supportive as was her position from the beginning. She did not address question directly but stated here feelings as "*I think it (HM, research, stress reduction, any or all of these?) is great. Teachers need to think beyond what they usually think and having them look at what their reactions are and what their children do. I think it was a great thing."* When asked about the foundational issues of the program being emotion-based she responded that "*emotions are a very big part of school and of people and who they are. School, as an institution, requires everyone to follow these rules and go like this (pointing with both hands in a parallel fashion). There are different feelings about it and what is the best way, how do you do it, what works for this one may not work for everyone. I feel this program can help teachers, students, and families. I think coming to a PTO meeting and doing a big thing where families could tune into it would be great. Some would understand and some would not have a clue what you are talking about."* I enjoyed visiting with her about this program and felt that she had a grasp of the difference between emotions/feelings and thinking that the fourteen teachers involved in the study did not. Originally I may not have stressed enough or in a meaningful way how to allow the heart to generate the positive emotions while allowing the brain to amplify those feelings and stay in this frame of being for prolonged periods of time. This is what accomplishes the benefits from positive affective emotional management and practice. Regardless of the final impact of this research the experience of working in her building will allow similar research in the future and the ability to share this program with students and their families as she suggested.

Ethnographic Observation

Typical of what I remember from being in elementary school were the gymnasium which doubles as the lunch room, a separate fenced playground area, library (with adjacent computer lab, not typical of my elementary experience) and location for music distinct from the regular classroom. Teachers could be seen taking students to and from their classrooms to these other areas for the subject of that hour or working quietly on grading papers while students were assigned reading or writing assignments. During the kindergarten class observation the students were preparing to go outside for recess and thus about 13 whirling dervishes could be seen going from one piece of equipment to the next. The females in this class were either playing quietly in pairs, being chased by the boys, or competing with the boys. Two students tried to take jump ropes and use them to swing down off the jungle gym which very quickly lost them jump rope privileges. The equipment available consisted of one regular monkey bar apparatus, one complex of climbing with multiple slide styles attached, linear and circular, two sets of swings with three swings each and a fairly large open area for running and falling down. The constant vigilance in monitoring these young people led this teacher to remark that although she was not physically tired at the end of the day she was emotionally exhausted. She felt that she was continually having to counsel, scold, remind students of how to behave and explain why they were doing things a certain way. She was hopeful that this was the impression being left with her students.

Not as frequent with this group as with the Fourth graders were the every couple of minutes requesting rest room visits. This seemed almost to be a domino affect, one would return and another would ask to go. A Fourth grader counted his steps to and from the restroom (he appeared to have been affected by Down's syndrome).

A second grade teacher that I observed seemed so very happy, smiling and being hugged by her students, that stress issues did not even present themselves as a problem with this teacher. Miscellaneous items recorded during my visit were that not all of the teachers exhibited a rosy, cheerful demeanor, and yet they appeared very cordial whenever I spoke or asked a question. Two of the classrooms were hatching chicks so the aroma and sounds were quite distinct from these areas. The look of wonder on the students' faces whenever they peered over the edge of the box at the little chirping creatures and why teachers would want the mess and the smell in their rooms if they did not *feel* this experience would provide not only knowledge but feelings of wonder, appreciation, beauty?

Primary Documents

Posted on the home page for the elementary teachers was the mission statement 'Developing Self-directed Learners.' There was minimal personal or emotional qualities detected anywhere on this site. This little piece of information (mission statement) would have served me well when sharing the research with them and might have given the self-generating nature of the HM idea and project greater meaning for the teachers. Upon clicking on the Elementary tab the first items that appear are a calendar in the center of the page with the following options along the left margin; new and links, reading, help, parent help, elementary school, newsletters, information, *staff, staff web pages*, student handbook, preschool information. Expecting to see personal information about the faculty and staff, items that would provide an emotional link to the teachers in this district resulted in minimal if any personal information, no pictures, no after-school programs or projects, etc. Indicating to me that teachers are all business when it comes to teaching and learning. Emotions, knowing them as individuals away from school, is privileged information.

Checking out the information posted under staff gave a listing of all employees and their grade level or general charge, i.e., counselor, nurse, office professional etc. There were no pictures of any of the employees except of the building principal. Under staff web pages were a listing of six areas or teachers only one of which was from the elementary school and were assignments for students that these teachers had posted. No additional information from this site was found about the teachers themselves. Very purposeful information for parents and students needs in keeping with the mission statement for students' academic performance was revealed.

The newsletter was for parents and gave advice from teachers on setting boundaries, interaction with children, meal time, and other items aimed at increasing the parent-child relationship. From this document it would seem that the teachers are centered on student achievement and providing additional information that will encourage academic and social success. Depicting emotional education should be cultivated at home and not at school may also be interpreted from the information provided. Although some of this information gave the impression of wholeness in terms of their support for the students learning and succeeding. I could not determine from this information compared with the interviews and observations whether they, pardon the expression, took it *to heart* for themselves.

Comparing the look and vocabulary from the school website with the HM was intriguing to me because of the metaphors present with the HM images. There was a lot of openness on the page and not a lot of reading required but messages such as “Our research on emotional energy and intuitive development enables the quick transformation of stress and the recoup of lost vitality.” This statement, as well as the line under the name about the involvement of the heart as the center of HM’s existence “decoder of the intelligence of the heart” depicts the focus and direction of this organization very succinctly from their homepage web site. Also on the home page is an image made to appear as if you were looking out your window into an idyllic landscape of green rolling hills, with bursts of colorful flowers under an azure blue and sunny sky, watching someone fly a brightly colored kite. Within this bright blue sky are tufts of white clouds, a portion of which are in the line deflection characteristic of that seen on a heart monitor used during a hospital stay.

Hence, the unwritten idea gleaned from this production by the HM Company is that if you focus on the heart, as an organ of positive emotional and intelligent information, practice their system of generating positive feelings, breath through your heart, your life may be “picture perfect” in terms of stress reduction and that regardless of the field (education, research, or individual) the power is within reach to improve your current condition. Just as a kite climbs high in the atmosphere it is anchored by a tiny thread, HM training can allow individuals positive emotions to carry them above the stress that may seem to overwhelm, while still “grounding” them in reality.

Summary

Examining the data for errors and violation of assumptions indicates that the sample size will be the most critical factor in the ability to generalize about the population from which this sample of elementary educators was extracted. The data suggests that there is a significant difference in the indices of calmness and freedom of expression and no significant differences among any of the other dimensions measured with the instruments used in this study, including the perception of time pressure which was mentioned in the qualitative inquiry. The difference within calmness and freedom of expression specifically occurred between time 1 and time 3 (during and prior to the beginning of an academic year) according to the POQA-R instrument. Examining the subjects for an overall emotional intelligence score using the EQi:S electronic version reveals that this population is not significantly different from the normative sample on which values were based. Examining the implication of extreme scores in relation to the POQA-R will be discussed in the discussion section.

CHAPTER 5

DISCUSSION, CONCLUSIONS, AND IMPLICATIONS

Study Summary

The purpose of this study was to determine if the positive, heart-based, emotional intervention known as HeartMath would result in significantly different feelings over time as measured by the POQA-R instrument. Additional investigation was included to examine the degree of emotional intelligence among this sample of elementary educators using the EQi:S (electronic version). Among the treatment group, a qualitative investigation of interviews, authentic documents, and ethnographic observations was conducted to understand teachers' views of being research subjects and their feelings about the HeartMath system and research protocol in general. This study was a quasi-experimental design with repeated measures ANOVA examining the independent variable of time with the same subjects administered the same instrument (POQA-R) at three time periods over the academic year. The desired questions with this research were:

1. Is there a significant difference between treatment and control groups after HeartMath training?
2. If a significant difference between treatment and control groups exists, does this difference persist over time?
3. Were there significant differences between groups from with the pre-test scores?

Actual questions asked with this research were:

1. What effect does time have on the indices reflecting personal and organizational quality as measured by the POQA-R?
2. Were there significant indices markedly different over time that

impact personal and organizational quality and thus resilience among elementary educators?

This repeated measures ANOVA was conducted among a sample of kindergarten thru fifth grade public school teachers over one academic year to determine the effect of time on personal and organizational quality factors (POQA-R, Institute of HeartMath, 2004). In addition the Bar-On (2002) EQi:S was added to asses overall emotional intelligence among this group. Other information collected about this sample included demographic information of age, gender, marital status, level of education, salary, number of work hours per week, years employed, level of employment, and years in a gainful position with the same organization. Qualitative inquiry asked the following questions:

1. How did teachers feel about being involved in research?
2. What were their feelings about the HeartMath program?
3. What would have increased their participation with this research?
4. Did they have suggestions for research that would more appropriately address the construct of resiliency? Or other ideas that were more expedient?
5. Did they have questions about the research?

Data representing demographics and raw data from test instruments are included with Appendix H and I. Consent documents, recruitment and presentation materials shared with the original treatment group are included as Appendices C, D, and E. The HeartMath intervention training materials are attached as Appendix F and G. Test instrument information is contained under Appendix A and B of this document.

The hypotheses tested with this research were that there would be no significant differences over time on any indices of personal and organizational quality, emotional intelligence levels among subjects would be similar to a normative age and gender matched population, and that teachers did not participate due to lack of proper incentive, motivation, and encouragement. Data were analyzed by computing frequency distributions, descriptive statistics, repeated measures ANOVA, bivariate correlation, and comparison of means. Post hoc with the Bonferroni adjustment was performed. All analyses were conducted using SPSS 13.0.

Limitations

Small, nonrandomly selected sample will limit generalizability to similar environments and groups. The ability to detect significance was compromised by the number of subjects who completed the program as described, providing valid cases. Comprehension of the purpose and process of the study by all teachers in the treatment group may not be uniform and may influence data results. Non-blind study may have produced bias from the subjects reported what they perceived the primary investigator wished to discover. A repeated measures design will have improved power but is not immune to potential alpha inflation.

Discussion

The POQA-R was selected due to this instrument addressing both personal and organizational factors that contribute to the construct of resiliency and had adequate statistical reliability and validity. Likewise the EQi:S was used because of its extensive statistical vigor, was available electronically, reported to require only a modicum of time to complete and would provide a measure of emotional intelligence among research subjects. The qualitative inquiry was undertaken to explain the poor compliance among subjects.

The ANOVA results indicated significant changes over time with the POQA-R indices of calmness, freedom of expression, and communication effectiveness ($p<.05$). Mean of calmness at time 1 equal to 3.614 and time 3 equal to 4.4815. Freedom of expression time 1 mean 5.4545 and time 3 mean 6.1212. Communication effectiveness overall significance was .052 which is not according to the a priori alpha level of .05. Due to the value approximating significance a review of the pairwise comparisons was conducted to see if there was significance between the time points and this was found to be the case with mean at time 1 of 5.50 and time 3 mean of 6.1818, *p* value =.049. Post hoc analysis revealed the specific location of these findings between time 1 and time 3 with all being greater at time 3[1] compared to time 1 (.05 alpha level). These findings may suggest the deterioration of these abilities during the course of an academic year. According to a 1980s U.S. Department of Labor, Employment, and Training Administration Research Project entitled *What Employers Want for Teens,* one of the top seven skills or attributes desired by employers within teenagers was communication effectiveness proficiency. If in elementary school, skills are acquired as much from observation as from the modeled behavior, as much from verbal or didactic style as from expression with delivery, than this is an item that may warrant further investigation among this group of subjects. Calmness, Freedom of expression and Communication effectiveness would also support other U.S. Department of Labor, Employment, and Training Administration Research Project (1980-1989) findings of group effectiveness

[1] Time one was shifted to the time period approximately 10 weeks into the academic year, time 2 was approximately 8 weeks from the end of the academic year and time 1 was the beginning of the year.

based on interpersonal skills, negotiation, teamwork, organizational effectiveness and leadership, and contributing. Winkleman & Harmon-Jones (2006) feel that emotional states are contagious in that an area of the brain now termed the 'social' brain detects the state of the person with whom one is interacting, adjusting feelings and actions of self to correspond to those of the other. Goleman (2006) and Barsade (2002) feel that humans' brain mirror the emotional states of others, particularly others in power which reinforces the need for the teacher (the most emotionally powerful in the classroom) to be emotionally grounded and skilled in personal interaction, by way of role model and the source of an 'emotional ripple effect'.

Evaluating the data from the EQi:S implies that the possibility exists for over confidence of self report scores. This is due to the data being markedly above normal, to the point of invalidating the test, and may have erroneously elevated the overall emotional intelligence value (54% of subjects equal to or greater than 120 on the positive impression index). Approximately 8% of subjects were markedly low, less than 70 on intrapersonal index suggesting that these individuals were not able to accurately self-assess their emotions, express their feelings or communicate their needs to others. The comparison of means between EQi:S standard scales indices from this population with the normative group were not significant. Although Bar-On provides an interpretive guide for the standard score, evaluation is approached with caution in concluding meaningful differences based on these values. The sample overall emotional intelligence mean was 113.9615 indicating a high level of emotional intelligence, a well-developed emotional and social capacity.

Explanations about the significant differences between POQA-R indices of calmness, freedom of expression, and communication effectiveness may be a normal finding within the profession of teaching. These findings may be due to the nature of this field requiring culturally or socially distinct restraints on behavior and attitude, extensive language and communication skills, and continuous interaction between pupil and instructor where authority must be exerted over others, and over the school year, these resources become diminished. Other factors may have been extant undetectable by the methods used in this study or merely associated with the passage of time.

Using the standard scale values for EQi:S interpretation did not reveal any significant findings when comparing means or standard deviations and were only remarkable when viewing individual scores with the recommendations from the technical manual (Bar-On, 2002). These discrepancies indicate a possible ‘faking good’ by subjects in that they responded according to their idea of societal norms or for some possibility their administrators may have had access their responses. Bar-On recommends reassuring subjects about the confidentiality of responses but as this test was administered electronically and password protected this may not apply here. As this group is familiar with standardized test administration, they may represent a special group in terms of accessing their true responses.

Demographic information was collected for comparison of groups with those age and gender designated tables from the EQi:S Technical Manual (Bar-On, 2002) and can be viewed in Appendix H and I. This information was useful to determine the empirical percentile of subjects with those in the normative EQi:S sample. Gender demographics could also help explain the responses on all instruments as subjects were predominantly female in this study. No specific tests were conducted evaluating possible gender differences, as only one participant was male. Future possibilities for research among this group may address gender differences, how a positive emotional management practice between males and females contributes to resiliency among educators, student-teacher relationships, and learning.

Qualitative Discussion and Conclusions

Qualitative inquiry based on ethnographic interviewing, observation, and authentic document review reveals that subjects' degree of involvement was due to a combination of the following themes; perceived lack of time, perceived lack of reinforcement and/or incentive to participate, and conceptual misunderstanding. Perceived lack of time was not supported by the quantitative analysis, as significantly different between fall, spring or summer, but may be a societal construct in which teachers feel a perpetual time-deficient state with no real seasonal or job-related change. The majority of subjects in the study gave support for these qualitative data findings as collected by the aforementioned means. Although very few subjects stated they enjoyed participating and that time was not an issue, and that they comprehended the intent, practice, and requirements of the intervention and overall study protocol, these handful of subjects did relate personal testimony that the technique was useful to them. Personal experiences reported by those in favor of this research as well as allowing the program to be shared in their classrooms with their students was evidence that this program was worthy of further investigation to some of the elementary teachers.

Qualitative results indicate a relationship with the teachers may be necessary prior to attempting a research study with this group. This relationship would help the researcher to understand what subjects collectively feel would benefit their concept of resilience, in this case, and efficacy in the profession of student learning. Obtaining financial and administrative support would also be major contributors to a successful research endeavor with this population. Teachers were asked prior to this research if they had previous experience with the HeartMath organization, tools or training. All subjects reported no exposure to this company and their programs to facilitate educators' resilience and student learning.

Conclusion

This study yielded information about the possible attitudes and emotional intelligence of educators over the course of one academic year in the public elementary school setting as an indirect evaluation of the construct of resilience. This study helps clarify that the variable of time may be a factor for certain affect indices relating to calmness, freedom of expression, and communication effectiveness as well as suggests that the ability of individuals to accurately report their feelings may not be an acceptable or comfortable avenue for adults to pursue. Although no examination was conducted for alexithymia this may be a pseudo-state in the educational environment where typically feelings are dictated or have not been recognized as influential in the health and coping ability of adults. Ways to sufficiently describe positive emotions and how they have place in the educational setting, for not only the teachers resilience but the students health and learning is becoming widely accepted (Durlak & Weissberg, 2005; Goleman, 2006; Goleman, Boyatzis, & McKee, 2004; McDevitt & Ormrod, 2002; Page & Page, 2003; Patti & Tobin, 2006; Stone, Parker, & Wood, 2005; Winkleman & Harmon-Jones, 2006). Selecting the positive emotion of care is described as critical for relationships and learning (Stipek, 2006) and according to Elias, Zins, Weissberg, Frey, Greenberg, Haynes, Kessler, Schwab-Stone, & Shriver (1997):

> "Caring is central to the shaping of relationships that are meaningful, supportive, rewarding, and productive. Caring happens when children sense that the adults in their lives think they are important and when they understand that they will be accepted and respected, regardless of any particular talents they have. Caring is a product of a community that deems all of its members to be important, believes everyone has something to contribute, and acknowledges that everyone counts".

Implications

With the growing body of evidence reporting the health consequences of stress (Arnetz & Ekman, editors, 2006; Childre & Martin, 1999; Childre & Rozman, 2006; Trivieri, 2003) on health and resilience, an approach that incorporates the factors of positive, heart-based, emotional management is producing promising results in both the public and private sectors, within corporate and educational settings. Current trends in terms of preventive techniques and therapies have not had a significant impact on the mortality rates associated with heart disease (Insel & Roth, 2006) and selecting positive emotions may be the component necessary to alter this situation (Gallo, Ghaed, & Bracken, 2004; Guarneri, 2006).

Actualizing long-term changes in the health of a nation may be in focusing preventive practices toward not only adults but children as well. Research that has the potential to influence both of these populations is possible in the school setting. Using the analogy represented in Figure 1 for how positive emotions contribute to improved coping strategies and increased resilience is grounded within recognizing heart intelligence as the source and power to met challenges with less stress and greater plasticity (Childre & Rozman, 2006).

Suggestions for Future Research

Correcting the flaws that existed within this research would be the first suggestion prior to implementation of additional study with this group. A heart-generated, positive affective self-selected emotional management protocol devised to increase resilience and health among public elementary school educators and indirectly students, parents, communities, and the ultimately the country is a necessary and valuable area to pursue.

1. Prior to soliciting participation in a HeartMath study explore grant opportunities to support the research project.
2. Conduct power analyses estimations for the minimum number of subjects necessary to meet a priori statistical frameworks and from that value multiple 5-10% to obtain the number that will realistically complete the study as requested.
3. Continue recruiting subjects until the 10% value equals the recommended number from the power analysis procedure.
4. When approaching school districts for participation if grant funds are available this will reassure the prospective parties that human subjects and other criteria have been evaluated and approved for the study.
5. Meet frequently with subjects to insure compliance with study guidelines and to supervise test administration.

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APPENDIX A

POQA-R SAMPLE

Personal and Organizational Quality Assessment – Revised (POQA-R)

The POQA-R is a self-report inventory designed to reflect the key psychological and workplace elements that contribute to the overall quality of an organization. The instrument provides a concentrated yet comprehensive assessment in the two main topic areas listed below.

Personal Quality

- Positive Outlook
- Gratitude
- Motivation
- Calmness
- Fatigue
- Anxiety
- Depression
- Anger Management
- Resentfulness
- Stress Symptoms

Organizational Quality

- Strategic Understanding
- Value of Contribution
- Manager Support
- Goal Clarity
- Job Challenge
- Work Intensity
- Time Pressure
- Freedom of Expression
- Communication Effectiveness
- Confidence in the Organization
- Work Attitude
- Morale Issues
- Productivity
- Intention to Quit

Personal Quality scales directly reflect employees' day-to-day moods, attitudes and stress-related symptoms. The stress symptom items possess clinical relevance as valid measures of stress, which can exert a significant negative impact on employee health and work performance. Organizational Quality scales are comprised of questions concerning such areas as Strategic Understanding, Goal Clarity and Work Attitude. Organizational Quality scales also examine key areas that influence employee job involvement, performance and important factors related to employee behavior, attitudes toward work, and ability to perform well.

ANALYSIS

Standardized scores enable comparisons of the status or performance of an individual or group with that of some relevant reference group. Standardized scales also enable meaningful comparisons of an individual's or group's performance or status in one domain to that in another. (e.g., anxiety versus depression). The two normative summary pages display the group's average standardized score. Quartiles (the 25th, 50th, and 75th percentiles) divide the graph into four sections. The quartiles are labeled as follows Substantially below average <25th, Below average 25th - 49.9th, Above average 50th - 74.9th, Substantially above average 75th - 100th.

On the remaining pages: Two primary 7-point scales are used in the POQA-R, one asks about how frequently an item is experienced, ranging from "not at all" to "always." Percentages of responses at the top end of the scale, i.e. responses of "Often," "Very Often," or "Always," are reported. The other scale asks how much one disagrees or agrees with a particular statement, ranging from "strongly disagree" to "strongly agree." Percentages of persons that agree or strongly agree are combined and reported as the top end of the scale.

REFERENCE GROUP

Although reference values used for this report are based on a large data set, research with the POQA-R is ongoing. The reference values may be updated from time to time as additional data is added to the database. Currently, the reference data is based on the responses from over 1,000 working adults.

Personal and Organizational Quality Assessment - Revised

Reliability of the POQA-R

The POQA-R was distributed to a sample of working adults at several job levels, who commented on the clarity and phrasing of the items on the questionnaire. The format was then revised to provide better face validity. Next, the dimensions were reconfirmed by factor analysis. The two to six items representing each of the dimensions were then subjected to internal consistency analysis on a population of 1568 working adults, using Cronbach's coefficient alpha (a). Alpha coefficients for all scales achieved acceptable reliability scores ranging from a low of .65 on the Goal Clarity dimension to a high of .90 on the Fatigue dimension. Table 2 lists each scale and the alpha coefficients.

Dimensions measured by the POQA-R

1. Positive Outlook
2. Gratitude
3. Motivation
4. Calmness
5. Fatigue
6. Anxiety
7. Depression
8. Anger Management
9. Resentfulness
10. Physical Stress Symptoms
11. Work Attitude
12. Strategic Understanding
13. Confidence in the Organization
14. Manager Support
15. Goal Clarity
16. Job Challenge
17. Value of Contribution
18. Freedom of Expression
19. Work Intensity
20. Communication Effectiveness
21. Productivity
22. Time Pressure
23. Morale Issues
24. Intention to Quit

Standalone Items

1. **General Health:** Over the last month my health has been:

2. **Analog Stress Scale:** Place a mark on the line below, indicating how stressed you have been in the past month:

Additional Items

1. It takes a lot of effort to sustain my performance level
2. I am creative and innovative
3. I feel conflict between work and personal priorities
4. There is tension between management and staff
5. I feel loved by my spouse / partner

Table 2. Internal Consistency

	Number of Items	Internal Consistency α (N=1568)
Positive Outlook	4	0.86
Gratitude	3	0.86
Motivation	3	0.81
Calmness	3	0.83
Fatigue	3	0.90
Anxiety	3	0.80
Depression	4	0.89
Anger Management	4	0.79
Resentfulness	4	0.74
Physical Stress Symptoms	6	0.75
Work Attitude	3	0.73
Strategic Understanding	3	0.68
Confidence in the Organization	3	0.68
Manager Support	4	0.89
Goal Clarity	3	0.65
Job Challenge	3	0.77
Value of Contribution	3	0.75
Freedom of Expression	3	0.73
Work Intensity	4	0.76
Communication Effectiveness	2	0.73
Productivity	3	0.68
Time Pressure	3	0.75
Morale Issues	2	0.65
Intention to Quit	2	0.89

Table 1. POQA-R Dimension Items

Dimension	Item #	Question	Response scale: Not at all - Always
Positive Outlook			
	q34	I feel optimistic about the future	
	q37	I am pleased with my life	
	q29	My life is deeply fulfilling	
	q35	I wake up and look forward to each day	
Gratitude			
	q11	appreciative	
	q16	thankful	
	q21	grateful	
Motivation			
	q30	Dynamic	
	q36	Motivated	
	q40	Enthusiastic	
Calmness			
	q18	Calm	
	q26	Peaceful	
	q12	Relaxed	
Fatigue			
	q14	Tired	
	q2	Fatigued	
	q9	Exhausted	
Anxiety			
	q13	Anxious	
	q22	Worried	
	q24	Uneasy	
Depression			
	q10	Blue	
	q4	Sad	
	q8	Depressed	
	q23	Unhappy	
Anger Management			
	q39	I sometimes have a short fuse	
	q31	I get upset easily	
	q38	I sometimes have urges to break, throw or smash things	
	q32	It's difficult for me to calm down after I've been upset	
Resentfulness			
	q1	Resentful	
	q19	Cynical	
	q3	Annoyed	
	q25	Angry	
Physical Stress Symptoms			
	q15	My sleep is inadequate	
	q5	Body aches (joint pain, backaches, etc.)	
	q17	Indigestion, heartburn or stomach upset	
	q7	Rapid heartbeats	
	q20	Muscle tension	
	q6	Headaches	
Single Items			
	Q027	Over the last month my health has been:	
	Q028	Place a mark on the line below, indicating how stressed you have been in the past month:	

Dimension	Item #	Question	Response scale: Strongly Disagree - Strongly Agree
Work Attitude			
	q55	I am proud of the company I work for	
	q79	My job gives me a sense of accomplishment	
	q48	I feel good about what I do at work	
Strategic Understanding			
	q58	I understand our business strategy	
	q65	I see a connection between the work I do and the company's strategic objectives	
	q53	I feel good about the future of the organization	
Confidence in the Organization			
	q73	We have great confidence about being successful in the future	
	q78	When people talk about the current state of our organization, most of the stories are about good news (e.g. innovations, achievements, new and better practices, etc.)	
	q82	This is and organization where people feel a sense of appreciation for one another	
Manager Support			
	q66	I feel very supported by my supervisor	
	q62	I feel a strong sense of rapport with my supervisor	
	q56	I really like the way I'm treated by my supervisor	
	q77	My work is often recognized and appreciated by my superiors	
Goal Clarity			
	q69	I always know how my supervisor wants me to utilize my time	
	q50	The goals of my organization are clear to me	
	q43	Peoples roles and responsibilities are made clear	
Job Challenge			
	q83	My job requires me to use all of my abilities	
	q72	My work is very challenging	
	q46	My work is usually interesting and stimulating	
Value of Contribution			
	q54	My efforts make a big difference in my organization	
	q85	Doing my tasks well substantially contributes to my organization	
	q68	I feel very useful in my job	
Freedom of Expression			
	q76	People where I work feel free to express their opinions	
	q75	People respectfully express different points of view during meetings	
	q70	I am able to speak out with out fear of the consequences	
Work Intensity			
	q41	I consistently work at my full capacity	
	q60	I always approach my work with whole-hearted effort	
	q44	I strive as hard as I can to be successful in my work	
Communication Effectiveness			
	q42	We listen carefully to each other at work	
	q49	The quality of communication at work is excellent	
Productivity			
	q51	I accomplish all my objectives at work	
	q59	My work produces excellent results	
	q80	I am always highly productive	
Time Pressure			
	q57	I feel pressed for time	
	q52	I feel there is never enough time	
	q61	The pace of life is too fast and I can't keep up	
Morale Issues			
	q81	I work with people who don't get along with each other	
	q84	I'm aware of power struggles between co-workers that damage morale	
Intention to Quit			
	q71	I feel like leaving this organization	
	q74	I feel like quitting my job	
Additional Items			
	q67	It takes a lot of effort to sustain my performance level	
	q63	I am creative and innovative	
	q64	I feel conflict between work and personal priorities	
	q45	There is tension between management and staff	
	q47	Other people know me by the long hours I keep	
	q33	I feel loved by my spouse / partner	

POQA-R

Personal and Organizational Quality Assessment - Revised

Report for:

Sample Report

January 4, 2004 & February 2, 2004

Confidential

A322

Personal and Organizational Quality Assessment – Revised (POQA-R)

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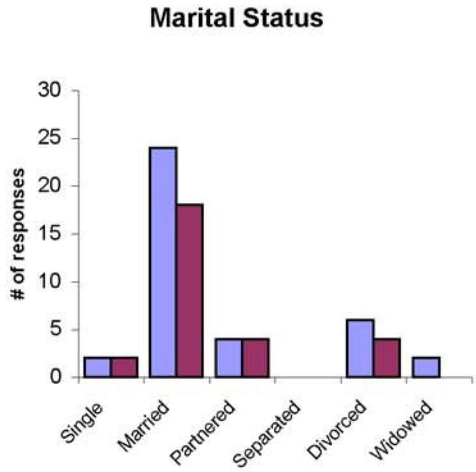
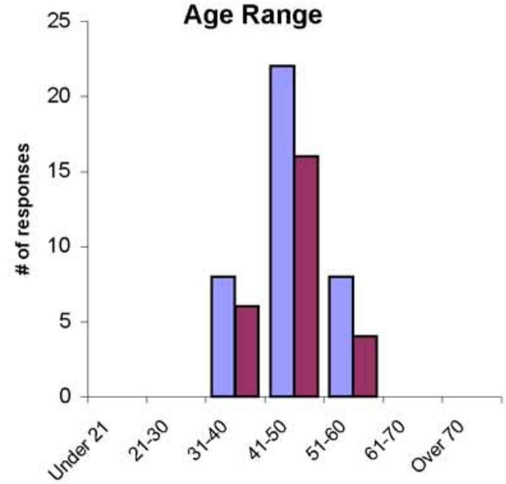
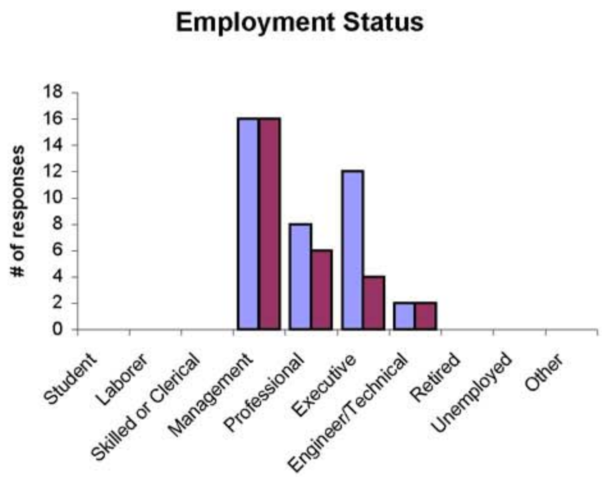
Personal and Organizational Quality Assessment-Revised

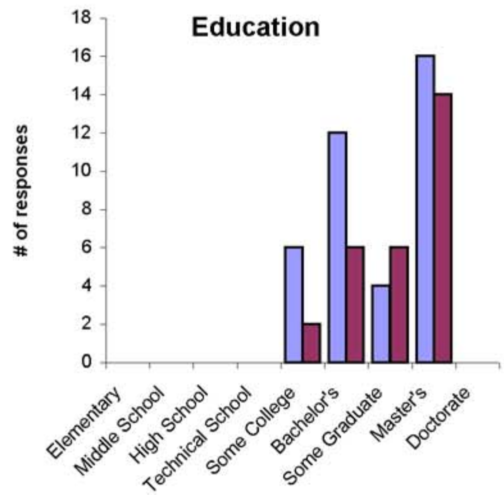
Sample Report **January 4, 2004 & February 2, 2004**

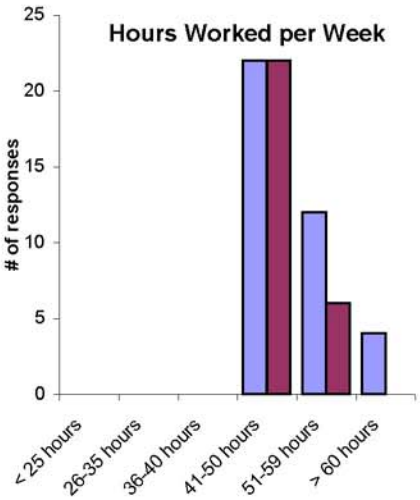
	Total Responses	
January 4, 2004	38	Gender: 14 Males, 24 Females and 0 NA
February 2, 2004	30	Gender: 10 Males, 20 Females and 0 NA

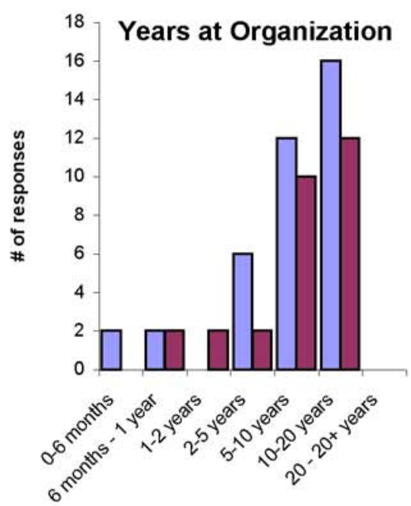


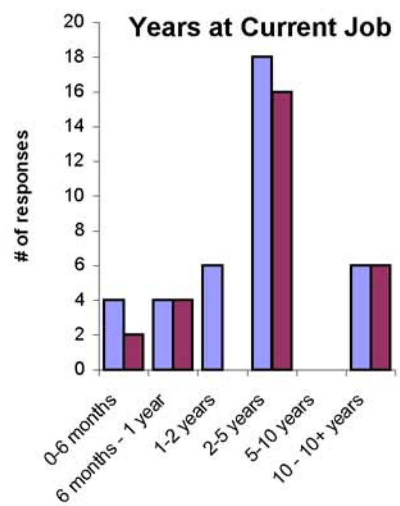








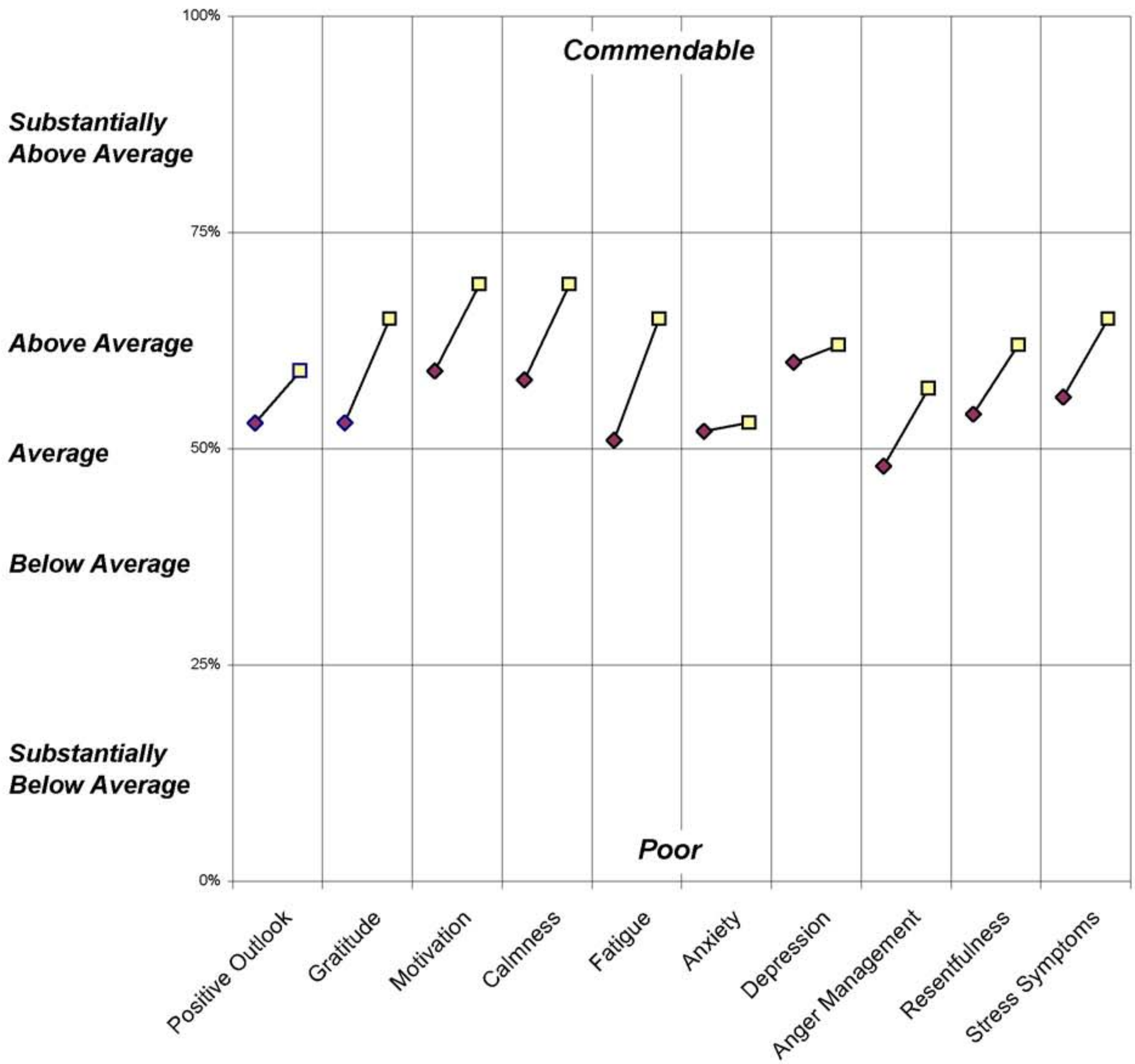




Personal and Organizational Quality Assessment-Revised

POQA-R Normative Summary

Sample Report **January 4, 2004 & February 2, 2004**



PERSONAL

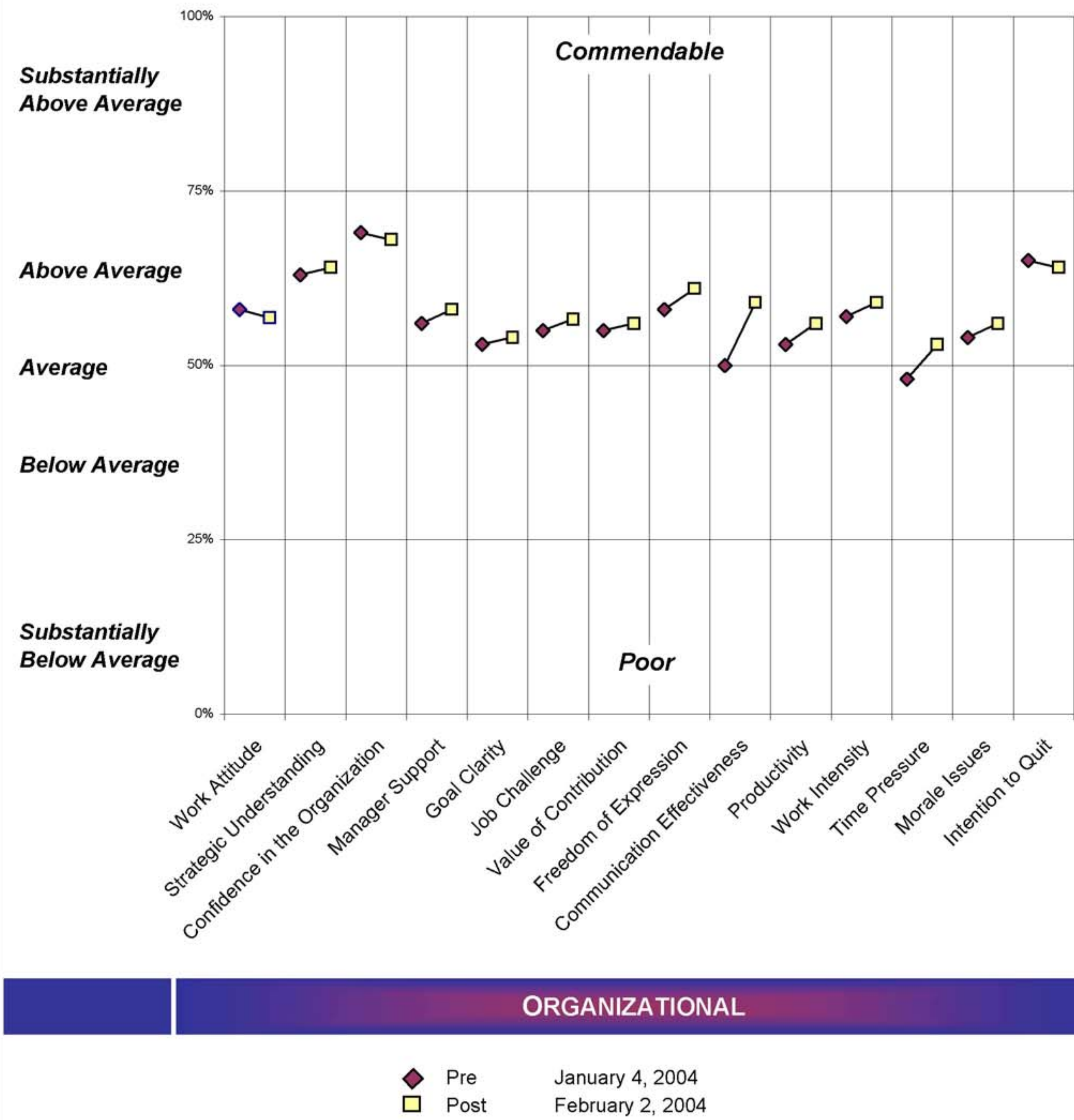
◆ Pre January 4, 2004
□ Post February 2, 2004

The standardized scales on this page are coded so that the desirable end of the graph is toward the top, where substantially above average would be a commendable result and substantially below average would be a poor result.

Personal and Organizational Quality Assessment-Revised

POQA-R Normative Summary

Sample Report **January 4, 2004 & February 2, 2004**



The standardized scales on this page are coded so that the desirable end of the graph is toward the top, where substantially above average would be a commendable result and substantially below average would be a poor result.

Sample Report

January 4, 2004
February 2, 2004

Personal Quality

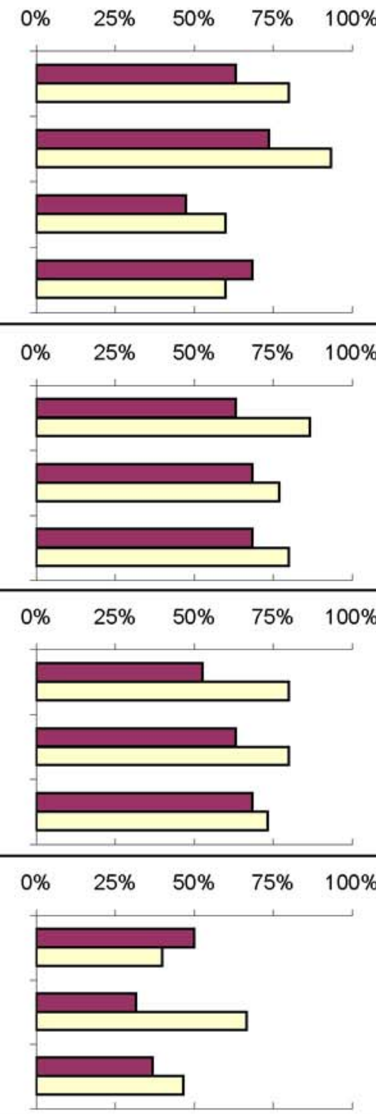
Percentage of individuals who responded: often - always

Positive Outlook	Pre	Post
I feel optimistic about the future	63%	80%
I am pleased with my life	74%	93%
My life is deeply fulfilling	47%	60%
I wake up and look forward to each day	68%	60%

Gratitude	Pre	Post
Appreciative	63%	87%
Thankful	68%	77%
Grateful	68%	80%

Motivation	Pre	Post
Dynamic	53%	80%
Motivated	63%	80%
Enthusiastic	68%	73%

Calmness	Pre	Post
Calm	50%	40%
Peaceful	32%	67%
Relaxed	37%	47%

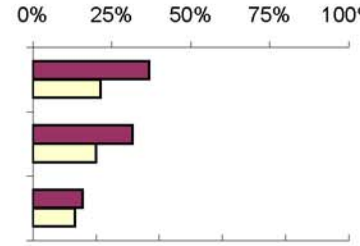


January 4, 2004
February 2, 2004

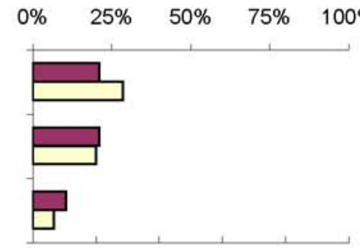
Personal Quality

Percentage of individuals who responded: often - always

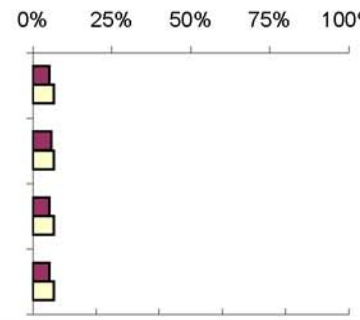
Fatigue	Pre	Post
Tired	37%	21%
Fatigued	32%	20%
Exhausted	16%	13%



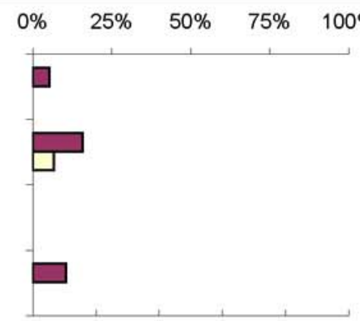
Anxiety	Pre	Post
Anxious	21%	29%
Worried	21%	20%
Uneasy	11%	7%



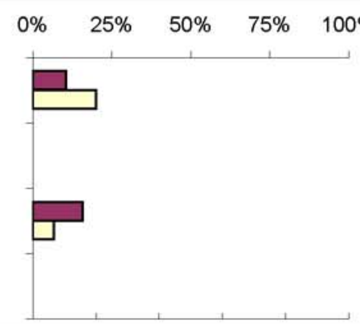
Depression	Pre	Post
Blue	5%	7%
Sad	6%	7%
Depressed	5%	7%
Unhappy	5%	7%



Anger Management	Pre	Post
I sometimes have a short fuse	5%	0%
I get upset easily	16%	7%
I sometimes have urges to break, throw or smash things	0%	0%
It's difficult for me to calm down after I've been upset	11%	0%



Resentfulness	Pre	Post
Resentful	11%	20%
Cynical	0%	0%
Annoyed	16%	7%
Angry	0%	0%

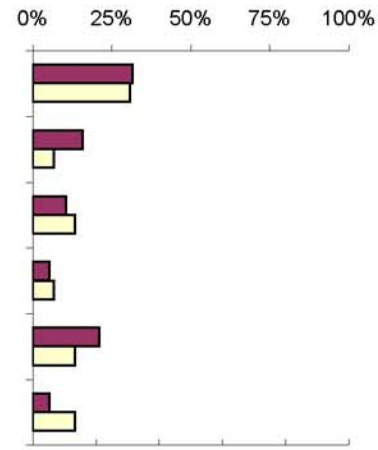


Sample Report

January 4, 2004
February 2, 2004

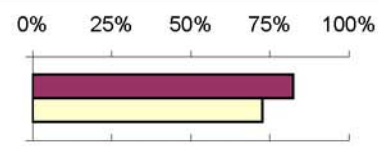
Percentage of individuals who responded: often - always

Stress Symptoms	Pre	Post
My sleep is inadequate	32%	31%
Body aches (joint pain, backaches, etc.)	16%	7%
Indigestion, heartburn or stomach upset	11%	13%
Rapid heartbeats	5%	7%
Muscle tension	21%	13%
Headaches	5%	13%



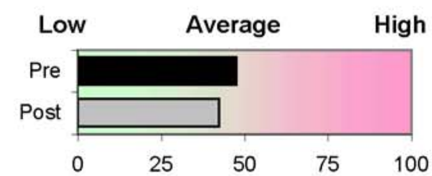
Percentage of individuals who responded: good - excellent

General Health	Pre	Post
Over the last month my health has been: (Good - Excellent)	82%	73%



Group average stress score

Stress	Pre	Post
How stressed you have been in the past month	48	42



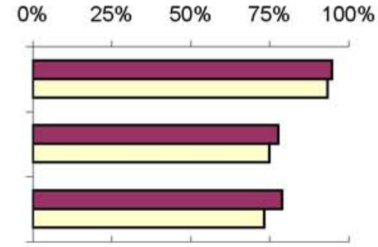
Sample Report

January 4, 2004
February 2, 2004

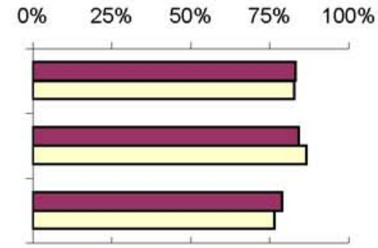
Organizational Quality

Percentage of individuals who agree or strongly agree

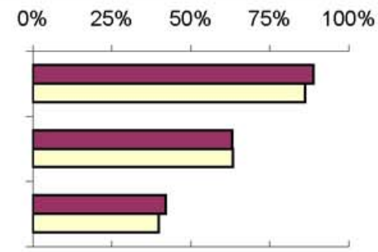
Work Attitude	Pre	Post
I am proud of the company I work for	95%	93%
My job gives me a sense of accomplishment	78%	75%
I feel good about what I do at work	79%	73%



Strategic Understanding	Pre	Post
I understand our business strategy	83%	83%
I see a connection between the work I do and the company's strategic objectives	84%	87%
I feel good about the future of the organization	79%	77%



Confidence in the Organization	Pre	Post
We have great confidence about being successful in the future	89%	86%
When people talk about the current state of our organization, most of the stories are about good news	63%	63%
This is an organization where people feel a sense of appreciation for one another	42%	40%



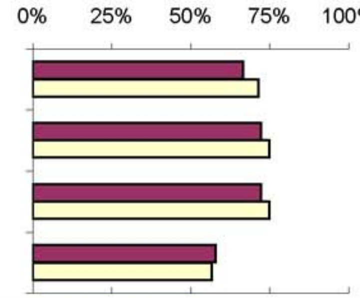
Sample Report

January 4, 2004
February 2, 2004

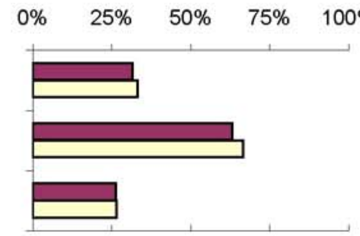
Organizational Quality

Percentage of individuals who agree or strongly agree

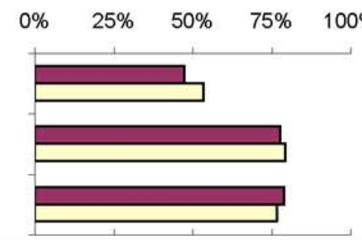
Manager Support	Pre	Post
I feel very supported by my supervisor	67%	71%
I feel a strong sense of rapport with my supervisor	72%	75%
I really like the way I'm treated by my supervisor	72%	75%
My work is often recognized and appreciated by my superiors	58%	57%



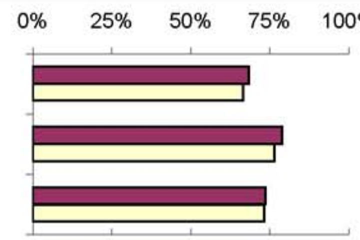
Goal Clarity	Pre	Post
I always know how my supervisor wants me to utilize my time	32%	33%
The goals of my organization are clear to me	63%	67%
Peoples roles and responsibilities are made clear	26%	27%



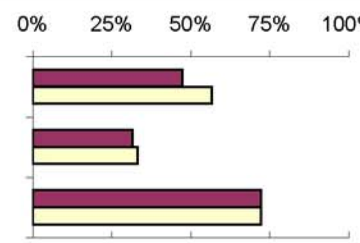
Job Challenge	Pre	Post
My job requires me to use all of my abilities	47%	53%
My work is very challenging	78%	79%
My work is usually interesting and stimulating	79%	77%



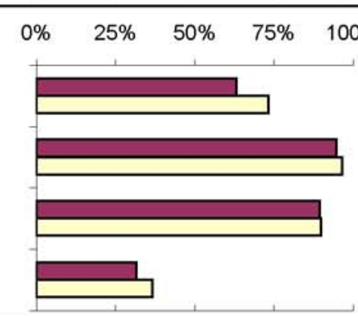
Value of Contribution	Pre	Post
My efforts make a big difference in my organization	68%	67%
Doing my tasks well substantially contributes to my organization	79%	77%
I feel very useful in my job	74%	73%



Freedom of Expression	Pre	Post
People where I work feel free to express their opinions	47%	57%
People respectfully express different points of view during meetings	32%	33%
I am able to speak out without fear of the consequences	72%	72%



Work Intensity	Pre	Post
I consistently work at my full capacity	63%	73%
I always approach my work with whole-hearted effort	95%	97%
I strive as hard as I can to be successful in my work	89%	90%
Other people know me by the long hours I keep	32%	37%



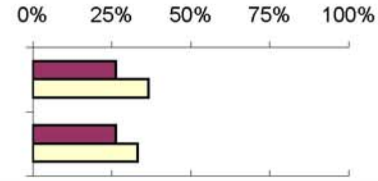
Sample Report

January 4, 2004
February 2, 2004

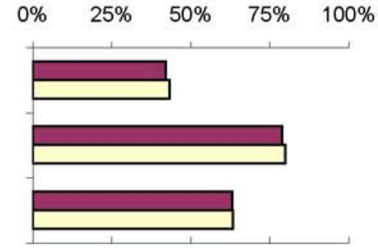
Organizational Quality

Percentage of individuals who agree or strongly agree

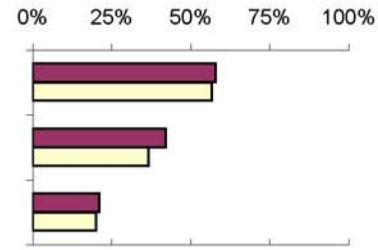
Communication Effectiveness	Pre	Post
We listen carefully to each other at work	26%	37%
The quality of communication at work is excellent	26%	33%



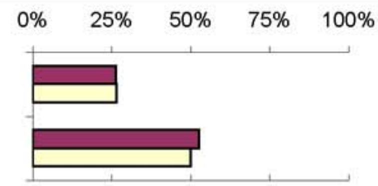
Productivity	Pre	Post
I accomplish all my objectives at work	42%	43%
My work produces excellent results	79%	80%
I am always highly productive	63%	63%



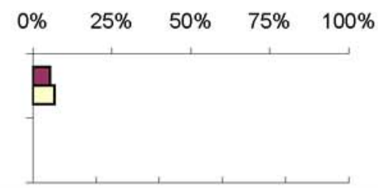
Time Pressure	Pre	Post
I feel pressed for time	58%	57%
I feel there is never enough time	42%	37%
The pace of life is too fast and I can't keep up	21%	20%



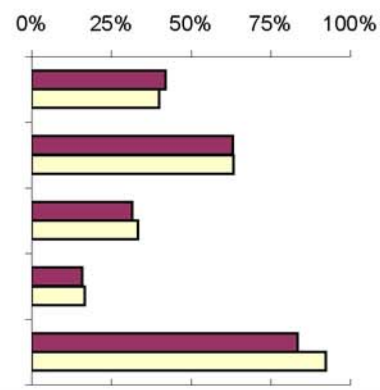
Morale Issues	Pre	Post
I work with people who don't get along with each other	26%	27%
I'm aware of power struggles between co-workers that damage morale	53%	50%



Intention to Quit	Pre	Post
I feel like leaving this organization	6%	7%
I feel like quitting my job	0%	0%



Additional Items	Pre	Post
It takes a lot of effort to sustain my performance level	42%	40%
I am creative and innovative	63%	63%
I feel conflict between work and personal priorities	32%	33%
There is tension between management and staff	16%	17%
I feel loved by my spouse / partner	83%	92%



POQA-R Personal and Organizational Quality Assessment-Revised

This survey is voluntary and confidential.
Only summary, anonymous data will be provided to your organization.

INSTRUCTIONS: Please fill in the boxes below with the requested dates and ID number. For the remaining items, FILL IN THE NUMBER of the response that describes you.

TODAY'S DATE

Month		Day		Year			

UNIQUE ID NUMBER

Please enter the last four digits of your social security number or a 4-digit number you can easily remember. This number is used for tracking responses over time. No attempt to identify you can or will be made. If you feel uncomfortable providing this information, you may leave it blank.

1. What is your GENDER?

- ① Male
- ② Female

2. What is your MARITAL STATUS? (fill in one only)

- ① Single
- ② Married
- ③ Partnered
- ④ Separated
- ⑤ Divorced
- ⑥ Widowed

3. Roughly how old are you?

- ① Under 21
- ② 21-30
- ③ 31-40
- ④ 41-50
- ⑤ 51-60
- ⑥ 61-70
- ⑦ [illegible]

4. What is your approximate salary range?

- ① Under 20,000
- ② $20,000 - 29,999
- ③ $30,000 - 39,999
- ④ $40,000 - 49,999
- ⑤ $50,000 - 59,999
- ⑥ $60,000 - 69,999
- ⑦ $70,000 - 79,999
- ⑧ $80,000 - 89,999
- ⑨ $90,000 - 99,999
- ⑩ $100,000 - 149,999
- ⑪ $150,000 or more

5. What is your highest level of EDUCATION? (fill in only one)

- ① Elementary
- ② Junior/Middle School
- ③ High School
- ④ Technical School
- ⑤ Some College/Associate's Degree
- ⑥ Bachelor's Degree
- ⑦ Some Graduate
- ⑧ Master's Degree
- ⑨ Doctorate Degree

6. Which of the following best describes your EMPLOYMENT STATUS? (fill in only one)

- ① Student
- ② Laborer
- ③ Skilled or Clerical
- ④ Management
- ⑤ Professional
- ⑥ Executive
- ⑦ Engineer/Technical
- ⑧ Retired
- ⑨ Unemployed
- ⑩ Other

7. How many HOURS PER WEEK do you usually work?

- ① Less than 25 hours
- ② 26-35 hours
- ③ 36-40 hours
- ④ 41-50 hours
- ⑤ 51-59 hours
- ⑥ 60 or more hours

8. How long have you been with this COMPANY or ORGANIZATION?

- ① 0 - 6 MONTHS
- ② 6 MONTHS - 1 YEAR
- ③ 1 YEAR - 2 YEARS
- ④ 2 YEARS - 5 YEARS
- ⑤ 5 YEARS - 10 YEARS
- ⑥ 10 YEARS - 20 YEARS
- ⑦ 20 YEARS OR MORE

9. How long have you been in your CURRENT JOB or POSITION?

- ① 0 - 6 MONTHS
- ② 6 MONTHS - 1 YEAR
- ③ 1 YEAR - 2 YEARS
- ④ 2 YEARS - 5 YEARS
- ⑤ 5 YEARS - 10 YEARS
- ⑥ 10 YEARS OR MORE

Please turn to the next page

PLEASE DO NOT WRITE IN THIS AREA

POQA-R Personal and Organizational Quality Assessment-Revised

INSTRUCTIONS:
Following is a list of words that describe feelings people sometimes have. Please FILL IN THE NUMBER which reflects how frequently you have felt the following during the LAST MONTH.

	NOT AT ALL	ONCE IN A WHILE	SOMETIMES	FAIRLY OFTEN	OFTEN	VERY OFTEN	ALWAYS
1. Resentful							
2. Fatigued							
3. Annoyed							
4. Sad							
5. Body aches (Joint Pain, Backaches, etc.)							
6. Headaches							
7. Rapid Heartbeats							
8. Depressed							
9. Exhausted							
10. Blue							
11. Appreciative							
12. Relaxed							
13. Anxious							
14. Tired							
15. My sleep is inadequate							
16. Thankful							
17. Indigestion, heartburn or stomach upset							
18. Calm							
19. Cynical							
20. Muscle Tension							
21. Grateful							
22. Worried							
23. Unhappy							
24. Uneasy							
25. Angry							
26. Peaceful							

27. Over the last month my health has been:

Excellent Good Average Fair Poor

28. Fill in the bubble on the line below that indicates how stressed you have been in the past month:

Most Calm I've Ever Been — Most Stressed I've Ever Been

Please turn to the next page

Following is a list of statements that describe the way people sometimes feel or think about themselves. Please FILL IN THE NUMBER which reflects how frequently you have felt or thought the following during the LAST MONTH.

	NOT AT ALL	ONCE IN A WHILE	SOMETIMES	FAIRLY OFTEN	OFTEN	VERY OFTEN	ALWAYS
29. My life is deeply fulfilling							
30. Dynamic							
31. I get upset easily							
32. I find it difficult to calm down after I've been upset							
33. I feel loved by my spouse/partner							
34. I feel optimistic about the future							
35. I wake up and look forward to each day							
36. Motivated							
37. I am pleased with my life							
38. I sometimes have urges to break, throw or smash things							
39. I sometimes have a short fuse							
40. Enthusiastic							

We are asking about your feelings and experiences over the LAST MONTH. Please FILL IN THE NUMBER which reflects how much you AGREE or DISAGREE with the following statements as they apply to your job and place of employment during the LAST MONTH.

	STRONGLY DISAGREE	DISAGREE	SLIGHTLY DISAGREE	NEUTRAL	SLIGHTLY AGREE	AGREE	STRONGLY AGREE
41. I constantly work at full capacity							
42. We listen carefully to each other at work							
43. People's roles and responsibilities are made clear							
44. I strive as hard as I can to be successful in my work							
45. There is tension between management and staff							
46. My work is usually interesting and stimulating							
47. Other people know me by the long hours I keep							
48. I feel good about what I do at work							
49. The quality of communication at work is excellent							
50. The goals of my organization are clear to me							
51. I accomplish all my objectives at work							
52. I feel there is never enough time							
53. I feel good about the future of the organization							
54. My efforts make a big difference in my organization							
55. I am proud of the company I work for							

Please turn to the next page

We are asking about your feelings and experiences over the LAST MONTH. Please FILL IN THE NUMBER which reflects how much you AGREE or DISAGREE with the following statements as they apply to you, your job and place of employment during the LAST MONTH.

	STRONGLY DISAGREE	DISAGREE	SLIGHTLY DISAGREE	NEUTRAL	SLIGHTLY AGREE	AGREE	STRONGLY AGREE
56. I really like the way I'm treated by my supervisor	1	2	3	4	5	6	7
57. I feel pressed for time	1	2	3	4	5	6	7
58. I understand our business strategy	1	2	3	4	5	6	7
59. My work produces excellent results	1	2	3	4	5	6	7
60. I always approach my work with whole-hearted effort	1	2	3	4	5	6	7
61. The pace of life is too fast and I can't keep up	1	2	3	4	5	6	7
62. I feel a strong sense of rapport with my supervisor	1	2	3	4	5	6	7
63. I am creative and innovative	1	2	3	4	5	6	7
64. I feel conflict between work and personal priorities	1	2	3	4	5	6	7
65. I see a connection between the work I do and the company's strategic objectives	1	2	3	4	5	6	7
66. I feel very supported by my supervisor	1	2	3	4	5	6	7
67. It takes a lot of effort to sustain my performance level	1	2	3	4	5	6	7
68. I feel very useful in my job	1	2	3	4	5	6	7
69. I always know how my supervisor wants me to utilize my time	1	2	3	4	5	6	7
70. I am able to speak out without fear of the consequences	1	2	3	4	5	6	7
71. I feel like leaving this organization	1	2	3	4	5	6	7
72. My work is very challenging	1	2	3	4	5	6	7
73. We have great confidence about being successful in the future	1	2	3	4	5	6	7
74. I feel like quitting my job	1	2	3	4	5	6	7
75. People respectfully express different points of view during meetings	1	2	3	4	5	6	7
76. People where I work feel free to express their opinions	1	2	3	4	5	6	7
77. My work is often recognized and appreciated by my superiors	1	2	3	4	5	6	7
78. When people talk about the current state of our organization, most of the stories are about good news (e.g. innovations, achievements, new and better practices, etc.)	1	2	3	4	5	6	7
79. My job gives me a sense of accomplishment	1	2	3	4	5	6	7
80. I am always highly productive	1	2	3	4	5	6	7
81. I work with people who don't get along with each other	1	2	3	4	5	6	7
82. This is an organization where people feel a sense of appreciation for one another	1	2	3	4	5	6	7
83. My job requires me to use all of my abilities	1	2	3	4	5	6	7
84. I'm aware of power struggles between co-workers that damage morale	1	2	3	4	5	6	7
85. Doing my tasks well substantially contributes to my organization	1	2	3	4	5	6	7

Thank You Very Much For Your Participation!

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APPENDIX B

EQi:S SAMPLE

BarOn EQ-i®

BarOn Emotional Quotient Inventory™

Measures emotional intelligence—one's ability to deal with daily environmental demands and pressures

R. Bar-On, Ph.D., & (for Youth Version) J. D. A. Parker, Ph.D.

133 items (Youth Version: 60 items, Short Version: 51 items); Self-Report

Ages 16 and older (Youth Version: Ages 7 to 18 years)

30 minutes administration time

B-Level User Qualification

MHS

Reuven Bar-On, Ph.D., & (for Youth Version)
James D. A. Parker, Ph.D.

Aim

Emotional intelligence (EI) reflects the ways a person interacts with and applies his or her knowledge to daily life. Broadly speaking, emotional intelligence addresses the emotional, personal, social, and survival dimensions of intelligence. EI is concerned with understanding oneself and others, relating to people, and adapting to and coping with the immediate surroundings to be more successful in dealing with environmental demands.

BarOn EQ-i® assesses emotional intelligence in a variety of settings including corporate, educational, clinical, medical, and research settings. Potential users of BarOn EQ-i® include psychologists, psychiatrists, human resource professionals, organizational consultants, physicians, social workers, and guidance or career counselors.

BarOn EQ-i® is very versatile in business environments. For instance, BarOn EQ-i® can make employee recruitment and selection a more reliable and efficient process. Thanks to BarOn EQ-i®'s brevity and multifaceted information, employers can use the instrument as a screening tool for selecting emotionally intelligent and potentially successful personnel. In addition, employers can use BarOn EQ-i® with current staff to evaluate ongoing functioning, well-being, and the effectiveness of organizational change and restructuring.

BarOn EQ-i® can also be used in a variety of educational settings. School psychologists and counselors can use BarOn EQ-i® to help identify students whose inability to cope adequately with academic demands could lead to developing emotional problems or dropping out of school. Results obtained from BarOn EQ-i® could also be used when exploring career and further educational options.

Within a clinical domain, BarOn EQ-i® is invaluable in helping to tailor treatment programs and evaluate their effectiveness. Based on a client's BarOn EQ-i® profile, medical staff can effectively assess a person's ability to deal with the pressures of being seriously ill with conditions such as heart disease, cancer, and AIDS, and the emotional demands of undergoing medical procedures. Data generated from the patient's BarOn EQ-i® profile can aid mental health professionals in identifying emotional skills that should be addressed in the patient's treatment program. The data also illustrates areas of strength that can be used to bolster the patient's learning of new social and emotional skills. For example, the effectiveness of BarOn EQ-i® as a tool to measure sensitivity to psychosocial treatment was demonstrated in a study monitoring cardiac patients who underwent a stress reduction program subsequent to suffering myocardial infarction. (For details, refer to the references section of the *BarOn EQ-i® Technical Manual: BarOn, 1997.*) The inventory can also be used in assessing the potential for rehabilitation success of clients being considered for substance abuse recovery programs.

User Qualifications

BarOn EQ-i® and BarOn EQ-i:YV™ may be administered and scored by professionals with advanced training in psychological assessment and professionals from related disciplines that adhere to relevant assessment standards. The B-level qualification requires that, as a minimum, the user has completed courses in tests and measurement at a university or has received equivalent documented training in the use of BarOn EQ-i®. Qualified Individuals must assume responsibility for the use, interpretation, and communication of the results. Individuals without formal psychological training and professional affiliations require BarOn EQ-i® training and certification. The certification program is available through MHS, Inc.; please contact our Customer Service Department for additional information at customerservice@mhs.com.

BarOn Emotional Quotient Inventory™

Norming

BarOn EQ-i® has been used to assess over 100,000 individuals worldwide. The normative data for the 133-item version is documented in the Technical Manual. The North American sample is diverse in terms of age, socioeconomic, educational, and occupational/ professional breakdown. BarOn EQ-i® has separate norms available for men and women based on age.

Age Group*	Males	Females
16 to 30	678	814
30 to 39	432	404
40 to 49	452	420
Over 50	214	229

*An additional 188 respondents did not indicate their age, gender, or both on the response sheet.

BarOn EQ-i:YV™ (the Youth Version) was normed on a sample of over 9,000 children and teenagers from elementary, junior high, and high schools in the United States and Canada.

Age Group	Males	Females
7 to 9	1348	1253
10 to 12	1581	1563
13 to 15	946	1020
16 to 18	750	711

Instrument

Respondents of either the adult or youth version are asked to rate each item on a five-point Likert-type scale ranging from (1) "Very Seldom or Not True of Me" to (5) "Very Often True of Me or True of Me." In addition to 4 validity indices and a sophisticated correction factor, the 133-item (BarOn EQ-i®) renders scores for the following composite scales and subscales.

- Intrapersonal Scales
  - Emotional Self-Awareness
  - Assertiveness
  - Self-Regard
  - Self-Actualization
  - Independence
- Interpersonal Scales
  - Interpersonal Relationship
  - Social Responsibility
  - Empathy
- Adaptability Scales
  - Problem Solving
  - Reality Testing
  - Flexibility
- Stress Management Scales
  - Stress Tolerance
  - Impulse Control
- General Mood
  - Happiness
  - Optimism

Readability analyses conducted on BarOn EQ-i® using the Flesch Reading Ease Formula indicate a sixth- to seventh-grade reading equivalent.

The 51-item BarOn Emotional Quotient Inventory: Short (BarOn EQ-i:S™) is easy to score and interpret. It contains the BarOn EQ-i® Total Score and the 5 BarOn EQ-i® composite scales listed above.

Reuven Bar-On, Ph.D., & (for Youth Version) James D. A. Parker, Ph.D.

The BarOn Emotional Quotient Inventory: Youth Version (BarOn EQ-i:YV™) consists of 60 items distributed across 7 scales. The instrument also includes an Inconsistency Index scale that assesses item response consistency. A short form is also available: BarOn EQ-i:YV(S)™ contains 30 items suited for screening large groups or in situations when time with a respondent is limited.

Measures Contained in the BarOn EQ-i:YV™ scales:

- Total EQ
    - Interpersonal
    - Intrapersonal
    - Adaptability
    - Stress Management
- General Mood
- Positive Impression
- Inconsistency Index

Measures Contained in the BarOn EQ-i:YV(S)™ scales:

- Total EQ
    - Interpersonal
    - Intrapersonal
    - Adaptability
    - Stress Management
- Positive Impression

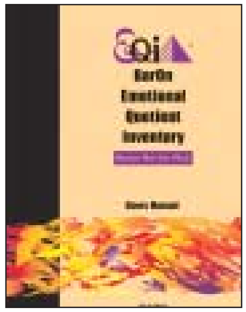
Using the Dale-Chall procedure, readability of BarOn EQ-i:YV™ for both the long and short forms is at a North American fourth-grade reading level.

Translations

MHS' worldwide network of over 400 qualified translators with backgrounds in psychology and medicine enables us to offer our assessments in multiple languages. While we offer many assessments, in English, Spanish, and French, BarOn EQ-i® is also available in Chinese, Czech, Danish, Dutch, French (Canadian), German, Hebrew, Korean, Norwegian, Russian, Spanish (U.S.), and Swedish. To find out about other assessments offered in multiple languages, please contact the MHS Translations Department at translations@mhs.com.

Format

BarOn EQ-i®



Administration resources include the Technical and User's Manuals, Administrator's and Facilitator's Guides, Item Booklets, and Response Sheets. Administration of the adult version can occur in one of three formats: paper-and-pencil, computer software, or on the Internet. Convenient and easy scoring options are available. Whether you want age/gender norms or general population norms, you may choose mail-in or fax-in services for paper-and-pencil administrations; automatic scoring using BarOn EQ-i® for Windows™; and online scoring services for BarOn EQ-i® via Internet administrations. Each scoring option can produce one of four report types:

- The Individual Summary report offers a 4-page graphical representation of the overall EQ score, scores for each of the 5 composite scales and the 15 subscales, and validity results. The report is designed to be viewed by the administrator, not the client.

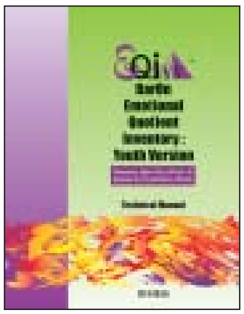
- The Development report is a 15-page report that includes the information available in the Individual Summary as well as an in-depth explanation of the meaning of the scores, individual strengths and weaknesses, and suggestions to improve emotional intelligence. Also included is a Counselor's Section displaying all of the scale and subscale scores in a tabular format, the item response sheet for verification of item endorsement, and the validity index scores. The entire report is designed to be viewed by the administrator, not the client.

- The Resource report is a 14-page report (that can be black and white or printed on colored paper) that presents BarOn EQ-i® scores in a graphical format with terminology conducive to development, coaching, and counseling. The

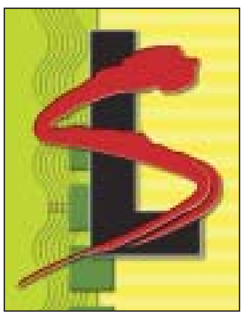
Resource report contains the same information and components as the Development report, except that test scores are not provided on the graphs. Instead, terminology such as "Effective Functioning" is used. This report is favored when the assessor wants to present the patient with a report during the feedback session or in therapeutic context. The Counselor's Section of this report is designed for viewing by the administrator, not the client.

- The Group report is a 25 to 30-page report that provides an anonymous summary of BarOn EQ-i® scores for a group of respondents. In addition to Total EQ and subscale scores, frequency scores for each item are presented.

BarOn EQ-i:YV™



BarOn EQ-i:YV™ is available in MHS QuikScore™ format. This paper-and-pencil format is designed for easy recording, scoring, and profiling of responses. No scoring templates are necessary and because the respondent's answers automatically transfer through to the concealed scoring page, the scores can be generated immediately and at the clinician's convenience. Youth Version includes a Technical Manual.



BarOn EQ-i® and BarOn EQ-i:YV™ are incorporated into the MHS Professional Tool Suite of sophisticated software technology featuring SmartLink™, a client-management program. This software allows for computer-based and assessments, custom integration with an enterprise database, or web application or site licensing arrangements. (For details about the capabilities and configuration possibilities of MHS Professional Tool Suite, please refer to the product brochure available from MHS or contact the MHS Customer Service Department at customerservice@mhs.com.) A variety of Comparison reports permits the comparison of either an individual against a group or one group against another group. Comparison reports facilitate the tracking of performance across administrations to identify areas of improvement and areas that require ongoing intervention.

With Online administration, clients can complete the assessment remotely through a secure MHS assessment website. Administrators quickly receive the reports by email as Adobe Acrobat Reader® .pdf files.

Scientific Validation

BarOn EQ-i® was developed using rigorous test-development procedures. BarOn EQ-i®'s background and underlying theoretical concepts appear in the *EQ-i® Technical Manual*. The manual also offers a series of case studies as concrete examples of the instrument's applicability across a variety of settings. Reliability and validity data provide empirical justification for BarOn EQ-i®'s use.

- The internal consistency of the BarOn EQ-i® scales show desirable levels of statistical accuracy in measuring the constructs they were developed to measure.
- The retest reliability studies demonstrate the temporal stability of the BarOn EQ-i®.
- Extensive validity studies were conducted, including content, factor, construct, convergent, divergent, criterion-group, discriminant, and predictive validity.

Please refer to the *EQ-i® Technical Manual* for further details.

The empirical research supports the theoretical scale structure of BarOn EQ-i® and BarOn EQ-i:YV™ (long and short forms) and shows that the scales correlate well with measures believed to tap similar or related constructs. Findings are consistent with the authors' conceptualization of emotional intelligence and definitions of the BarOn EQ-i® subscales, and they show that these inventories are psychometrically sound.

Supporting Literature

Barling, J., Slater, F., & Kelloway, E. K. (2000). Transformational leadership and emotional intelligence: An exploratory study. *Leadership and Organization Development Journal, 21, 157–161.*

Summary: The association between emotional intelligence and transformational leadership was investigated, controlling statistically for leaders' attributional style. It was shown that emotional intelligence is associated with 3 aspects of transformational leadership (idealized influence, inspirational motivation, and individualized consideration) and contingent reward. Active and passive management-by-exception, and laissez-faire management were not associated with emotional intelligence.

Dawda, D. & Hart, S. D. (2000). Assessing emotional intelligence: Reliability and validity of BarOn Emotional Quotient Inventory (BarOn EQ-i®). *Journal of Personality and Individual Differences, 28,* 797–812.

Summary: The reliability and validity of BarOn EQ-i® in a sample of university students were evaluated in the context of a larger program of research examining association between emotion and personality. BarOn EQ-i® scores were correlated against the NEOFFI (which measures Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness), Beck Depression Inventory, Intensity of Affective Experience, Symptom Checklist (Somatization), and Alexythymia. The convergent and discriminant validities suggested that BarOn EQ-i® taps a fairly broad range of related emotional constructs. The interpersonal scale, however, had relatively small correlation with the other EQ composite scales, as well as a different pattern of convergent and discriminant validities. In general, the BarOn EQ-i® scales show a similar pattern of validity results for men and women, providing preliminary evidence for a lack of gender bias. These results suggest that the EQ Total score may be a good overall index of emotional intelligence.

Handley, R. (April, 1997). Emotional Intelligence. *Recruiter*, 10–11.

Summary: This study describes the research showing the relationship between BarOn EQ-i® scores and success in recruitment among Air Force staff. BarOn EQ-i® was completed by 1234 Air Force recruiters. Recruiters who thought of themselves as successful were compared with those who thought of themselves as unsuccessful. In addition, recruiters who were achieving 100 percent of their assigned goal were compared to those who were producing less than 80 percent of their goal. Results indicate that optimism with high self-regard and assertively solving problems, stress tolerance, flexibility, and self-actualization contribute to greater degrees of happiness and success in recruiting.

Reker, D. L., & Parker, J. D. A. (1999, August). Emotional intelligence, mood, and problem behaviors in children and adolescents. Poster session presented at APA 107th Annual Convention, Boston, MA. (For further information, contact the MHS Research & Development Department.)

Summary: This study used Bar-On EQ-i® to examine the relationship between a parent's and child's emotional intelligence, as well as the relationship between a child's emotional intelligence and both internalizing and externalizing problem behaviors. A significant but low association was found between the mother's and father's emotional intelligence level. However, only the mother's level of emotional intelligence was significantly related to the child's emotional intelligence. Emotional intelligence in children was found to be a moderate to strong predictor of both externalizing and internalizing problem behaviors.

Sitarenios, G. *Emotional Intelligence in the prediction of sales success in the finance industry.* Toronto, Canada: Multi-Health Systems.

Summary: The BarOn EQ-i composite scales and subscales were correlated with 4 objective measures of success in 13 financial employees of the Global Private banking and Trust division of the Canadian Imperial Bank of Commerce (CIBC)

Measures of success were "booked sales", "pipeline sales", total 1 (the sum of the booked and pipeline sales), and total 2 (1/2 of the pipeline total + booked sales). The results suggest that emotional skills are highly related to overall success as evaluated by booked, pipeline, and combined values. The results indicate that the most important aspects of emotional intelligence for sales people are self-actualization, interpersonal relationship skill, and to a lesser extent empathy, flexibility, stress tolerance, reality testing, and independence.

Independent Review

Impara, J. C., & Plake, B. S. (Eds.). (2001). BarOn Emotional Quotient-Inventory (BarOn EQ-i®). *The fourteenth mental measurements yearbook (pp. 106–109).* Lincoln, Nebraska: Buros Institute.

Buros Mental Measurements Yearbook is the leading publication for critical analysis of tests and measures. Two independent reviewers are asked to evaluate the psychometric and practical value of test instruments. The evaluation of BarOn EQ-i® by both reviewers was positive, indicating that BarOn EQ-i® is a sound measure of emotional intelligence. Approval in Buros of psychometric quality is a very important marker of proper test development.

BarOn Emotional Quotient-inventory Youth Version (BarOn EQ-i: YV™) is currently under review by Buros Institute.

BarOn EQ-i® Certification

MHS offers a 3-day certification program designed to help professionals learn to use BarOn EQ-i® effectively within their organizations. HR professionals, medical directors, employee assistance program administrators, business consultants, corporate professionals, educators, counselors, mental health and other professionals who are considering incorporating BarOn EQ-i® in their environment would benefit from participating.

Scheduled programs include detailed information and instruction about the administration, scoring, and interpretation of BarOn EQ-i®. Attendees will gain a full appreciation and understanding of the scientific strengths of BarOn EQ-i®.

BarOn EQ-i® Authors

Reuven Bar-On, author of BarOn EQ-i® and coauthor of BarOn EQ-i:YV™

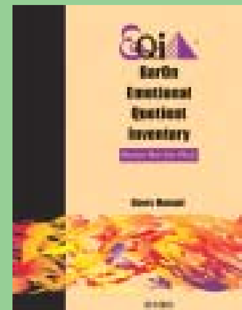
Dr. Reuven Bar-On is a clinical psychologist and a senior psychodiagnostic consultant for a variety of institutions and organizations in Israel, including the Israeli Defense Forces, ministries, and other government offices. He received his Ph.D. in Psychology from Rhodes University (South Africa) in 1988. He has also received a lectureship at the Tel Aviv University Medical School in the Department of Family Medicine.

Dr. Bar-On has researched the area of emotional and social intelligence since 1980, and his research has crossed borders into more than 12 countries in an effort to develop a cross-cultural approach to describing and assessing the emotional, personal, and social components of intelligent behavior. As an international expert in the field of emotional intelligence, he lectured extensively on his work, has presented his findings at professional conferences, and has been interviewed around the world.

James D. A. Parker, co-author of BarOn EQ-i:YV™

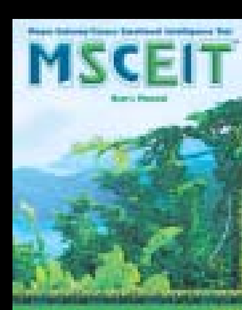
Dr. James D. A. Parker is Associate Professor of Psychology in the Department of Psychology at Trent University, Canada. He earned his Ph.D. in psychology from York University in 1991.

Since 1992, Dr. Parker has also worked as a statistical and psychometric consultant for MHS. He has collaborated in the development of several assessment instruments and has published over 80 articles and chapters, mostly in the areas of alexithymia and emotional intelligence, personality and psychopathology, and coping. Much of his recent work has focused on the study of the regulation of emotion and the link between emotion regulation and mental and physical health. He is co-author (along with Graeme J. Taylor and R. Michael Bagby) of the recent book (1997) from Cambridge University Press titled *Disorders of Affect Regulation: Alexithymia in Medical and Psychiatric Illness.*



Complements for EQ-i®

BarOn Emotional Quotient–360 (BarOn EQ–360)
BarOn Emotional Quotient–Interview (BarOn EQ–Interview)
Coping Inventory for Stressful Situations (CISS)
Coping with Health Injuries and Problems (CHIP)
Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT)
Rehabilitation Survey of Problems and Coping (R–SOPAC)
Social Problem-Solving Inventory–Revised (SPSI–R)



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MHS

APPENDIX C

RECRUITMENT DOCUMENTS

Project #1053917

Researcher: Would you allow me to request teachers to be interviewed about the research study?

Principal: When? How much time involved?

Research: At the next teacher in-service or when the teachers would be available over a lunch period. The interview will be audio taped and take about 30-45 minutes. I want to collect information about how they felt being involved in a research study, how they felt about this particular program (Heart Math or POQA-R) and what they feel their needs are in terms of resiliency.

Principal: I will post an announcement in the weekly bulletin and have a sign up sheet in the teacher work room. I will contact you when they have had a chance to read and review the request.

Project #1053917

The questions listed below are the ones that will be asked during the group interview of teachers.

1. How did you feel about being involved in this study?
2. What would have made this experience better?
3. What are your greatest concerns in terms of your teaching and your emotional health?
4. How are you addressing those concerns?
5. Do you have any questions or any additional comments about this study?

Project #1053917 Project Summary

The original project was a quasi-experimental inquiry using elementary educators as test subjects, the HeartMath training as the independent variable and scores on the Personal and Organizational Quality of Life Assessment-Revised (POQA-R) as the dependent variable with the time line one academic year, 2005-2006. Amendments to this project include adding a qualitative inquiry about teachers being involved with research and an evaluation of emotional intelligence as measured by Bar-On's Emotional Intelligence test, short form (EQ-i:S) at two time points spring and fall.

The teachers were given the POQA-R three times during the 2005-2006 school year and the EQ-i:S twice. The treatment group was given training in the HeartMath software computer program eight weeks after school had started (October, 2005). Final data collection will occur before the project deadline, September 9, 2006. Data analysis and reporting will be given to committee members fall 2006 at the conclusion of this project.

Methods Outline

1. IRB approval
2. Contact school districts and explain research
3. consent forms distributed
4. Meet with each group of teachers to administer the POQA-R three times during the 2005-2006 school year
5. Explain the EQ-i:S as it is an electronic instrument (2 applications)
6. Meet with the treatment group to explain HeartMath and demonstrate procedure for using this computer program
7. All data collected from the POQA-R and EQ-i:S are anonymous

8. Data analysis and report

APPENDIX D

CONSENT DOCUMENT

Consent Form

Identification of Researchers: This research is being done by Susan Stockton, Instructor with the Department of Health and Human Performance at Central Missouri State University.

Purpose of the Study: The purpose of this investigation is to use the Personal and Organizational Quality Assessment-Revised (POQA-R) as a measure of resiliency and to determine if the HeartMath system is significantly different from no intervention on the construct of resiliency measured at three different time periods. *A critical component of this study is the effect of time on the test scores as well as the intervention using HeartMath training/tools.*

Request for Participation: I am inviting you to participate in a study on resiliency, as measured by the POQA-R, using the HeartMath system. It is up to you whether or not you would like to participate. If you decide not to participate you will not be penalized in any way. You can also decide to stop at any time without penalty.

Exclusions: You must be at least 18 years of age to participate in this research.

Description of Research Method: The research involves completing the POQA-R at three time periods over the course of the 2005-2006 academic year. These times are within the first few weeks of the first day of school, around the first of November-2005, and around the first of April-2006. The approximate time to take the test is 20-30 minutes. The treatment group will use the HeartMath tools (heart rate variability training to increase entrainment scores and employ the steps of Freeze Frame=1. Focus on the area of the heart, 2. Breathe as though the breath was entering and leaving the body through the heart, 3. Reproduce a **feeling** of love, compassion, forgiveness, appreciation, gratitude, etc, for someone or something, 4. Ask what might be a better way to handle this situation and wait for the answer, as needed). If possible participants are asked to document the situation around which they chose to use Freeze Frame. HeartMath skills are to be practiced consistently during the month of October with a minimum of 5 and maximum of 15 minutes per practice session and 2-3 times per week. These boundaries are for practice with the software computer program. Utilizing the steps without the computer devices is certainly encouraged and may be used while stopped at a red light for example, or any other time during the day that the subject would like. When using the software program printed recordings from one session per week need to be placed in the study folders. Folders will be collected during the second test session (around the first of November, 2005). Both treatment and control groups will take the exams at approximately the same time of day (afternoon after students have been dismissed from school) and within the same week. If you have any questions during the course of this study or would like to be informed of the study results please contact Susan Stockton at sstockton@cmsu1.cmsu.edu or 660-543-8893. Please note that I cannot give individual survey results because data are confidential.

Privacy: All of the information collected will be confidential. No identifying information will be collected. I am asking participants to use a 4 digit number they can remember for linking scores over the course of the study. Federal regulations require that all research records be kept for at least 3 years following the completion of the project.

Explanation of Risk: The risks to this study are similar to the risks of everyday life. The test environment poses no greater risk to participants than they experience on a regular basis.

Explanation of Benefits: You will benefit from participating in this study by being exposed to the research process and informed of the impact HeartMath tools may have on quality of life as measured by the POQA-R.

Questions about Your Rights: If you have any questions about your rights as a research participant, please contact this researcher or Janelle Greening, Compliance Specialist, Campus Institutional Review Board, University of Missouri-Columbia, 487 McReynolds Hall, 573-882-9585.

If you would like to participate, please sign a copy of this letter and return it to me. The other copy is for you to keep.

I have read this letter and agree to participate.

Signature:_______________________________Date:___________________________

Addendum: Please consider completing the online survey entitled Emotional Quotient Inventory: short, EQ-i: s. This survey will take about 10-15 minutes to complete. The purpose of this survey it to help explain the results of my research about educators and their attitudes about emotions, resiliency, and quality of life. All of the criteria explained in this consent form apply to this addendum request as well, and you are welcome to participate or not.

Consent Form

Identification of Researchers: This research is being done by Susan Stockton, Instructor with the Department of Health and Human Performance at Central Missouri State University.

Purpose of the Study: The purpose of this investigation is to use the Personal and Organizational Quality Assessment-Revised (POQA-R) as a measure of resiliency and to determine if the HeartMath system is significantly different from no intervention on the construct of resiliency measured at three different time periods. *A critical component of this study is the effect of time on the test scores as well as the intervention using HeartMath training/tools.*

Request for Participation: I am inviting you to participate in a study on resiliency, as measured by the POQA-R, using the HeartMath system. It is up to you whether or not you would like to participate. If you decide not to participate you will not be penalized in any way. You can also decide to stop at any time without penalty.

Exclusions: You must be at least 18 years of age to participate in this research.

Description of Research Method: The research involves completing the POQA-R at three time periods over the course of the 2005-2006 academic year. These times are within the first few weeks of the first day of school, around the first of November-2005, and around the first of April-2006. The approximate time to take the test is 20-30 minutes. All surveys will be administered by this investigator to participants. Surveys will be given after the students have been dismissed from classes for the day. If you have any questions during the course of this study or would like to be informed of the study results please contact Susan Stockton at sstockton@cmsu1.cmsu.edu or 660-543-8893. Please note that I cannot give individual survey results because data are confidential.

Privacy: All of the information collected will be confidential. No identifying information will be collected. I am asking participants to use a 4 digit number they can remember for linking scores over the course of the study. Federal regulations require that all research records be kept for at least 3 years following the completion of the project.

Explanation of Risk: The risks to this study are similar to the risks of everyday life. The test environment poses no greater risk to participants than they experience on a regular basis.

Explanation of Benefits: You will benefit from participating in this study by being exposed to the research process and informed of the impact HeartMath tools may have on quality of life as measured by the POQA-R.

Questions about Your Rights: If you have any questions about your rights as a research participant, please contact this researcher or Janelle Greening, Compliance Specialist, Campus Institutional Review Board, University of Missouri-Columbia, 487 McReynolds Hall, 573-882-9585.

If you would like to participate, please sign a copy of this letter and return it to me. The other copy is for you to keep.

I have read this letter and agree to participate.

Signature:______________________________Date:__________________________

Addendum: Please consider completing the online survey entitled Emotional Quotient Inventory: short, EQ-i: s. This survey will take about 10-15 minutes to complete. The purpose of this survey it to help explain the results of my research about educators and their attitudes about emotions, resiliency, and quality of life. All of the criteria explained in this consent form apply to this addendum request as well, and you are welcome to participate or not.

Consent Form

Identification of Researcher: This research is being conducted by Susan L. Stockton, Instructor with the Department of Health and Human Performance at Central Missouri State University and doctoral student in Health Education with the University of Missouri, Columbia

Purpose of the Study: The purpose of this study is to understand the response of elementary educators to participating in the Resiliency study[1]. I want to understand how you felt about being asked to be involved in the project, whether you thought the project was useful and obtain feedback from you about using this project with students and teachers in the school setting in the future.

Subject Selection: The original subjects will be solicited by contacting the building principals for permission to interview. Principals may post an announcement in the weekly bulletin about the opportunity to give me feedback. There are approximately 20 subjects in each group. The study is being conducted from August, 2005 to April, 2006.

Informed Consent: Consent for this amendment to the original study is being petitioned to allow audio taping of responses during a 30 minute group interview. I will only interview you if you are willing and consent to have your conversations audio taped. Participation is voluntary and consent or refusal to participate will not affect your employment or status with the Resiliency study. You are permitted to withdraw at any time without penalty.

Data Collection: Data will be collected via audio tape recording during the 30 minute group interview at Crest Ridge R-VII and Holden R-III elementary school buildings library resource rooms.

Research Procedures: Invitation and obtaining informed consent will be completed prior to interviewing. If you consent to participate in an audio taped group interview you will be asked about your feelings as subjects of this study, how your emotional health is supported, and to answer any questions about this research study you may have.

Explanation of Data Recorded: Transcriptions of audio taped interviews will be confidential and kept in a locked cabinet in the researcher's office. I will be the only person with access to the cabinet. I am not asking you anything that would place you at risk. All data will be shredded at the end of three years.

Questions about Your Rights: If you have any questions about your rights as a research participant please contact the Institutional Review Board, 573-228-8984, 487 McReynolds Hall, Columbia, Missouri or Susan Stockton at sstockton@cmsu.edu or 660-543-8893.

If you would like to participate, please sign a copy of this letter and return to me. The other copy is for you to keep.

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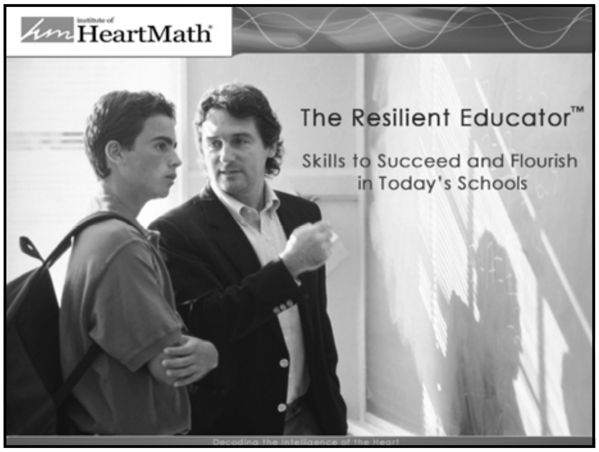
[1] This study is part of ongoing research evaluating Heart Math in local elementary schools as part of the original project 'Resiliency Among Public School Educators Exposed to the Heart Math Training System as Measured by the Personal and Organizational Quality Assessment-Revised (POQA-R).

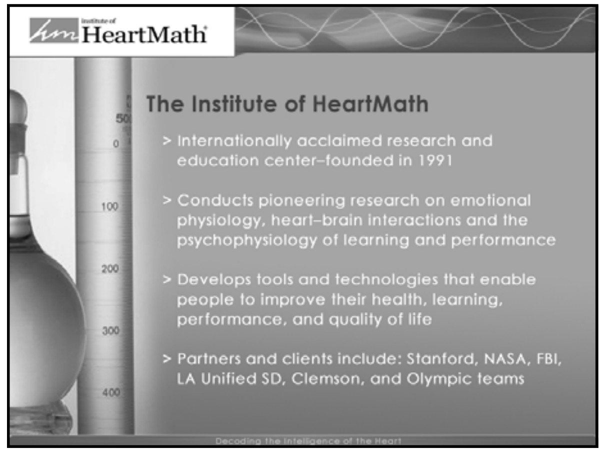
I have read this letter and agree to participate.

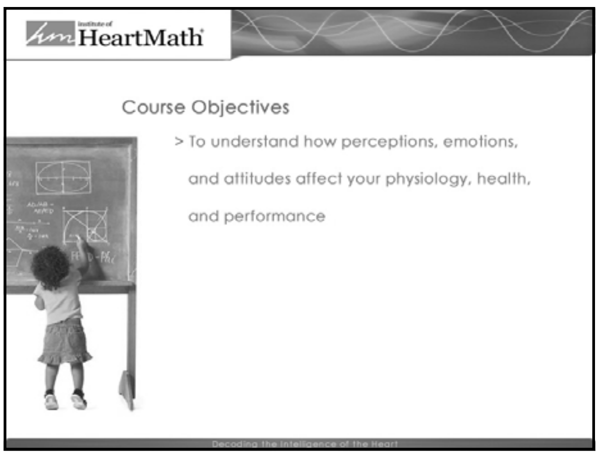
Signature: ______________________________Date:______________________________

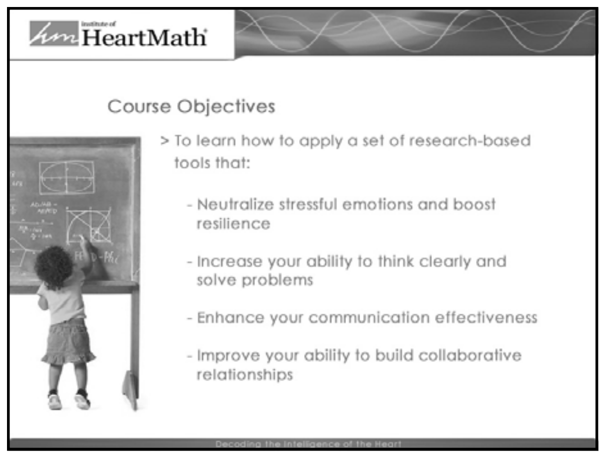
APPENDIX E

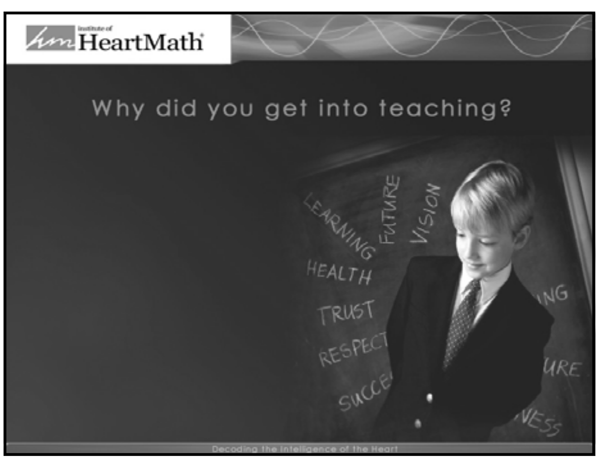
POWERPOINT PRESENTATION (INSTITUTE OF HEARTMATH)

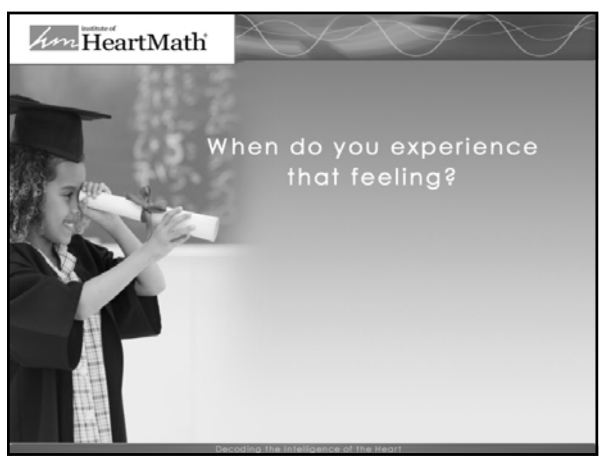

HeartMath
The Resilient Educator™
Skills to Succeed and Flourish in Today's Schools
Decoding the Intelligence of the Heart

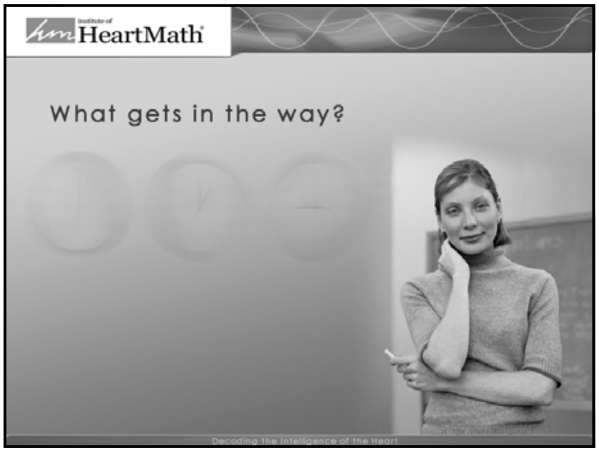

HeartMath
The Institute of HeartMath
> Internationally acclaimed research and education center–founded in 1991
> Conducts pioneering research on emotional physiology, heart–brain interactions and the psychophysiology of learning and performance
> Develops tools and technologies that enable people to improve their health, learning, performance, and quality of life
> Partners and clients include: Stanford, NASA, FBI, LA Unified SD, Clemson, and Olympic teams
Decoding the Intelligence of the Heart

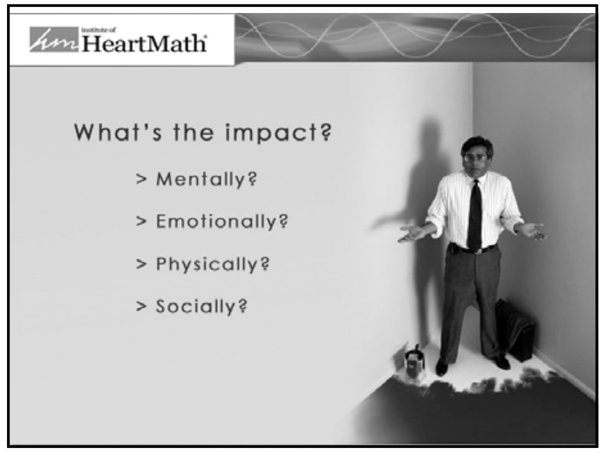

HeartMath
Course Objectives
> To understand how perceptions, emotions, and attitudes affect your physiology, health, and performance
Decoding the Intelligence of the Heart

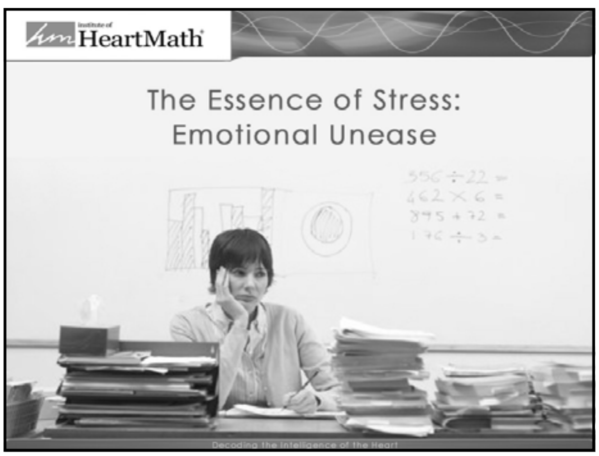

HeartMath
Course Objectives
> To learn how to apply a set of research-based tools that:
- Neutralize stressful emotions and boost resilience
- Increase your ability to think clearly and solve problems
- Enhance your communication effectiveness
- Improve your ability to build collaborative relationships
Decoding the Intelligence of the Heart

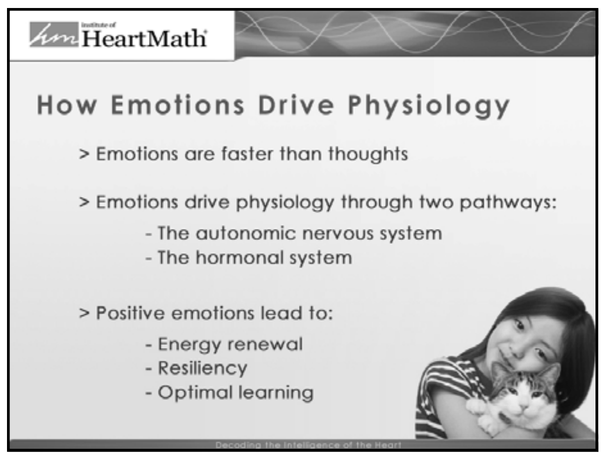

HeartMath
Why did you get into teaching?
LEARNING
FUTURE
VISION
HEALTH
TRUST
RESPECT
Decoding the Intelligence of the Heart

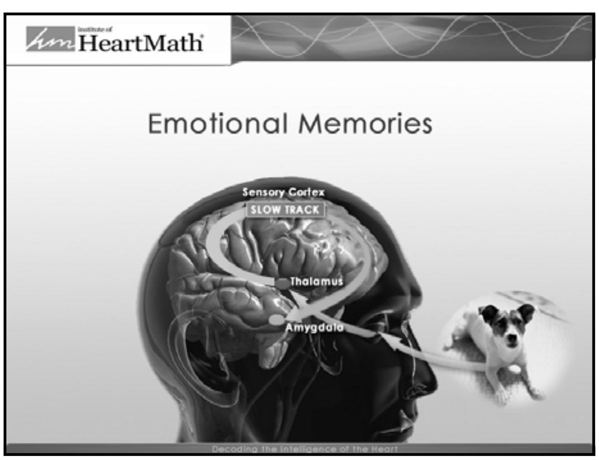

HeartMath
When do you experience that feeling?
Decoding the Intelligence of the Heart

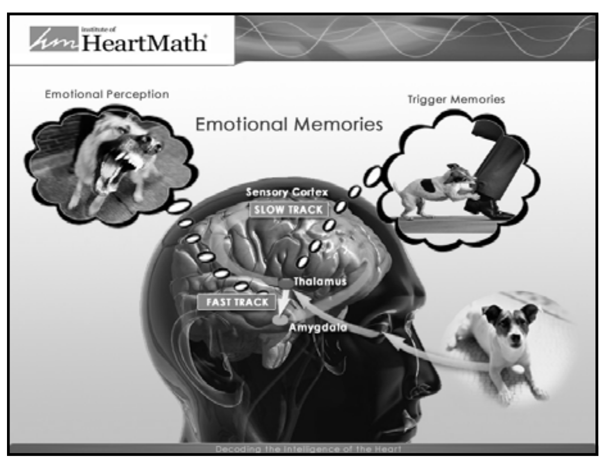

HeartMath
What gets in the way?

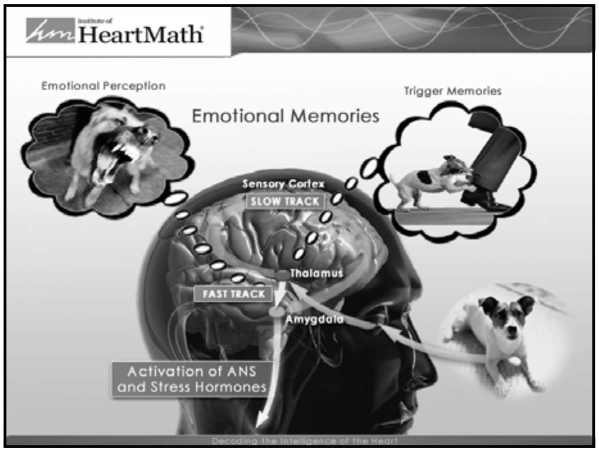

HeartMath
What's the impact?
> Mentally?
> Emotionally?
> Physically?
> Socially?


HeartMath
The Essence of Stress:
Emotional Unease


HeartMath
How Emotions Drive Physiology
> Emotions are faster than thoughts
> Emotions drive physiology through two pathways:
- The autonomic nervous system
- The hormonal system
> Positive emotions lead to:
- Energy renewal
- Resiliency
- Optimal learning


HeartMath
Emotional Memories
Sensory Cortex
SLOW TRACK
Thalamus
Amygdala


HeartMath
Emotional Perception
Emotional Memories
Trigger Memories
Sensory Cortex
SLOW TRACK
Thalamus
FAST TRACK
Amygdala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Emotional Perception
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Sensory Cortex
SLOW TRACK
Thalamus
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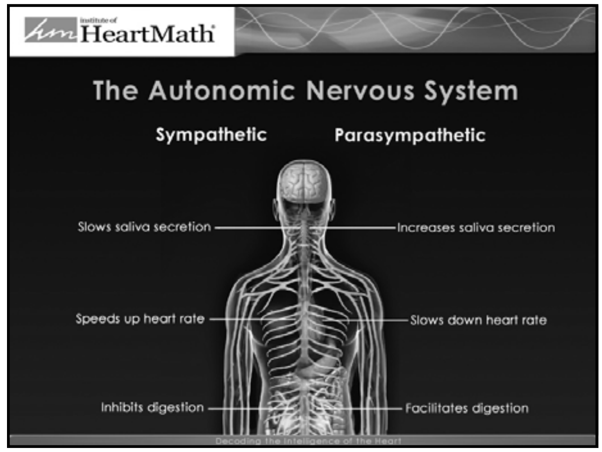
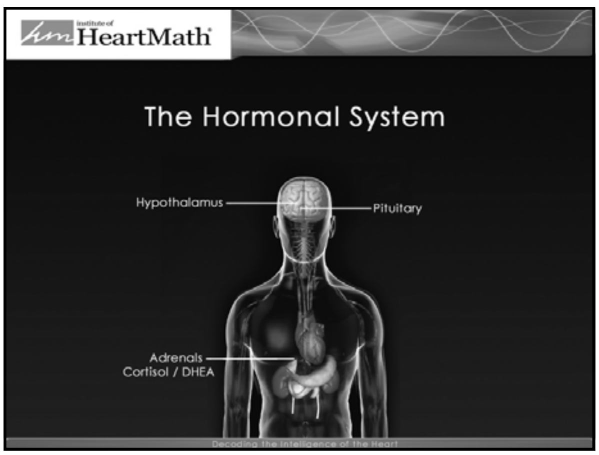
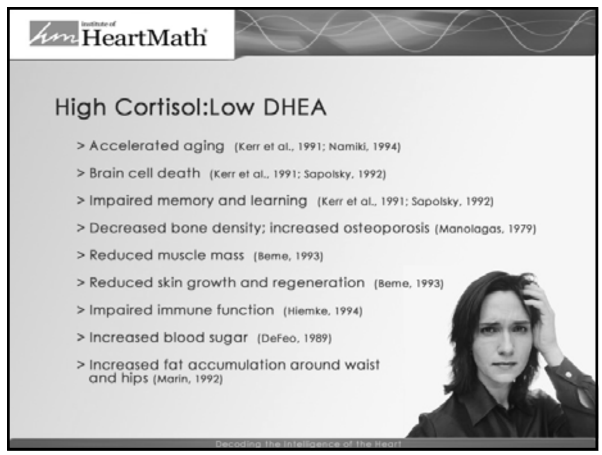
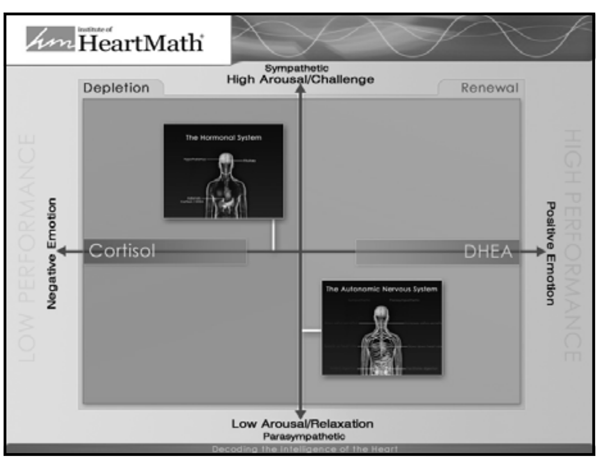
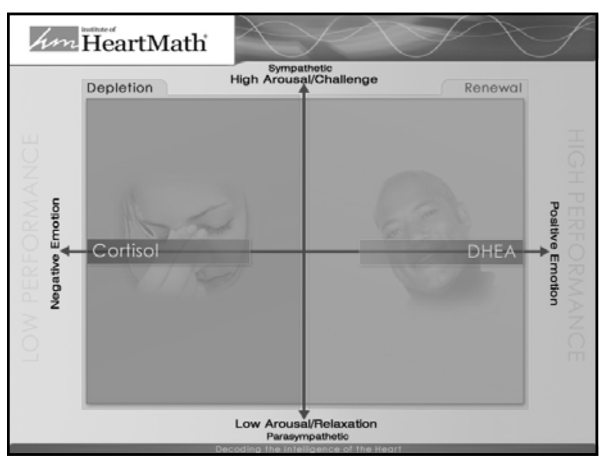
Amygdala
Activation of ANS and Stress Hormones
Decoding the Intelligence of the Heart

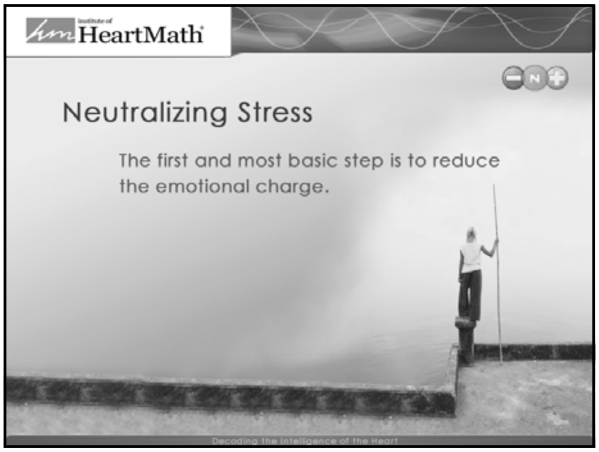

HeartMath
The Autonomic Nervous System
Sympathetic
Parasympathetic
Slows saliva secretion
Increases saliva secretion
Speeds up heart rate
Slows down heart rate
Inhibits digestion
Facilitates digestion
Decoding the Intelligence of the Heart

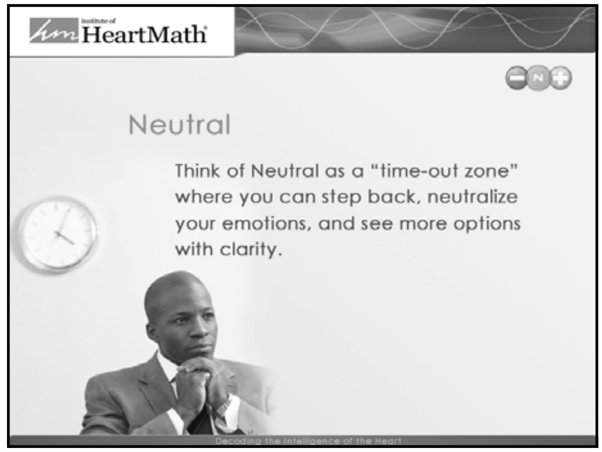

HeartMath
The Hormonal System
Hypothalamus
Pituitary
Adrenals
Cortisol / DHEA
Decoding the Intelligence of the Heart

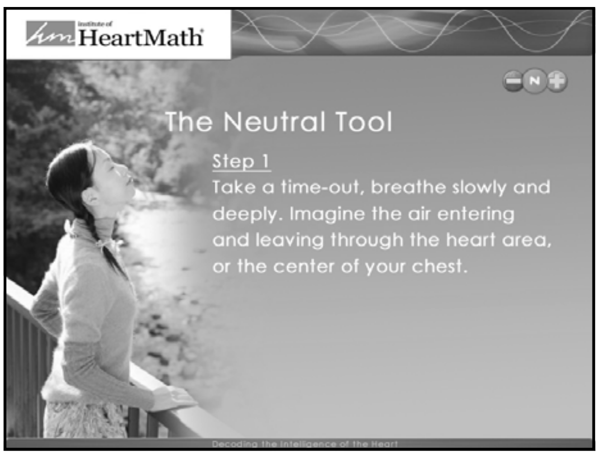

HeartMath
High Cortisol:Low DHEA
> Accelerated aging (Kerr et al., 1991; Namiki, 1994)
> Brain cell death (Kerr et al., 1991; Sapolsky, 1992)
> Impaired memory and learning (Kerr et al., 1991; Sapolsky, 1992)
> Decreased bone density; increased osteoporosis (Manolagas, 1979)
> Reduced muscle mass (Berne, 1993)
> Reduced skin growth and regeneration (Berne, 1993)
> Impaired immune function (Hiemke, 1994)
> Increased blood sugar (DeFeo, 1989)
> Increased fat accumulation around waist and hips (Marin, 1992)
Decoding the Intelligence of the Heart

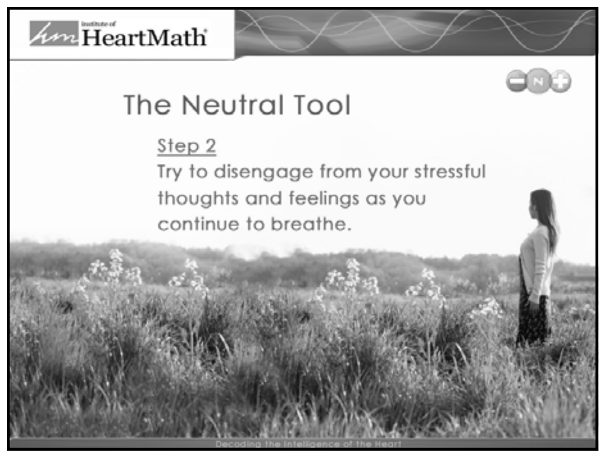

HeartMath
Sympathetic
High Arousal/Challenge
Depletion
Renewal
The Hormonal System
Cortisol
DHEA
The Autonomic Nervous System
Negative Emotion
Positive Emotion
LOW PERFORMANCE
HIGH PERFORMANCE
Low Arousal/Relaxation
Parasympathetic
Decoding the Intelligence of the Heart

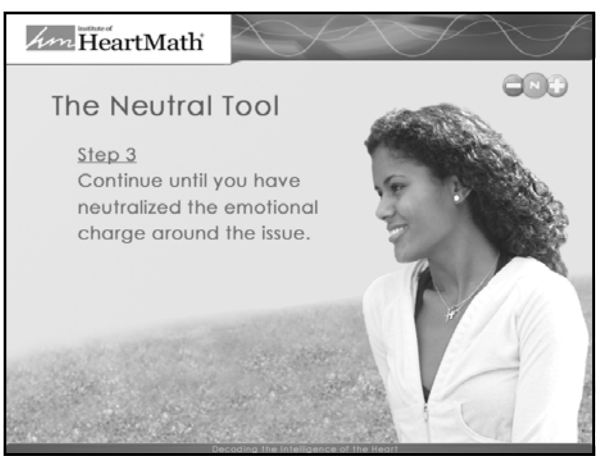

HeartMath
Sympathetic
High Arousal/Challenge
Depletion
Renewal
Cortisol
DHEA
Negative Emotion
Positive Emotion
LOW PERFORMANCE
HIGH PERFORMANCE
Low Arousal/Relaxation
Parasympathetic
Decoding the Intelligence of the Heart

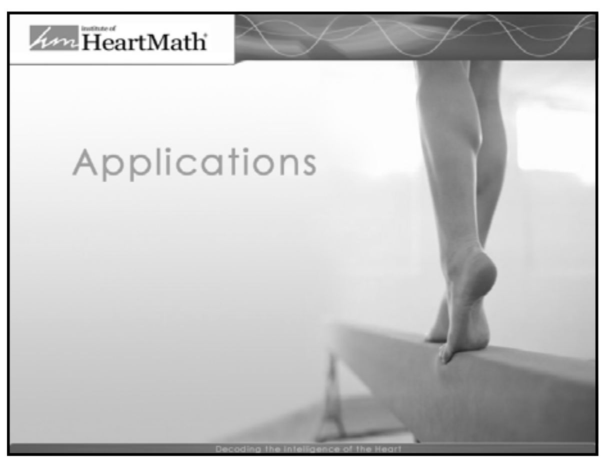

HeartMath
Neutralizing Stress
The first and most basic step is to reduce the emotional charge.
Decoding the Intelligence of the Heart

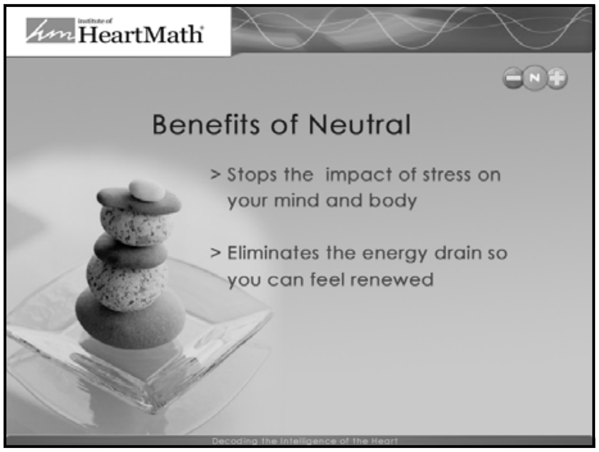

HeartMath
Neutral
Think of Neutral as a "time-out zone" where you can step back, neutralize your emotions, and see more options with clarity.
Decoding the Intelligence of the Heart

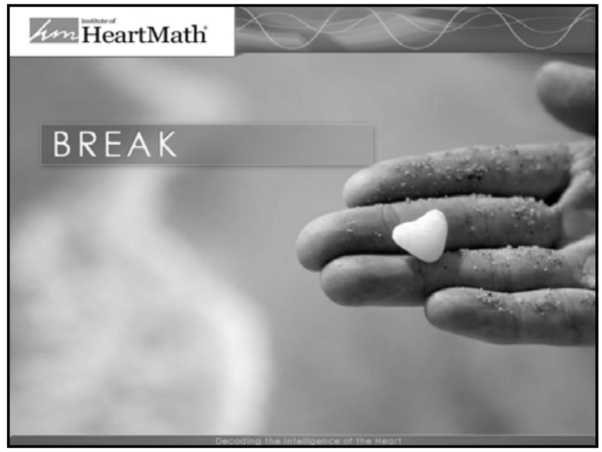

HeartMath
The Neutral Tool
Step 1
Take a time-out, breathe slowly and deeply. Imagine the air entering and leaving through the heart area, or the center of your chest.
Decoding the Intelligence of the Heart

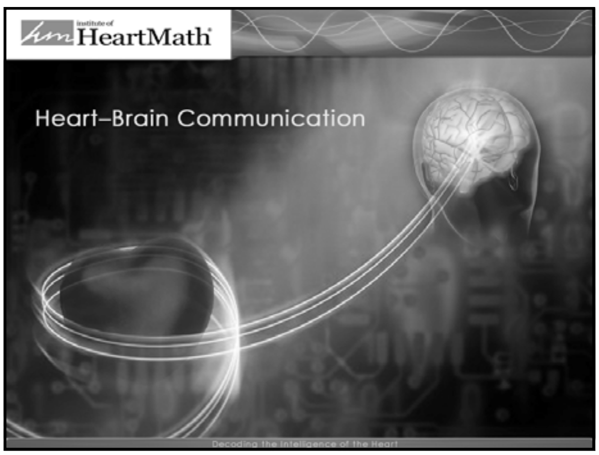

HeartMath
The Neutral Tool
Step 2
Try to disengage from your stressful thoughts and feelings as you continue to breathe.
Decoding the Intelligence of the Heart

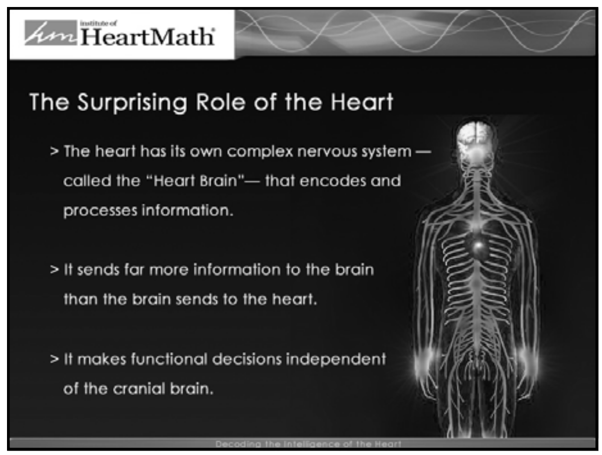

HeartMath
The Neutral Tool
Step 3
Continue until you have neutralized the emotional charge around the issue.
Decoding the Intelligence of the Heart

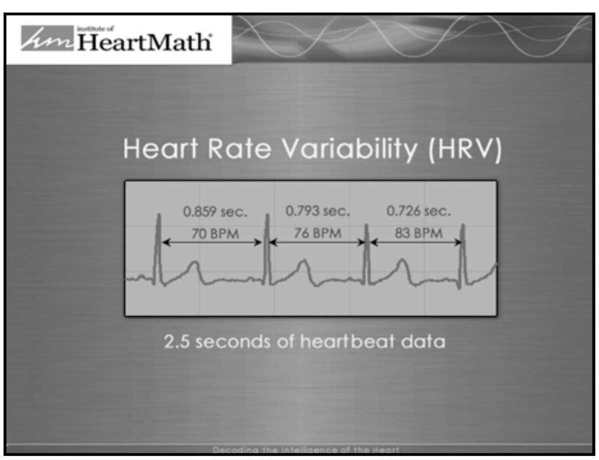

HeartMath
Applications
Decoding the Intelligence of the Heart

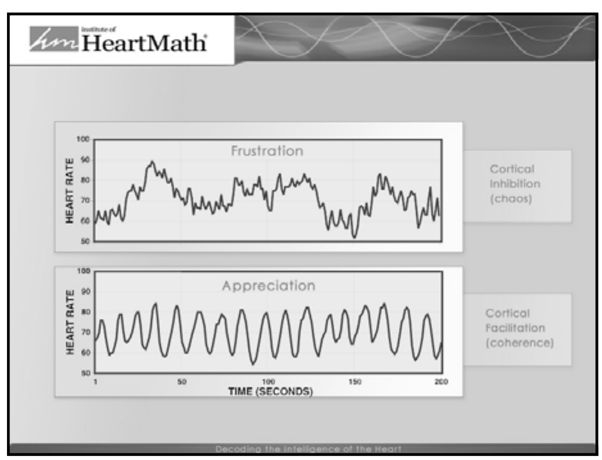

HeartMath
Benefits of Neutral
> Stops the impact of stress on your mind and body
> Eliminates the energy drain so you can feel renewed
Decoding the Intelligence of the Heart

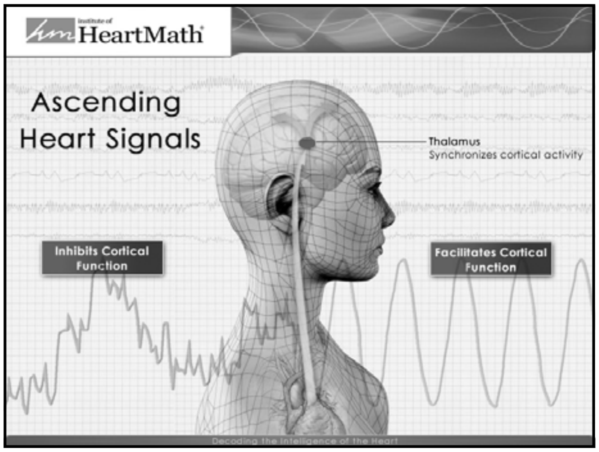

HeartMath
BREAK
Decoding the Intelligence of the Heart

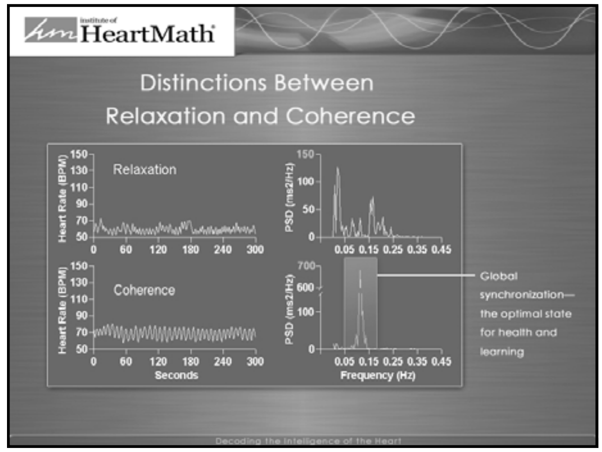

HeartMath
Heart–Brain Communication
Decoding the Intelligence of the Heart

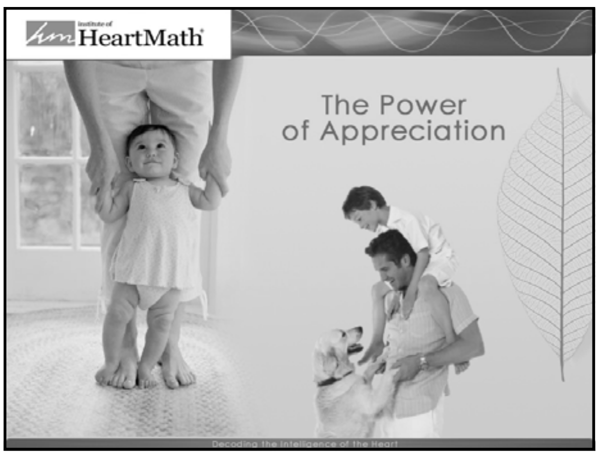

HeartMath
The Surprising Role of the Heart
> The heart has its own complex nervous system — called the "Heart Brain"— that encodes and processes information.
> It sends far more information to the brain than the brain sends to the heart.
> It makes functional decisions independent of the cranial brain.
Decoding the Intelligence of the Heart

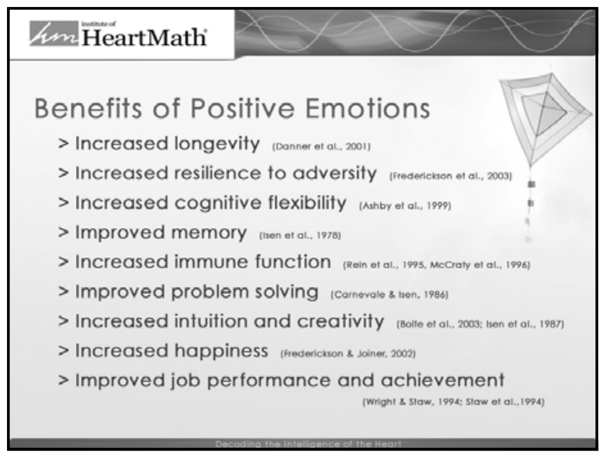

HeartMath
Heart Rate Variability (HRV)
0.859 sec.
70 BPM
0.793 sec.
76 BPM
0.726 sec.
83 BPM
2.5 seconds of heartbeat data
Decoding the Intelligence of the Heart


HeartMath
Frustration
HEART RATE
Cortical Inhibition (chaos)
Appreciation
Cortical Facilitation (coherence)
TIME (SECONDS)
Decoding the Intelligence of the Heart

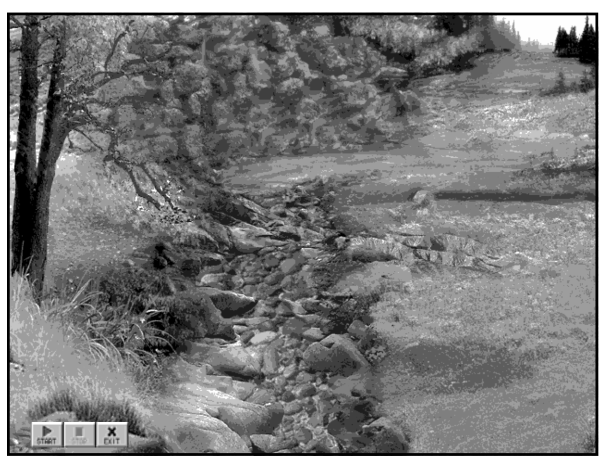

HeartMath
Ascending Heart Signals
Thalamus
Synchronizes cortical activity
Inhibits Cortical Function
Facilitates Cortical Function
Decoding the Intelligence of the Heart


HeartMath
Distinctions Between Relaxation and Coherence
Relaxation
Coherence
Heart Rate (BPM)
PSD (ms2/Hz)
Seconds
Frequency (Hz)
Global synchronization—the optimal state for health and learning
Decoding the Intelligence of the Heart


HeartMath
The Power of Appreciation
Decoding the Intelligence of the Heart

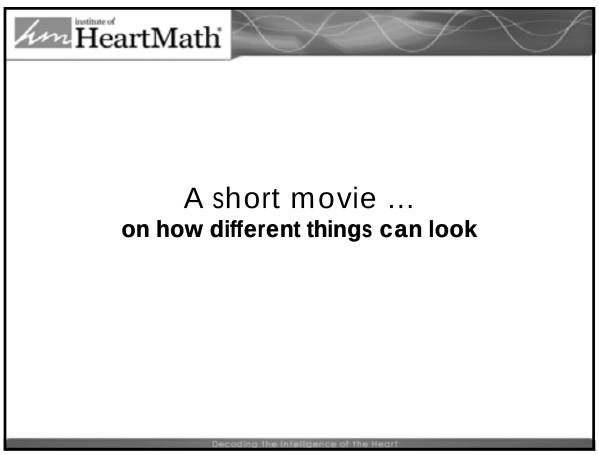

HeartMath
Benefits of Positive Emotions
> Increased longevity (Danner et al., 2001)
> Increased resilience to adversity (Fredrickson et al., 2003)
> Increased cognitive flexibility (Ashby et al., 1999)
> Improved memory (Isen et al., 1978)
> Increased immune function (Rein et al., 1995, McCraty et al., 1996)
> Improved problem solving (Carnevale & Isen, 1986)
> Increased intuition and creativity (Bolte et al., 2003; Isen et al., 1987)
> Increased happiness (Fredrickson & Joiner, 2002)
> Improved job performance and achievement (Wright & Staw, 1994; Staw et al.,1994)
Decoding the Intelligence of the Heart

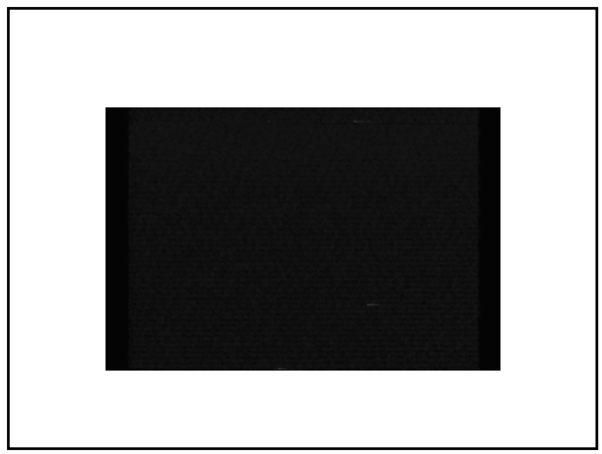

HeartMath
The Freeze-Framer® Technology
Harnessing the Power of Emotions for Optimal Health and Performance
Decoding the Intelligence of the Heart

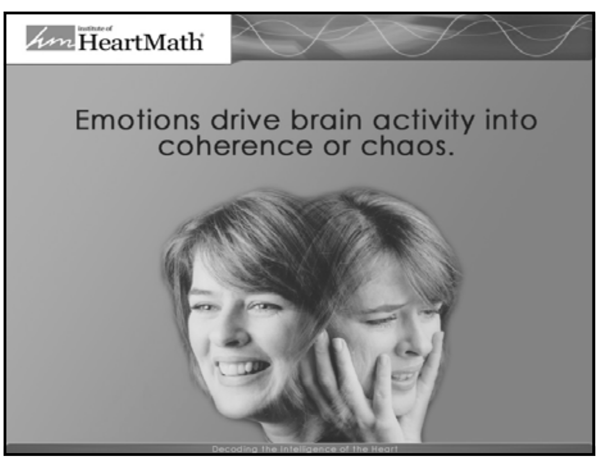


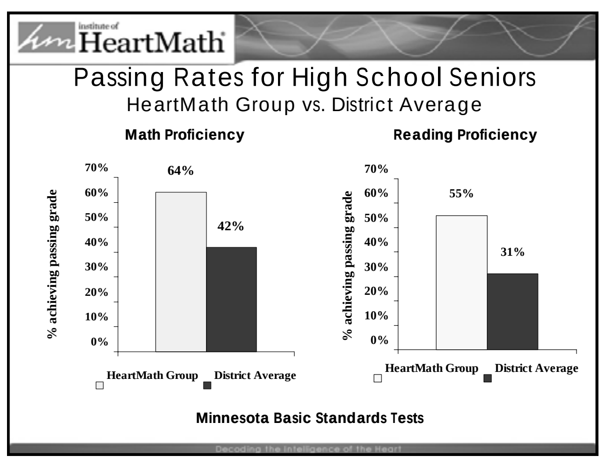

START
STOP
EXIT

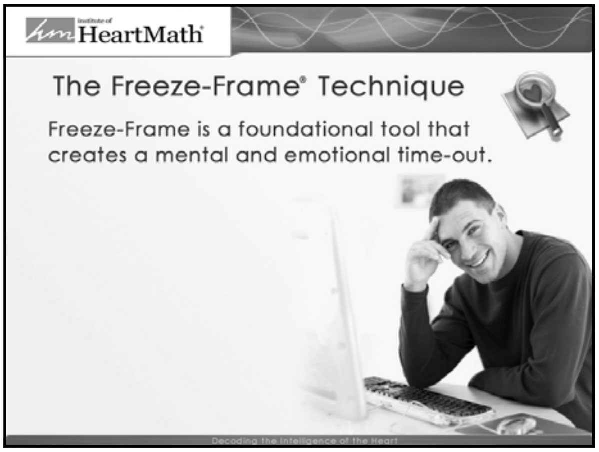

START
STOP
EXIT

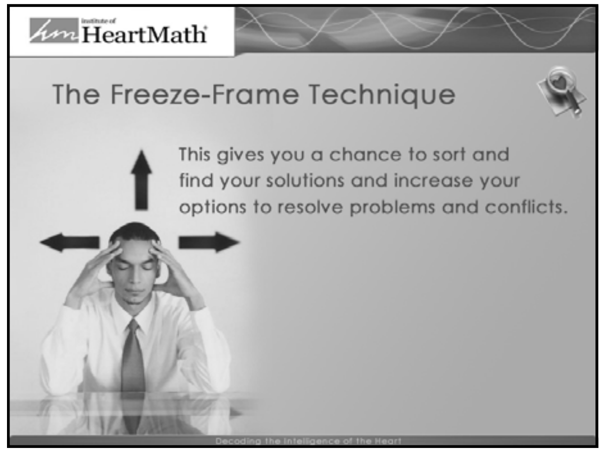

HeartMath
A short movie …
on how different things can look

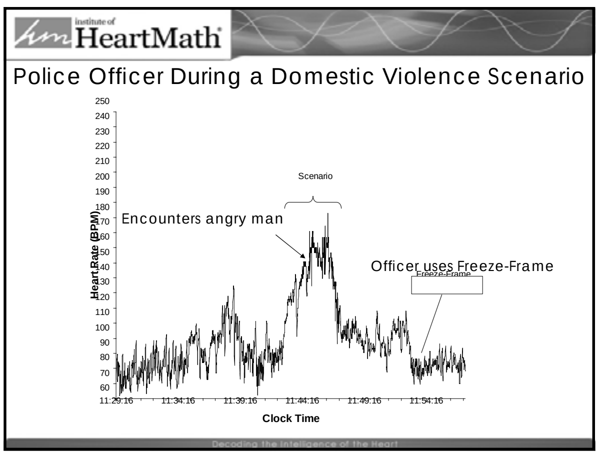


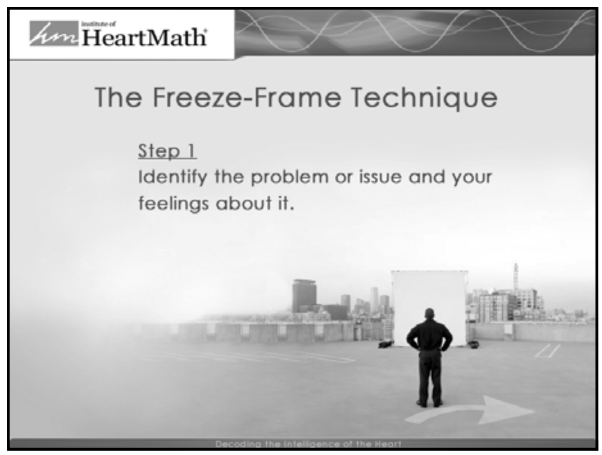

HeartMath
Emotions drive brain activity into coherence or chaos.

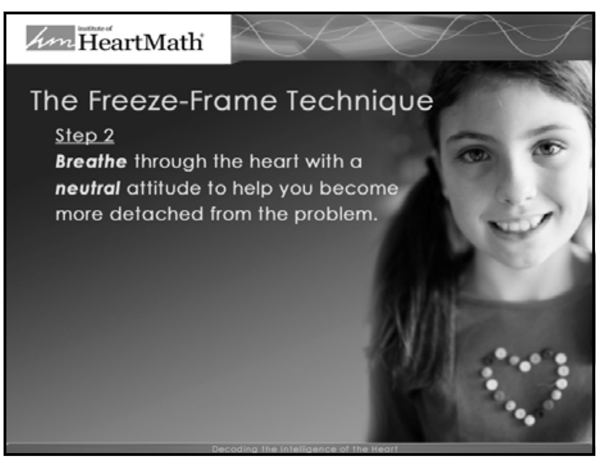

HeartMath
Passing Rates for High School Seniors
HeartMath Group vs. District Average
Math Proficiency
Reading Proficiency
% achieving passing grade
70%
60%
50%
40%
30%
20%
10%
0%
64%
42%
55%
31%
HeartMath Group
District Average
Minnesota Basic Standards Tests

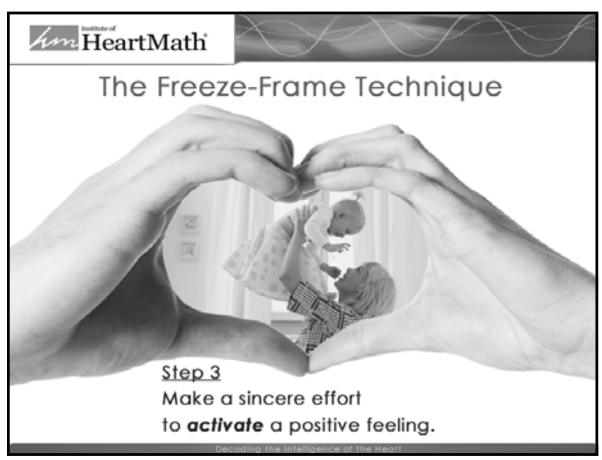

HeartMath
The Freeze-Frame® Technique
Freeze-Frame is a foundational tool that creates a mental and emotional time-out.
Decoding the Intelligence of the Heart

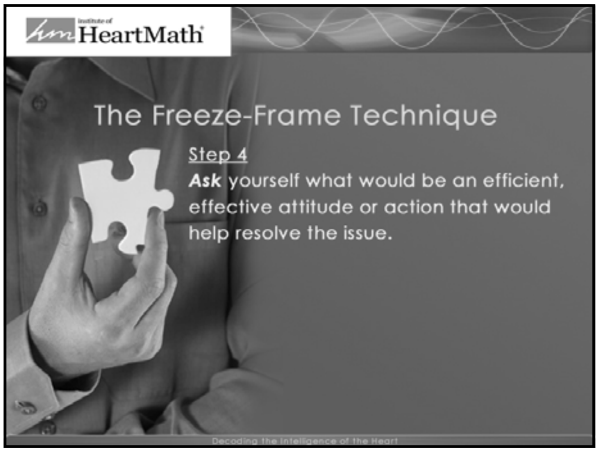

HeartMath
The Freeze-Frame Technique
This gives you a chance to sort and find your solutions and increase your options to resolve problems and conflicts.
Decoding the Intelligence of the Heart


HeartMath
Police Officer During a Domestic Violence Scenario
Scenario
Encounters angry man
Officer uses Freeze-Frame
Freeze-Frame
Heart Rate (BPM)
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
11:29:16
11:34:16
11:39:16
11:44:16
11:49:16
11:54:16
Clock Time
Decoding the Intelligence of the Heart

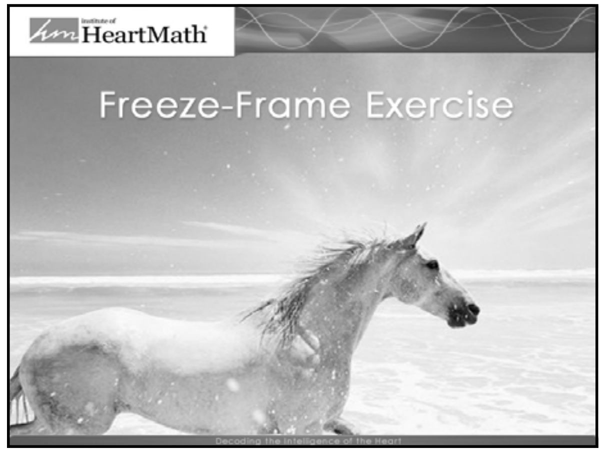

HeartMath
The Freeze-Frame Technique
Step 1
Identify the problem or issue and your feelings about it.
Decoding the Intelligence of the Heart


HeartMath
The Freeze-Frame Technique
Step 2
Breathe through the heart with a neutral attitude to help you become more detached from the problem.
Decoding the Intelligence of the Heart

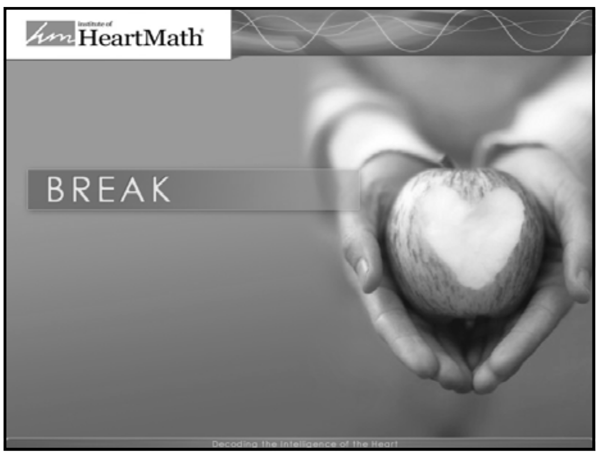

HeartMath
The Freeze-Frame Technique
Step 3
Make a sincere effort to activate a positive feeling.
Decoding the Intelligence of the Heart



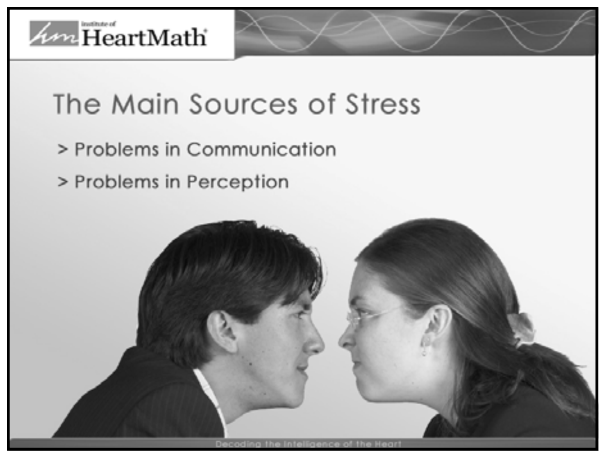
HeartMath
The Freeze-Frame Technique
Step 4
Ask yourself what would be an efficient, effective attitude or action that would help resolve the issue.
Decoding the Intelligence of the Heart



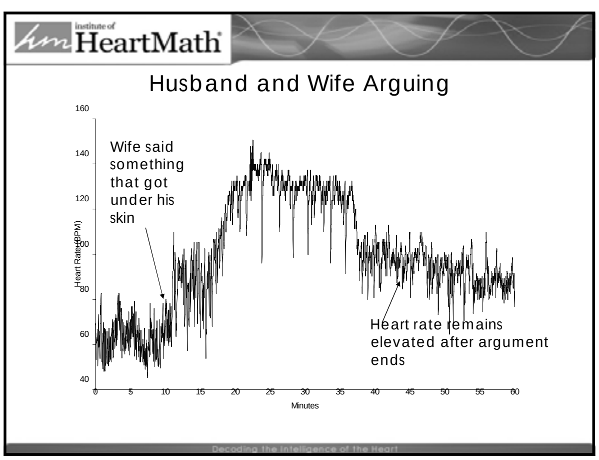
HeartMath
Freeze-Frame Exercise
Decoding the Intelligence of the Heart



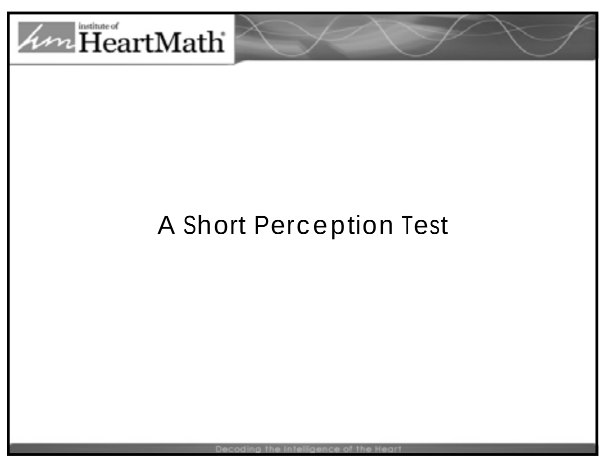
HeartMath
BREAK
Decoding the Intelligence of the Heart



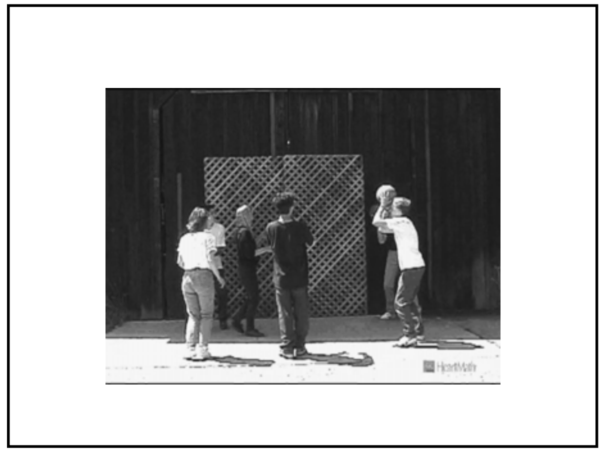
HeartMath
The Main Sources of Stress
> Problems in Communication
> Problems in Perception
Decoding the Intelligence of the Heart

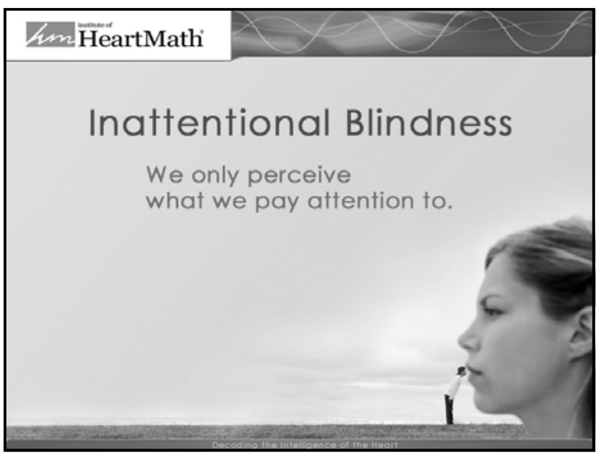


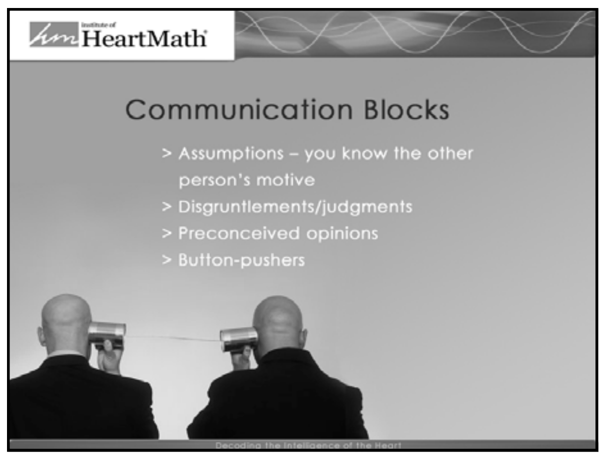
HeartMath
Husband and Wife Arguing
Wife said something that got under his skin
Heart rate remains elevated after argument ends
Heart Rate (BPM)
Minutes
40
60
80
100
120
140
160
0
5
10
15
20
25
30
35
40
45
50
55
60
Decoding the Intelligence of the Heart



HeartMath
A Short Perception Test
Decoding the Intelligence of the Heart



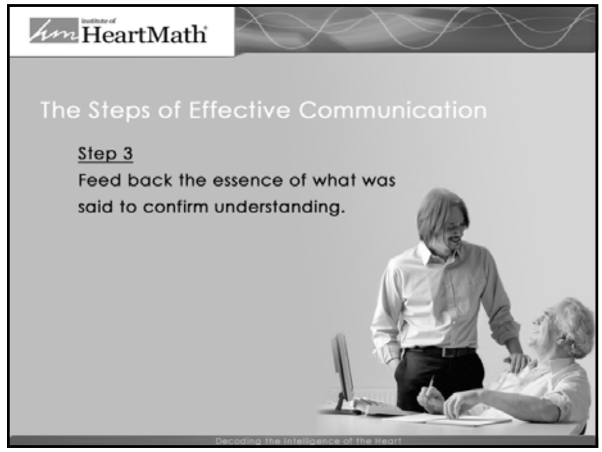

HeartMath
Inattentional Blindness
We only perceive
what we pay attention to.
Decoding the Intelligence of the Heart

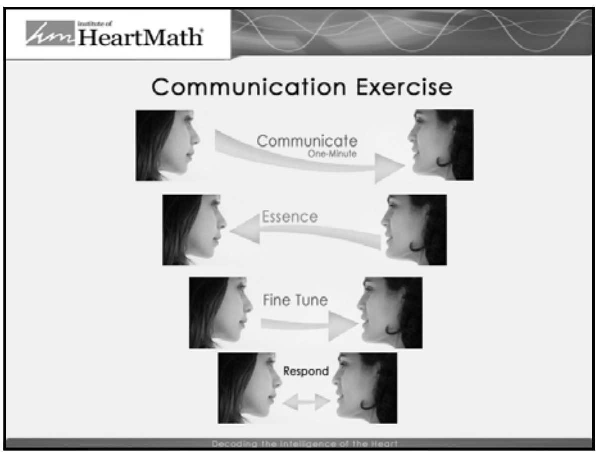

HeartMath
Communication Blocks
> Assumptions – you know the other person's motive
> Disgruntlements/judgments
> Preconceived opinions
> Button-pushers
Decoding the Intelligence of the Heart

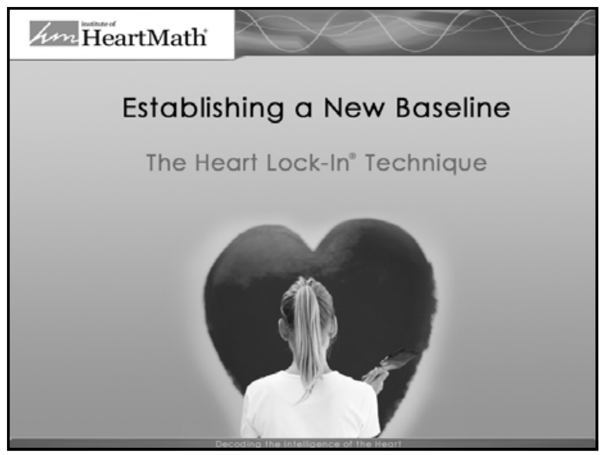

HeartMath
Effective Communication™
> Speaker and listener maintain a sincere intent to understand each other
> Listen for the essence
> Feed back the essence of what you heard to see if it's in sync with what they meant
Decoding the Intelligence of the Heart

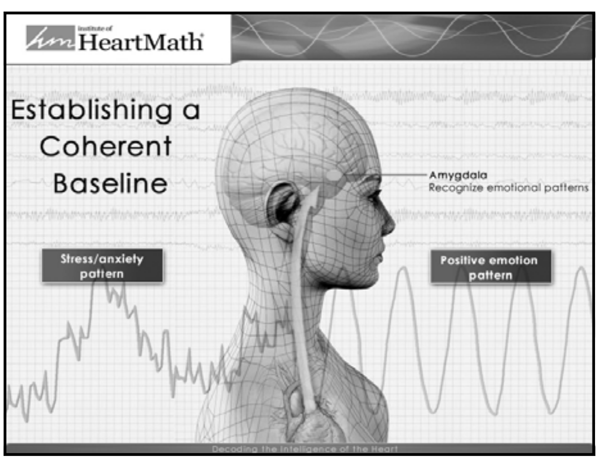

HeartMath
The Steps of Effective Communication
Step 1
Focus in the area of the heart and breathe an attitude of neutral to prepare yourself for sincere communication.
Decoding the Intelligence of the Heart

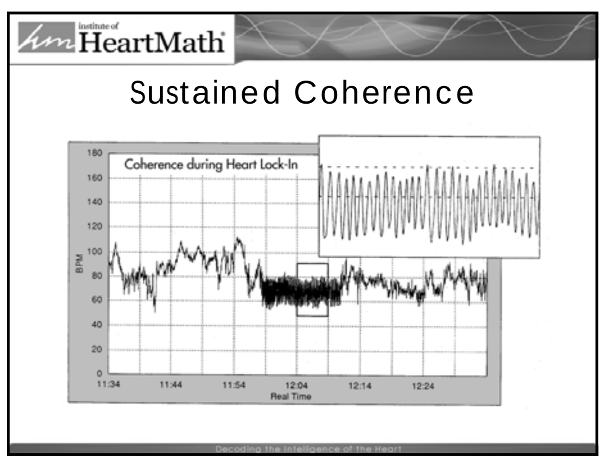

HeartMath
The Steps of Effective Communication
Step 2
Sustain a genuine attitude of neutral while listening.

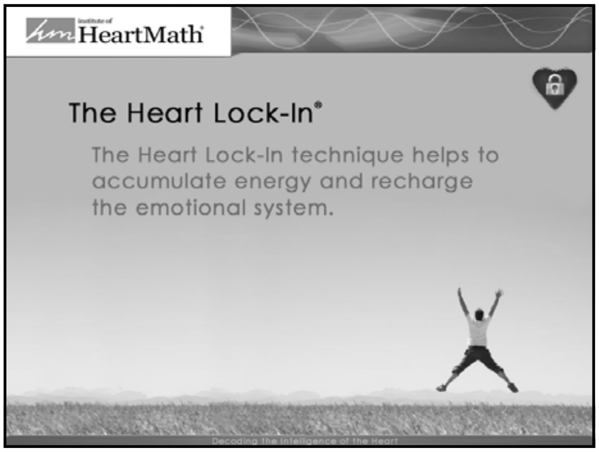

HeartMath
The Steps of Effective Communication
Step 3
Feed back the essence of what was said to confirm understanding.

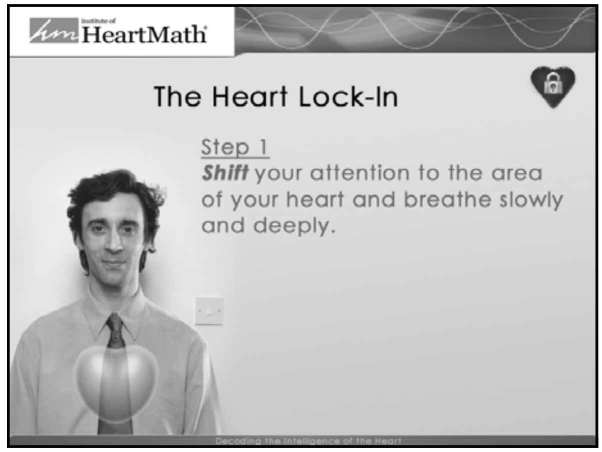

HeartMath
Communication Exercise
Communicate
One-Minute
Essence
Fine Tune
Respond

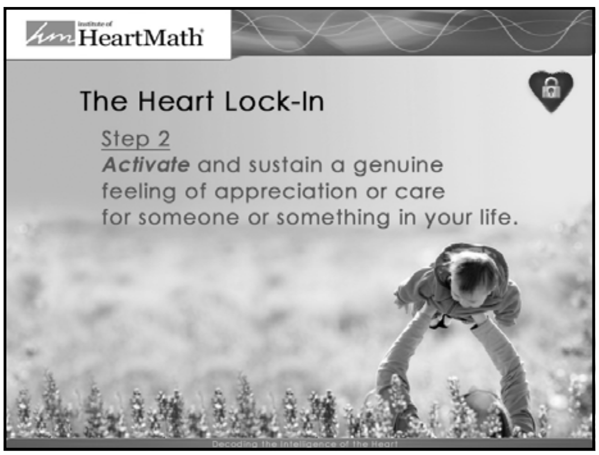

HeartMath
Establishing a New Baseline
The Heart Lock-In® Technique

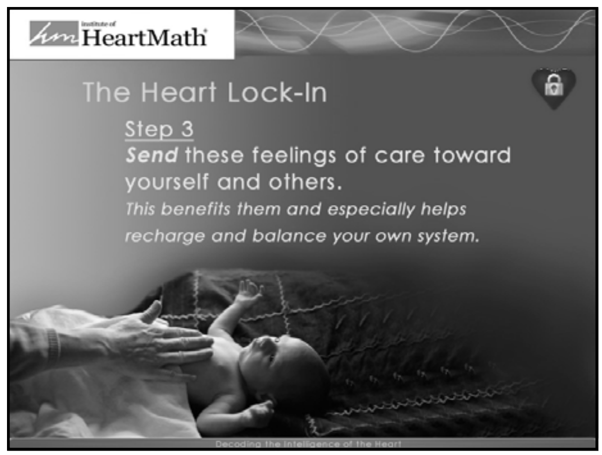

HeartMath
Establishing a Coherent Baseline
Amygdala
Recognize emotional patterns
Stress/anxiety pattern
Positive emotion pattern

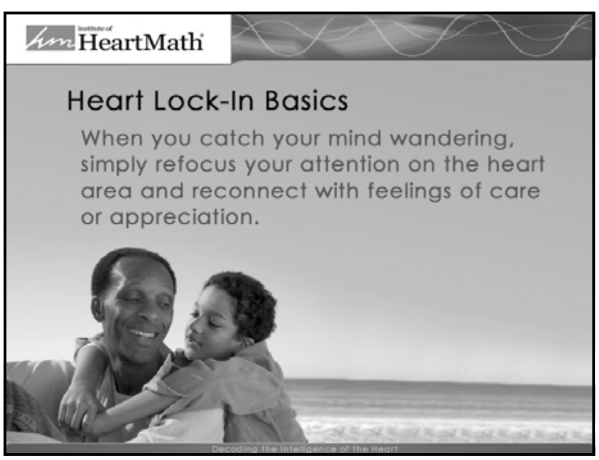

HeartMath
Sustained Coherence
Coherence during Heart Lock-In
BPM
Real Time

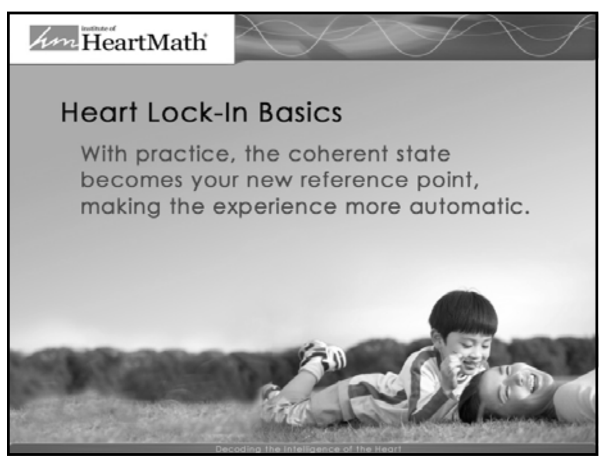

HeartMath
The Heart Lock-In®
The Heart Lock-In technique helps to accumulate energy and recharge the emotional system.

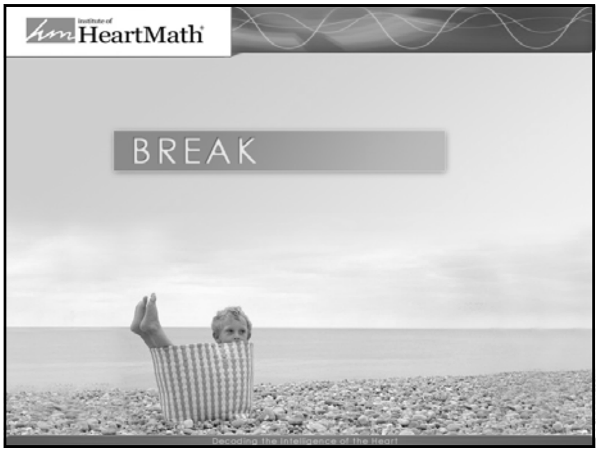

HeartMath
The Heart Lock-In
Step 1
Shift your attention to the area of your heart and breathe slowly and deeply.

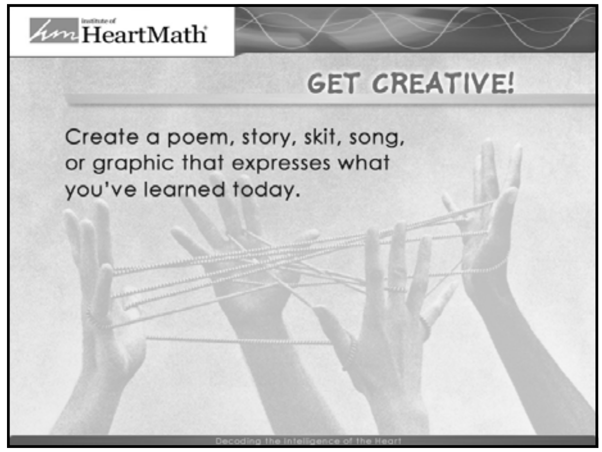

HeartMath
The Heart Lock-In
Step 2
Activate and sustain a genuine feeling of appreciation or care for someone or something in your life.

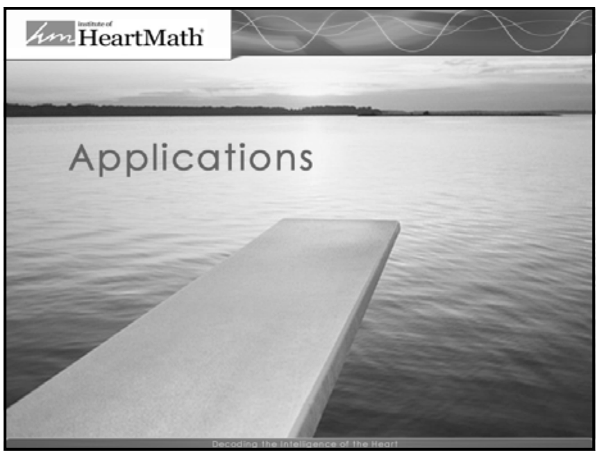

HeartMath
The Heart Lock-In
Step 3
Send these feelings of care toward yourself and others.
This benefits them and especially helps recharge and balance your own system.

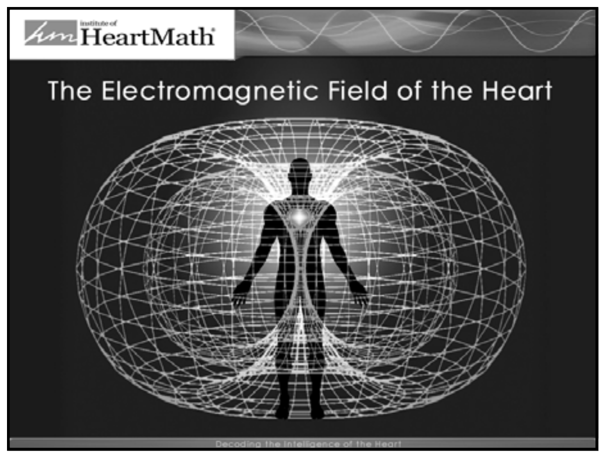

HeartMath
Heart Lock-In Basics
When you catch your mind wandering, simply refocus your attention on the heart area and reconnect with feelings of care or appreciation.

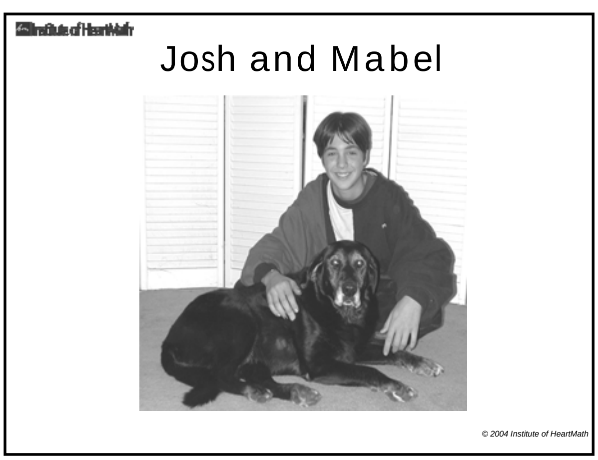

HeartMath
Heart Lock-In Basics
With practice, the coherent state becomes your new reference point, making the experience more automatic.

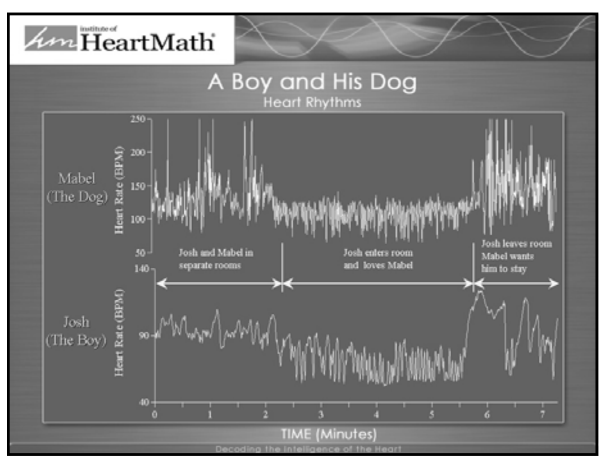

HeartMath
BREAK
Decoding the Intelligence of the Heart

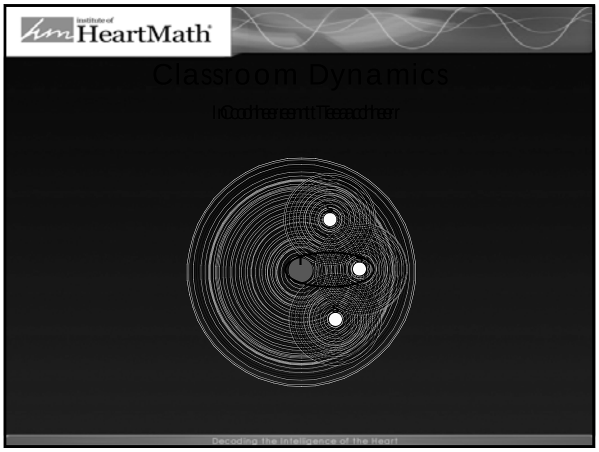

HeartMath
GET CREATIVE!
Create a poem, story, skit, song, or graphic that expresses what you've learned today.
Decoding the Intelligence of the Heart

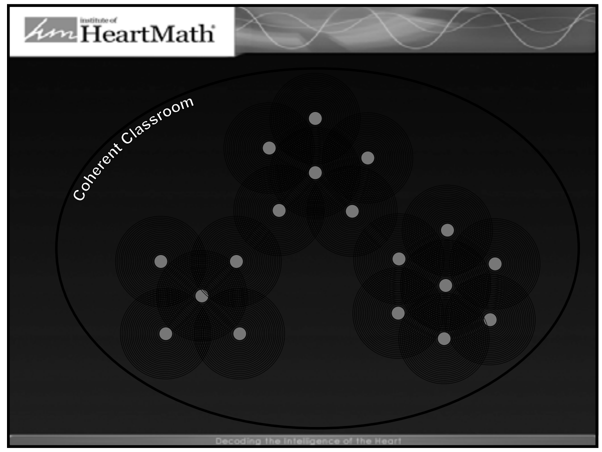

HeartMath
Applications
Decoding the Intelligence of the Heart


HeartMath
The Electromagnetic Field of the Heart
Decoding the Intelligence of the Heart


Josh and Mabel
© 2004 Institute of HeartMath


HeartMath
A Boy and His Dog
Heart Rhythms
Mabel (The Dog)
Heart Rate (BPM)
250
200
150
100
50
Josh and Mabel in separate rooms
Josh enters room and loves Mabel
Josh leaves room Mabel wants him to stay
Josh (The Boy)
Heart Rate (BPM)
140
90
40
0 1 2 3 4 5 6 7
TIME (Minutes)
Decoding the Intelligence of the Heart

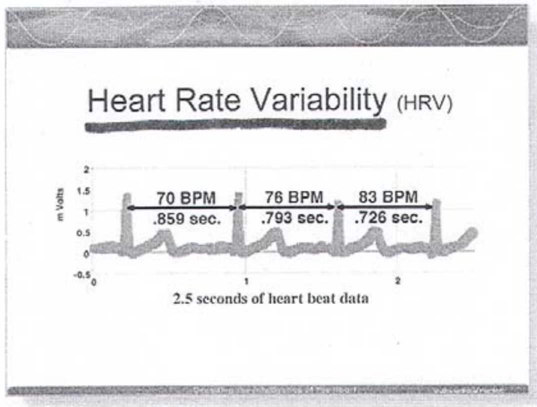

HeartMath
Classroom Dynamics
Decoding the Intelligence of the Heart

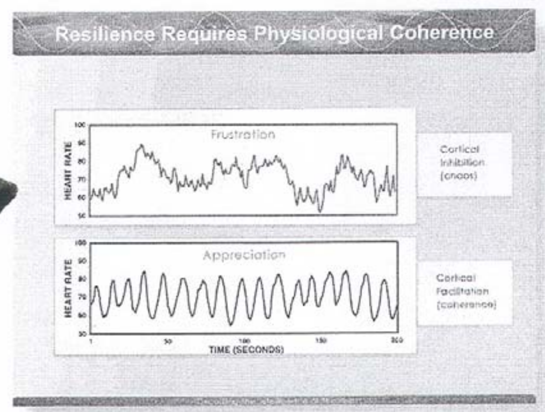

HeartMath
Coherent Classroom
Decoding the Intelligence of the Heart

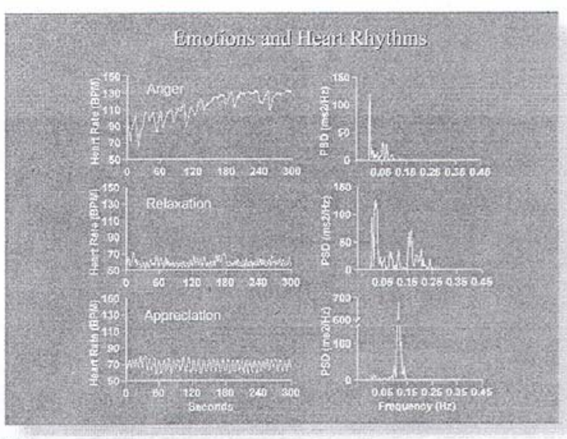

For more information about the Institute of HeartMath:
www.heartmath.org
Decoding the Intelligence of the Heart

APPENDIX F

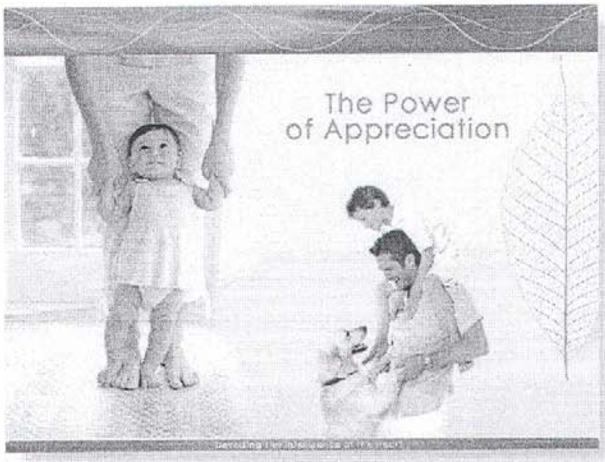
FREEZE-FRAMER INTERACTIVE LEARNING SYSTEM


Heart Rate Variability (HRV)
m Volts
70 BPM
.859 sec.
76 BPM
.793 sec.
83 BPM
.726 sec.
2.5 seconds of heart beat data


Resilience Requires Physiological Coherence
Frustration
Appreciation
HEART RATE
TIME (SECONDS)
Cortical Inhibition (chaos)
Cortical Facilitation (coherence)

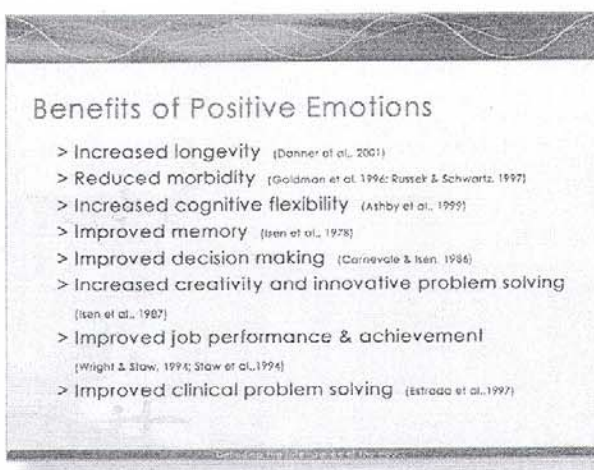

Emotions and Heart Rhythms
Anger
Relaxation
Appreciation
Heart Rate (BPM)
PSD (ms2/Hz)
Seconds
Frequency (Hz)

Appreciation Exercise

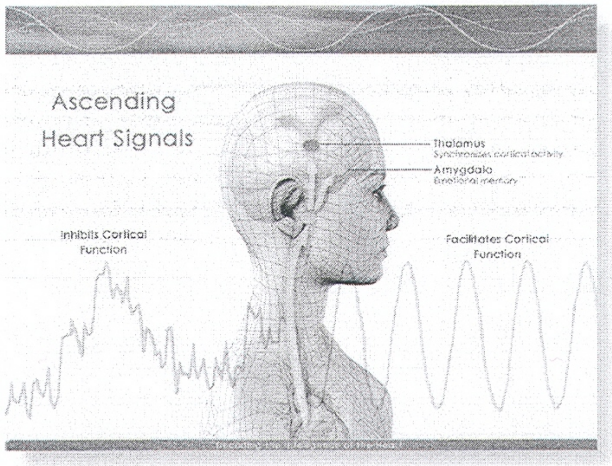


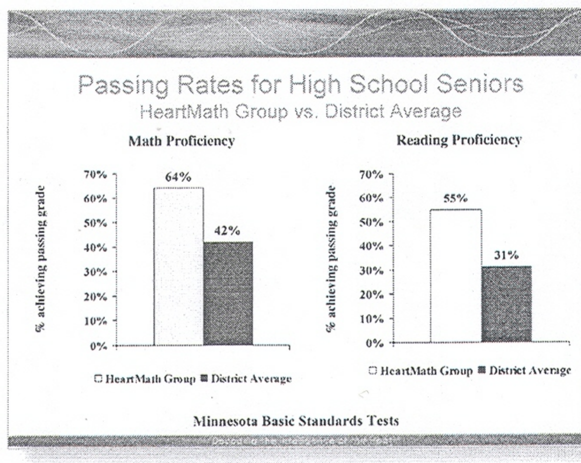
What person, place or thing evokes a feeling of appreciation?

Benefits of Positive Emotions

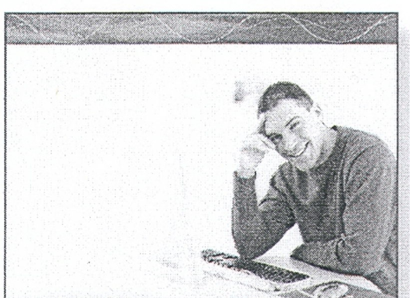


Increase Your Ability to Think Clearly and Solve Problems



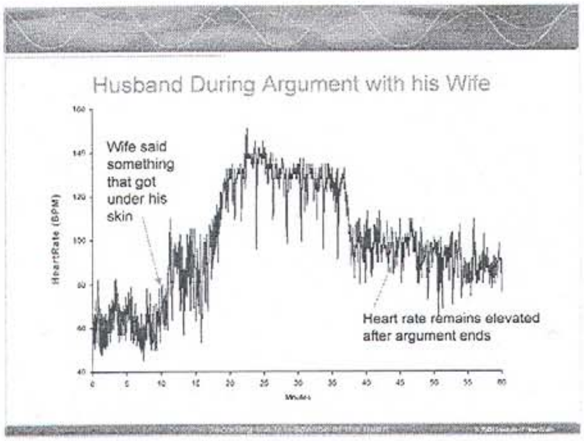


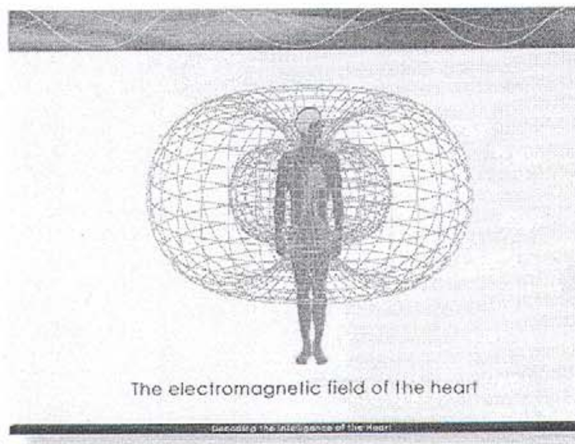
The Freeze-Frame® Technique



Freeze-Frame is a foundational tool that creates a mental and emotional time-out. This gives you a chance to sort and find your solutions and increase your options to resolve problems and conflicts.

Enhance Communication Effectiveness





Communication Blocks

- Assumptions - you know the other person's motive
- Disgruntlements/Judgments
- Pre-conceived opinions
- Button pushers

"When the heart has received a message, we find it hard to turn away, even if the message engages us with issues that yield no easy fix; if that were not the case, why would so many people still be working toward a world of truth, justice, and mercy?"

Parker Palmer and Tom Vander Ark, "Introduction" to Teaching with Fire: Poetry that Sustains the Courage to Teach (Jossey-Bass, 2003), xix.

First Grade

Until then, every forest
Had wolves in it, we thought
It would be fun to wear snowshoes
All the time, and we could talk to water.

So, who is this woman with the gray
Breath calling out names and pointing
To the little desks we will occupy
For the rest of our lives?

--Ron Koertge

New York Times 8.16.05, A17

No Emotion Left Behind

By Timothy P. Shriver and Roger P. Weissberg

THE debate over education reform has tended to divide children's learning along two axes, the emotional and the academic. Either we can address children's academic performance, the conventional thinking holds, or we can address their emotional and social needs. Before No Child Left Behind comes up for reauthorization in 2007, we'd like to deliver some important news: The two kinds of learning are intimately connected. That means that promoting students' social and emotional skills plays a critical role in improving their academic performance.

Social and emotional learning is the process through which children learn to recognize and manage emotions. It allows them to understand and interact with others, to make good decisions and to behave ethically and responsibly. The best social and emotional learning programs engage not only children, but also their teachers, administrators and parents in providing children with the information and skills that help them make ethical and sensible decisions — to avoid bullying, for instance, or to resist pressures to engage in destructive or risky behavior, such as substance abuse. When they are well designed and executed, such programs have consistently achieved these goals, turning out students who are good citizens committed to serving their communities and cooperating with others.

Recent studies, however, have revealed something even more exciting about these programs. Along with Joseph Durlak, a Loyola University psychologist, one of us (Roger Weissberg) recently conducted the largest-ever quantitative analysis, encompassing more than 300 research studies on this subject. The results, which will be presented later this week for the first time, show that social and emotional learning programs significantly improve students' academic performance. The review shows, for example, that an average student enrolled in a social and emotional learning program ranks at least 10 percentile points higher on achievement tests than students who do not participate in such programs. Moreover, compared with their counterparts outside of these programs, social and emotional learning students have significantly better attendance records; their classroom behavior is more constructive and less often disruptive; they like school more; and they have better grade point averages. They are also less likely to be suspended or otherwise disciplined.

Good grades depend not just on brains, but on hearts.

The numbers vindicate what has long been common sense among many teachers and parents: that children who are given clear behavioral standards and social skills, allowing them to feel safe, valued, confident and challenged, will exhibit better school behavior and learn more to boot.

This simple observation is of monumental importance as we attempt to improve our country's public schools. We don't have to choose between academic achievement and the development of character. Rather, we should concentrate on both. No Child Left Behind has created greater accountability in American education, but it is inadequately financed, it fails to effectively address the needs of special education students, and its assessment standards for all children are far too narrow. A truly effective new law should include benchmarks for social and civic learning.

One state, Illinois, has blazed a path in this regard. There is a social and emotional learning component to the Illinois State Learning Standards, and the state's school districts now incorporate such programs into their curriculums. Federal legislation should follow that lead. The new law should also include provisions for conducting systematic classroom assessments of children's social and emotional growth.

What we now understand about the role of social and emotional learning in academic learning should lead us to dramatic action, but it builds on common wisdom. Good teachers know that they can't sacrifice one part of a child for another. Now they have the figures to prove it. The time has come for policy makers to help restore balance to our nation's classrooms and, in so doing, to help American children achieve their fullest potential.

Timothy P. Shriver is the chairman of the Collaborative for Academic, Social, and Emotional Learning and of the Special Olympics. Roger P. Weissberg is a professor of psychology and education at the University of Illinois at Chicago and president of the collaborative.

APPENDIX G

FREEZE-FRAMER® 2.0 QUICK START GUIDE

Freeze-Framer® 2.0 Quick Start Guide

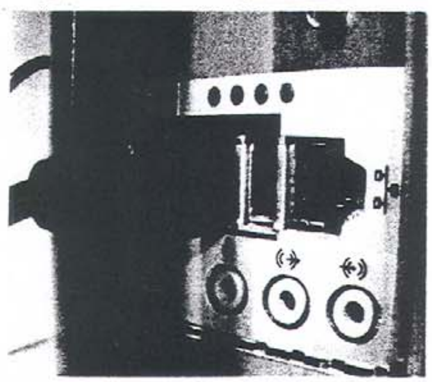
Sensor Installation

Remove the sensor hardware from the packaging. The parts contained are the:
1) Black triangular sensor pod
2) USB extension cable for connecting the pod to the USB computer port
3) Finger sensor with strap
(An optional ear sensor with lapel clip may be purchased separately)

If you have a serial port finger sensor, see installation instructions on page 14.

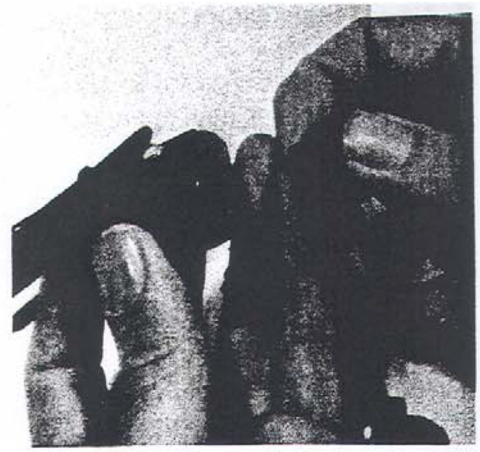
1. If the cable from the black triangular pod can conveniently reach a USB port on your computer or USB hub, plug it in now and skip to step 4. Otherwise, proceed to step 2.

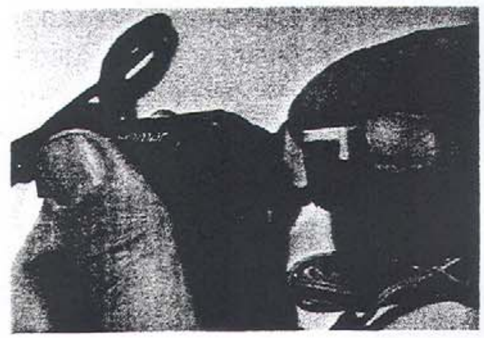
2. If the pod cable cannot conveniently reach a USB port on your computer, unwrap the USB extension cable and connect the male end of the cable to a USB port on your computer or USB hub.



3. Connect the female end of the USB extension cable to the cable coming out of the sensor pod.

6. Plug the finger sensor into the pod.





7. An optional ear sensor may be plugged into the pod instead of the finger sensor.

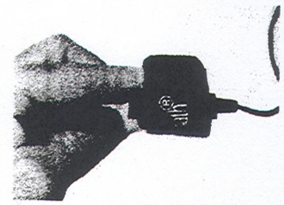
If you are switching from a serial port sensor to a USB sensor, go to the Edit Menu, Options, Pulse Sensor tab to make sure that the USB Sensor is selected.

If the green light on the USB sensor pod does not stay illuminated, it means the device is not being recognized. Try plugging the pod into a different USB port, preferably one directly on your computer, instead of on a docking station or USB Hub. If the USB sensor pod still does not stay illuminated, you will need to shut down and power off your computer and restart.

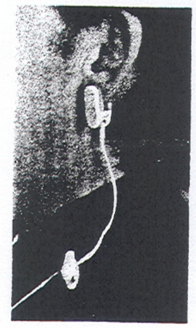
All versions of Freeze-Framer 2.x software are compatible with the USB sensor hardware. We invite you to check for and download free updates by going to http://support.freezeframer.com

Click on the Heart Rhythm Display Button once you're ready to begin.

Collect Accurate Data



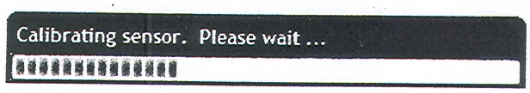
Insert your finger into the finger sensor. Your finger should be relaxed; it is okay to put your hand on your lap.

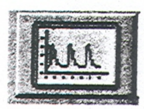


Or, if you're using the optional ear sensor, clip the ear sensor clip to an earlobe, and the lapel clip to your clothing. Slide the lapel clip along the wire to a comfortable position.

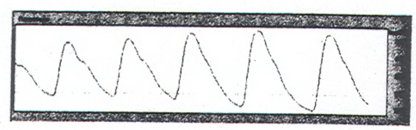
Click the Start Icon. 

While the Automatic Gain Control is calibrating, you will see the following progress bar, unless you are playing a game:



Then click the Pulse Wave Icon. 

Adjust your finger until your pulse wave data shows distinct, smooth pulse spikes.



View your Heart Rhythm and Coherence Ratios

Click on the View Coherence Ratios Icon. After 20 seconds has elapsed, the Freeze-Framer will begin to compute your "Coherence Score," and the screen will adjust.

Other Buttons on the Toolbar:

Return to the Main Screen. 

Start a new session. 

View your progress. 

Review a previous session. 

Click on context-sensitive help icon, then somewhere on screen to get more information about a specific aspect of the program. 

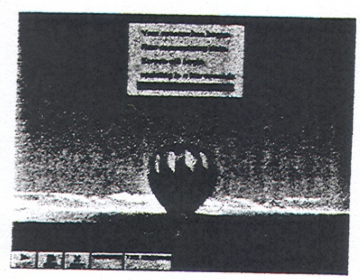
Play a Game

Important: It's best not to attempt to play the games until you have practiced the Quick Coherence technique. Practice using the Heart Rhythm Display screen first. Once you can successfully reduce the low coherence score to about 50% you will be ready to try the Freeze-Framer games.

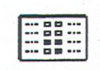
Choose a game by clicking on a game button.

The starting screen for the game will appear. Click on the Start Icon located in the lower left corner of the screen.

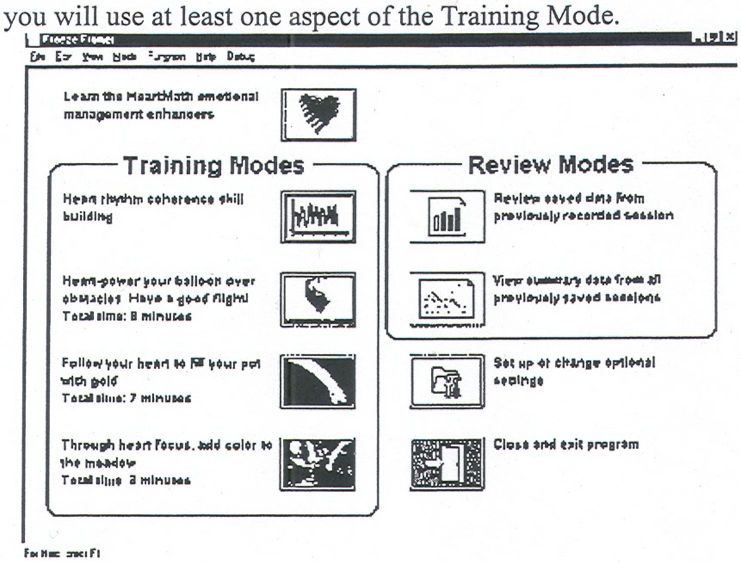
You will see the "Now accumulating data" box appear. The game has started. You are being scored on the data being accumulated, starting the moment this box appears. Therefore, begin to apply the Quick Coherence technique as soon as you see this box appear.



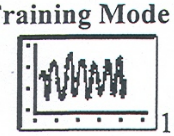
Main Window



Once the program is installed and the system restarted (reboot), the first program window that will appear is the Main Window. The Main Window is the start point for the entire program, where all areas can be accessed easily and quickly.
The Main Window is divided into three (3) sections: Training Modes, Review Modes, and other. The Training Modes include all activities pertaining to actual use of the software during active data recording. Anytime you practice the Heart Lock-In or Freeze-Frame techniques with the Freeze-Framer, you will use at least one aspect of the Training Mode.



The Training Mode encompasses these features:



1. Heart rhythm coherence skill building (no time limit)

Begin here. It is important to practice using Freeze-Framer in the heart rhythm mode first. Practice Heart Lock-In and Freeze-Frame here first until you are comfortable with how Freeze-Framer works before moving on to playing the games.

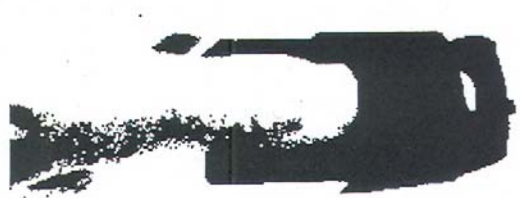
2. The Balloon Game: Heart-power your balloon over obstacles (8 minutes)

Collect accurate data

Note: The Freeze-Framer's finger pulse sensor and heart rhythm charting software is sensitive to motion, such as your pulse beat. It may be helpful to record several practice sessions to become familiar with the product.
In order to record the heart rhythm accurately, you should avoid moving the hand attached to the finger pulse sensor while recording. It is recommended that you cease conversation and sit or lie down quietly while using the Freeze-Framer. Normal conversations often include gestures and body language motions that may be picked up by the pulse sensor and result in inaccurate data recording.
You may notice that as the sensor begins to record data on the Heart Rhythm Graph, one or several red lines may appear in the graph from time to time. This usually indicates that inaccurate or no data has been recorded, and that the program is compensating by leaving a gap in the data. The data inaccuracy or gap may be caused by movement or a poor connection from the finger sensor. Check the finger placement in the sensor for a good connection between the finger pad and the sensor window.

To ensure an accurate pulse signal:

1. Place the tip of your index finger in the cradle of the finger sensor.
2. Attach the Velcro strap. The sensor should be snug but comfortable.



For best results, position your finger so the fleshy part of your finger (where your fingerprints are) presses gently on the sensor window.

If you have small fingers, turning the sensor cradle around so that the cord is pointed toward you may improve the sensor connection by placing the sensor window closer to the edge of the cradle.

APPENDIX H

POQA-R DATA

Frequencies

POQA-R

Statistics-Demographics of Subjects

		d1	d2	d3	d4	d5	d6	d7
N	Valid	23	21	21	21	21	21	21
	Missing	16	18	18	18	18	18	18
Mean		1.9565	2.2381	3.7619	3.3810	7.5714	4.9524	4.5714
Std. Deviation		.20851	.94365	.94365	1.16087	.74642	.21822	.81064
Skewness		-4.796	2.630	-.263	2.121	-1.464	-4.583	-.254
Std. Error of Skewness		.481	.501	.501	.501	.501	.501	.501
Kurtosis		23.000	6.609	-.692	4.919	.652	21.000	-.129
Std. Error of Kurtosis		.935	.972	.972	.972	.972	.972	.972
Minimum		1.00	1.00	2.00	2.00	6.00	4.00	3.00
Maximum		2.00	5.00	5.00	7.00	8.00	5.00	6.00
Percentiles	25	2.0000	2.0000	3.0000	3.0000	7.0000	5.0000	4.0000
	50	2.0000	2.0000	4.0000	3.0000	8.0000	5.0000	5.0000
	75	2.0000	2.0000	4.5000	3.5000	8.0000	5.0000	5.0000

Statistics-Demographics of Subjects

		d8	d9
N	Valid	21	21
	Missing	18	18
Mean		5.7619	5.0952
Std. Deviation		1.26114	1.51343
Skewness		-.826	-1.612
Std. Error of Skewness		.501	.501
Kurtosis		-.477	1.719
Std. Error of Kurtosis		.972	.972
Minimum		3.00	1.00
Maximum		7.00	6.00
Percentiles	25	4.5000	4.0000
	50	6.0000	6.0000
	75	7.0000	6.0000

Frequency Table Demographics from POQA-R

d1 Gender 1-male 2-female

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	2.6	4.3	4.3
	2.00	22	56.4	95.7	100.0
	Total	23	59.0	100.0	
Missing	System	16	41.0		
Total		39	100.0		

d2 Marital Status 1-single 2-married 3-partnered 4-separated 5-divorced 6-widowed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	2.6	4.8	4.8
	2.00	18	46.2	85.7	90.5
	5.00	2	5.1	9.5	100.0
	Total	21	53.8	100.0	
Missing	System	18	46.2		
Total		39	100.0		

d3 Age 1 <21 2=21-30 3=31-40 4=41-50 5=51-60 6=61-70 7>70

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	2	5.1	9.5	9.5
	3.00	6	15.4	28.6	38.1
	4.00	8	20.5	38.1	76.2
	5.00	5	12.8	23.8	100.0
	Total	21	53.8	100.0	
Missing	System	18	46.2		
Total		39	100.0		

d4 Salary Range 1<20K 2=20K-29,999 3=30K-39,999 4=40K-49,999 5=50K-59,999 6=60K-69,999 7=70K-79,999 8=80K-89,999

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	2	5.1	9.5	9.5
	3.00	14	35.9	66.7	76.2
	4.00	3	7.7	14.3	90.5
	6.00	1	2.6	4.8	95.2
	7.00	1	2.6	4.8	100.0
	Total	21	53.8	100.0	
Missing	System	18	46.2		
Total		39	100.0		

d5 Education 1-Elem 2-Jr/Middle Sch 3-High School 4-Tech. Sch 5-BA 6-BS 7-Some graduate 8-MS 9-PhD

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6.00	3	7.7	14.3	14.3
	7.00	3	7.7	14.3	28.6
	8.00	15	38.5	71.4	100.0
	Total	21	53.8	100.0	
Missing	System	18	46.2		
Total		39	100.0		

d6 Employment 1-student 2-laborer 3-skilled/clerical 4-management 5-professional 6-executive 7-engineer 8-retired 9-unemployed 10-other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4.00	1	2.6	4.8	4.8
	5.00	20	51.3	95.2	100.0
	Total	21	53.8	100.0	
Missing	System	18	46.2		
Total		39	100.0		

d7 Hours/wk 1<25 2=26-35 3=36-40 4=41-50 5=51-59 6=60 or more

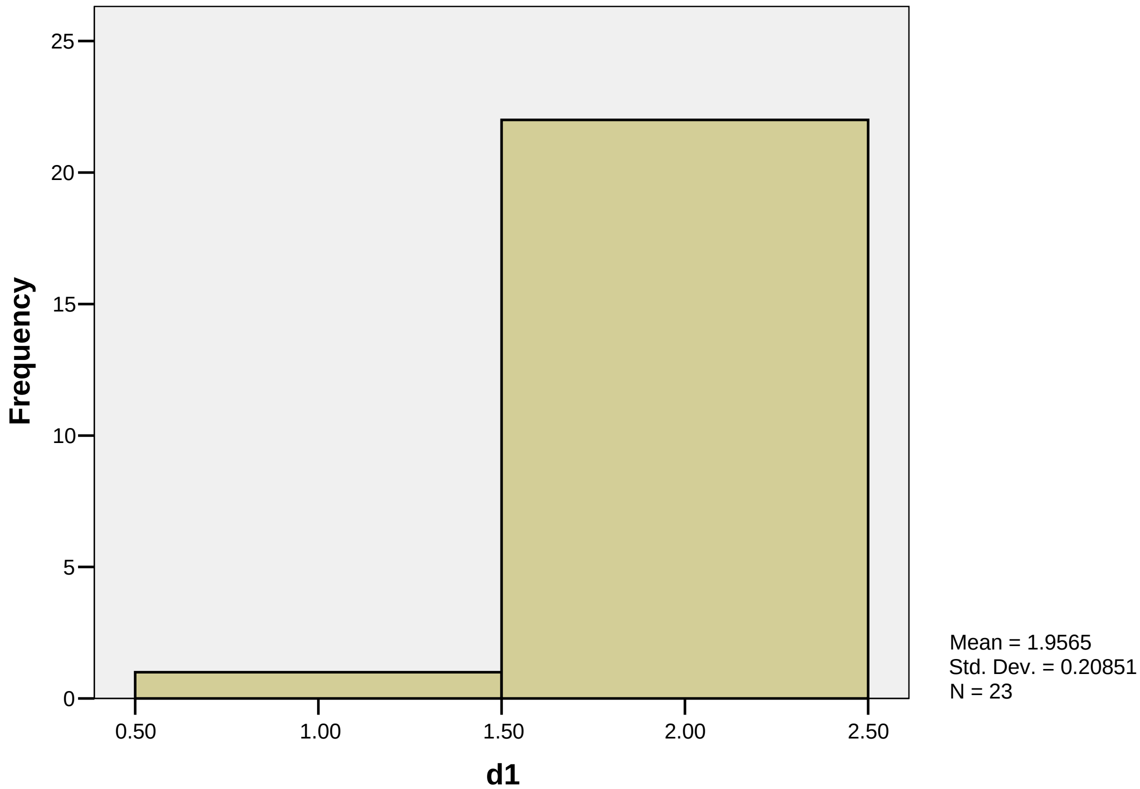
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3.00	2	5.1	9.5	9.5
	4.00	7	17.9	33.3	42.9
	5.00	10	25.6	47.6	90.5
	6.00	2	5.1	9.5	100.0
	Total	21	53.8	100.0	
Missing	System	18	46.2		
Total		39	100.0		

d8 Years of service 1=0-6 mo. 2=6 mo.-1 yr. 3=1-2yrs. 4=2-5 yrs.
5=5-10yrs. 6=10-20yrs. 7=20 or more yrs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3.00	1	2.6	4.8	4.8
	4.00	4	10.3	19.0	23.8
	5.00	1	2.6	4.8	28.6
	6.00	8	20.5	38.1	66.7
	7.00	7	17.9	33.3	100.0
	Total	21	53.8	100.0	
Missing	System	18	46.2		
Total		39	100.0		

d9 Current job 1=0-6mo. 2=6mo.-1yr 3=1-2yrs 4=2-5 yrs. 5=5-10yrs
6=10 or more yrs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	2.6	4.8	4.8
	2.00	1	2.6	4.8	9.5
	3.00	1	2.6	4.8	14.3
	4.00	3	7.7	14.3	28.6
	5.00	1	2.6	4.8	33.3
	6.00	14	35.9	66.7	100.0
	Total	21	53.8	100.0	
Missing	System	18	46.2		
Total		39	100.0		



Frequency
25
20
15
10
5
0
0.50
1.00
1.50
2.00
2.50
d1
Mean = 1.9565
Std. Dev. = 0.20851
N = 23

d7 Hours/wk 1<25 2=26-35 3=36-40 4=41-50 5=51-59 6=60 or more

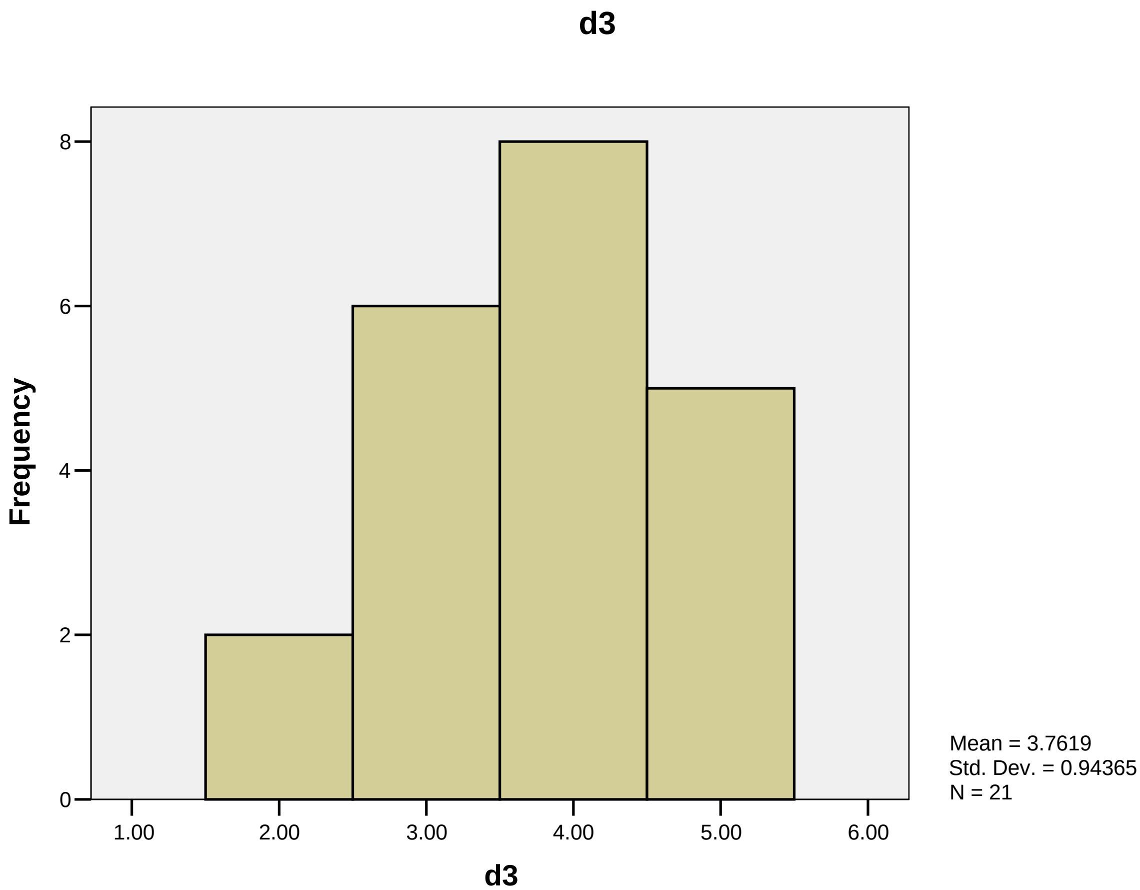
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3.00	2	5.1	9.5	9.5
	4.00	7	17.9	33.3	42.9
	5.00	10	25.6	47.6	90.5
	6.00	2	5.1	9.5	100.0
	Total	21	53.8	100.0	
Missing	System	18	46.2		
Total		39	100.0		

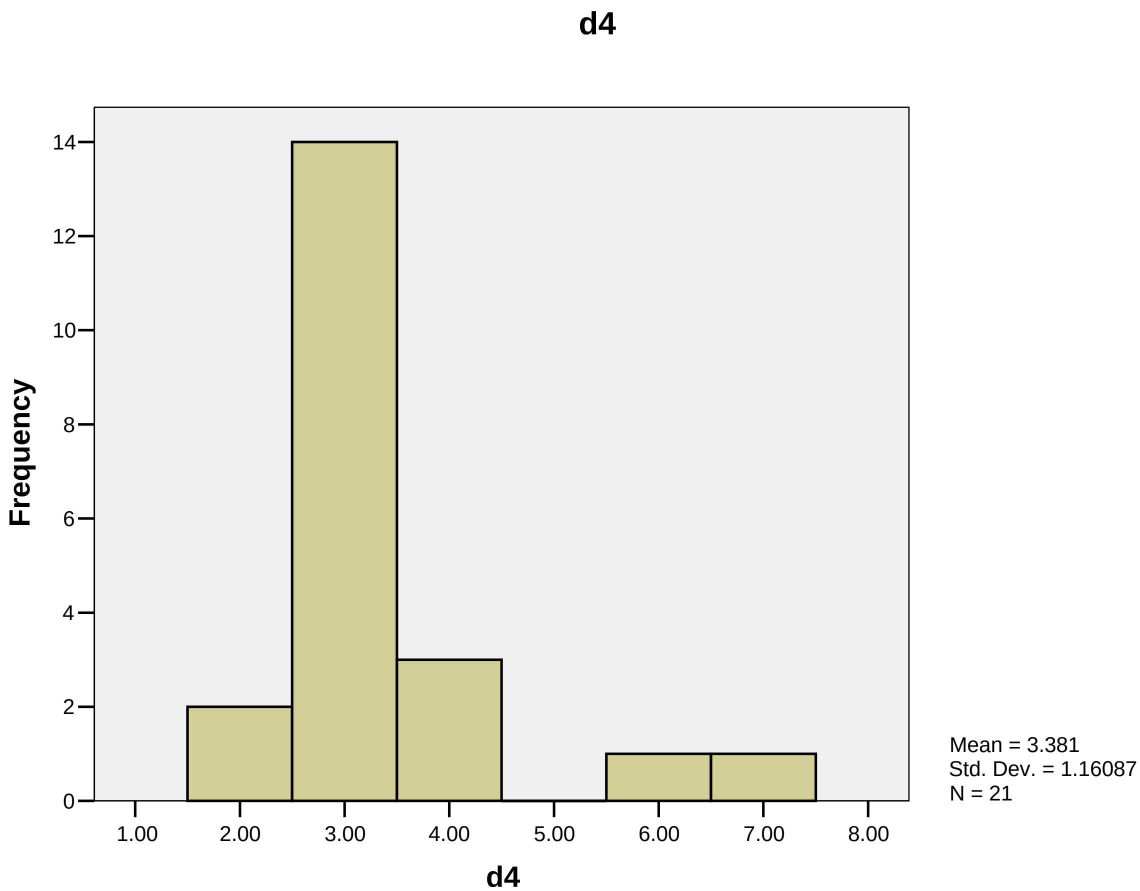
d8 Years of service 1=0-6 mo. 2=6 mo.-1 yr. 3=1-2yrs. 4=2-5 yrs. 5=5-10yrs. 6=10-20yrs. 7=20 or more yrs.

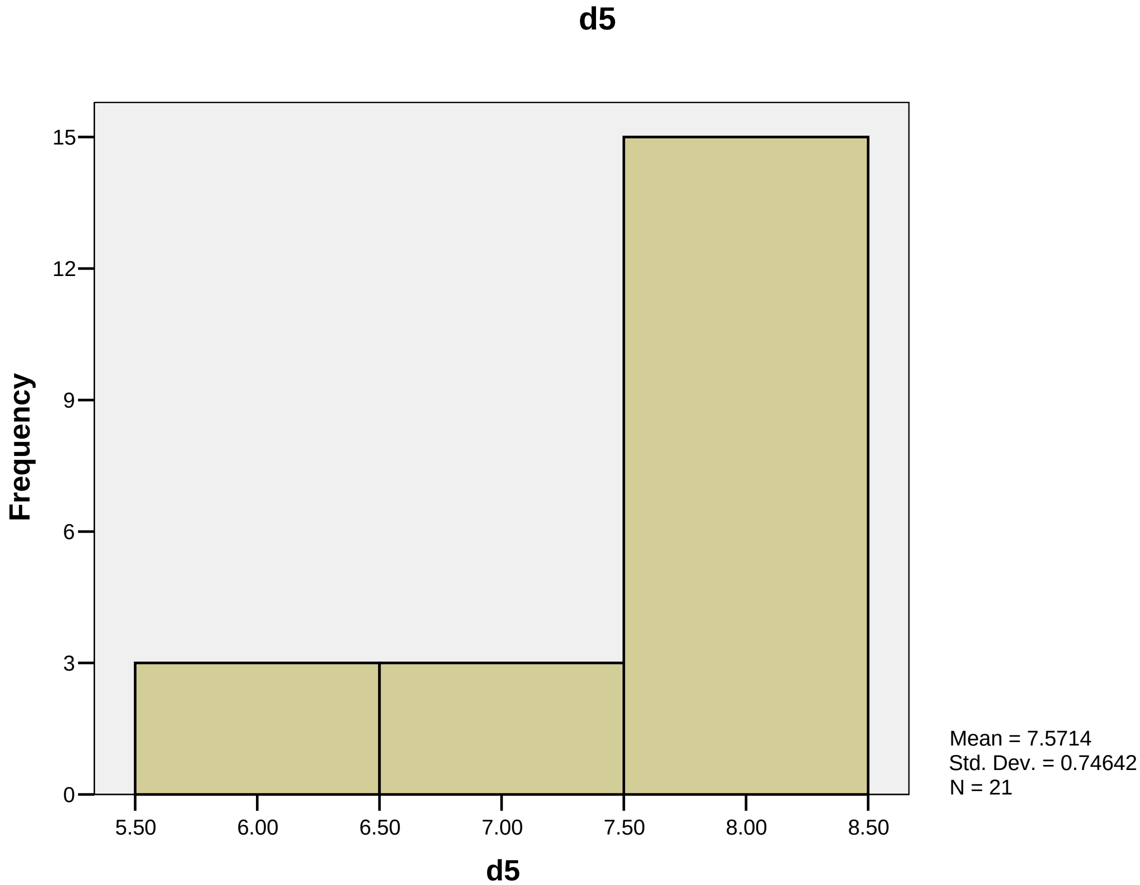
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3.00	1	2.6	4.8	4.8
	4.00	4	10.3	19.0	23.8
	5.00	1	2.6	4.8	28.6
	6.00	8	20.5	38.1	66.7
	7.00	7	17.9	33.3	100.0
	Total	21	53.8	100.0	
Missing	System	18	46.2		
Total		39	100.0		

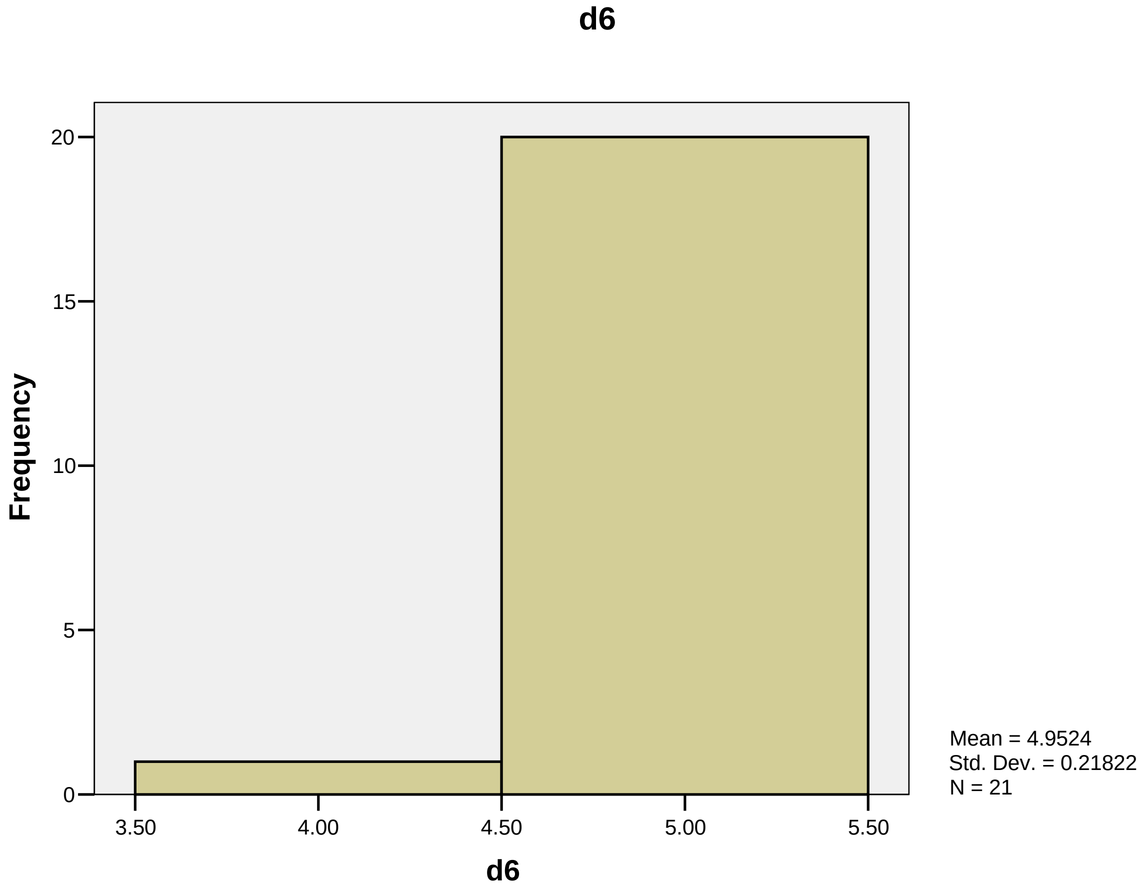
d9 Current job 1=0-6mo. 2=6mo.-1yr 3=1-2yrs 4=2-5 yrs. 5=5-10yrs 6=10 or more yrs.

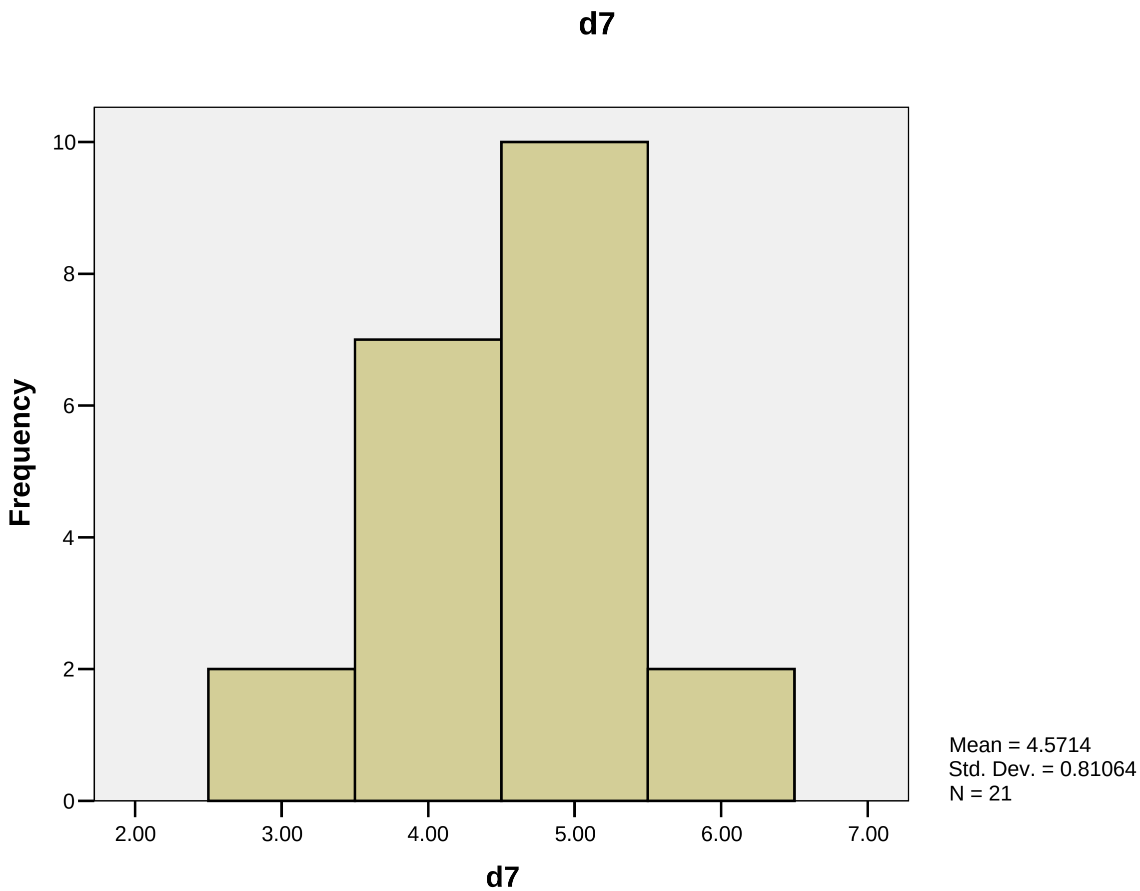
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	2.6	4.8	4.8
	2.00	1	2.6	4.8	9.5
	3.00	1	2.6	4.8	14.3
	4.00	3	7.7	14.3	28.6
	5.00	1	2.6	4.8	33.3
	6.00	14	35.9	66.7	100.0
	Total	21	53.8	100.0	
Missing	System	18	46.2		
Total		39	100.0		

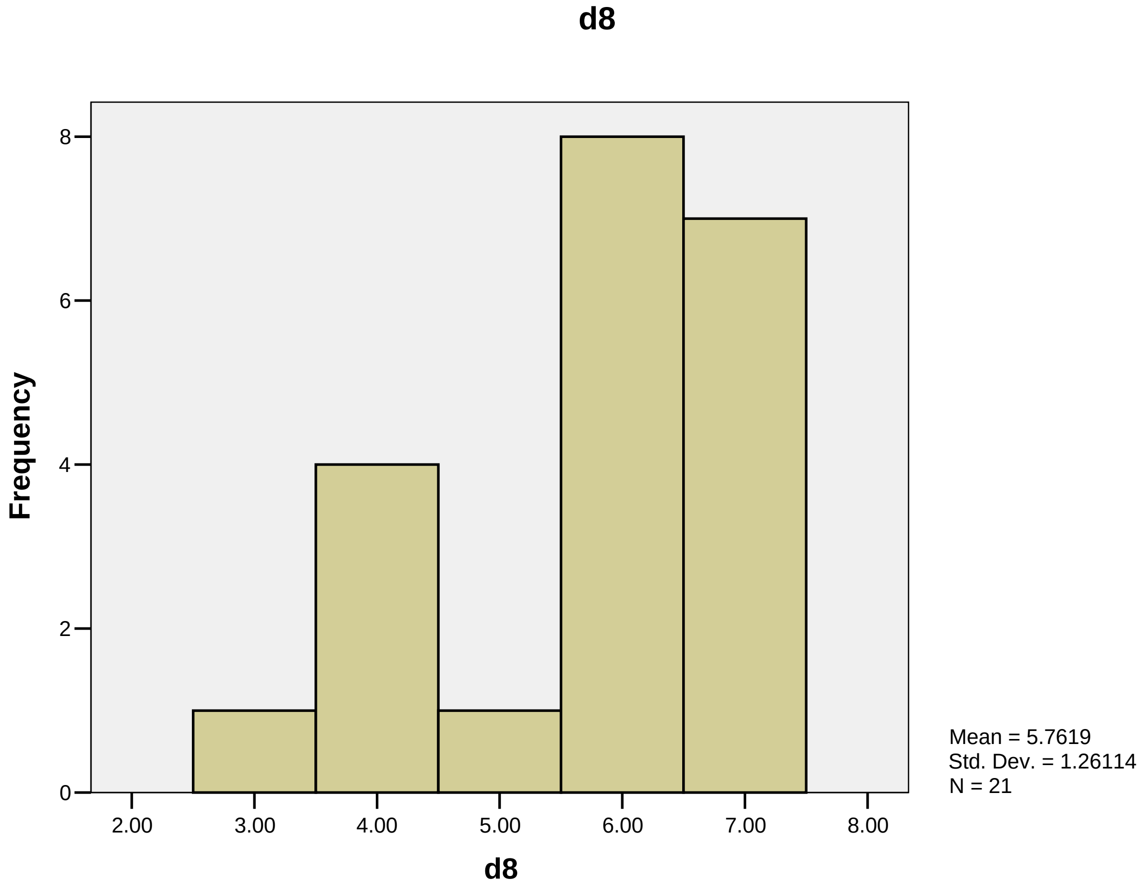

d3
Frequency
8
6
4
2
0
1.00
2.00
3.00
4.00
5.00
6.00
d3
Mean = 3.7619
Std. Dev. = 0.94365
N = 21

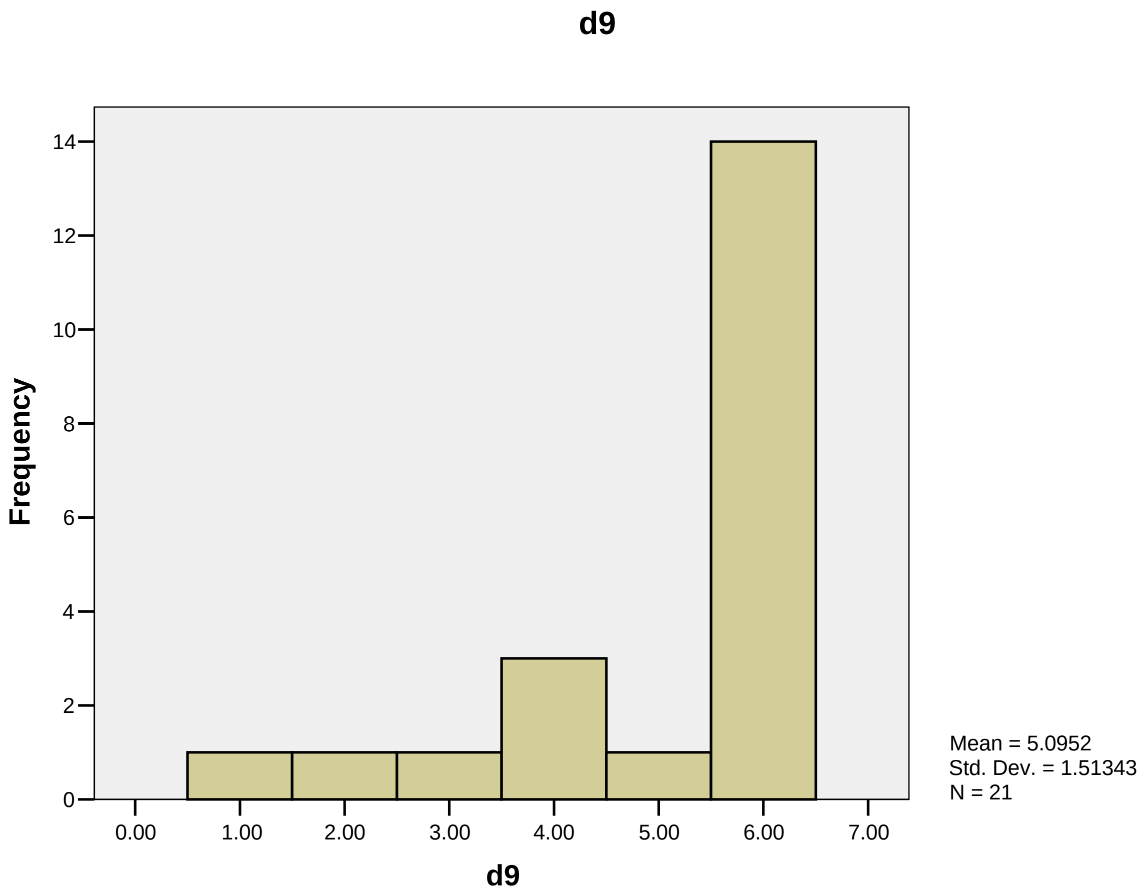

d4
Frequency
14
12
10
8
6
4
2
0
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
d4
Mean = 3.381
Std. Dev. = 1.16087
N = 21


d5
Frequency
15
12
9
6
3
0
5.50
6.00
6.50
7.00
7.50
8.00
8.50
d5
Mean = 7.5714
Std. Dev. = 0.74642
N = 21


d6
Frequency
20
15
10
5
0
3.50
4.00
4.50
5.00
5.50
d6
Mean = 4.9524
Std. Dev. = 0.21822
N = 21


d7
Frequency
10
8
6
4
2
0
2.00
3.00
4.00
5.00
6.00
7.00
d7
Mean = 4.5714
Std. Dev. = 0.81064
N = 21


d8
Frequency
0
2
4
6
8
2.00
3.00
4.00
5.00
6.00
7.00
8.00
d8
Mean = 5.7619
Std. Dev. = 1.26114
N = 21



Frequencies

Statistics for Positive Outlook

		aPOSOut	bPosOut	cPosOut
N	Valid	19	19	11
	Missing	20	20	28
Mean		4.8158	5.2105	5.4318
Std. Deviation		1.58079	1.20837	1.06120
Skewness		-.498	-.717	-.076
Std. Error of Skewness		.524	.524	.661
Kurtosis		-1.043	.077	-.941
Std. Error of Kurtosis		1.014	1.014	1.279
Minimum		2.25	2.50	3.75
Maximum		7.00	7.00	7.00
Percentiles	25	3.2500	4.7500	4.2500
	50	5.5000	5.5000	5.5000
	75	5.7500	6.0000	6.5000

General Linear Model Constructs from the POQA-R

Within-Subjects Factors

Measure: MEASURE_1

Positive Outlook	Dependent Variable
Time 1	aPOSOut
Time 2	bPosOut
Time 3	cPosOut

Descriptive Statistics

	Mean	Std. Deviation	N
aPOSOut	5.4318	1.13518	11
bPosOut	5.7045	.77313	11
cPosOut	5.4318	1.06120	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
posout	Pillai's Trace	.194	1.085[b]	2.000	9.000	.378	.194
	Wilks' Lambda	.806	1.085[b]	2.000	9.000	.378	.194
	Hotelling's Trace	.241	1.085[b]	2.000	9.000	.378	.194
	Roy's Largest Root	.241	1.085[b]	2.000	9.000	.378	.194

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
posout	Pillai's Trace	2.170	.185
	Wilks' Lambda	2.170	.185
	Hotelling's Trace	2.170	.185
	Roy's Largest Root	2.170	.185

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: posout

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
posout	.716	3.007	2	.222

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
posout	.779	.896	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: posout

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
posout	Sphericity Assumed	.545	2	.273	1.702	.208
	Greenhouse-Geisser	.545	1.558	.350	1.702	.216
	Huynh-Feldt	.545	1.793	.304	1.702	.212
	Lower-bound	.545	1.000	.545	1.702	.221
Error(posout)	Sphericity Assumed	3.205	20	.160		
	Greenhouse-Geisser	3.205	15.576	.206		
	Huynh-Feldt	3.205	17.925	.179		
	Lower-bound	3.205	10.000	.320		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
posout	Sphericity Assumed	.145	3.404	.315
	Greenhouse-Geisser	.145	2.651	.274
	Huynh-Feldt	.145	3.051	.296
	Lower-bound	.145	1.702	.219
Error(posout)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	posout	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
posout	Linear	.000	1	.000	.000	1.000	.000
	Quadratic	.545	1	.545	2.280	.162	.186
Error(posout)	Linear	.813	10	.081			
	Quadratic	2.392	10	.239			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	posout	Noncent. Parameter	Observed Power[a]
posout	Linear	.000	.050
	Quadratic	2.280	.277
Error(posout)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1006.517	1	1006.517	373.886	.000	.974
Error	26.920	10	2.692			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	373.886	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Positive Outlook

Estimates

Measure: MEASURE_1

posout	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	5.432	.342	4.669	6.194
2	5.705	.233	5.185	6.224
3	5.432	.320	4.719	6.145

Pairwise Comparisons

Measure: MEASURE_1

(I) posout	(J) posout	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	-.273	.204	.630	-.857	.311
	3	.000	.122	1.000	-.349	.349
2	1	.273	.204	.630	-.311	.857
	3	.273	.177	.461	-.234	.780
3	1	.000	.122	1.000	-.349	.349
	2	-.273	.177	.461	-.780	.234

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.194	1.085[b]	2.000	9.000	.378	.194
Wilks' lambda	.806	1.085[b]	2.000	9.000	.378	.194
Hotelling's trace	.241	1.085[b]	2.000	9.000	.378	.194
Roy's largest root	.241	1.085[b]	2.000	9.000	.378	.194

Each F tests the multivariate effect of posout. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	2.170	.185
Wilks' lambda	2.170	.185
Hotelling's trace	2.170	.185
Roy's largest root	2.170	.185

Each F tests the multivariate effect of posout. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics for Gratitude

		aGrat	bGrat	cGrat
N	Valid	19	24	27
	Missing	20	15	12
Mean		5.7018	5.6806	5.6296
Std. Deviation		1.15947	1.12709	1.04731
Skewness		-1.727	-.989	-1.071
Std. Error of Skewness		.524	.472	.448
Kurtosis		2.700	.608	.649
Std. Error of Kurtosis		1.014	.918	.872
Minimum		2.67	3.00	3.00
Maximum		7.00	7.00	7.00
Percentiles	25	5.3333	5.0833	5.0000
	50	6.0000	6.0000	6.0000
	75	6.3333	6.3333	6.3333

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Gratitude	Dependent Variable
Time 1	aGrat
Time 2	bGrat
Time 3	cGrat

Descriptive Statistics

	Mean	Std. Deviation	N
aGrat	6.1212	.61955	11
bGrat	6.1212	.67120	11
cGrat	5.9394	1.15295	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
grat	Pillai's Trace	.032	.151[b]	2.000	9.000	.862	.032
	Wilks' Lambda	.968	.151[b]	2.000	9.000	.862	.032
	Hotelling's Trace	.034	.151[b]	2.000	9.000	.862	.032
	Roy's Largest Root	.034	.151[b]	2.000	9.000	.862	.032

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
grat	Pillai's Trace	.302	.067
	Wilks' Lambda	.302	.067
	Hotelling's Trace	.302	.067
	Roy's Largest Root	.302	.067

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: grat

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
grat	.389	8.489	2	.014

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
grat	.621	.666	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: grat

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
grat	Sphericity Assumed	.242	2	.121	.298	.745
	Greenhouse-Geisser	.242	1.242	.195	.298	.644
	Huynh-Feldt	.242	1.331	.182	.298	.659
	Lower-bound	.242	1.000	.242	.298	.597
Error(grat)	Sphericity Assumed	8.128	20	.406		
	Greenhouse-Geisser	8.128	12.417	.655		
	Huynh-Feldt	8.128	13.312	.611		
	Lower-bound	8.128	10.000	.813		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
grat	Sphericity Assumed	.029	.597	.091
	Greenhouse-Geisser	.029	.370	.082
	Huynh-Feldt	.029	.397	.083
	Lower-bound	.029	.298	.079
Error(grat)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	grat	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
grat	Linear	.182	1	.182	.325	.581	.031
	Quadratic	.061	1	.061	.239	.635	.023
Error(grat)	Linear	5.596	10	.560			
	Quadratic	2.532	10	.253			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	grat	Noncent. Parameter	Observed Power[a]
grat	Linear	.325	.081
	Quadratic	.239	.073
Error(grat)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1212.121	1	1212.121	897.308	.000	.989
Error	13.508	10	1.351			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	897.308	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Gratitude

Estimates

Measure: MEASURE_1

grat	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	6.121	.187	5.705	6.537
2	6.121	.202	5.670	6.572
3	5.939	.348	5.165	6.714

Pairwise Comparisons

Measure: MEASURE_1

(I) grat	(J) grat	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	8.88E-016	.127	1.000	-.365	.365
	3	.182	.319	1.000	-.734	1.097
2	1	-8.88E-016	.127	1.000	-.365	.365
	3	.182	.322	1.000	-.743	1.106
3	1	-.182	.319	1.000	-1.097	.734
	2	-.182	.322	1.000	-1.106	.743

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.032	.151[b]	2.000	9.000	.862	.032
Wilks' lambda	.968	.151[b]	2.000	9.000	.862	.032
Hotelling's trace	.034	.151[b]	2.000	9.000	.862	.032
Roy's largest root	.034	.151[b]	2.000	9.000	.862	.032

Each F tests the multivariate effect of grat. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	.302	.067
Wilks' lambda	.302	.067
Hotelling's trace	.302	.067
Roy's largest root	.302	.067

Each F tests the multivariate effect of grat. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics for Motivation

		aMot	bMot	cMot
N	Valid	17	24	27
	Missing	22	15	12
Mean		4.2157	4.4444	4.6420
Std. Deviation		1.48109	.96141	1.06187
Skewness		-.005	-.317	-.105
Std. Error of Skewness		.550	.472	.448
Kurtosis		-.747	.063	-.374
Std. Error of Kurtosis		1.063	.918	.872
Minimum		2.00	2.33	2.33
Maximum		6.67	6.33	6.67
Percentiles	25	3.1667	3.7500	3.6667
	50	4.0000	4.3333	4.3333
	75	5.3333	5.2500	5.3333

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Motivation	Dependent Variable
Time 1	aMot
Time 2	bMot
Time 3	cMot

Descriptive Statistics

	Mean	Std. Deviation	N
aMot	4.9333	1.19464	10
bMot	4.8667	.74037	10
cMot	5.1333	1.34440	10

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
mot	Pillai's Trace	.075	.325[b]	2.000	8.000	.731	.075
	Wilks' Lambda	.925	.325[b]	2.000	8.000	.731	.075
	Hotelling's Trace	.081	.325[b]	2.000	8.000	.731	.075
	Roy's Largest Root	.081	.325[b]	2.000	8.000	.731	.075

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
mot	Pillai's Trace	.651	.086
	Wilks' Lambda	.651	.086
	Hotelling's Trace	.651	.086
	Roy's Largest Root	.651	.086

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: mot

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
mot	.804	1.747	2	.418

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

	Epsilon[a]		
Within Subjects Effect	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
mot	.836	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: mot

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
mot	Sphericity Assumed	.385	2	.193	.332	.722
	Greenhouse-Geisser	.385	1.672	.230	.332	.685
	Huynh-Feldt	.385	2.000	.193	.332	.722
	Lower-bound	.385	1.000	.385	.332	.578
Error(mot)	Sphericity Assumed	10.430	18	.579		
	Greenhouse-Geisser	10.430	15.048	.693		
	Huynh-Feldt	10.430	18.000	.579		
	Lower-bound	10.430	9.000	1.159		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
mot	Sphericity Assumed	.036	.665	.095
	Greenhouse-Geisser	.036	.556	.091
	Huynh-Feldt	.036	.665	.095
	Lower-bound	.036	.332	.081
Error(mot)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	mot	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
mot	Linear	.200	1	.200	.241	.635	.026
	Quadratic	.185	1	.185	.563	.472	.059
Error(mot)	Linear	7.467	9	.830			
	Quadratic	2.963	9	.329			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	mot	Noncent. Parameter	Observed Power[a]
mot	Linear	.241	.073
	Quadratic	.563	.103
Error(mot)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	743.348	1	743.348	283.302	.000	.969
Error	23.615	9	2.624			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	283.302	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Motivation

Estimates

Measure: MEASURE_1

mot	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	4.933	.378	4.079	5.788
2	4.867	.234	4.337	5.396
3	5.133	.425	4.172	6.095

Pairwise Comparisons

Measure: MEASURE_1

(I) mot	(J) mot	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	.067	.285	1.000	-.768	.901
	3	-.200	.407	1.000	-1.395	.995
2	1	-.067	.285	1.000	-.901	.768
	3	-.267	.317	1.000	-1.198	.664
3	1	.200	.407	1.000	-.995	1.395
	2	.267	.317	1.000	-.664	1.198

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.075	.325[b]	2.000	8.000	.731	.075
Wilks' lambda	.925	.325[b]	2.000	8.000	.731	.075
Hotelling's trace	.081	.325[b]	2.000	8.000	.731	.075
Roy's largest root	.081	.325[b]	2.000	8.000	.731	.075

Each F tests the multivariate effect of mot. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	.651	.086
Wilks' lambda	.651	.086
Hotelling's trace	.651	.086
Roy's largest root	.651	.086

Each F tests the multivariate effect of mot. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

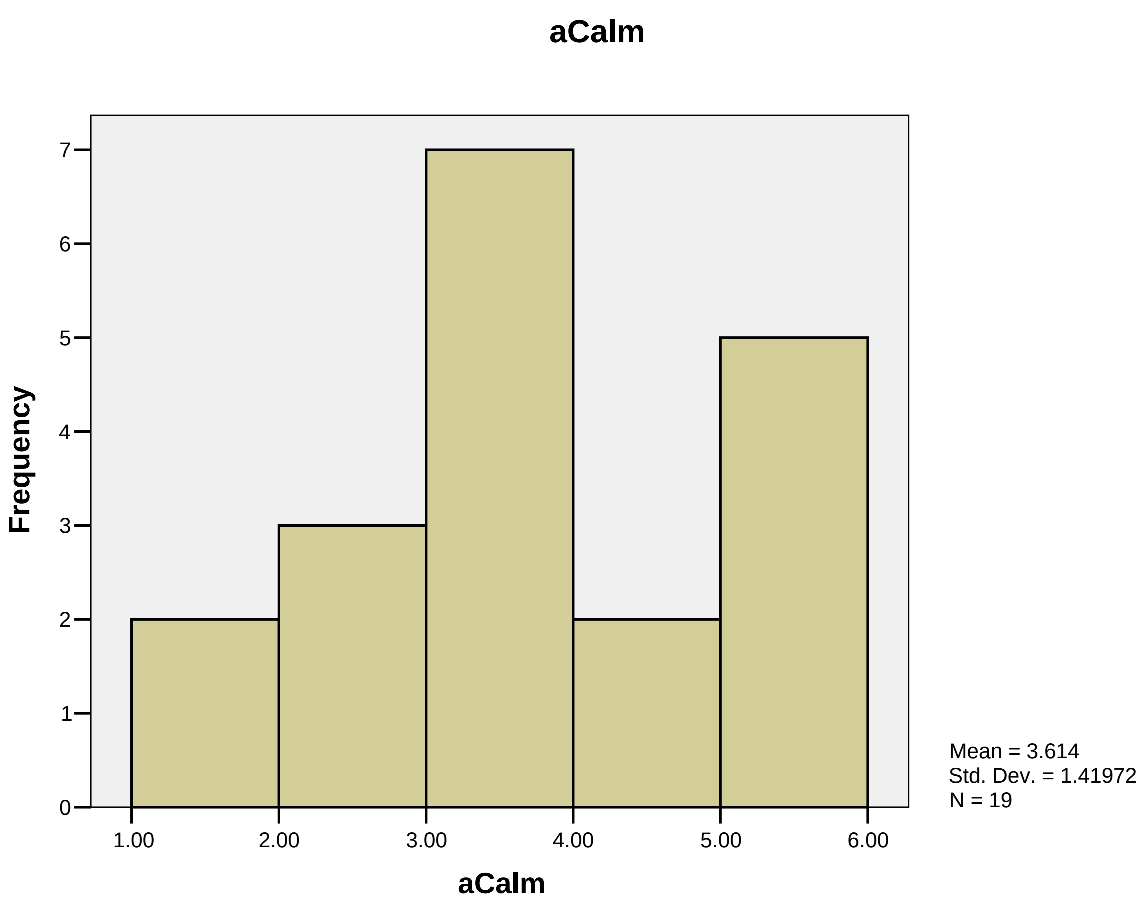
a. Computed using alpha = .05

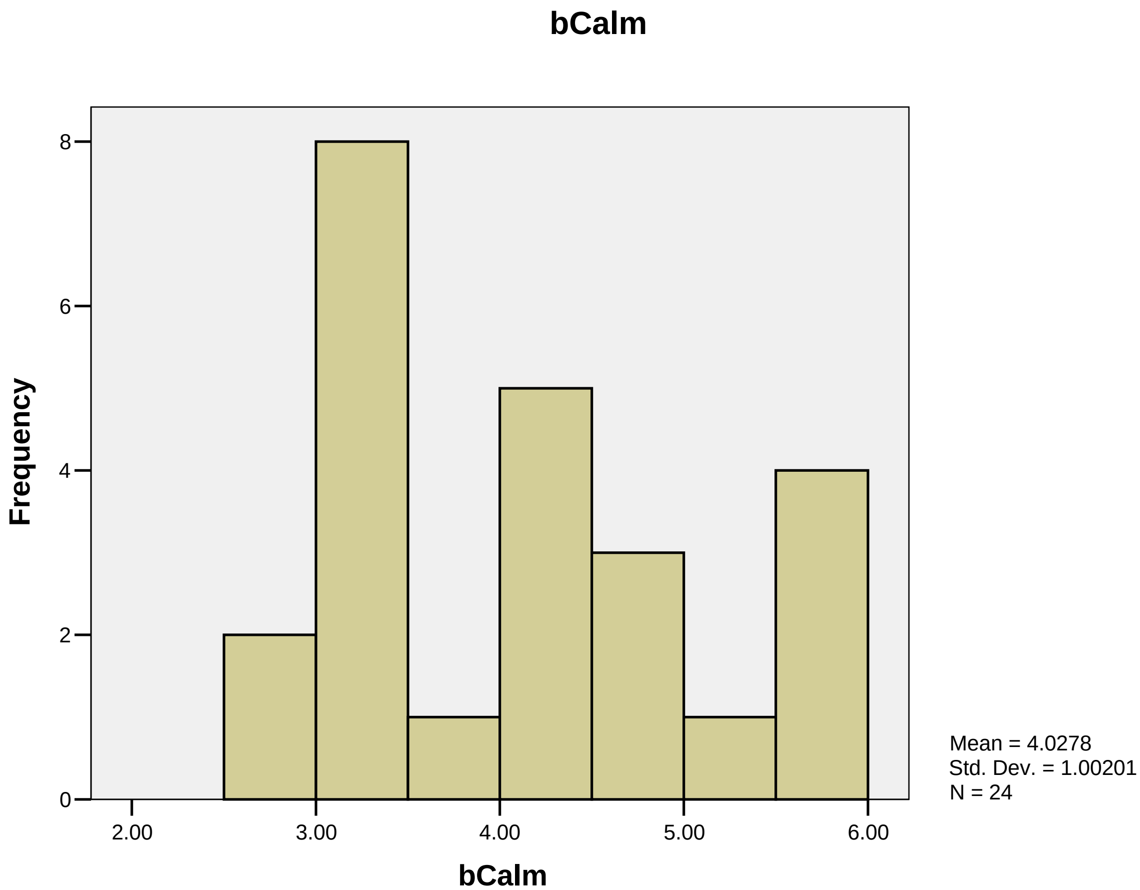
b. Exact statistic

Statistics for Calmness

		aCalm	bCalm	cCalm
N	Valid	19	24	27
	Missing	20	15	12
Mean		3.6140	4.0278	4.4815
Std. Deviation		1.41972	1.00201	.96668
Skewness		.214	.405	-.286
Std. Error of Skewness		.524	.472	.448
Kurtosis		-.720	-1.052	-.956
Std. Error of Kurtosis		1.014	.918	.872
Minimum		1.33	2.67	2.67
Maximum		6.00	5.67	6.00
Percentiles	25	2.6667	3.0833	3.6667
	50	3.3333	4.0000	4.6667
	75	5.0000	4.6667	5.3333

Histogram




bCalm
Frequency
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6
4
2
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3.00
4.00
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6.00
bCalm
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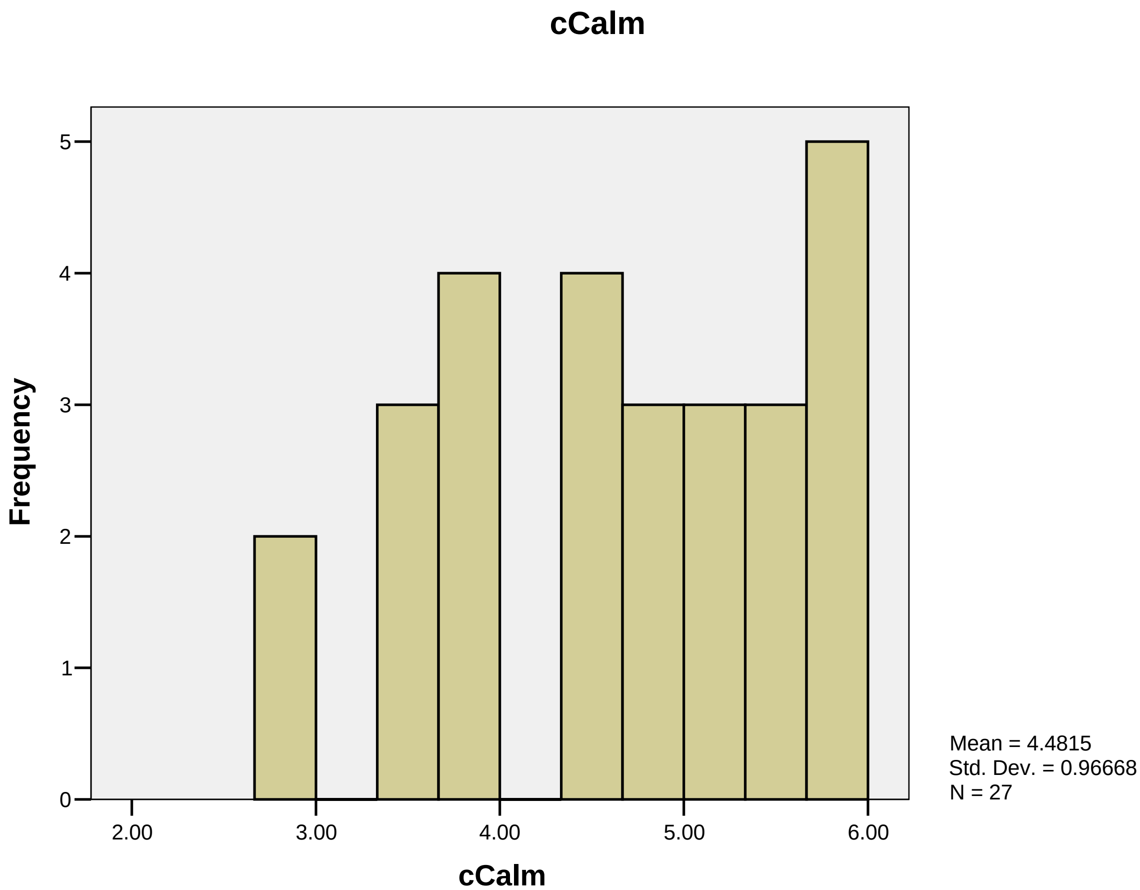
Std. Dev. = 1.00201
N = 24



General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Calmness	Dependent Variable
Time 1	aCalm
Time 2	bCalm
Time 3	cCalm

Descriptive Statistics

	Mean	Std. Deviation	N
aCalm	3.7273	1.27208	11
bCalm	4.1515	.95874	11
cCalm	4.6364	1.05887	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
calm	Pillai's Trace	.533	5.137[b]	2.000	9.000	.032	.533
	Wilks' Lambda	.467	5.137[b]	2.000	9.000	.032	.533
	Hotelling's Trace	1.142	5.137[b]	2.000	9.000	.032	.533
	Roy's Largest Root	1.142	5.137[b]	2.000	9.000	.032	.533

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
calm	Pillai's Trace	10.274	.673
	Wilks' Lambda	10.274	.673
	Hotelling's Trace	10.274	.673
	Roy's Largest Root	10.274	.673

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: calm

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
calm	.910	.847	2	.655

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
calm	.918	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: calm

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
calm	Sphericity Assumed	4.552	2	2.276	4.781	.020
	Greenhouse-Geisser	4.552	1.835	2.481	4.781	.024
	Huynh-Feldt	4.552	2.000	2.276	4.781	.020
	Lower-bound	4.552	1.000	4.552	4.781	.054
Error(calm)	Sphericity Assumed	9.522	20	.476		
	Greenhouse-Geisser	9.522	18.351	.519		
	Huynh-Feldt	9.522	20.000	.476		
	Lower-bound	9.522	10.000	.952		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
calm	Sphericity Assumed	.323	9.562	.729
	Greenhouse-Geisser	.323	8.773	.700
	Huynh-Feldt	.323	9.562	.729
	Lower-bound	.323	4.781	.506
Error(calm)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	calm	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
calm	Linear	4.545	1	4.545	10.204	.010	.505
	Quadratic	.007	1	.007	.013	.911	.001
Error(calm)	Linear	4.455	10	.445			
	Quadratic	5.067	10	.507			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	calm	Noncent. Parameter	Observed Power[a]
calm	Linear	10.204	.820
	Quadratic	.013	.051
Error(calm)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	574.306	1	574.306	212.203	.000	.955
Error	27.064	10	2.706			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	212.203	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Calmness

Estimates

Measure: MEASURE_1

calm	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	3.727	.384	2.873	4.582
2	4.152	.289	3.507	4.796
3	4.636	.319	3.925	5.348

Pairwise Comparisons

Measure: MEASURE_1

(I) calm	(J) calm	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-.424	.334	.697	-1.382	.533
	3	-.909*	.285	.029	-1.726	-.092
2	1	.424	.334	.697	-.533	1.382
	3	-.485	.260	.274	-1.230	.260
3	1	.909*	.285	.029	.092	1.726
	2	.485	.260	.274	-.260	1.230

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.533	5.137[b]	2.000	9.000	.032	.533
Wilks' lambda	.467	5.137[b]	2.000	9.000	.032	.533
Hotelling's trace	1.142	5.137[b]	2.000	9.000	.032	.533
Roy's largest root	1.142	5.137[b]	2.000	9.000	.032	.533

Each F tests the multivariate effect of calm. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	10.274	.673
Wilks' lambda	10.274	.673
Hotelling's trace	10.274	.673
Roy's largest root	10.274	.673

Each F tests the multivariate effect of calm. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics

		aFatig	bFatig	cFatig
N	Valid	19	24	27
	Missing	20	15	12
Mean		4.4912	4.1389	3.4321
Std. Deviation		1.71546	1.71077	1.29699
Skewness		-.229	-.052	.922
Std. Error of Skewness		.524	.472	.448
Kurtosis		-1.502	-1.516	-.250
Std. Error of Kurtosis		1.014	.918	.872
Minimum		1.67	1.67	1.67
Maximum		6.67	7.00	6.00
Percentiles	25	3.0000	2.6667	2.3333
	50	5.0000	4.1667	3.0000
	75	6.0000	5.9167	3.6667

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Fatigue	Dependent Variable
Time 1	aFatig
Time 2	bFatig
Time 3	cFatig

Descriptive Statistics

	Mean	Std. Deviation	N
aFatig	3.9394	1.55505	11
bFatig	4.3636	1.59481	11
cFatig	3.5152	1.65572	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
fatig	Pillai's Trace	.270	1.665[b]	2.000	9.000	.243	.270
	Wilks' Lambda	.730	1.665[b]	2.000	9.000	.243	.270
	Hotelling's Trace	.370	1.665[b]	2.000	9.000	.243	.270
	Roy's Largest Root	.370	1.665[b]	2.000	9.000	.243	.270

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
fatig	Pillai's Trace	3.329	.263
	Wilks' Lambda	3.329	.263
	Hotelling's Trace	3.329	.263
	Roy's Largest Root	3.329	.263

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: fatig

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
fatig	.467	6.845	2	.033

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
fatig	.652	.710	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: fatig

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
fatig	Sphericity Assumed	3.960	2	1.980	1.699	.208
	Greenhouse-Geisser	3.960	1.305	3.034	1.699	.219
	Huynh-Feldt	3.960	1.421	2.787	1.699	.218
	Lower-bound	3.960	1.000	3.960	1.699	.222
Error(fatig)	Sphericity Assumed	23.300	20	1.165		
	Greenhouse-Geisser	23.300	13.050	1.785		
	Huynh-Feldt	23.300	14.209	1.640		
	Lower-bound	23.300	10.000	2.330		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
fatig	Sphericity Assumed	.145	3.399	.315
	Greenhouse-Geisser	.145	2.218	.250
	Huynh-Feldt	.145	2.415	.261
	Lower-bound	.145	1.699	.219
Error(fatig)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	fatig	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
fatig	Linear	.990	1	.990	.696	.424	.065
	Quadratic	2.970	1	2.970	3.275	.100	.247
Error(fatig)	Linear	14.232	10	1.423			
	Quadratic	9.067	10	.907			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	fatig	Noncent. Parameter	Observed Power[a]
fatig	Linear	.696	.118
	Quadratic	3.275	.373
Error(fatig)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	512.121	1	512.121	95.313	.000	.905
Error	53.731	10	5.373			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	95.313	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Fatigue

Estimates

Measure: MEASURE_1

fatig	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	3.939	.469	2.895	4.984
2	4.364	.481	3.292	5.435
3	3.515	.499	2.403	4.627

Pairwise Comparisons

Measure: MEASURE_1

(I) fatig	(J) fatig	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-.424	.247	.348	-1.132	.283
	3	.424	.509	1.000	-1.036	1.884
2	1	.424	.247	.348	-.283	1.132
	3	.848	.562	.486	-.765	2.462
3	1	-.424	.509	1.000	-1.884	1.036
	2	-.848	.562	.486	-2.462	.765

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.270	1.665[b]	2.000	9.000	.243	.270
Wilks' lambda	.730	1.665[b]	2.000	9.000	.243	.270
Hotelling's trace	.370	1.665[b]	2.000	9.000	.243	.270
Roy's largest root	.370	1.665[b]	2.000	9.000	.243	.270

Each F tests the multivariate effect of fatig. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	3.329	.263
Wilks' lambda	3.329	.263
Hotelling's trace	3.329	.263
Roy's largest root	3.329	.263

Each F tests the multivariate effect of fatig. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

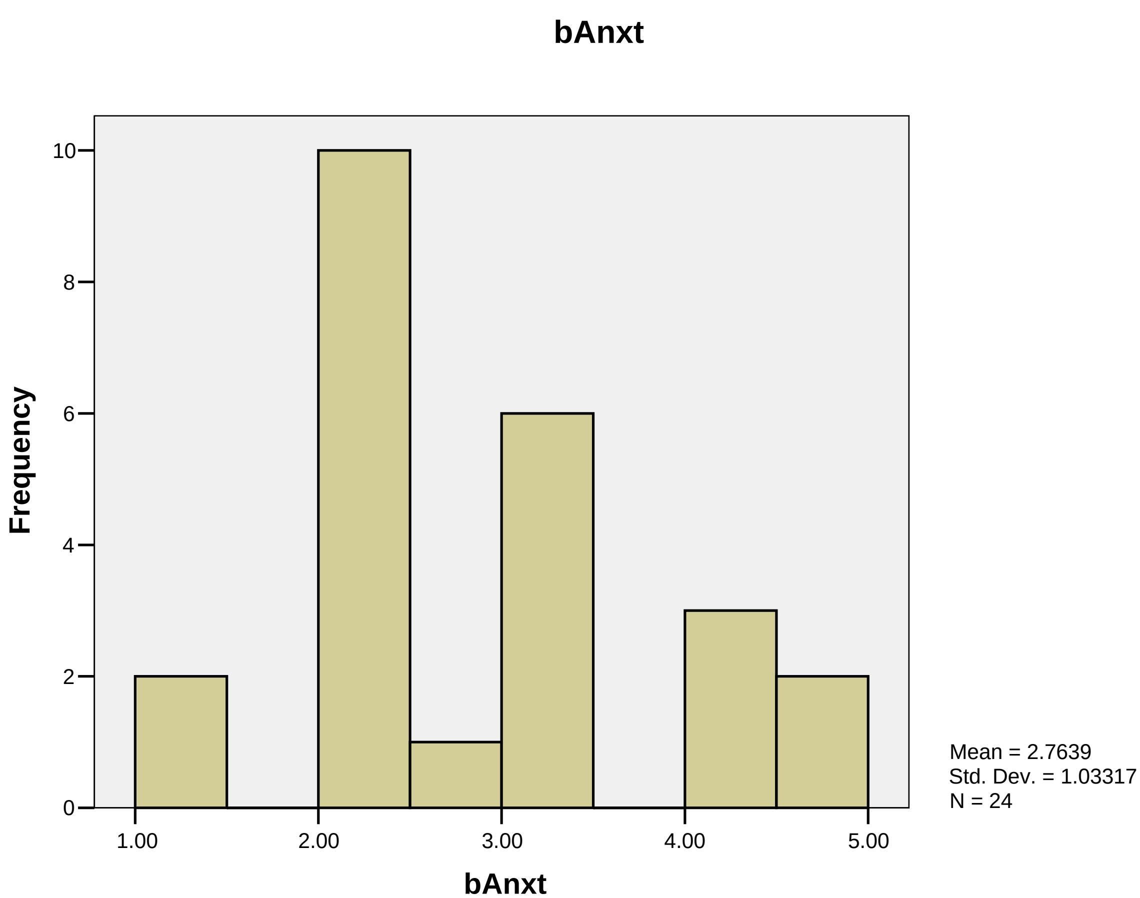
a. Computed using alpha = .05

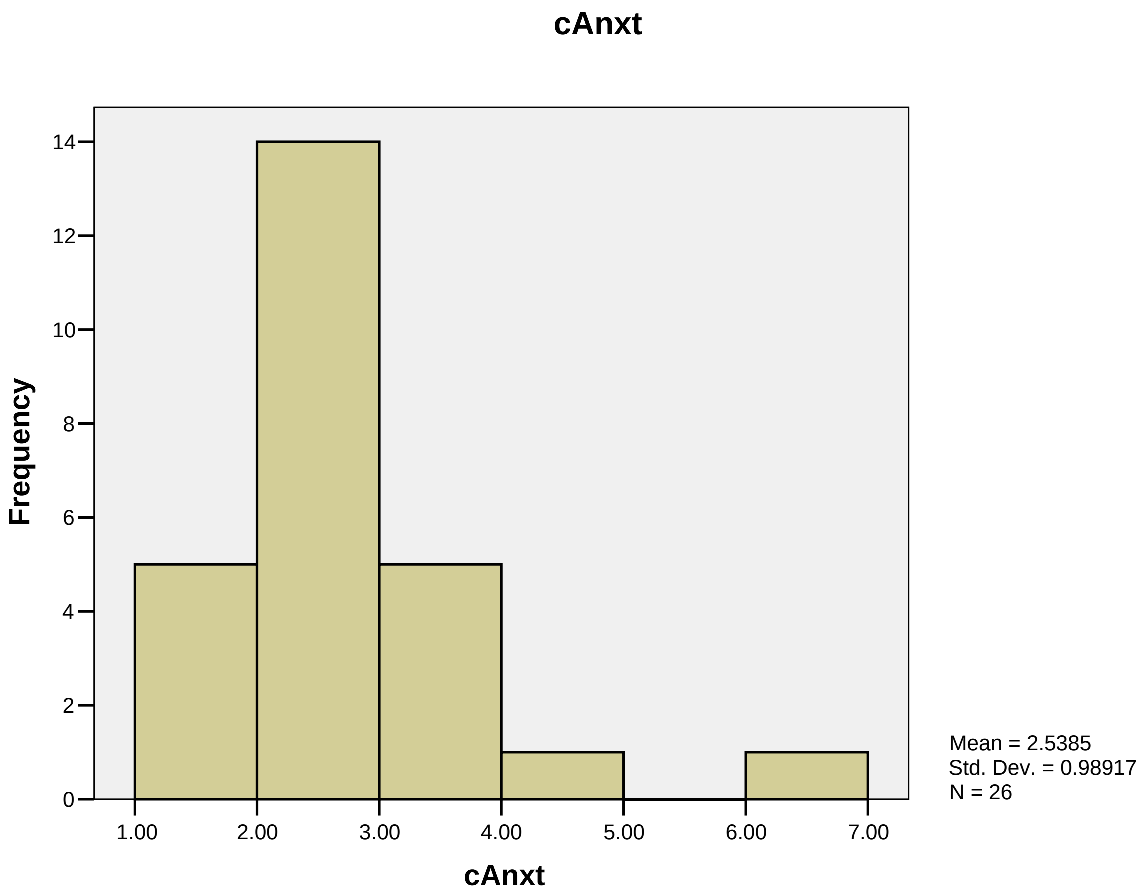
b. Exact statistic

Statistics for Anxiety

		aAnxt	bAnxt	cAnxt
N	Valid	19	24	26
	Missing	20	15	13
Mean		3.1579	2.7639	2.5385
Std. Deviation		1.03857	1.03317	.98917
Skewness		.367	.610	2.417
Std. Error of Skewness		.524	.472	.456
Kurtosis		-1.389	-.198	8.168
Std. Error of Kurtosis		1.014	.918	.887
Minimum		1.67	1.00	1.33
Maximum		4.67	5.00	6.33
Percentiles	25	2.3333	2.0000	2.0000
	50	3.0000	2.5000	2.3333
	75	4.0000	3.2500	3.0000

Histogram





General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Anxiety	Dependent Variable
Time 1	aAnxt
Time 2	bAnxt
Time 3	cAnxt

Descriptive Statistics

	Mean	Std. Deviation	N
aAnxt	3.0303	.95980	11
bAnxt	2.4848	.72055	11
cAnxt	2.5455	1.34390	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
anxt	Pillai's Trace	.348	2.402[b]	2.000	9.000	.146	.348
	Wilks' Lambda	.652	2.402[b]	2.000	9.000	.146	.348
	Hotelling's Trace	.534	2.402[b]	2.000	9.000	.146	.348
	Roy's Largest Root	.534	2.402[b]	2.000	9.000	.146	.348

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
anxt	Pillai's Trace	4.803	.363
	Wilks' Lambda	4.803	.363
	Hotelling's Trace	4.803	.363
	Roy's Largest Root	4.803	.363

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: anxt

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
anxt	.507	6.120	2	.047

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
anxt	.670	.735	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: anxt

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
anxt	Sphericity Assumed	1.966	2	.983	1.099	.352
	Greenhouse-Geisser	1.966	1.339	1.468	1.099	.335
	Huynh-Feldt	1.966	1.470	1.338	1.099	.339
	Lower-bound	1.966	1.000	1.966	1.099	.319
Error(anxt)	Sphericity Assumed	17.886	20	.894		
	Greenhouse-Geisser	17.886	13.392	1.335		
	Huynh-Feldt	17.886	14.700	1.217		
	Lower-bound	17.886	10.000	1.789		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
anxt	Sphericity Assumed	.099	2.199	.216
	Greenhouse-Geisser	.099	1.472	.179
	Huynh-Feldt	.099	1.616	.186
	Lower-bound	.099	1.099	.158
Error(anxt)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	anxt	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
anxt	Linear	1.293	1	1.293	.928	.358	.085
	Quadratic	.673	1	.673	1.702	.221	.145
Error(anxt)	Linear	13.929	10	1.393			
	Quadratic	3.956	10	.396			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	anxt	Noncent. Parameter	Observed Power[a]
anxt	Linear	.928	.141
	Quadratic	1.702	.219
Error(anxt)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	238.236	1	238.236	163.409	.000	.942
Error	14.579	10	1.458			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	163.409	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Anxiety

Estimates

Measure: MEASURE_1

anxt	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	3.030	.289	2.386	3.675
2	2.485	.217	2.001	2.969
3	2.545	.405	1.643	3.448

Pairwise Comparisons

Measure: MEASURE_1

(I) anxt	(J) anxt	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	.545	.239	.137	-.140	1.231
	3	.485	.503	1.000	-.960	1.929
2	1	-.545	.239	.137	-1.231	.140
	3	-.061	.421	1.000	-1.269	1.148
3	1	-.485	.503	1.000	-1.929	.960
	2	.061	.421	1.000	-1.148	1.269

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.348	2.402[b]	2.000	9.000	.146	.348
Wilks' lambda	.652	2.402[b]	2.000	9.000	.146	.348
Hotelling's trace	.534	2.402[b]	2.000	9.000	.146	.348
Roy's largest root	.534	2.402[b]	2.000	9.000	.146	.348

Each F tests the multivariate effect of anxt. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	4.803	.363
Wilks' lambda	4.803	.363
Hotelling's trace	4.803	.363
Roy's largest root	4.803	.363

Each F tests the multivariate effect of anxt. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

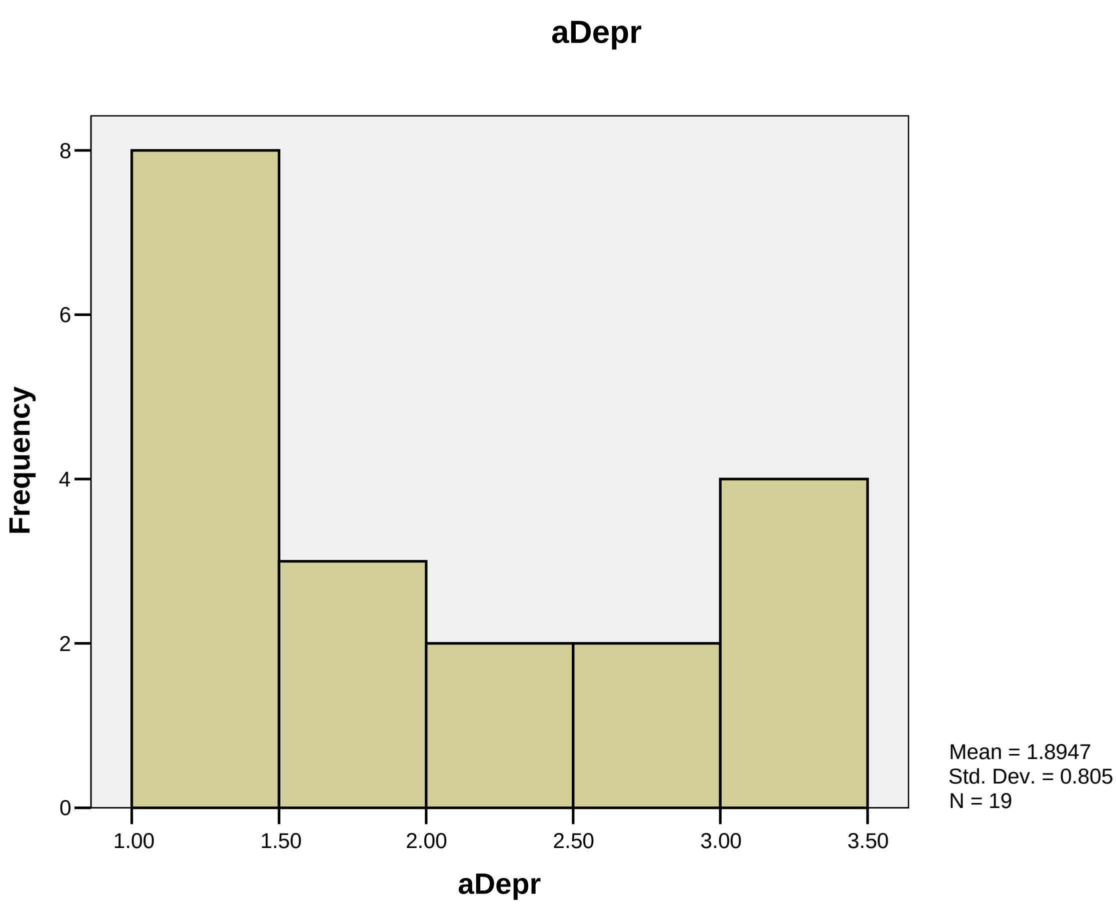
a. Computed using alpha = .05

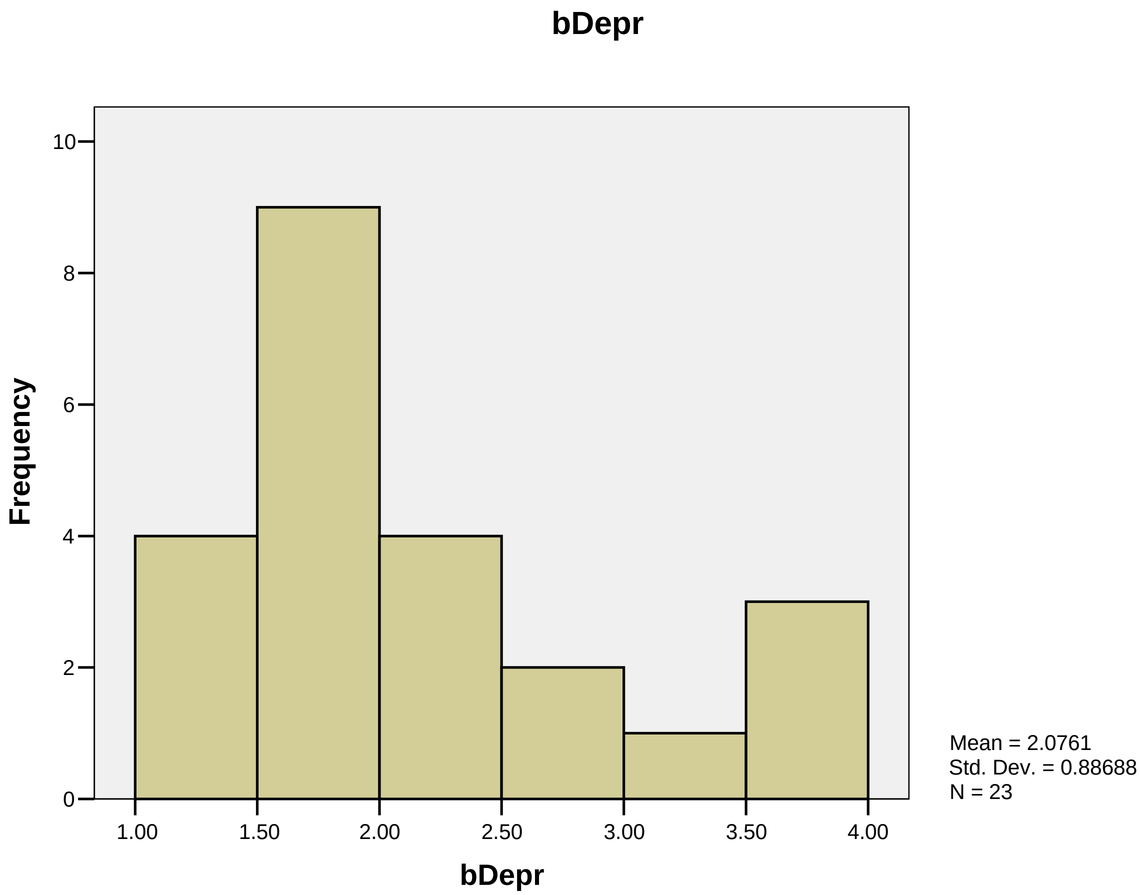
b. Exact statistic

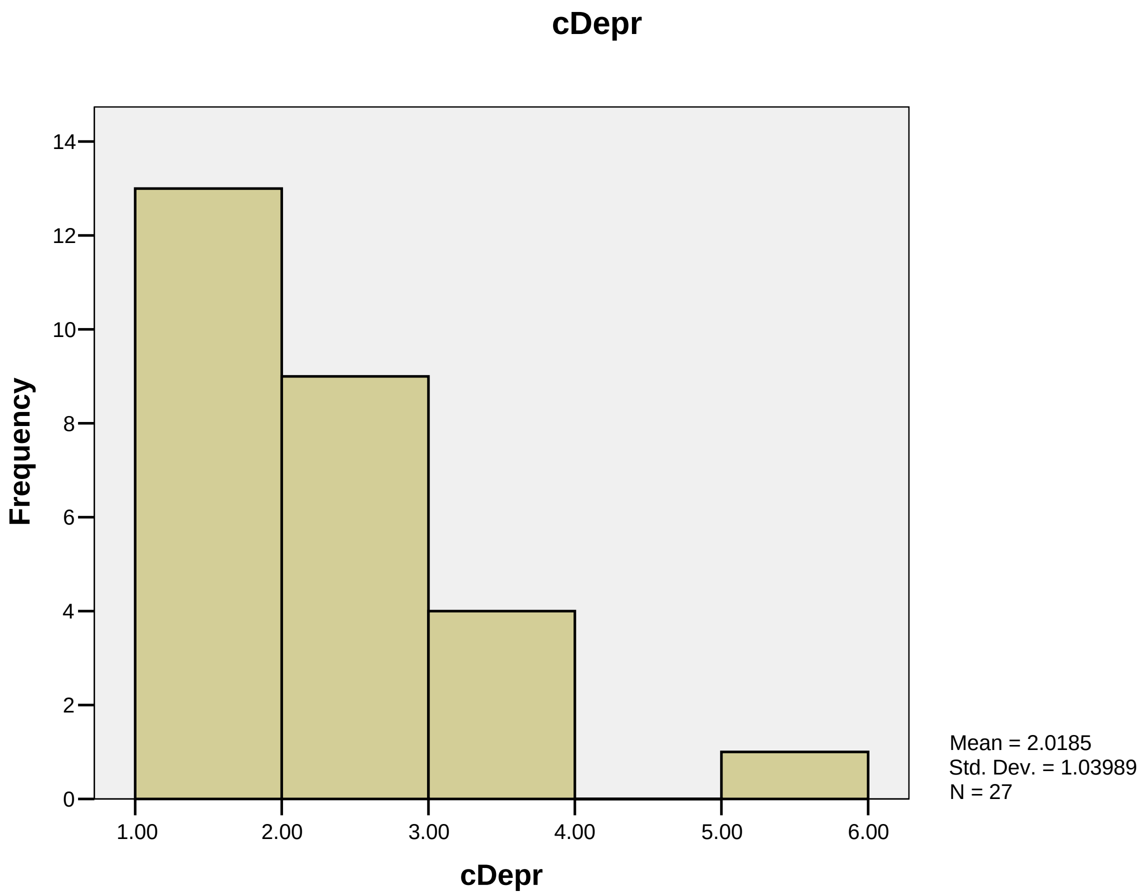
Statistics Depression

		aDepr	bDepr	cDepr
N	Valid	19	23	27
	Missing	20	16	12
Mean		1.8947	2.0761	2.0185
Std. Deviation		.80500	.88688	1.03989
Skewness		.504	1.057	1.820
Std. Error of Skewness		.524	.481	.448
Kurtosis		-1.405	.206	5.199
Std. Error of Kurtosis		1.014	.935	.872
Minimum		1.00	1.00	1.00
Maximum		3.25	4.00	5.75
Percentiles	25	1.2500	1.5000	1.2500
	50	1.7500	1.7500	2.0000
	75	2.7500	2.7500	2.5000

Histogram




bDepr
Frequency
10
8
6
4
2
0
1.00
1.50
2.00
2.50
3.00
3.50
4.00
bDepr
Mean = 2.0761
Std. Dev. = 0.88688
N = 23



General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Depression	Dependent Variable
Time 1	aDepr
Time 2	bDepr
Time 3	cDepr

Descriptive Statistics

	Mean	Std. Deviation	N
aDepr	1.7273	.74544	11
bDepr	1.7045	.49772	11
cDepr	1.8409	1.42422	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
depr	Pillai's Trace	.026	.121[b]	2.000	9.000	.888	.026
	Wilks' Lambda	.974	.121[b]	2.000	9.000	.888	.026
	Hotelling's Trace	.027	.121[b]	2.000	9.000	.888	.026
	Roy's Largest Root	.027	.121[b]	2.000	9.000	.888	.026

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
depr	Pillai's Trace	.242	.063
	Wilks' Lambda	.242	.063
	Hotelling's Trace	.242	.063
	Roy's Largest Root	.242	.063

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: depr

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
depr	.105	20.276	2	.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
depr	.528	.537	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: depr

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
depr	Sphericity Assumed	.117	2	.059	.086	.918
	Greenhouse-Geisser	.117	1.055	.111	.086	.788
	Huynh-Feldt	.117	1.074	.109	.086	.793
	Lower-bound	.117	1.000	.117	.086	.775
Error(depr)	Sphericity Assumed	13.633	20	.682		
	Greenhouse-Geisser	13.633	10.555	1.292		
	Huynh-Feldt	13.633	10.744	1.269		
	Lower-bound	13.633	10.000	1.363		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
depr	Sphericity Assumed	.009	.172	.061
	Greenhouse-Geisser	.009	.091	.058
	Huynh-Feldt	.009	.093	.058
	Lower-bound	.009	.086	.058
Error(depr)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	depr	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
depr	Linear	.071	1	.071	.065	.804	.006
	Quadratic	.046	1	.046	.174	.686	.017
Error(depr)	Linear	10.960	10	1.096			
	Quadratic	2.672	10	.267			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	depr	Noncent. Parameter	Observed Power[a]
depr	Linear	.065	.056
	Quadratic	.174	.067
Error(depr)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	101.939	1	101.939	69.414	.000	.874
Error	14.686	10	1.469			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	69.414	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Depression

Estimates

Measure: MEASURE_1

depr	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	1.727	.225	1.226	2.228
2	1.705	.150	1.370	2.039
3	1.841	.429	.884	2.798

Pairwise Comparisons

Measure: MEASURE_1

(I) depr	(J) depr	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	.023	.092	1.000	-.241	.287
	3	-.114	.446	1.000	-1.395	1.168
2	1	-.023	.092	1.000	-.287	.241
	3	-.136	.405	1.000	-1.299	1.026
3	1	.114	.446	1.000	-1.168	1.395
	2	.136	.405	1.000	-1.026	1.299

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.026	.121[b]	2.000	9.000	.888	.026
Wilks' lambda	.974	.121[b]	2.000	9.000	.888	.026
Hotelling's trace	.027	.121[b]	2.000	9.000	.888	.026
Roy's largest root	.027	.121[b]	2.000	9.000	.888	.026

Each F tests the multivariate effect of depr. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	.242	.063
Wilks' lambda	.242	.063
Hotelling's trace	.242	.063
Roy's largest root	.242	.063

Each F tests the multivariate effect of depr. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

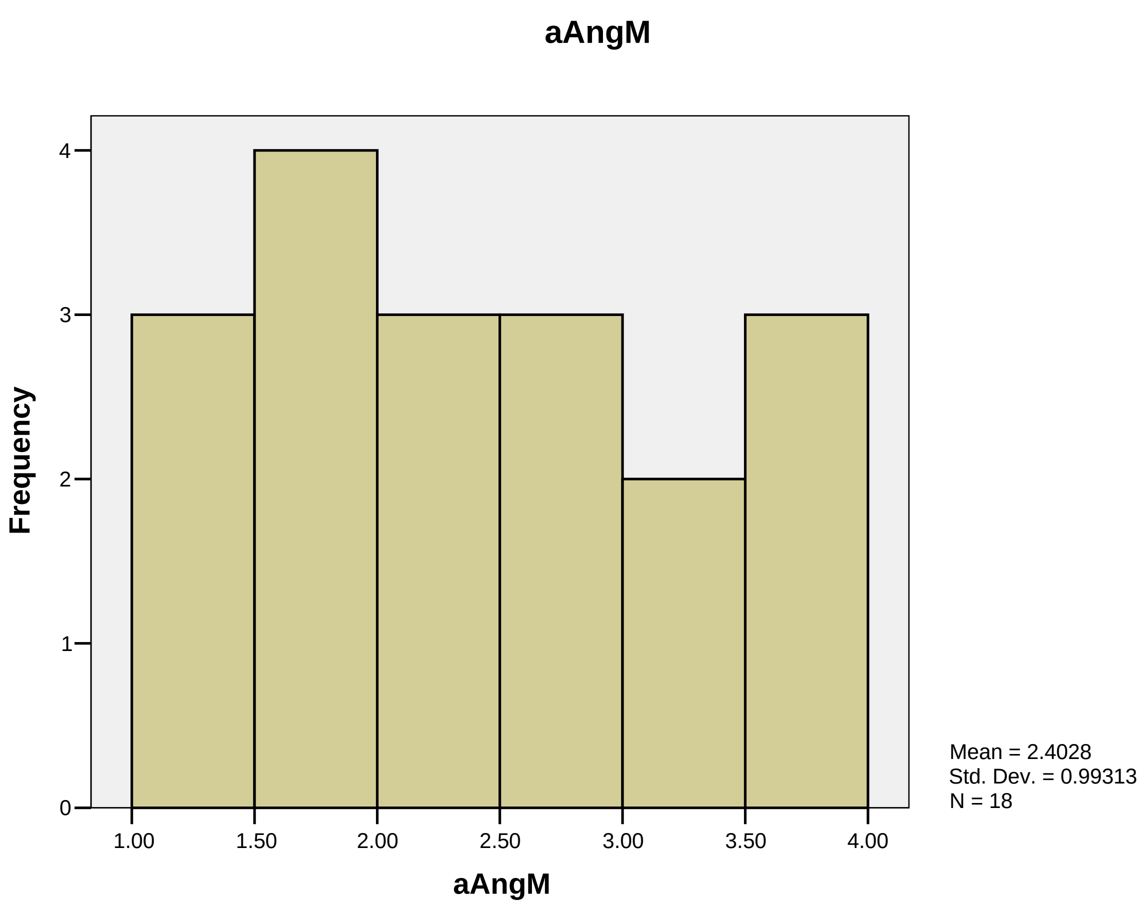
a. Computed using alpha = .05

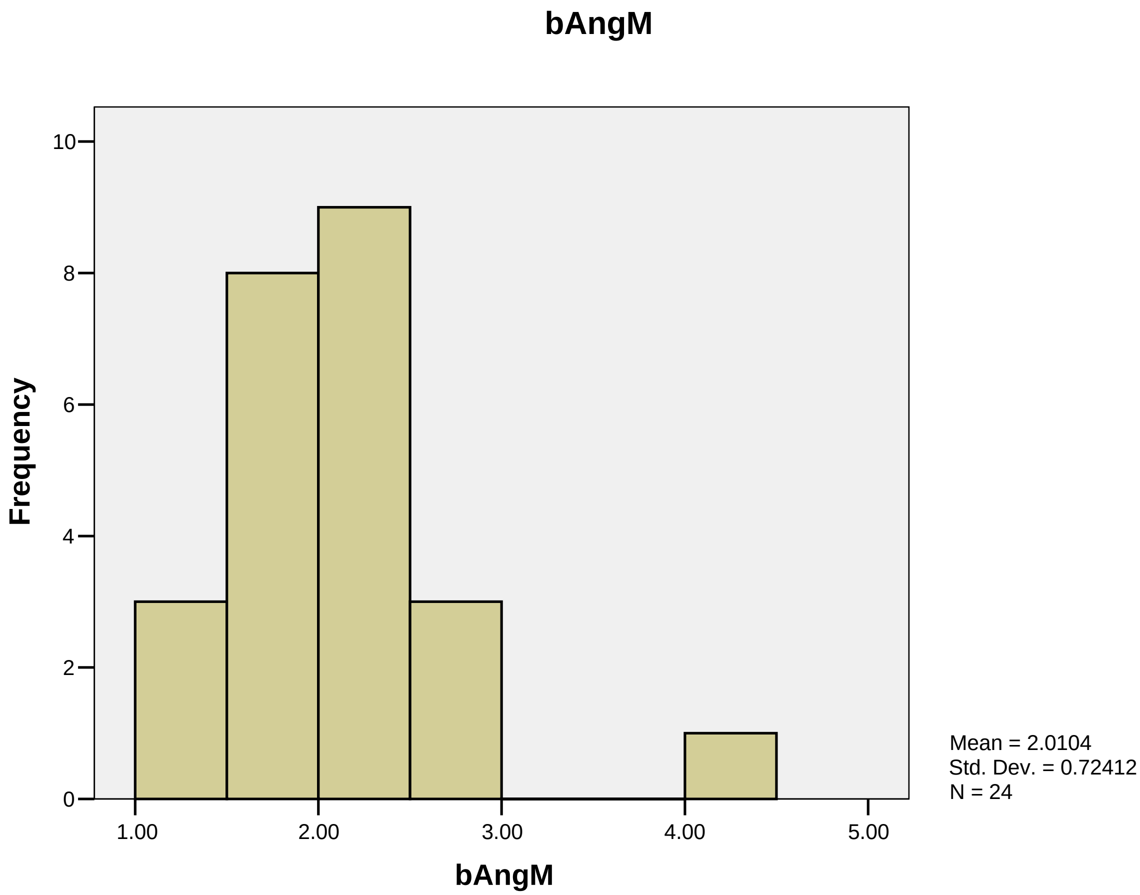
b. Exact statistic

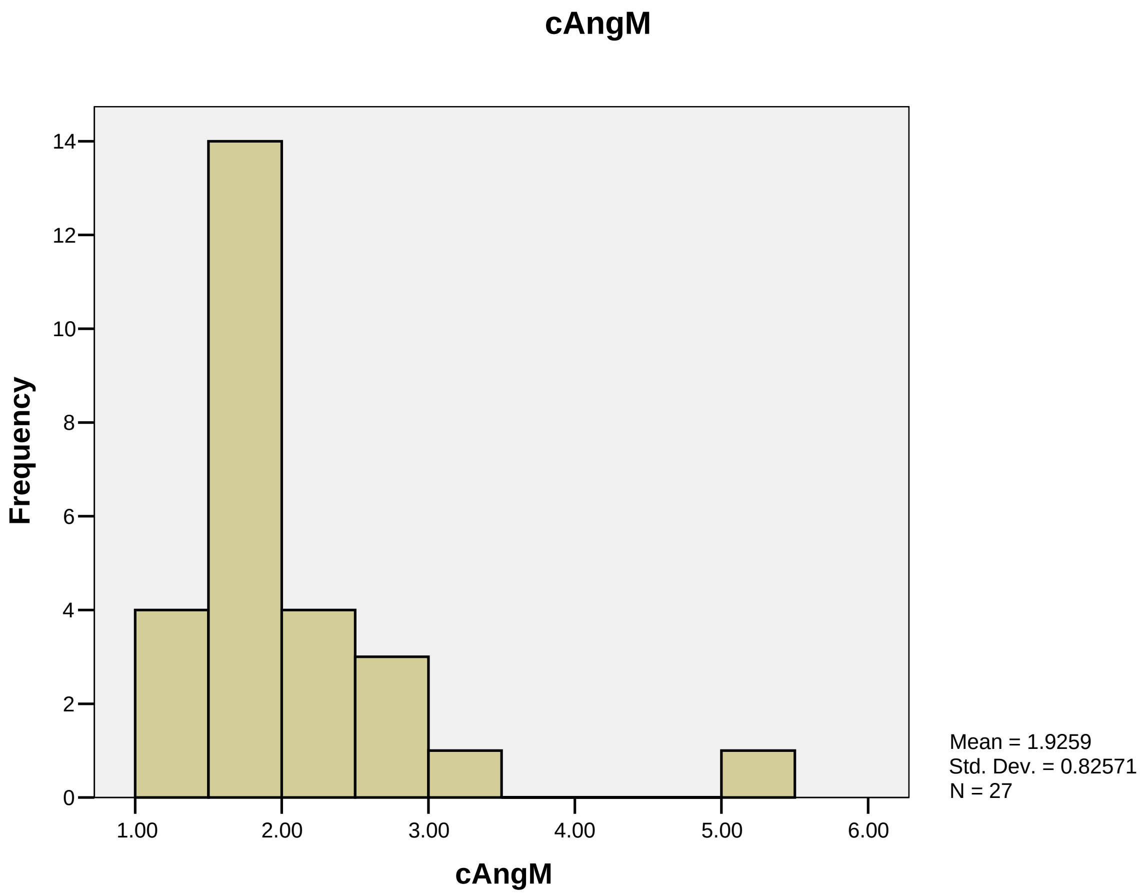
Statistics Anger Management

		aAngM	bAngM	cAngM
N	Valid	18	24	27
	Missing	21	15	12
Mean		2.4028	2.0104	1.9259
Std. Deviation		.99313	.72412	.82571
Skewness		.381	1.606	2.703
Std. Error of Skewness		.536	.472	.448
Kurtosis		-1.051	5.282	9.966
Std. Error of Kurtosis		1.038	.918	.872
Minimum		1.00	1.00	1.00
Maximum		4.00	4.50	5.25
Percentiles	25	1.5000	1.5625	1.5000
	50	2.2500	2.0000	1.7500
	75	3.2500	2.2500	2.0000

Histogram




bAngM
Frequency
10
8
6
4
2
0
1.00
2.00
3.00
4.00
5.00
bAngM
Mean = 2.0104
Std. Dev. = 0.72412
N = 24



General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Anger Management	Dependent Variable
Time 1	aAngM
Time 2	bAngM
Time 3	cAngM

Descriptive Statistics

	Mean	Std. Deviation	N
aAngM	2.3500	.91439	10
bAngM	1.8250	.56581	10
cAngM	1.9750	1.18702	10

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
angm	Pillai's Trace	.464	3.456[b]	2.000	8.000	.083	.464
	Wilks' Lambda	.536	3.456[b]	2.000	8.000	.083	.464
	Hotelling's Trace	.864	3.456[b]	2.000	8.000	.083	.464
	Roy's Largest Root	.864	3.456[b]	2.000	8.000	.083	.464

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
angm	Pillai's Trace	6.912	.480
	Wilks' Lambda	6.912	.480
	Hotelling's Trace	6.912	.480
	Roy's Largest Root	6.912	.480

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: angm

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
angm	.474	5.975	2	.050

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
angm	.655	.722	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: angm

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
angm	Sphericity Assumed	1.463	2	.731	1.498	.250
	Greenhouse-Geisser	1.463	1.310	1.116	1.498	.254
	Huynh-Feldt	1.463	1.444	1.013	1.498	.254
	Lower-bound	1.463	1.000	1.463	1.498	.252
Error(angm)	Sphericity Assumed	8.788	18	.488		
	Greenhouse-Geisser	8.788	11.794	.745		
	Huynh-Feldt	8.788	12.997	.676		
	Lower-bound	8.788	9.000	.976		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
angm	Sphericity Assumed	.143	2.996	.277
	Greenhouse-Geisser	.143	1.963	.222
	Huynh-Feldt	.143	2.163	.233
	Lower-bound	.143	1.498	.195
Error(angm)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	angm	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
angm	Linear	.703	1	.703	.849	.381	.086
	Quadratic	.759	1	.759	5.122	.050	.363
Error(angm)	Linear	7.453	9	.828			
	Quadratic	1.334	9	.148			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	angm	Noncent. Parameter	Observed Power[a]
angm	Linear	.849	.131
	Quadratic	5.122	.524
Error(angm)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	126.075	1	126.075	79.348	.000	.898
Error	14.300	9	1.589			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	79.348	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Anger Managment

Estimates

Measure: MEASURE_1

angm	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	2.350	.289	1.696	3.004
2	1.825	.179	1.420	2.230
3	1.975	.375	1.126	2.824

Pairwise Comparisons

Measure: MEASURE_1

(I) angm	(J) angm	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	.525	.216	.113	-.107	1.157
	3	.375	.407	1.000	-.819	1.569
2	1	-.525	.216	.113	-1.157	.107
	3	-.150	.284	1.000	-.984	.684
3	1	-.375	.407	1.000	-1.569	.819
	2	.150	.284	1.000	-.684	.984

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.464	3.456[b]	2.000	8.000	.083	.464
Wilks' lambda	.536	3.456[b]	2.000	8.000	.083	.464
Hotelling's trace	.864	3.456[b]	2.000	8.000	.083	.464
Roy's largest root	.864	3.456[b]	2.000	8.000	.083	.464

Each F tests the multivariate effect of angm. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	6.912	.480
Wilks' lambda	6.912	.480
Hotelling's trace	6.912	.480
Roy's largest root	6.912	.480

Each F tests the multivariate effect of angm. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

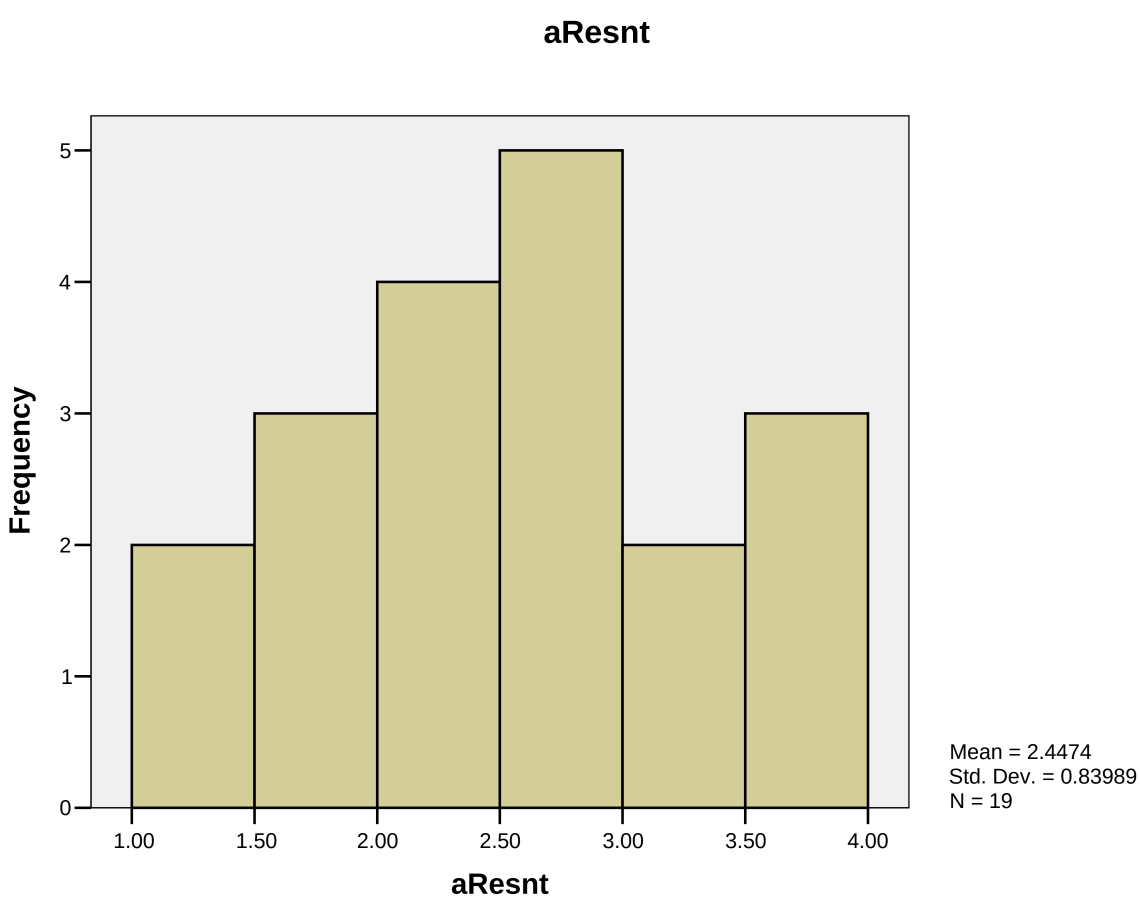
a. Computed using alpha = .05

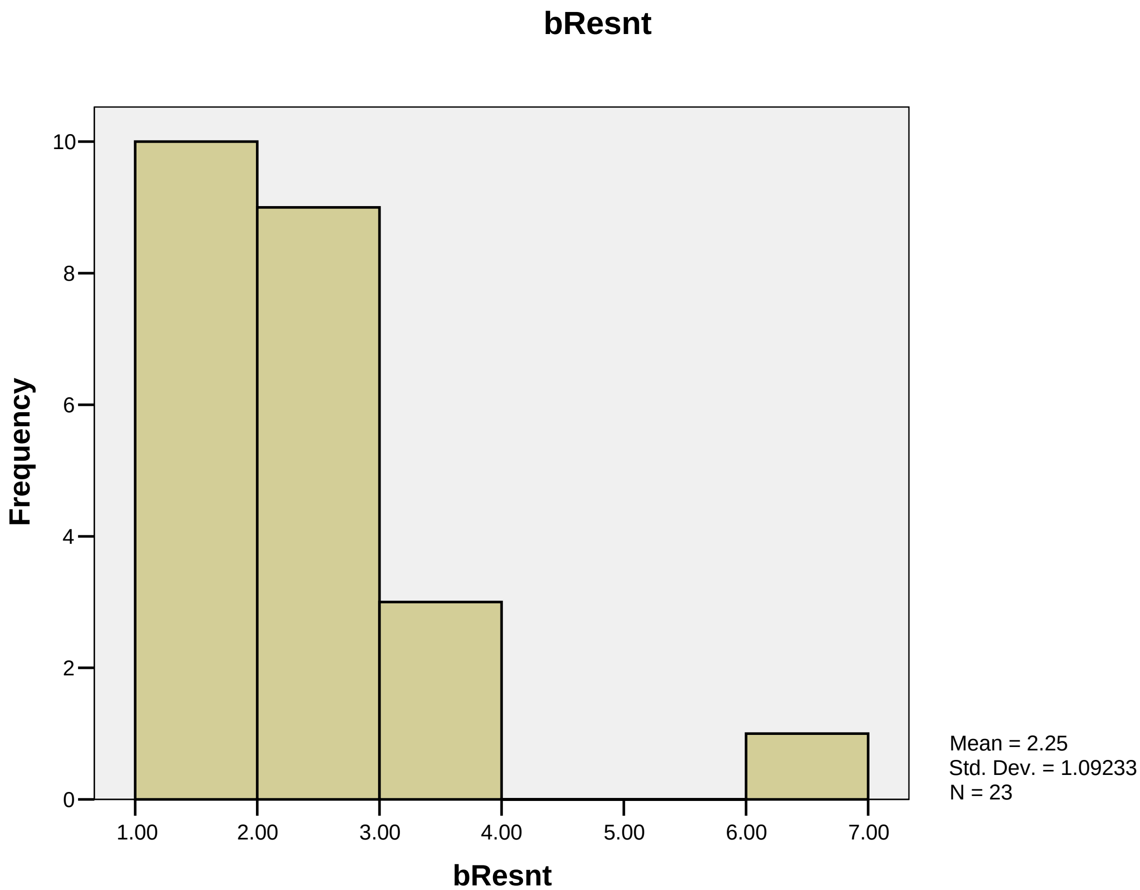
b. Exact statistic

Statistics Resentment

		aResnt	bResnt	cResnt
N	Valid	19	23	27
	Missing	20	16	12
Mean		2.4474	2.2500	2.0463
Std. Deviation		.83989	1.09233	.74691
Skewness		.273	2.335	1.797
Std. Error of Skewness		.524	.481	.448
Kurtosis		-.319	7.733	5.753
Std. Error of Kurtosis		1.014	.935	.872
Minimum		1.00	1.00	1.00
Maximum		4.00	6.25	4.75
Percentiles	25	1.7500	1.7500	1.7500
	50	2.5000	2.0000	2.0000
	75	3.0000	2.5000	2.2500

Histogram




bResnt
Frequency
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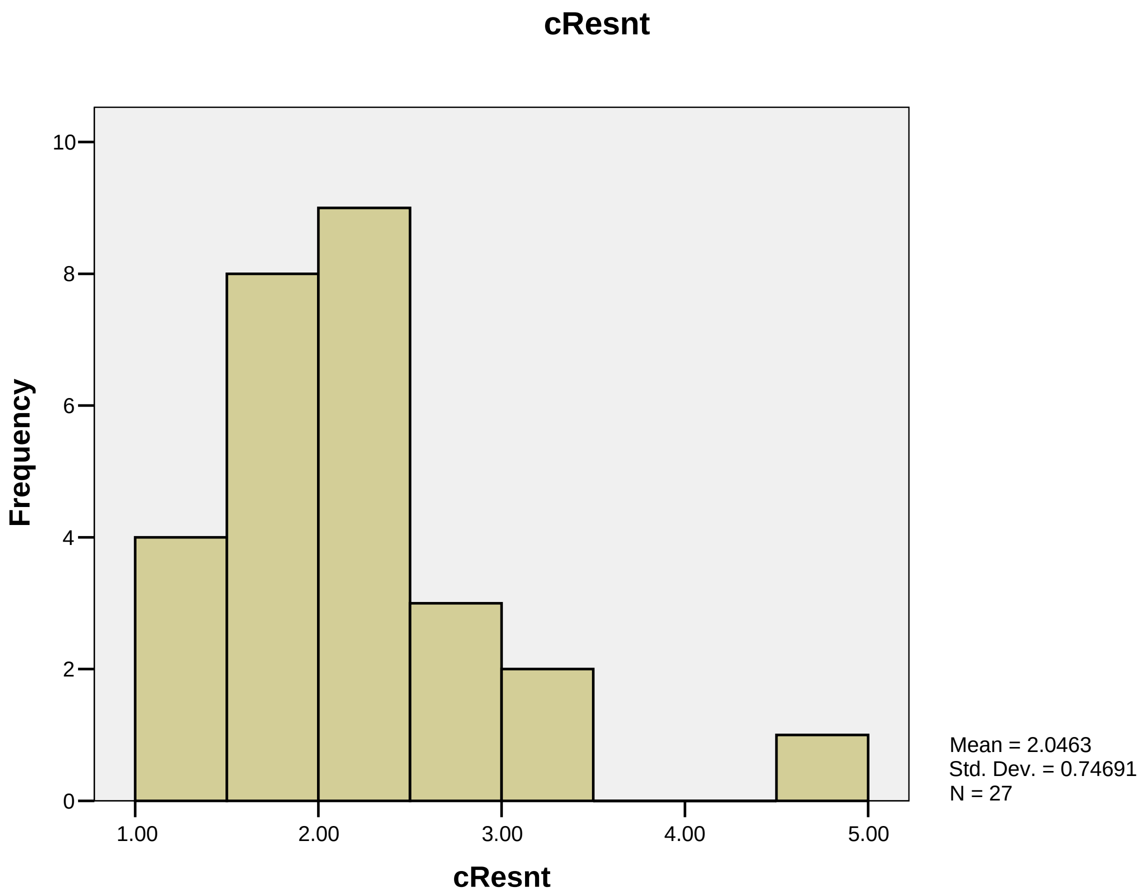
6
4
2
0
1.00
2.00
3.00
4.00
5.00
6.00
7.00
bResnt
Mean = 2.25
Std. Dev. = 1.09233
N = 23



General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Resentment	Dependent Variable
Time 1	aResnt
Time 2	bResnt
Time 3	cResnt

Descriptive Statistics

	Mean	Std. Deviation	N
aResnt	2.2273	.75378	11
bResnt	2.1364	.46588	11
cResnt	2.0000	1.03078	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
resnt	Pillai's Trace	.058	.277[b]	2.000	9.000	.764	.058
	Wilks' Lambda	.942	.277[b]	2.000	9.000	.764	.058
	Hotelling's Trace	.062	.277[b]	2.000	9.000	.764	.058
	Roy's Largest Root	.062	.277[b]	2.000	9.000	.764	.058

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
resnt	Pillai's Trace	.554	.082
	Wilks' Lambda	.554	.082
	Hotelling's Trace	.554	.082
	Roy's Largest Root	.554	.082

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: resnt

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
resnt	.773	2.323	2	.313

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
resnt	.815	.951	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: resnt

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
resnt	Sphericity Assumed	.288	2	.144	.395	.679
	Greenhouse-Geisser	.288	1.629	.177	.395	.639
	Huynh-Feldt	.288	1.902	.151	.395	.669
	Lower-bound	.288	1.000	.288	.395	.544
Error(resnt)	Sphericity Assumed	7.295	20	.365		
	Greenhouse-Geisser	7.295	16.293	.448		
	Huynh-Feldt	7.295	19.022	.384		
	Lower-bound	7.295	10.000	.730		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
resnt	Sphericity Assumed	.038	.789	.105
	Greenhouse-Geisser	.038	.643	.099
	Huynh-Feldt	.038	.751	.103
	Lower-bound	.038	.395	.088
Error(resnt)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	resnt	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
resnt	Linear	.284	1	.284	.587	.461	.055
	Quadratic	.004	1	.004	.015	.904	.002
Error(resnt)	Linear	4.841	10	.484			
	Quadratic	2.455	10	.245			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	resnt	Noncent. Parameter	Observed Power[a]
resnt	Linear	.587	.107
	Quadratic	.015	.051
Error(resnt)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	148.485	1	148.485	132.791	.000	.930
Error	11.182	10	1.118			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	132.791	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Resentment

Estimates

Measure: MEASURE_1

resnt	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	2.227	.227	1.721	2.734
2	2.136	.140	1.823	2.449
3	2.000	.311	1.308	2.692

Pairwise Comparisons

Measure: MEASURE_1

(I) resnt	(J) resnt	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	.091	.189	1.000	-.450	.632
	3	.227	.297	1.000	-.624	1.079
2	1	-.091	.189	1.000	-.632	.450
	3	.136	.275	1.000	-.652	.925
3	1	-.227	.297	1.000	-1.079	.624
	2	-.136	.275	1.000	-.925	.652

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.058	.277[b]	2.000	9.000	.764	.058
Wilks' lambda	.942	.277[b]	2.000	9.000	.764	.058
Hotelling's trace	.062	.277[b]	2.000	9.000	.764	.058
Roy's largest root	.062	.277[b]	2.000	9.000	.764	.058

Each F tests the multivariate effect of resnt. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	.554	.082
Wilks' lambda	.554	.082
Hotelling's trace	.554	.082
Roy's largest root	.554	.082

Each F tests the multivariate effect of resnt. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics Stress Symptoms

		aStrsS	bStrsS	cStrsS
N	Valid	19	24	27
	Missing	20	15	12
Mean		3.0263	2.7986	2.6296
Std. Deviation		1.21114	1.07898	.90739
Skewness		.337	.891	.455
Std. Error of Skewness		.524	.472	.448
Kurtosis		-.433	1.132	-.498
Std. Error of Kurtosis		1.014	.918	.872
Minimum		1.33	1.17	1.00
Maximum		5.33	5.67	4.50
Percentiles	25	1.8333	1.8750	2.0000
	50	3.0000	2.8333	2.3333
	75	3.8333	3.5000	3.0000

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Stress Symptoms	Dependent Variable
Time 1	aStrsS
Time 2	bStrsS
Time 3	cStrsS

Descriptive Statistics

	Mean	Std. Deviation	N
aStrsS	2.6515	.99010	11
bStrsS	2.5758	.80057	11
cStrsS	2.3182	.98165	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
strss	Pillai's Trace	.136	.711[b]	2.000	9.000	.517	.136
	Wilks' Lambda	.864	.711[b]	2.000	9.000	.517	.136
	Hotelling's Trace	.158	.711[b]	2.000	9.000	.517	.136
	Roy's Largest Root	.158	.711[b]	2.000	9.000	.517	.136

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
strss	Pillai's Trace	1.422	.135
	Wilks' Lambda	1.422	.135
	Hotelling's Trace	1.422	.135
	Roy's Largest Root	1.422	.135

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: strss

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
strss	.440	7.396	2	.025

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
strss	.641	.694	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: strss

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
strss	Sphericity Assumed	.672	2	.336	1.206	.320
	Greenhouse-Geisser	.672	1.282	.524	1.206	.308
	Huynh-Feldt	.672	1.388	.484	1.206	.311
	Lower-bound	.672	1.000	.672	1.206	.298
Error(strss)	Sphericity Assumed	5.569	20	.278		
	Greenhouse-Geisser	5.569	12.818	.434		
	Huynh-Feldt	5.569	13.879	.401		
	Lower-bound	5.569	10.000	.557		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
strss	Sphericity Assumed	.108	2.412	.233
	Greenhouse-Geisser	.108	1.546	.188
	Huynh-Feldt	.108	1.674	.195
	Lower-bound	.108	1.206	.169
Error(strss)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	strss	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
strss	Linear	.611	1	.611	1.279	.284	.113
	Quadratic	.061	1	.061	.766	.402	.071
Error(strss)	Linear	4.778	10	.478			
	Quadratic	.791	10	.079			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	strss	Noncent. Parameter	Observed Power[a]
strss	Linear	1.279	.176
	Quadratic	.766	.125
Error(strss)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	208.758	1	208.758	102.940	.000	.911
Error	20.279	10	2.028			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	102.940	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Stress Symptoms

Estimates

Measure: MEASURE_1

strss	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	2.652	.299	1.986	3.317
2	2.576	.241	2.038	3.114
3	2.318	.296	1.659	2.978

Pairwise Comparisons

Measure: MEASURE_1

(I) strss	(J) strss	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	.076	.151	1.000	-.359	.510
	3	.333	.295	.853	-.513	1.179
2	1	-.076	.151	1.000	-.510	.359
	3	.258	.205	.714	-.331	.846
3	1	-.333	.295	.853	-1.179	.513
	2	-.258	.205	.714	-.846	.331

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.136	.711[b]	2.000	9.000	.517	.136
Wilks' lambda	.864	.711[b]	2.000	9.000	.517	.136
Hotelling's trace	.158	.711[b]	2.000	9.000	.517	.136
Roy's largest root	.158	.711[b]	2.000	9.000	.517	.136

Each F tests the multivariate effect of strss. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	1.422	.135
Wilks' lambda	1.422	.135
Hotelling's trace	1.422	.135
Roy's largest root	1.422	.135

Each F tests the multivariate effect of strss. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics General Health

		aGenH	bGenH	cGenH
N	Valid	15	22	27
	Missing	24	17	12
Mean		5.7333	5.2727	4.6481
Std. Deviation		2.14532	1.67423	1.88013
Skewness		-.953	-.392	-.114
Std. Error of Skewness		.580	.491	.448
Kurtosis		-.350	-.443	-.430
Std. Error of Kurtosis		1.121	.953	.872
Minimum		1.50	2.00	1.00
Maximum		8.00	8.50	8.50
Percentiles	25	4.0000	3.8750	3.5000
	50	6.5000	5.7500	4.5000
	75	7.5000	6.5000	6.0000

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

genh	Dependent Variable
1	aGenH
2	bGenH
3	cGenH

Descriptive Statistics

	Mean	Std. Deviation	N
aGenH	5.6000	2.17051	10
bGenH	5.3500	1.68408	10
cGenH	4.3500	2.42728	10

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
genh	Pillai's Trace	.312	1.814[b]	2.000	8.000	.224	.312
	Wilks' Lambda	.688	1.814[b]	2.000	8.000	.224	.312
	Hotelling's Trace	.454	1.814[b]	2.000	8.000	.224	.312
	Roy's Largest Root	.454	1.814[b]	2.000	8.000	.224	.312

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
genh	Pillai's Trace	3.628	.274
	Wilks' Lambda	3.628	.274
	Hotelling's Trace	3.628	.274
	Roy's Largest Root	3.628	.274

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: genh

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
genh	.785	1.934	2	.380

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
genh	.823	.983	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: genh

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
genh	Sphericity Assumed	8.750	2	4.375	2.962	.077
	Greenhouse-Geisser	8.750	1.646	5.315	2.962	.090
	Huynh-Feldt	8.750	1.967	4.448	2.962	.078
	Lower-bound	8.750	1.000	8.750	2.962	.119
Error(genh)	Sphericity Assumed	26.583	18	1.477		
	Greenhouse-Geisser	26.583	14.818	1.794		
	Huynh-Feldt	26.583	17.703	1.502		
	Lower-bound	26.583	9.000	2.954		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
genh	Sphericity Assumed	.248	5.925	.504
	Greenhouse-Geisser	.248	4.877	.450
	Huynh-Feldt	.248	5.827	.499
	Lower-bound	.248	2.962	.337
Error(genh)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	genh	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
genh	Linear	7.813	1	7.813	4.004	.076	.308
	Quadratic	.938	1	.938	.935	.359	.094
Error(genh)	Linear	17.563	9	1.951			
	Quadratic	9.021	9	1.002			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	genh	Noncent. Parameter	Observed Power[a]
genh	Linear	4.004	.432
	Quadratic	.935	.140
Error(genh)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	780.300	1	780.300	74.419	.000	.892
Error	94.367	9	10.485			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	74.419	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

General Health

Estimates

Measure: MEASURE_1

genh	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	5.600	.686	4.047	7.153
2	5.350	.533	4.145	6.555
3	4.350	.768	2.614	6.086

Pairwise Comparisons

Measure: MEASURE_1

(I) genh	(J) genh	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	.250	.403	1.000	-.932	1.432
	3	1.250	.625	.229	-.583	3.083
2	1	-.250	.403	1.000	-1.432	.932
	3	1.000	.577	.352	-.694	2.694
3	1	-1.250	.625	.229	-3.083	.583
	2	-1.000	.577	.352	-2.694	.694

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.312	1.814[b]	2.000	8.000	.224	.312
Wilks' lambda	.688	1.814[b]	2.000	8.000	.224	.312
Hotelling's trace	.454	1.814[b]	2.000	8.000	.224	.312
Roy's largest root	.454	1.814[b]	2.000	8.000	.224	.312

Each F tests the multivariate effect of genh. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	3.628	.274
Wilks' lambda	3.628	.274
Hotelling's trace	3.628	.274
Roy's largest root	3.628	.274

Each F tests the multivariate effect of genh. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics Work Attitude

		aWrkA	bWrkA	cWrkA
N	Valid	19	23	27
	Missing	20	16	12
Mean		5.6491	6.1304	6.3333
Std. Deviation		1.22964	.73676	.48920
Skewness		-1.096	-1.293	.079
Std. Error of Skewness		.524	.481	.448
Kurtosis		.412	1.546	-.915
Std. Error of Kurtosis		1.014	.935	.872
Minimum		3.00	4.33	5.33
Maximum		7.00	7.00	7.00
Percentiles	25	4.6667	6.0000	6.0000
	50	6.0000	6.3333	6.3333
	75	6.3333	6.6667	7.0000

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Work Attitude	Dependent Variable
Time 1	aWrkA
Time 2	bWrkA
Time 3	cWrkA

Descriptive Statistics

	Mean	Std. Deviation	N
aWrkA	6.3030	.67420	11
bWrkA	6.5152	.40452	11
cWrkA	6.6061	.44267	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
wrka	Pillai's Trace	.336	2.281[b]	2.000	9.000	.158	.336
	Wilks' Lambda	.664	2.281[b]	2.000	9.000	.158	.336
	Hotelling's Trace	.507	2.281[b]	2.000	9.000	.158	.336
	Roy's Largest Root	.507	2.281[b]	2.000	9.000	.158	.336

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
wrka	Pillai's Trace	4.562	.347
	Wilks' Lambda	4.562	.347
	Hotelling's Trace	4.562	.347
	Roy's Largest Root	4.562	.347

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: wrka

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
wrka	.669	3.615	2	.164

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
wrka	.751	.855	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: wrka

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
wrka	Sphericity Assumed	.532	2	.266	3.292	.058
	Greenhouse-Geisser	.532	1.503	.354	3.292	.076
	Huynh-Feldt	.532	1.710	.311	3.292	.068
	Lower-bound	.532	1.000	.532	3.292	.100
Error(wrka)	Sphericity Assumed	1.616	20	.081		
	Greenhouse-Geisser	1.616	15.028	.108		
	Huynh-Feldt	1.616	17.101	.095		
	Lower-bound	1.616	10.000	.162		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
wrka	Sphericity Assumed	.248	6.583	.557
	Greenhouse-Geisser	.248	4.947	.473
	Huynh-Feldt	.248	5.629	.510
	Lower-bound	.248	3.292	.375
Error(wrka)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	wrka	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
wrka	Linear	.505	1	.505	4.808	.053	.325
	Quadratic	.027	1	.027	.476	.506	.045
Error(wrka)	Linear	1.051	10	.105			
	Quadratic	.566	10	.057			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	wrka	Noncent. Parameter	Observed Power[a]
wrka	Linear	4.808	.508
	Quadratic	.476	.096
Error(wrka)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1383.438	1	1383.438	2120.129	.000	.995
Error	6.525	10	.653			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	2120.129	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Work Attitude

Estimates

Measure: MEASURE_1

wrka	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	6.303	.203	5.850	6.756
2	6.515	.122	6.243	6.787
3	6.606	.133	6.309	6.903

Pairwise Comparisons

Measure: MEASURE_1

(I) wrka	(J) wrka	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	-.212	.137	.457	-.605	.181
	3	-.303	.138	.159	-.700	.094
2	1	.212	.137	.457	-.181	.605
	3	-.091	.079	.830	-.318	.136
3	1	.303	.138	.159	-.094	.700
	2	.091	.079	.830	-.136	.318

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.336	2.281[b]	2.000	9.000	.158	.336
Wilks' lambda	.664	2.281[b]	2.000	9.000	.158	.336
Hotelling's trace	.507	2.281[b]	2.000	9.000	.158	.336
Roy's largest root	.507	2.281[b]	2.000	9.000	.158	.336

Each F tests the multivariate effect of wrka. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	4.562	.347
Wilks' lambda	4.562	.347
Hotelling's trace	4.562	.347
Roy's largest root	4.562	.347

Each F tests the multivariate effect of wrka. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

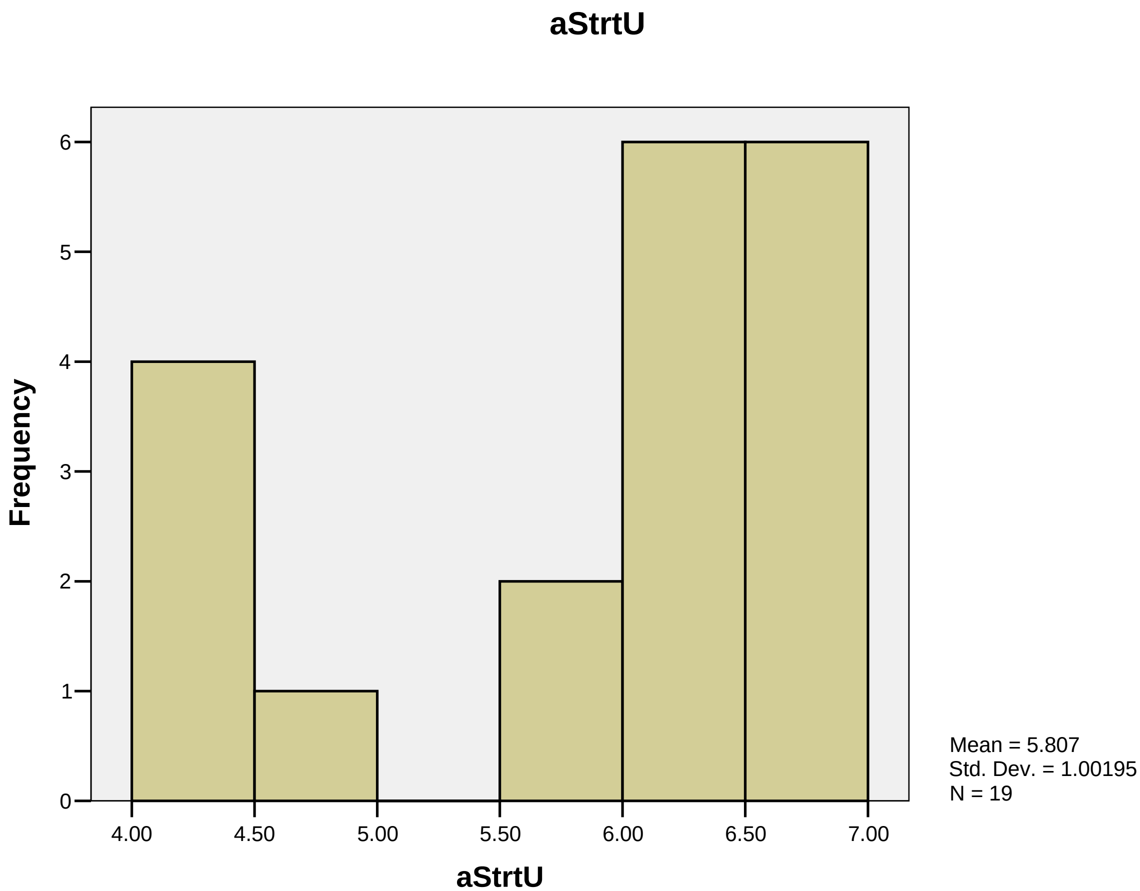
b. Exact statistic

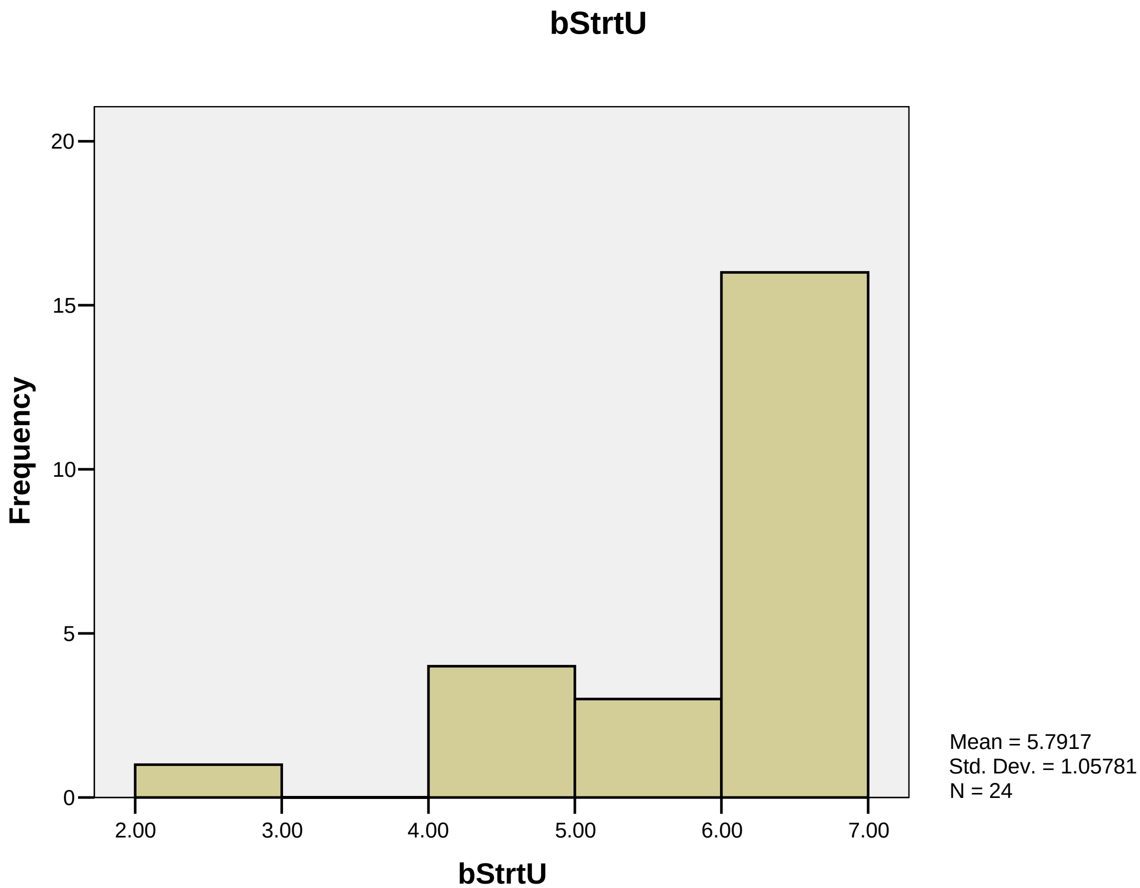
Statistics Strategic Understanding

		aStrtU	bStrtU	cStrtU
N	Valid	19	24	27
	Missing	20	15	12
Mean		5.8070	5.7917	6.1605
Std. Deviation		1.00195	1.05781	.66904
Skewness		-.606	-1.675	-.541
Std. Error of Skewness		.524	.472	.448
Kurtosis		-.932	3.783	.558
Std. Error of Kurtosis		1.014	.918	.872
Minimum		4.00	2.33	4.33
Maximum		7.00	7.00	7.00
Percentiles	25	4.6667	5.3333	5.6667
	50	6.0000	6.0000	6.0000
	75	6.6667	6.3333	7.0000

aStrtU

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4.00	1	2.6	5.3	5.3
	4.33	3	7.7	15.8	21.1
	4.67	1	2.6	5.3	26.3
	5.67	2	5.1	10.5	36.8
	6.00	5	12.8	26.3	63.2
	6.33	1	2.6	5.3	68.4
	6.67	3	7.7	15.8	84.2
	7.00	3	7.7	15.8	100.0
	Total	19	48.7	100.0	
Missing	System	20	51.3		
Total		39	100.0		


aStrtU
Frequency
6
5
4
3
2
1
0
4.00
4.50
5.00
5.50
6.00
6.50
7.00
aStrtU
Mean = 5.807
Std. Dev. = 1.00195
N = 19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Frequency
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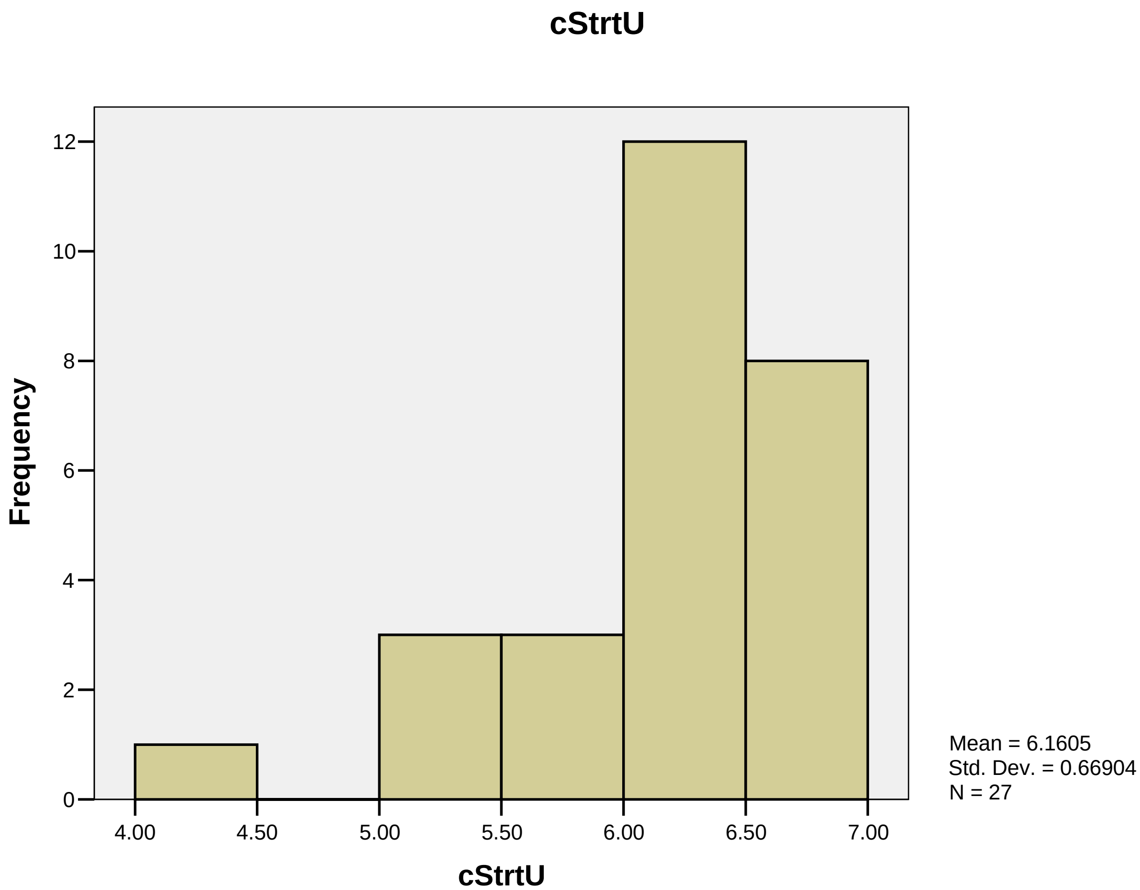
15
10
5
0
2.00
3.00
4.00
5.00
6.00
7.00
bStrtU
Mean = 5.7917
Std. Dev. = 1.05781
N = 24



General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Strategic Understanding	Dependent Variable
Time 1	aStrtU
Time 2	bStrtU
Time 3	cStrtU

Descriptive Statistics

	Mean	Std. Deviation	N
aStrtU	6.2121	.83364	11
bStrtU	6.2424	.73168	11
cStrtU	6.6667	.47140	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
strtun	Pillai's Trace	.411	3.144[b]	2.000	9.000	.092	.411
	Wilks' Lambda	.589	3.144[b]	2.000	9.000	.092	.411
	Hotelling's Trace	.699	3.144[b]	2.000	9.000	.092	.411
	Roy's Largest Root	.699	3.144[b]	2.000	9.000	.092	.411

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
strtun	Pillai's Trace	6.288	.459
	Wilks' Lambda	6.288	.459
	Hotelling's Trace	6.288	.459
	Roy's Largest Root	6.288	.459

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: strtun

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
strtun	.866	1.290	2	.525

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
strtun	.882	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: strtun

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
strtun	Sphericity Assumed	1.421	2	.710	4.587	.023
	Greenhouse-Geisser	1.421	1.764	.805	4.587	.028
	Huynh-Feldt	1.421	2.000	.710	4.587	.023
	Lower-bound	1.421	1.000	1.421	4.587	.058
Error(strtun)	Sphericity Assumed	3.098	20	.155		
	Greenhouse-Geisser	3.098	17.644	.176		
	Huynh-Feldt	3.098	20.000	.155		
	Lower-bound	3.098	10.000	.310		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
strtun	Sphericity Assumed	.314	9.174	.710
	Greenhouse-Geisser	.314	8.093	.667
	Huynh-Feldt	.314	9.174	.710
	Lower-bound	.314	4.587	.490
Error(strtun)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	strtun	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
strtun	Linear	1.136	1	1.136	5.597	.040	.359
	Quadratic	.285	1	.285	2.666	.134	.210
Error(strtun)	Linear	2.030	10	.203			
	Quadratic	1.067	10	.107			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	strtun	Noncent. Parameter	Observed Power[a]
strtun	Linear	5.597	.570
	Quadratic	2.666	.315
Error(strtun)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1340.609	1	1340.609	1173.132	.000	.992
Error	11.428	10	1.143			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	1173.132	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Strategic Understanding

Estimates

Measure: MEASURE_1

strtun	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	6.212	.251	5.652	6.772
2	6.242	.221	5.751	6.734
3	6.667	.142	6.350	6.983

Pairwise Comparisons

Measure: MEASURE_1

(I) strtun	(J) strtun	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-.030	.138	1.000	-.427	.366
	3	-.455	.192	.119	-1.006	.097
2	1	.030	.138	1.000	-.366	.427
	3	-.424	.169	.092	-.908	.060
3	1	.455	.192	.119	-.097	1.006
	2	.424	.169	.092	-.060	.908

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.411	3.144[b]	2.000	9.000	.092	.411
Wilks' lambda	.589	3.144[b]	2.000	9.000	.092	.411
Hotelling's trace	.699	3.144[b]	2.000	9.000	.092	.411
Roy's largest root	.699	3.144[b]	2.000	9.000	.092	.411

Each F tests the multivariate effect of strtun. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	6.288	.459
Wilks' lambda	6.288	.459
Hotelling's trace	6.288	.459
Roy's largest root	6.288	.459

Each F tests the multivariate effect of strtun. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics

		aConOrg	bConOrg	cConOrg
N	Valid	19	23	27
	Missing	20	16	12
Mean		5.4561	5.6377	5.6296
Std. Deviation		1.01963	.84634	.83887
Skewness		-1.458	-1.098	-.756
Std. Error of Skewness		.524	.481	.448
Kurtosis		1.973	1.456	1.071
Std. Error of Kurtosis		1.014	.935	.872
Minimum		2.67	3.33	3.33
Maximum		6.67	7.00	7.00
Percentiles	25	5.0000	5.0000	5.3333
	50	5.6667	6.0000	5.6667
	75	6.0000	6.0000	6.3333

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Confidence in the Organization	Dependent Variable
Time 1	aConOrg
Time 2	bConOrg
Time 3	cConOrg

Descriptive Statistics

	Mean	Std. Deviation	N
aConOrg	5.7576	1.07591	11
bConOrg	5.7879	.96922	11
cConOrg	6.2121	.67120	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
conorg	Pillai's Trace	.475	4.075[b]	2.000	9.000	.055	.475
	Wilks' Lambda	.525	4.075[b]	2.000	9.000	.055	.475
	Hotelling's Trace	.906	4.075[b]	2.000	9.000	.055	.475
	Roy's Largest Root	.906	4.075[b]	2.000	9.000	.055	.475

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
conorg	Pillai's Trace	8.150	.568
	Wilks' Lambda	8.150	.568
	Hotelling's Trace	8.150	.568
	Roy's Largest Root	8.150	.568

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: conorg

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
conorg	.803	1.970	2	.373

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
conorg	.836	.984	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: conorg

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
conorg	Sphericity Assumed	1.421	2	.710	4.280	.028
	Greenhouse-Geisser	1.421	1.671	.850	4.280	.037
	Huynh-Feldt	1.421	1.967	.722	4.280	.029
	Lower-bound	1.421	1.000	1.421	4.280	.065
Error(conorg)	Sphericity Assumed	3.320	20	.166		
	Greenhouse-Geisser	3.320	16.714	.199		
	Huynh-Feldt	3.320	19.673	.169		
	Lower-bound	3.320	10.000	.332		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
conorg	Sphericity Assumed	.300	8.560	.678
	Greenhouse-Geisser	.300	7.153	.618
	Huynh-Feldt	.300	8.420	.673
	Lower-bound	.300	4.280	.464
Error(conorg)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	conorg	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
conorg	Linear	1.136	1	1.136	4.808	.053	.325
	Quadratic	.285	1	.285	2.975	.115	.229
Error(conorg)	Linear	2.364	10	.236			
	Quadratic	.956	10	.096			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	conorg	Noncent. Parameter	Observed Power[a]
conorg	Linear	4.808	.508
	Quadratic	2.975	.345
Error(conorg)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1156.215	1	1156.215	521.878	.000	.981
Error	22.155	10	2.215			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	521.878	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Confidence in the Organization

Estimates

Measure: MEASURE_1

conorg	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	5.758	.324	5.035	6.480
2	5.788	.292	5.137	6.439
3	6.212	.202	5.761	6.663

Pairwise Comparisons

Measure: MEASURE_1

(I) conorg	(J) conorg	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-.030	.165	1.000	-.503	.443
	3	-.455	.207	.159	-1.050	.140
2	1	.030	.165	1.000	-.443	.503
	3	-.424*	.143	.042	-.834	-.014
3	1	.455	.207	.159	-.140	1.050
	2	.424*	.143	.042	.014	.834

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.475	4.075[b]	2.000	9.000	.055	.475
Wilks' lambda	.525	4.075[b]	2.000	9.000	.055	.475
Hotelling's trace	.906	4.075[b]	2.000	9.000	.055	.475
Roy's largest root	.906	4.075[b]	2.000	9.000	.055	.475

Each F tests the multivariate effect of conorg. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	8.150	.568
Wilks' lambda	8.150	.568
Hotelling's trace	8.150	.568
Roy's largest root	8.150	.568

Each F tests the multivariate effect of conorg. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics Manager Support

		aMgrSp	bMgrSp	cMgrSp
N	Valid	18	23	27
	Missing	21	16	12
Mean		5.5139	5.8261	6.0185
Std. Deviation		1.51578	.94579	.74655
Skewness		-1.420	-1.450	-.835
Std. Error of Skewness		.536	.481	.448
Kurtosis		.870	2.366	.444
Std. Error of Kurtosis		1.038	.935	.872
Minimum		2.25	3.00	4.00
Maximum		7.00	7.00	7.00
Percentiles	25	5.0625	5.2500	5.7500
	50	6.0000	6.0000	6.0000
	75	6.5625	6.5000	6.7500

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Manager Support	Dependent Variable
Time 1	aMgrSp
Time 2	bMgrSp
Time 3	cMgrSp

Descriptive Statistics

	Mean	Std. Deviation	N
aMgrSp	6.2500	.69821	11
bMgrSp	6.1136	.75302	11
cMgrSp	6.6136	.35992	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
mgrsp	Pillai's Trace	.408	3.104[b]	2.000	9.000	.094	.408
	Wilks' Lambda	.592	3.104[b]	2.000	9.000	.094	.408
	Hotelling's Trace	.690	3.104[b]	2.000	9.000	.094	.408
	Roy's Largest Root	.690	3.104[b]	2.000	9.000	.094	.408

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
mgrsp	Pillai's Trace	6.207	.454
	Wilks' Lambda	6.207	.454
	Hotelling's Trace	6.207	.454
	Roy's Largest Root	6.207	.454

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: mgrsp

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
mgrsp	.808	1.915	2	.384

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
mgrsp	.839	.989	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: mgrsp

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
mgrsp	Sphericity Assumed	1.470	2	.735	2.437	.113
	Greenhouse-Geisser	1.470	1.678	.876	2.437	.124
	Huynh-Feldt	1.470	1.978	.743	2.437	.114
	Lower-bound	1.470	1.000	1.470	2.437	.150
Error(mgrsp)	Sphericity Assumed	6.030	20	.302		
	Greenhouse-Geisser	6.030	16.783	.359		
	Huynh-Feldt	6.030	19.781	.305		
	Lower-bound	6.030	10.000	.603		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
mgrsp	Sphericity Assumed	.196	4.874	.433
	Greenhouse-Geisser	.196	4.090	.391
	Huynh-Feldt	.196	4.821	.430
	Lower-bound	.196	2.437	.293
Error(mgrsp)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	mgrsp	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
mgrsp	Linear	.727	1	.727	4.103	.070	.291
	Quadratic	.742	1	.742	1.744	.216	.148
Error(mgrsp)	Linear	1.773	10	.177			
	Quadratic	4.258	10	.426			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	mgrsp	Noncent. Parameter	Observed Power[a]
mgrsp	Linear	4.103	.449
	Quadratic	1.744	.223
Error(mgrsp)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1320.502	1	1320.502	2272.572	.000	.996
Error	5.811	10	.581			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	2272.572	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Manager Support

Estimates

Measure: MEASURE_1

mgrsp	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	6.250	.211	5.781	6.719
2	6.114	.227	5.608	6.620
3	6.614	.109	6.372	6.855

Pairwise Comparisons

Measure: MEASURE_1

(I) mgrsp	(J) mgrsp	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	.136	.270	1.000	-.640	.913
	3	-.364	.180	.211	-.879	.152
2	1	-.136	.270	1.000	-.913	.640
	3	-.500	.243	.200	-1.198	.198
3	1	.364	.180	.211	-.152	.879
	2	.500	.243	.200	-.198	1.198

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.408	3.104[b]	2.000	9.000	.094	.408
Wilks' lambda	.592	3.104[b]	2.000	9.000	.094	.408
Hotelling's trace	.690	3.104[b]	2.000	9.000	.094	.408
Roy's largest root	.690	3.104[b]	2.000	9.000	.094	.408

Each F tests the multivariate effect of mgrsp. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	6.207	.454
Wilks' lambda	6.207	.454
Hotelling's trace	6.207	.454
Roy's largest root	6.207	.454

Each F tests the multivariate effect of mgrsp. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics Goal Clarity

		aGoalCl	bGoalCl	cGoalCl
N	Valid	19	24	27
	Missing	20	15	12
Mean		5.5965	5.9306	6.0247
Std. Deviation		1.40361	.94270	.75632
Skewness		-1.188	-1.555	-.995
Std. Error of Skewness		.524	.472	.448
Kurtosis		.374	2.114	1.178
Std. Error of Kurtosis		1.014	.918	.872
Minimum		2.67	3.33	4.00
Maximum		7.00	7.00	7.00
Percentiles	25	5.3333	5.6667	5.6667
	50	6.0000	6.0000	6.0000
	75	6.6667	6.6667	6.6667

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Goal Clarity	Dependent Variable
Time 1	aGoalCl
Time 2	bGoalCl
Time 3	cGoalCl

Descriptive Statistics

	Mean	Std. Deviation	N
aGoalCl	6.2727	.87962	11
bGoalCl	6.2424	.85753	11
cGoalCl	6.5758	.39696	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
goalcl	Pillai's Trace	.256	1.549[b]	2.000	9.000	.264	.256
	Wilks' Lambda	.744	1.549[b]	2.000	9.000	.264	.256
	Hotelling's Trace	.344	1.549[b]	2.000	9.000	.264	.256
	Roy's Largest Root	.344	1.549[b]	2.000	9.000	.264	.256

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
goalcl	Pillai's Trace	3.099	.248
	Wilks' Lambda	3.099	.248
	Hotelling's Trace	3.099	.248
	Roy's Largest Root	3.099	.248

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: goalcl

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
goalcl	.732	2.805	2	.246

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
goalcl	.789	.911	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: goalcl

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
goalcl	Sphericity Assumed	.747	2	.374	2.151	.143
	Greenhouse-Geisser	.747	1.578	.474	2.151	.156
	Huynh-Feldt	.747	1.823	.410	2.151	.148
	Lower-bound	.747	1.000	.747	2.151	.173
Error(goalcl)	Sphericity Assumed	3.475	20	.174		
	Greenhouse-Geisser	3.475	15.776	.220		
	Huynh-Feldt	3.475	18.229	.191		
	Lower-bound	3.475	10.000	.347		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
goalcl	Sphericity Assumed	.177	4.302	.388
	Greenhouse-Geisser	.177	3.394	.338
	Huynh-Feldt	.177	3.921	.368
	Lower-bound	.177	2.151	.264
Error(goalcl)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	goalcl	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
goalcl	Linear	.505	1	.505	2.024	.185	.168
	Quadratic	.242	1	.242	2.474	.147	.198
Error(goalcl)	Linear	2.495	10	.249			
	Quadratic	.980	10	.098			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	goalcl	Noncent. Parameter	Observed Power[a]
goalcl	Linear	2.024	.251
	Quadratic	2.474	.296
Error(goalcl)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1336.364	1	1336.364	1013.017	.000	.990
Error	13.192	10	1.319			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	1013.017	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Goal Clarity

Estimates

Measure: MEASURE_1

goalcl	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	6.273	.265	5.682	6.864
2	6.242	.259	5.666	6.819
3	6.576	.120	6.309	6.842

Pairwise Comparisons

Measure: MEASURE_1

(I) goalcl	(J) goalcl	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	.030	.131	1.000	-.345	.405
	3	-.303	.213	.556	-.914	.308
2	1	-.030	.131	1.000	-.405	.345
	3	-.333	.180	.280	-.849	.183
3	1	.303	.213	.556	-.308	.914
	2	.333	.180	.280	-.183	.849

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.256	1.549[b]	2.000	9.000	.264	.256
Wilks' lambda	.744	1.549[b]	2.000	9.000	.264	.256
Hotelling's trace	.344	1.549[b]	2.000	9.000	.264	.256
Roy's largest root	.344	1.549[b]	2.000	9.000	.264	.256

Each F tests the multivariate effect of goalcl. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	3.099	.248
Wilks' lambda	3.099	.248
Hotelling's trace	3.099	.248
Roy's largest root	3.099	.248

Each F tests the multivariate effect of goalcl. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

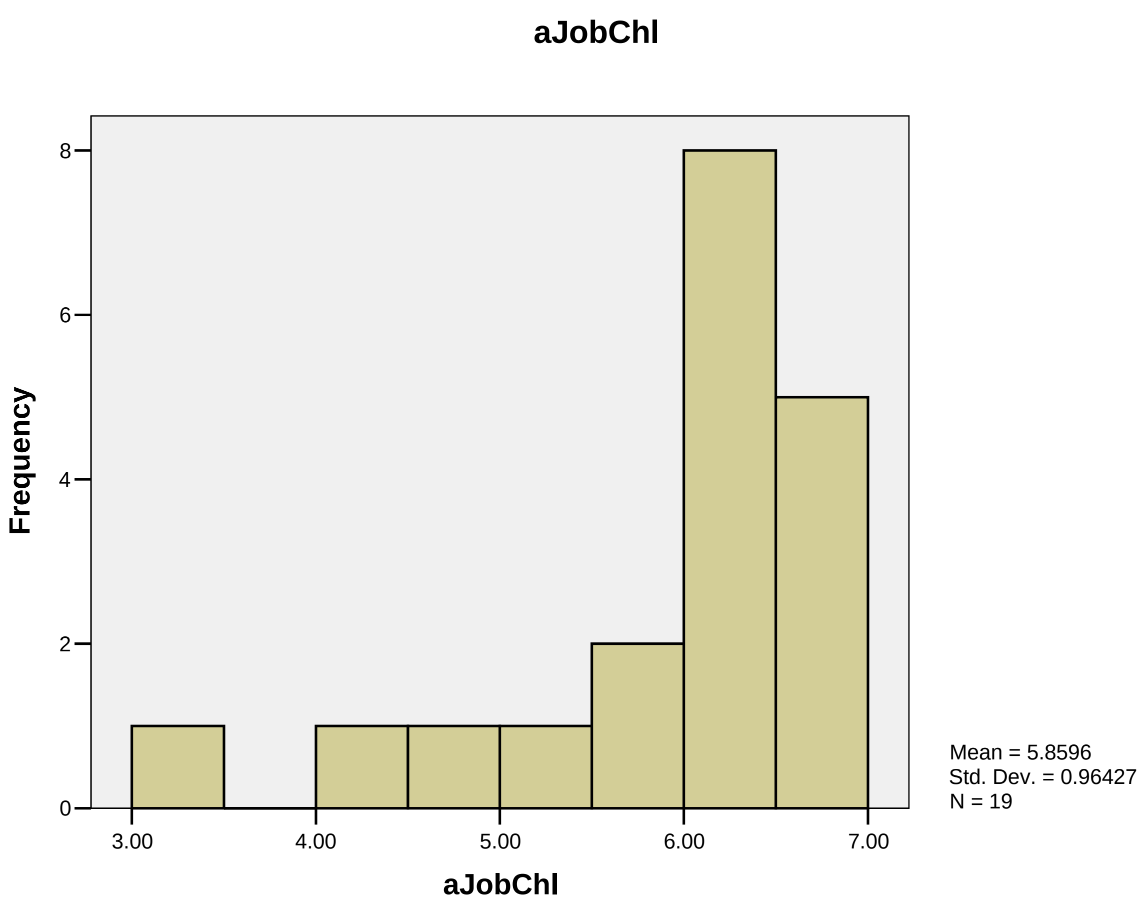
a. Computed using alpha = .05

b. Exact statistic

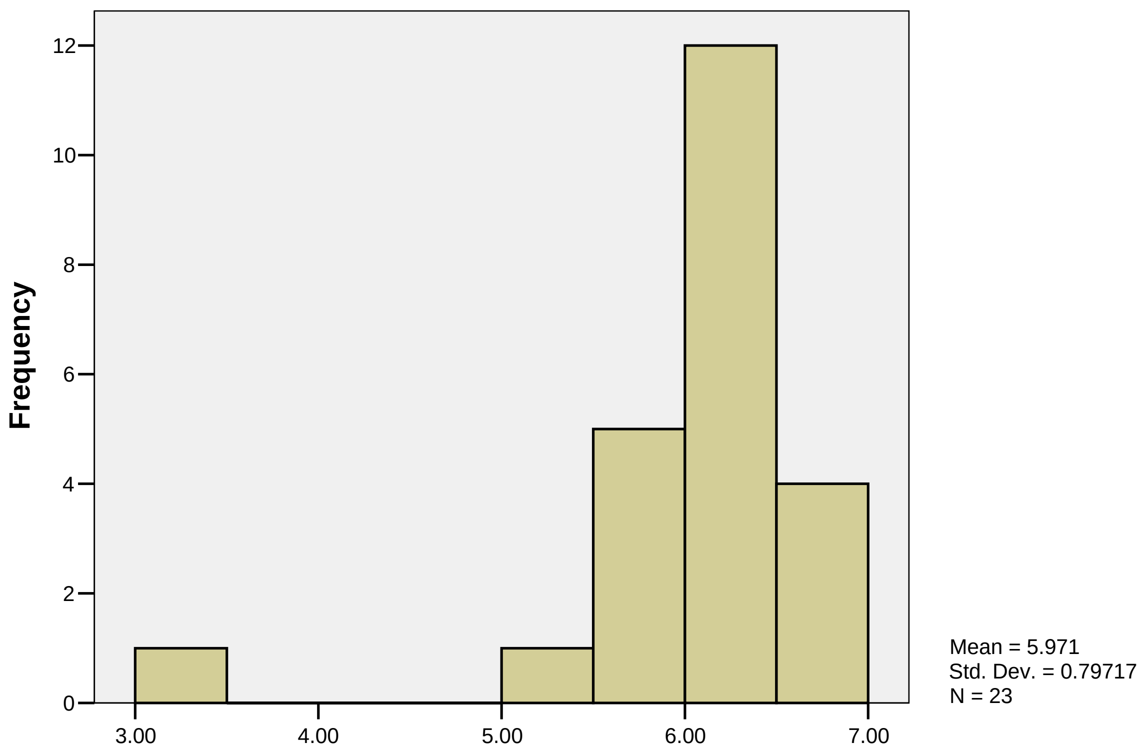
Statistics

		aJobChl	bJobChl	cJobChl
N	Valid	19	23	26
	Missing	20	16	13
Mean		5.8596	5.9710	6.2308
Std. Deviation		.96427	.79717	.57170
Skewness		-1.360	-2.377	-.922
Std. Error of Skewness		.524	.481	.456
Kurtosis		1.773	8.620	1.388
Std. Error of Kurtosis		1.014	.935	.887
Minimum		3.33	3.00	4.67
Maximum		7.00	7.00	7.00
Percentiles	25	5.6667	5.6667	6.0000
	50	6.0000	6.0000	6.3333
	75	6.6667	6.3333	6.6667

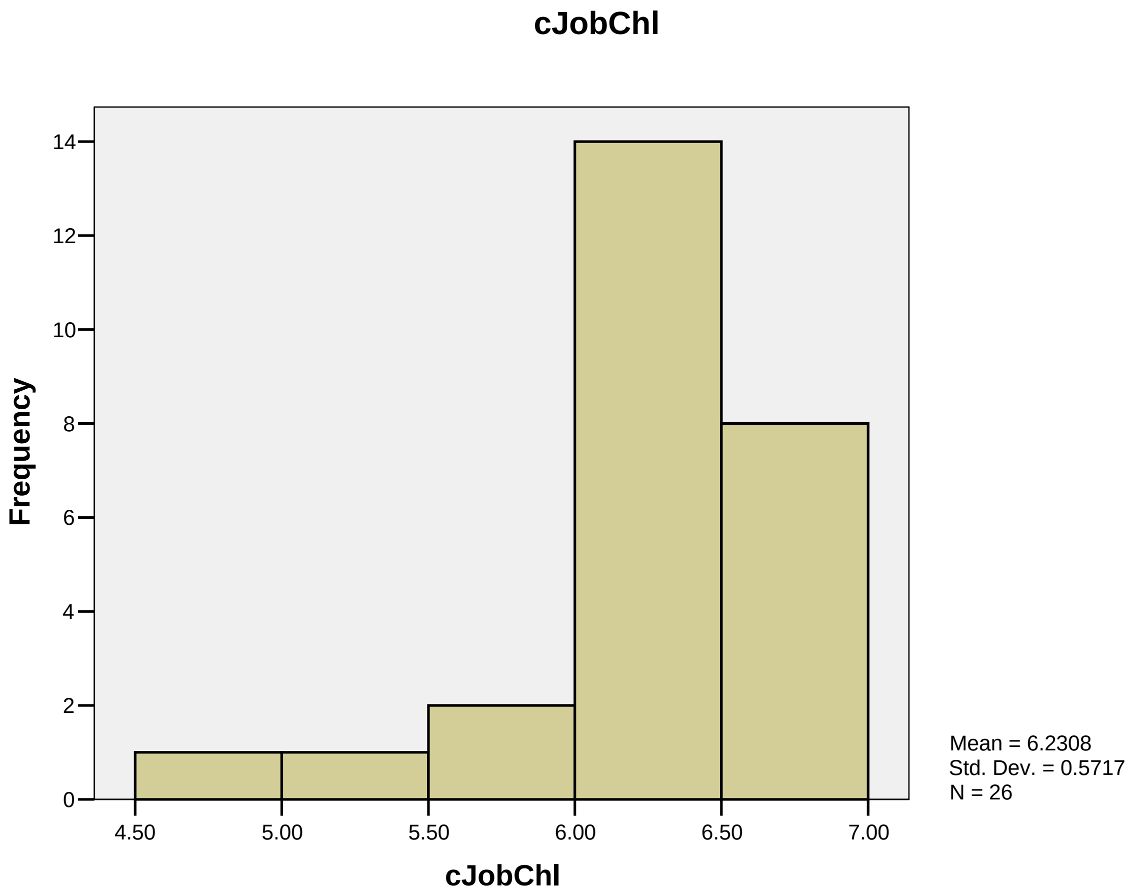
Histogram



bJobChl



bJobChl



General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Job Challenge	Dependent Variable
Time 1	aJobChl
Time 2	bJobChl
Time 3	cJobChl

Descriptive Statistics

	Mean	Std. Deviation	N
aJobChl	6.2424	.68461	11
bJobChl	6.1818	.50252	11
cJobChl	6.4848	.40452	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
jobch	Pillai's Trace	.466	3.927[b]	2.000	9.000	.059	.466
	Wilks' Lambda	.534	3.927[b]	2.000	9.000	.059	.466
	Hotelling's Trace	.873	3.927[b]	2.000	9.000	.059	.466
	Roy's Largest Root	.873	3.927[b]	2.000	9.000	.059	.466

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
jobch	Pillai's Trace	7.854	.552
	Wilks' Lambda	7.854	.552
	Hotelling's Trace	7.854	.552
	Roy's Largest Root	7.854	.552

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: jobch

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
jobch	.742	2.689	2	.261

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
jobch	.795	.920	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: jobch

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
jobch	Sphericity Assumed	.566	2	.283	2.159	.142
	Greenhouse-Geisser	.566	1.589	.356	2.159	.154
	Huynh-Feldt	.566	1.841	.307	2.159	.146
	Lower-bound	.566	1.000	.566	2.159	.172
Error(jobch)	Sphericity Assumed	2.620	20	.131		
	Greenhouse-Geisser	2.620	15.894	.165		
	Huynh-Feldt	2.620	18.410	.142		
	Lower-bound	2.620	10.000	.262		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
jobch	Sphericity Assumed	.178	4.319	.389
	Greenhouse-Geisser	.178	3.432	.341
	Huynh-Feldt	.178	3.975	.371
	Lower-bound	.178	2.159	.265
Error(jobch)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	jobch	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
jobch	Linear	.323	1	.323	2.406	.152	.194
	Quadratic	.242	1	.242	1.900	.198	.160
Error(jobch)	Linear	1.343	10	.134			
	Quadratic	1.276	10	.128			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	jobch	Noncent. Parameter	Observed Power[a]
jobch	Linear	2.406	.290
	Quadratic	1.900	.239
Error(jobch)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1311.030	1	1311.030	2104.735	.000	.995
Error	6.229	10	.623			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	2104.735	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Job Challenge

Estimates

Measure: MEASURE_1

jobch	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	6.242	.206	5.782	6.702
2	6.182	.152	5.844	6.519
3	6.485	.122	6.213	6.757

Pairwise Comparisons

Measure: MEASURE_1

(I) jobch	(J) jobch	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	.061	.184	1.000	-.468	.590
	3	-.242	.156	.456	-.691	.206
2	1	-.061	.184	1.000	-.590	.468
	3	-.303	.114	.072	-.631	.025
3	1	.242	.156	.456	-.206	.691
	2	.303	.114	.072	-.025	.631

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.466	3.927[b]	2.000	9.000	.059	.466
Wilks' lambda	.534	3.927[b]	2.000	9.000	.059	.466
Hotelling's trace	.873	3.927[b]	2.000	9.000	.059	.466
Roy's largest root	.873	3.927[b]	2.000	9.000	.059	.466

Each F tests the multivariate effect of jobch. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	7.854	.552
Wilks' lambda	7.854	.552
Hotelling's trace	7.854	.552
Roy's largest root	7.854	.552

Each F tests the multivariate effect of jobch. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics Value of Contributions

		aValCont	bValCont	cValCont
N	Valid	19	23	27
	Missing	20	16	12
Mean		5.5614	5.7971	6.1728
Std. Deviation		1.10584	.76369	.54200
Skewness		-.680	-.455	-.123
Std. Error of Skewness		.524	.481	.448
Kurtosis		-.992	-.273	-.458
Std. Error of Kurtosis		1.014	.935	.872
Minimum		3.67	4.33	5.00
Maximum		7.00	7.00	7.00
Percentiles	25	4.3333	5.3333	6.0000
	50	6.0000	6.0000	6.0000
	75	6.3333	6.3333	6.6667

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Value of Contributions	Dependent Variable
Time 1	aValCont
Time 2	bValCont
Time 3	cValCont

Descriptive Statistics

	Mean	Std. Deviation	N
aValCont	6.0303	.80904	11
bValCont	6.0606	.77198	11
cValCont	6.4545	.47779	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
valcon	Pillai's Trace	.390	2.874[b]	2.000	9.000	.108	.390
	Wilks' Lambda	.610	2.874[b]	2.000	9.000	.108	.390
	Hotelling's Trace	.639	2.874[b]	2.000	9.000	.108	.390
	Roy's Largest Root	.639	2.874[b]	2.000	9.000	.108	.390

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
valcon	Pillai's Trace	5.747	.425
	Wilks' Lambda	5.747	.425
	Hotelling's Trace	5.747	.425
	Roy's Largest Root	5.747	.425

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: valcon

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
valcon	.704	3.157	2	.206

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
valcon	.772	.886	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: valcon

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
valcon	Sphericity Assumed	1.232	2	.616	4.704	.021
	Greenhouse-Geisser	1.232	1.543	.798	4.704	.033
	Huynh-Feldt	1.232	1.771	.696	4.704	.026
	Lower-bound	1.232	1.000	1.232	4.704	.055
Error(valcon)	Sphericity Assumed	2.620	20	.131		
	Greenhouse-Geisser	2.620	15.434	.170		
	Huynh-Feldt	2.620	17.711	.148		
	Lower-bound	2.620	10.000	.262		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
valcon	Sphericity Assumed	.320	9.409	.722
	Greenhouse-Geisser	.320	7.261	.634
	Huynh-Feldt	.320	8.332	.680
	Lower-bound	.320	4.704	.500
Error(valcon)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	valcon	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
valcon	Linear	.990	1	.990	6.323	.031	.387
	Quadratic	.242	1	.242	2.300	.160	.187
Error(valcon)	Linear	1.566	10	.157			
	Quadratic	1.054	10	.105			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	valcon	Noncent. Parameter	Observed Power[a]
valcon	Linear	6.323	.621
	Quadratic	2.300	.279
Error(valcon)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1261.091	1	1261.091	1036.370	.000	.990
Error	12.168	10	1.217			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	1036.370	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Value of Contributions

Estimates

Measure: MEASURE_1

valcon	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	6.030	.244	5.487	6.574
2	6.061	.233	5.542	6.579
3	6.455	.144	6.134	6.776

Pairwise Comparisons

Measure: MEASURE_1

(I) valcon	(J) valcon	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-.030	.105	1.000	-.332	.271
	3	-.424	.169	.092	-.908	.060
2	1	.030	.105	1.000	-.271	.332
	3	-.394	.179	.156	-.907	.119
3	1	.424	.169	.092	-.060	.908
	2	.394	.179	.156	-.119	.907

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.390	2.874[b]	2.000	9.000	.108	.390
Wilks' lambda	.610	2.874[b]	2.000	9.000	.108	.390
Hotelling's trace	.639	2.874[b]	2.000	9.000	.108	.390
Roy's largest root	.639	2.874[b]	2.000	9.000	.108	.390

Each F tests the multivariate effect of valcon. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	5.747	.425
Wilks' lambda	5.747	.425
Hotelling's trace	5.747	.425
Roy's largest root	5.747	.425

Each F tests the multivariate effect of valcon. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics Freedom of Expression

		aFreeE	bFreeE	cFreeE
N	Valid	19	23	27
	Missing	20	16	12
Mean		4.9123	5.3188	5.2840
Std. Deviation		1.40036	1.10316	1.25645
Skewness		-.749	-.650	-.844
Std. Error of Skewness		.524	.481	.448
Kurtosis		-.395	-.045	.385
Std. Error of Kurtosis		1.014	.935	.872
Minimum		2.00	3.00	2.00
Maximum		7.00	7.00	7.00
Percentiles	25	3.6667	4.6667	4.6667
	50	5.3333	5.3333	5.6667
	75	6.0000	6.0000	6.0000

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Freedom of Expression	Dependent Variable
Time 1	aFreeE
Time 2	bFreeE
Time 3	cFreeE

Descriptive Statistics

	Mean	Std. Deviation	N
aFreeE	5.4545	1.30190	11
bFreeE	5.7576	1.01205	11
cFreeE	6.1212	.92223	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
freee	Pillai's Trace	.517	4.816[b]	2.000	9.000	.038	.517
	Wilks' Lambda	.483	4.816[b]	2.000	9.000	.038	.517
	Hotelling's Trace	1.070	4.816[b]	2.000	9.000	.038	.517
	Roy's Largest Root	1.070	4.816[b]	2.000	9.000	.038	.517

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
freee	Pillai's Trace	9.633	.643
	Wilks' Lambda	9.633	.643
	Hotelling's Trace	9.633	.643
	Roy's Largest Root	9.633	.643

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: freee

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
freee	.917	.785	2	.675

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
freee	.923	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: freee

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
freee	Sphericity Assumed	2.451	2	1.226	4.477	.025
	Greenhouse-Geisser	2.451	1.846	1.328	4.477	.028
	Huynh-Feldt	2.451	2.000	1.226	4.477	.025
	Lower-bound	2.451	1.000	2.451	4.477	.060
Error(freee)	Sphericity Assumed	5.475	20	.274		
	Greenhouse-Geisser	5.475	18.459	.297		
	Huynh-Feldt	5.475	20.000	.274		
	Lower-bound	5.475	10.000	.547		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
freee	Sphericity Assumed	.309	8.954	.699
	Greenhouse-Geisser	.309	8.264	.672
	Huynh-Feldt	.309	8.954	.699
	Lower-bound	.309	4.477	.481
Error(freee)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	freee	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
freee	Linear	2.444	1	2.444	9.565	.011	.489
	Quadratic	.007	1	.007	.023	.882	.002
Error(freee)	Linear	2.556	10	.256			
	Quadratic	2.919	10	.292			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	freee	Noncent. Parameter	Observed Power[a]
freee	Linear	9.565	.796
	Quadratic	.023	.052
Error(freee)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1101.630	1	1101.630	364.510	.000	.973
Error	30.222	10	3.022			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	364.510	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Freedom of Expression

Estimates

Measure: MEASURE_1

freee	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	5.455	.393	4.580	6.329
2	5.758	.305	5.078	6.437
3	6.121	.278	5.502	6.741

Pairwise Comparisons

Measure: MEASURE_1

(I) freee	(J) freee	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	-.303	.252	.771	-1.027	.420
	3	-.667*	.216	.034	-1.285	-.048
2	1	.303	.252	.771	-.420	1.027
	3	-.364	.198	.290	-.933	.205
3	1	.667*	.216	.034	.048	1.285
	2	.364	.198	.290	-.205	.933

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.517	4.816[b]	2.000	9.000	.038	.517
Wilks' lambda	.483	4.816[b]	2.000	9.000	.038	.517
Hotelling's trace	1.070	4.816[b]	2.000	9.000	.038	.517
Roy's largest root	1.070	4.816[b]	2.000	9.000	.038	.517

Each F tests the multivariate effect of freee. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	9.633	.643
Wilks' lambda	9.633	.643
Hotelling's trace	9.633	.643
Roy's largest root	9.633	.643

Each F tests the multivariate effect of freee. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics

		aWrkIn	bWrkIn	cWrkIn
N	Valid	19	24	27
	Missing	20	15	12
Mean		5.4868	5.7396	5.8056
Std. Deviation		.86391	.77136	.60975
Skewness		-.691	-.762	-.348
Std. Error of Skewness		.524	.472	.448
Kurtosis		.173	.232	-.912
Std. Error of Kurtosis		1.014	.918	.872
Minimum		3.50	3.75	4.75
Maximum		6.75	6.75	6.75
Percentiles	25	4.7500	5.0625	5.0000
	50	5.5000	6.0000	5.7500
	75	6.2500	6.4375	6.2500

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Work Intensity	Dependent Variable
Time 1	aWrkIn
Time 2	bWrkIn
Time 3	cWrkIn

Descriptive Statistics

	Mean	Std. Deviation	N
aWrkIn	5.9091	.64491	11
bWrkIn	5.8182	.75904	11
cWrkIn	6.1818	.52549	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
wrkin	Pillai's Trace	.388	2.850[b]	2.000	9.000	.110	.388
	Wilks' Lambda	.612	2.850[b]	2.000	9.000	.110	.388
	Hotelling's Trace	.633	2.850[b]	2.000	9.000	.110	.388
	Roy's Largest Root	.633	2.850[b]	2.000	9.000	.110	.388

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
wrkin	Pillai's Trace	5.699	.422
	Wilks' Lambda	5.699	.422
	Hotelling's Trace	5.699	.422
	Roy's Largest Root	5.699	.422

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: wrkin

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
wrkin	.934	.610	2	.737

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
wrkin	.939	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: wrkin

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
wrkin	Sphericity Assumed	.788	2	.394	3.701	.043
	Greenhouse-Geisser	.788	1.877	.420	3.701	.047
	Huynh-Feldt	.788	2.000	.394	3.701	.043
	Lower-bound	.788	1.000	.788	3.701	.083
Error(wrkin)	Sphericity Assumed	2.129	20	.106		
	Greenhouse-Geisser	2.129	18.770	.113		
	Huynh-Feldt	2.129	20.000	.106		
	Lower-bound	2.129	10.000	.213		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
wrkin	Sphericity Assumed	.270	7.402	.611
	Greenhouse-Geisser	.270	6.947	.590
	Huynh-Feldt	.270	7.402	.611
	Lower-bound	.270	3.701	.413
Error(wrkin)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	wrkin	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
wrkin	Linear	.409	1	.409	4.528	.059	.312
	Quadratic	.379	1	.379	3.091	.109	.236
Error(wrkin)	Linear	.903	10	.090			
	Quadratic	1.225	10	.123			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	wrkin	Noncent. Parameter	Observed Power[a]
wrkin	Linear	4.528	.485
	Quadratic	3.091	.356
Error(wrkin)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1176.030	1	1176.030	1114.401	.000	.991
Error	10.553	10	1.055			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	1114.401	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Work Intensity

Estimates

Measure: MEASURE_1

wrkin	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	5.909	.194	5.476	6.342
2	5.818	.229	5.308	6.328
3	6.182	.158	5.829	6.535

Pairwise Comparisons

Measure: MEASURE_1

(I) wrkin	(J) wrkin	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	.091	.132	1.000	-.287	.469
	3	-.273	.128	.178	-.641	.095
2	1	-.091	.132	1.000	-.469	.287
	3	-.364	.156	.125	-.811	.084
3	1	.273	.128	.178	-.095	.641
	2	.364	.156	.125	-.084	.811

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.388	2.850[b]	2.000	9.000	.110	.388
Wilks' lambda	.612	2.850[b]	2.000	9.000	.110	.388
Hotelling's trace	.633	2.850[b]	2.000	9.000	.110	.388
Roy's largest root	.633	2.850[b]	2.000	9.000	.110	.388

Each F tests the multivariate effect of wrkin. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	5.699	.422
Wilks' lambda	5.699	.422
Hotelling's trace	5.699	.422
Roy's largest root	5.699	.422

Each F tests the multivariate effect of wrkin. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics Communication Effectiveness

		aComEff	bComEff	cComEff
N	Valid	19	23	26
	Missing	20	16	13
Mean		5.1579	5.6087	5.5192
Std. Deviation		1.28076	1.10738	1.09983
Skewness		-.571	-1.730	-1.348
Std. Error of Skewness		.524	.481	.456
Kurtosis		-.624	2.677	2.894
Std. Error of Kurtosis		1.014	.935	.887
Minimum		2.50	2.50	2.00
Maximum		7.00	7.00	7.00
Percentiles	25	4.0000	5.5000	5.0000
	50	5.5000	6.0000	5.5000
	75	6.0000	6.0000	6.5000

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Communication Effectiveness	Dependent Variable
Time 1	aComEff
Time 2	bComEff
Time 3	cComEff

Descriptive Statistics

	Mean	Std. Deviation	N
aComEff	5.5000	1.02470	11
bComEff	5.7273	.84746	11
cComEff	6.1818	.71668	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
comeff	Pillai's Trace	.482	4.189[b]	2.000	9.000	.052	.482
	Wilks' Lambda	.518	4.189[b]	2.000	9.000	.052	.482
	Hotelling's Trace	.931	4.189[b]	2.000	9.000	.052	.482
	Roy's Largest Root	.931	4.189[b]	2.000	9.000	.052	.482

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
comeff	Pillai's Trace	8.378	.580
	Wilks' Lambda	8.378	.580
	Hotelling's Trace	8.378	.580
	Roy's Largest Root	8.378	.580

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: comeff

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
comeff	.955	.417	2	.812

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
comeff	.957	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: comeff

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
comeff	Sphericity Assumed	2.652	2	1.326	5.117	.016
	Greenhouse-Geisser	2.652	1.913	1.386	5.117	.018
	Huynh-Feldt	2.652	2.000	1.326	5.117	.016
	Lower-bound	2.652	1.000	2.652	5.117	.047
Error(comeff)	Sphericity Assumed	5.182	20	.259		
	Greenhouse-Geisser	5.182	19.134	.271		
	Huynh-Feldt	5.182	20.000	.259		
	Lower-bound	5.182	10.000	.518		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
comeff	Sphericity Assumed	.338	10.234	.760
	Greenhouse-Geisser	.338	9.791	.745
	Huynh-Feldt	.338	10.234	.760
	Lower-bound	.338	5.117	.533
Error(comeff)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	comeff	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
comeff	Linear	2.557	1	2.557	8.333	.016	.455
	Quadratic	.095	1	.095	.448	.518	.043
Error(comeff)	Linear	3.068	10	.307			
	Quadratic	2.114	10	.211			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	comeff	Noncent. Parameter	Observed Power[a]
comeff	Linear	8.333	.740
	Quadratic	.448	.093
Error(comeff)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1111.280	1	1111.280	630.107	.000	.984
Error	17.636	10	1.764			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	630.107	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Communication Effectiveness

Estimates

Measure: MEASURE_1

comeff	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	5.500	.309	4.812	6.188
2	5.727	.256	5.158	6.297
3	6.182	.216	5.700	6.663

Pairwise Comparisons

Measure: MEASURE_1

(I) comeff	(J) comeff	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a] Lower Bound	Upper Bound
1	2	-.227	.217	.959	-.850	.396
	3	-.682*	.236	.049	-1.360	-.004
2	1	.227	.217	.959	-.396	.850
	3	-.455	.196	.129	-1.017	.108
3	1	.682*	.236	.049	.004	1.360
	2	.455	.196	.129	-.108	1.017

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.482	4.189[b]	2.000	9.000	.052	.482
Wilks' lambda	.518	4.189[b]	2.000	9.000	.052	.482
Hotelling's trace	.931	4.189[b]	2.000	9.000	.052	.482
Roy's largest root	.931	4.189[b]	2.000	9.000	.052	.482

Each F tests the multivariate effect of comeff. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	8.378	.580
Wilks' lambda	8.378	.580
Hotelling's trace	8.378	.580
Roy's largest root	8.378	.580

Each F tests the multivariate effect of comeff. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics Productivity

		aProd	bProd	cProd
N	Valid	19	23	27
	Missing	20	16	12
Mean		5.1053	5.3188	5.7654
Std. Deviation		1.00032	.78160	.51320
Skewness		-.561	-.870	-.745
Std. Error of Skewness		.524	.481	.448
Kurtosis		-.619	.876	1.182
Std. Error of Kurtosis		1.014	.935	.872
Minimum		3.00	3.33	4.33
Maximum		6.67	6.67	6.67
Percentiles	25	4.0000	5.0000	5.3333
	50	5.3333	5.3333	6.0000
	75	6.0000	5.6667	6.0000

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Productivity	Dependent Variable
Time 1	aProd
Time 2	bProd
Time 3	cProd

Descriptive Statistics

	Mean	Std. Deviation	N
aProd	5.6061	.69631	11
bProd	5.7879	.47779	11
cProd	6.0000	.47140	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
prod	Pillai's Trace	.388	2.851[b]	2.000	9.000	.110	.388
	Wilks' Lambda	.612	2.851[b]	2.000	9.000	.110	.388
	Hotelling's Trace	.634	2.851[b]	2.000	9.000	.110	.388
	Roy's Largest Root	.634	2.851[b]	2.000	9.000	.110	.388

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
prod	Pillai's Trace	5.703	.422
	Wilks' Lambda	5.703	.422
	Hotelling's Trace	5.703	.422
	Roy's Largest Root	5.703	.422

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: prod

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
prod	.637	4.058	2	.131

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
prod	.734	.829	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: prod

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
prod	Sphericity Assumed	.855	2	.428	2.926	.077
	Greenhouse-Geisser	.855	1.467	.583	2.926	.097
	Huynh-Feldt	.855	1.657	.516	2.926	.089
	Lower-bound	.855	1.000	.855	2.926	.118
Error(prod)	Sphericity Assumed	2.923	20	.146		
	Greenhouse-Geisser	2.923	14.674	.199		
	Huynh-Feldt	2.923	16.573	.176		
	Lower-bound	2.923	10.000	.292		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
prod	Sphericity Assumed	.226	5.853	.506
	Greenhouse-Geisser	.226	4.294	.423
	Huynh-Feldt	.226	4.850	.454
	Lower-bound	.226	2.926	.340
Error(prod)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	prod	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
prod	Linear	.854	1	.854	4.311	.065	.301
	Quadratic	.002	1	.002	.018	.896	.002
Error(prod)	Linear	1.980	10	.198			
	Quadratic	.943	10	.094			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	prod	Noncent. Parameter	Observed Power[a]
prod	Linear	4.311	.467
	Quadratic	.018	.052
Error(prod)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1109.347	1	1109.347	1725.005	.000	.994
Error	6.431	10	.643			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	1725.005	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Productivity

Estimates

Measure: MEASURE_1

prod	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	5.606	.210	5.138	6.074
2	5.788	.144	5.467	6.109
3	6.000	.142	5.683	6.317

Pairwise Comparisons

Measure: MEASURE_1

(I) prod	(J) prod	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-.182	.182	1.000	-.704	.340
	3	-.394	.190	.194	-.938	.151
2	1	.182	.182	1.000	-.340	.704
	3	-.212	.103	.201	-.508	.084
3	1	.394	.190	.194	-.151	.938
	2	.212	.103	.201	-.084	.508

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.388	2.851[b]	2.000	9.000	.110	.388
Wilks' lambda	.612	2.851[b]	2.000	9.000	.110	.388
Hotelling's trace	.634	2.851[b]	2.000	9.000	.110	.388
Roy's largest root	.634	2.851[b]	2.000	9.000	.110	.388

Each F tests the multivariate effect of prod. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	5.703	.422
Wilks' lambda	5.703	.422
Hotelling's trace	5.703	.422
Roy's largest root	5.703	.422

Each F tests the multivariate effect of prod. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics Time Pressure

		aTmPrs	bTmPrs	cTmPrs
N	Valid	19	24	27
	Missing	20	15	12
Mean		5.7018	5.1667	5.0000
Std. Deviation		1.15947	1.49071	1.01695
Skewness		-1.727	-1.227	.211
Std. Error of Skewness		.524	.472	.448
Kurtosis		2.700	1.811	-1.056
Std. Error of Kurtosis		1.014	.918	.872
Minimum		2.67	1.00	3.33
Maximum		7.00	7.00	6.67
Percentiles	25	5.3333	4.4167	4.3333
	50	6.0000	5.5000	5.0000
	75	6.3333	6.2500	5.6667

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Time Pressure	Dependent Variable
Time 1	aTmPrs
Time 2	bTmPrs
Time 3	cTmPrs

Descriptive Statistics

	Mean	Std. Deviation	N
aTmPrs	6.1212	.61955	11
bTmPrs	5.3030	1.08990	11
cTmPrs	5.3030	1.12994	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
tmprs	Pillai's Trace	.286	1.800[b]	2.000	9.000	.220	.286
	Wilks' Lambda	.714	1.800[b]	2.000	9.000	.220	.286
	Hotelling's Trace	.400	1.800[b]	2.000	9.000	.220	.286
	Roy's Largest Root	.400	1.800[b]	2.000	9.000	.220	.286

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
tmprs	Pillai's Trace	3.600	.282
	Wilks' Lambda	3.600	.282
	Hotelling's Trace	3.600	.282
	Roy's Largest Root	3.600	.282

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: tmprs

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
tmprs	.442	7.350	2	.025

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
tmprs	.642	.695	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: tmprs

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
tmprs	Sphericity Assumed	4.909	2	2.455	3.493	.050
	Greenhouse-Geisser	4.909	1.284	3.824	3.493	.077
	Huynh-Feldt	4.909	1.390	3.531	3.493	.072
	Lower-bound	4.909	1.000	4.909	3.493	.091
Error(tmprs)	Sphericity Assumed	14.054	20	.703		
	Greenhouse-Geisser	14.054	12.836	1.095		
	Huynh-Feldt	14.054	13.905	1.011		
	Lower-bound	14.054	10.000	1.405		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
tmprs	Sphericity Assumed	.259	6.986	.584
	Greenhouse-Geisser	.259	4.484	.454
	Huynh-Feldt	.259	4.857	.475
	Lower-bound	.259	3.493	.394
Error(tmprs)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	tmprs	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
tmprs	Linear	3.682	1	3.682	3.837	.079	.277
	Quadratic	1.227	1	1.227	2.753	.128	.216
Error(tmprs)	Linear	9.596	10	.960			
	Quadratic	4.458	10	.446			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	tmprs	Noncent. Parameter	Observed Power[a]
tmprs	Linear	3.837	.425
	Quadratic	2.753	.324
Error(tmprs)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1025.939	1	1025.939	710.929	.000	.986
Error	14.431	10	1.443			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	710.929	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Time Pressure

Estimates

Measure: MEASURE_1

tmprs	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	6.121	.187	5.705	6.537
2	5.303	.329	4.571	6.035
3	5.303	.341	4.544	6.062

Pairwise Comparisons

Measure: MEASURE_1

(I) tmprs	(J) tmprs	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	.818	.420	.240	-.388	2.024
	3	.818	.418	.236	-.381	2.017
2	1	-.818	.420	.240	-2.024	.388
	3	8.88E-016	.180	1.000	-.516	.516
3	1	-.818	.418	.236	-2.017	.381
	2	-8.88E-016	.180	1.000	-.516	.516

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.286	1.800[b]	2.000	9.000	.220	.286
Wilks' lambda	.714	1.800[b]	2.000	9.000	.220	.286
Hotelling's trace	.400	1.800[b]	2.000	9.000	.220	.286
Roy's largest root	.400	1.800[b]	2.000	9.000	.220	.286

Each F tests the multivariate effect of tmprs. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	3.600	.282
Wilks' lambda	3.600	.282
Hotelling's trace	3.600	.282
Roy's largest root	3.600	.282

Each F tests the multivariate effect of tmprs. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

Statistics Morale Issues

		aMorIs	bMorIs	cMorIs
N	Valid	19	23	27
	Missing	20	16	12
Mean		3.9737	3.5870	4.0556
Std. Deviation		2.06474	1.85651	1.63103
Skewness		-.112	.206	-.444
Std. Error of Skewness		.524	.481	.448
Kurtosis		-1.312	-1.090	-1.027
Std. Error of Kurtosis		1.014	.935	.872
Minimum		1.00	1.00	1.00
Maximum		7.00	7.00	6.00
Percentiles	25	2.0000	2.0000	2.5000
	50	4.5000	3.5000	4.0000
	75	6.0000	5.0000	5.5000

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Morale Issues	Dependent Variable
Time 1	aMorIs
Time 2	bMorIs
Time 3	cMorIs

Descriptive Statistics

	Mean	Std. Deviation	N
aMorIs	3.6364	2.16900	11
bMorIs	3.9545	2.12667	11
cMorIs	3.5000	1.89737	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
morIs	Pillai's Trace	.089	.442[b]	2.000	9.000	.656	.089
	Wilks' Lambda	.911	.442[b]	2.000	9.000	.656	.089
	Hotelling's Trace	.098	.442[b]	2.000	9.000	.656	.089
	Roy's Largest Root	.098	.442[b]	2.000	9.000	.656	.089

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
morls	Pillai's Trace	.884	.102
	Wilks' Lambda	.884	.102
	Hotelling's Trace	.884	.102
	Roy's Largest Root	.884	.102

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: morls

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
morls	.853	1.433	2	.489

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
morls	.872	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: morls

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
morls	Sphericity Assumed	1.197	2	.598	.342	.714
	Greenhouse-Geisser	1.197	1.743	.687	.342	.686
	Huynh-Feldt	1.197	2.000	.598	.342	.714
	Lower-bound	1.197	1.000	1.197	.342	.571
Error(morls)	Sphericity Assumed	34.970	20	1.748		
	Greenhouse-Geisser	34.970	17.434	2.006		
	Huynh-Feldt	34.970	20.000	1.748		
	Lower-bound	34.970	10.000	3.497		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
morls	Sphericity Assumed	.033	.685	.097
	Greenhouse-Geisser	.033	.597	.094
	Huynh-Feldt	.033	.685	.097
	Lower-bound	.033	.342	.083
Error(morls)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	morls	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
morls	Linear	.102	1	.102	.043	.840	.004
	Quadratic	1.095	1	1.095	.978	.346	.089
Error(morls)	Linear	23.773	10	2.377			
	Quadratic	11.197	10	1.120			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	morls	Noncent. Parameter	Observed Power[a]
morls	Linear	.043	.054
	Quadratic	.978	.146
Error(morls)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	451.030	1	451.030	48.340	.000	.829
Error	93.303	10	9.330			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	48.340	1.000
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Morale Issures

Estimates

Measure: MEASURE_1

morls	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	3.636	.654	2.179	5.094
2	3.955	.641	2.526	5.383
3	3.500	.572	2.225	4.775

Pairwise Comparisons

Measure: MEASURE_1

(I) morls	(J) morls	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-.318	.473	1.000	-1.676	1.040
	3	.136	.657	1.000	-1.751	2.023
2	1	.318	.473	1.000	-1.040	1.676
	3	.455	.545	1.000	-1.111	2.020
3	1	-.136	.657	1.000	-2.023	1.751
	2	-.455	.545	1.000	-2.020	1.111

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.089	.442[b]	2.000	9.000	.656	.089
Wilks' lambda	.911	.442[b]	2.000	9.000	.656	.089
Hotelling's trace	.098	.442[b]	2.000	9.000	.656	.089
Roy's largest root	.098	.442[b]	2.000	9.000	.656	.089

Each F tests the multivariate effect of morls. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	.884	.102
Wilks' lambda	.884	.102
Hotelling's trace	.884	.102
Roy's largest root	.884	.102

Each F tests the multivariate effect of morls. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

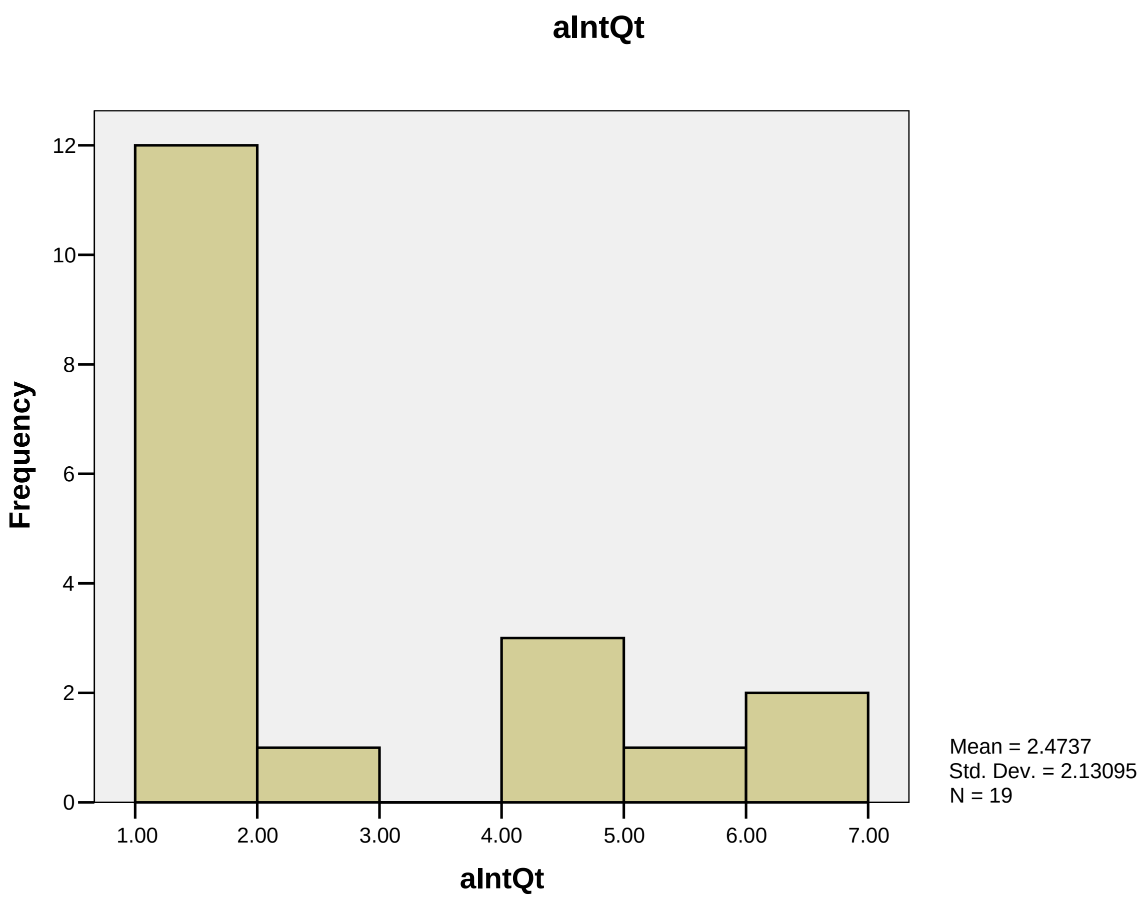
a. Computed using alpha = .05

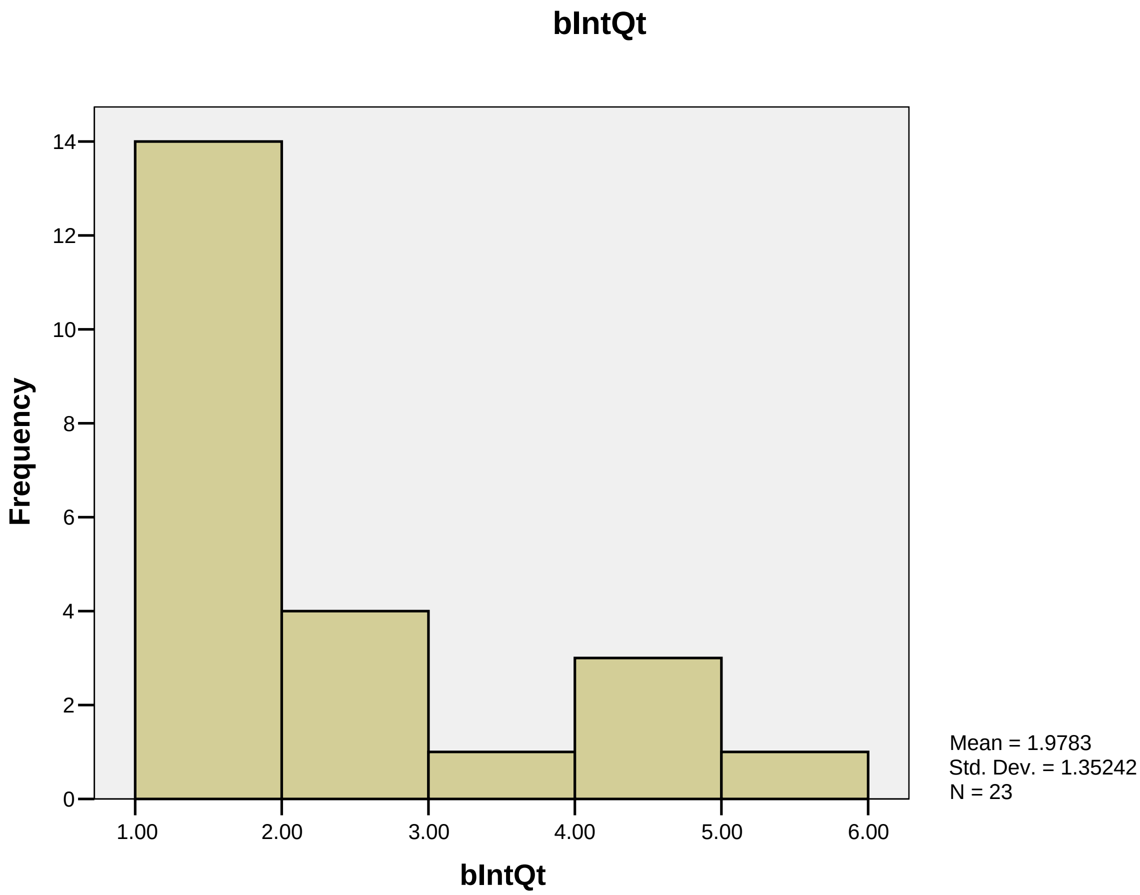
b. Exact statistic

Statistics Intention to Quit

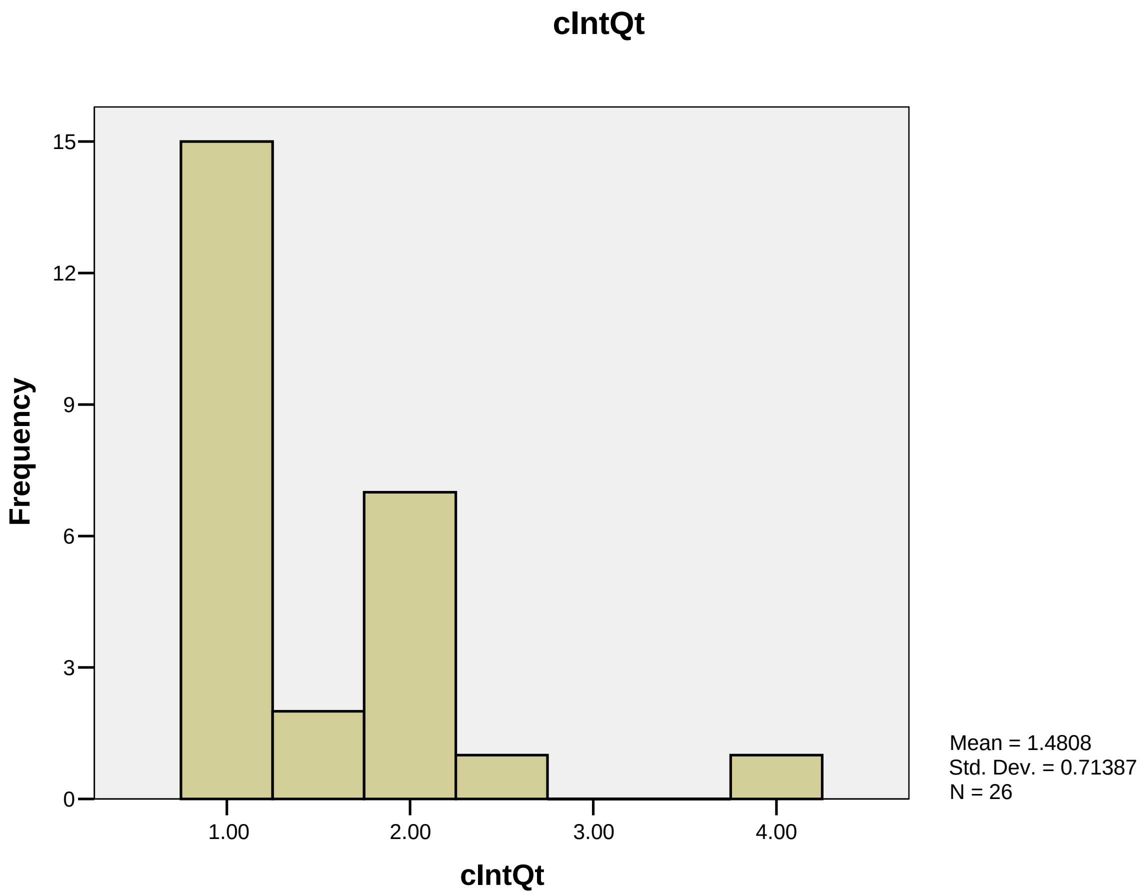
		aIntQt	bIntQt	cIntQt
N	Valid	19	23	26
	Missing	20	16	13
Mean		2.4737	1.9783	1.4808
Std. Deviation		2.13095	1.35242	.71387
Skewness		1.205	1.635	1.949
Std. Error of Skewness		.524	.481	.456
Kurtosis		.071	2.298	4.961
Std. Error of Kurtosis		1.014	.935	.887
Minimum		1.00	1.00	1.00
Maximum		7.00	6.00	4.00
Percentiles	25	1.0000	1.0000	1.0000
	50	1.0000	1.5000	1.0000
	75	4.5000	2.5000	2.0000

Histogram





bIntQt
Frequency
14
12
10
8
6
4
2
0
1.00
2.00
3.00
4.00
5.00
6.00
bIntQt
Mean = 1.9783
Std. Dev. = 1.35242
N = 23



General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Intention to Quit	Dependent Variable
Time 1	aIntQt
Time 2	bIntQt
Time 3	cIntQt

Descriptive Statistics

	Mean	Std. Deviation	N
aIntQt	1.5000	1.20416	11
bIntQt	1.5455	1.01130	11
cIntQt	1.1818	.40452	11

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
intqt	Pillai's Trace	.311	2.029[b]	2.000	9.000	.187	.311
	Wilks' Lambda	.689	2.029[b]	2.000	9.000	.187	.311
	Hotelling's Trace	.451	2.029[b]	2.000	9.000	.187	.311
	Roy's Largest Root	.451	2.029[b]	2.000	9.000	.187	.311

Multivariate Tests[c]

Effect		Noncent. Parameter	Observed Power[a]
intqt	Pillai's Trace	4.057	.313
	Wilks' Lambda	4.057	.313
	Hotelling's Trace	4.057	.313
	Roy's Largest Root	4.057	.313

a. Computed using alpha = .05

b. Exact statistic

c.
Design: Intercept
Within Subjects Design: intqt

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
intqt	.471	6.784	2	.034

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity[b]

Measure: MEASURE_1

Within Subjects Effect	Epsilon[a]		
	Greenhouse -Geisser	Huynh-Feldt	Lower-bound
intqt	.654	.712	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.
Design: Intercept
Within Subjects Design: intqt

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
intqt	Sphericity Assumed	.864	2	.432	1.798	.191
	Greenhouse-Geisser	.864	1.308	.660	1.798	.206
	Huynh-Feldt	.864	1.425	.606	1.798	.204
	Lower-bound	.864	1.000	.864	1.798	.210
Error(intqt)	Sphericity Assumed	4.803	20	.240		
	Greenhouse-Geisser	4.803	13.077	.367		
	Huynh-Feldt	4.803	14.248	.337		
	Lower-bound	4.803	10.000	.480		

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Partial Eta Squared	Noncent. Parameter	Observed Power[a]
intqt	Sphericity Assumed	.152	3.596	.331
	Greenhouse-Geisser	.152	2.351	.262
	Huynh-Feldt	.152	2.562	.274
	Lower-bound	.152	1.798	.229
Error(intqt)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	intqt	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
intqt	Linear	.557	1	.557	1.369	.269	.120
	Quadratic	.307	1	.307	4.175	.068	.295
Error(intqt)	Linear	4.068	10	.407			
	Quadratic	.735	10	.073			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	intqt	Noncent. Parameter	Observed Power[a]
intqt	Linear	1.369	.185
	Quadratic	4.175	.455
Error(intqt)	Linear		
	Quadratic		

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	65.523	1	65.523	30.390	.000	.752
Error	21.561	10	2.156			

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Noncent. Parameter	Observed Power[a]
Intercept	30.390	.999
Error		

a. Computed using alpha = .05

Estimated Marginal Means

Intention to Quit

Estimates

Measure: MEASURE_1

intqt	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	1.500	.363	.691	2.309
2	1.545	.305	.866	2.225
3	1.182	.122	.910	1.454

Pairwise Comparisons

Measure: MEASURE_1

(I) intqt	(J) intqt	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-.045	.142	1.000	-.454	.363
	3	.318	.272	.807	-.462	1.099
2	1	.045	.142	1.000	-.363	.454
	3	.364	.192	.262	-.187	.914
3	1	-.318	.272	.807	-1.099	.462
	2	-.364	.192	.262	-.914	.187

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.311	2.029[b]	2.000	9.000	.187	.311
Wilks' lambda	.689	2.029[b]	2.000	9.000	.187	.311
Hotelling's trace	.451	2.029[b]	2.000	9.000	.187	.311
Roy's largest root	.451	2.029[b]	2.000	9.000	.187	.311

Each F tests the multivariate effect of intqt. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

Multivariate Tests

	Noncent. Parameter	Observed Power[a]
Pillai's trace	4.057	.313
Wilks' lambda	4.057	.313
Hotelling's trace	4.057	.313
Roy's largest root	4.057	.313

Each F tests the multivariate effect of intqt. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

b. Exact statistic

APPENDIX I

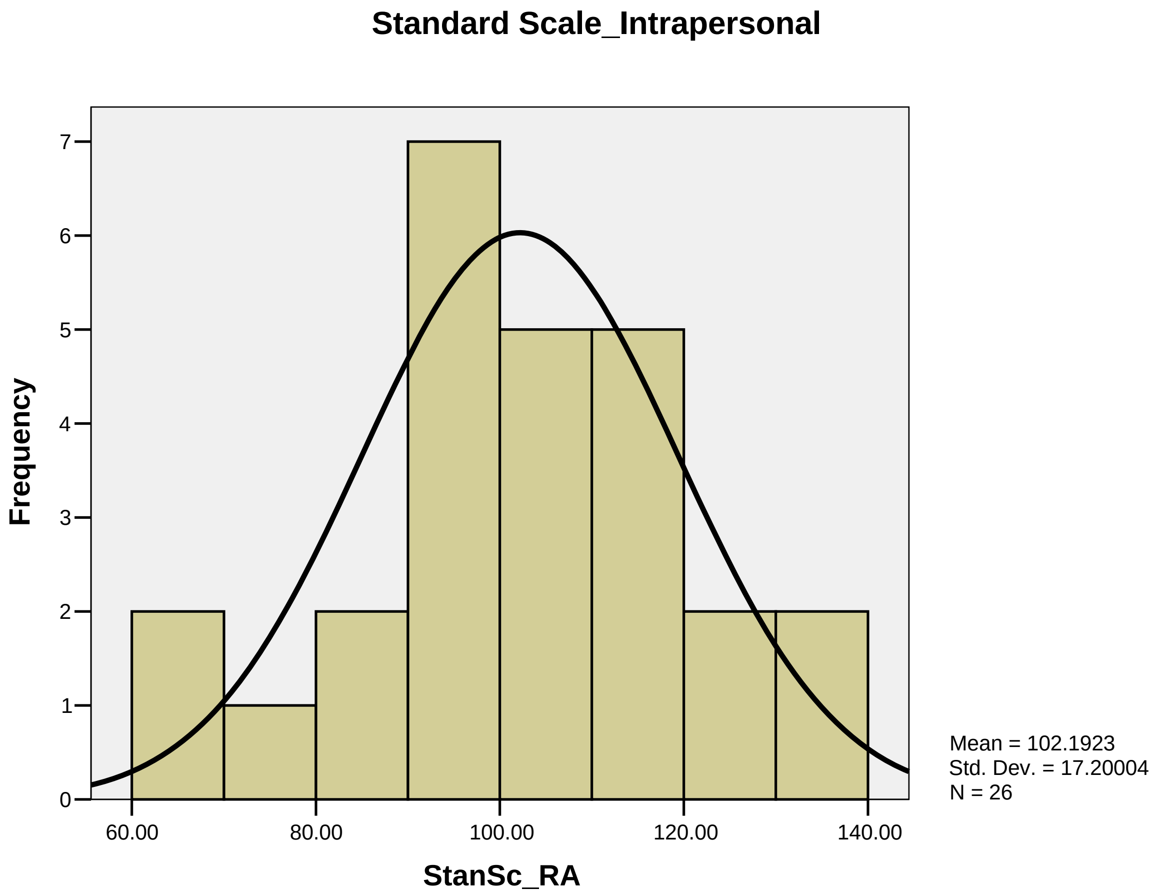
EQi:S DATA

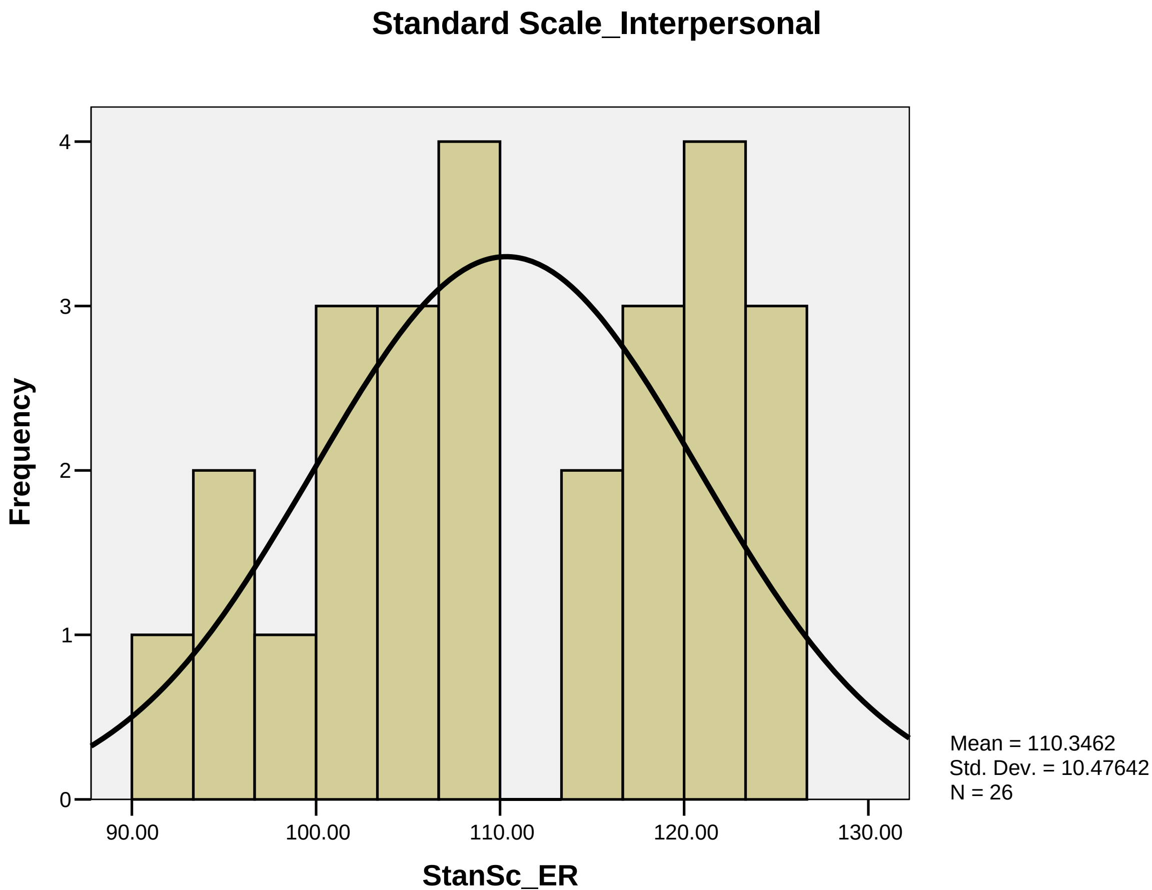
Statistics EQi:S Standard Scale

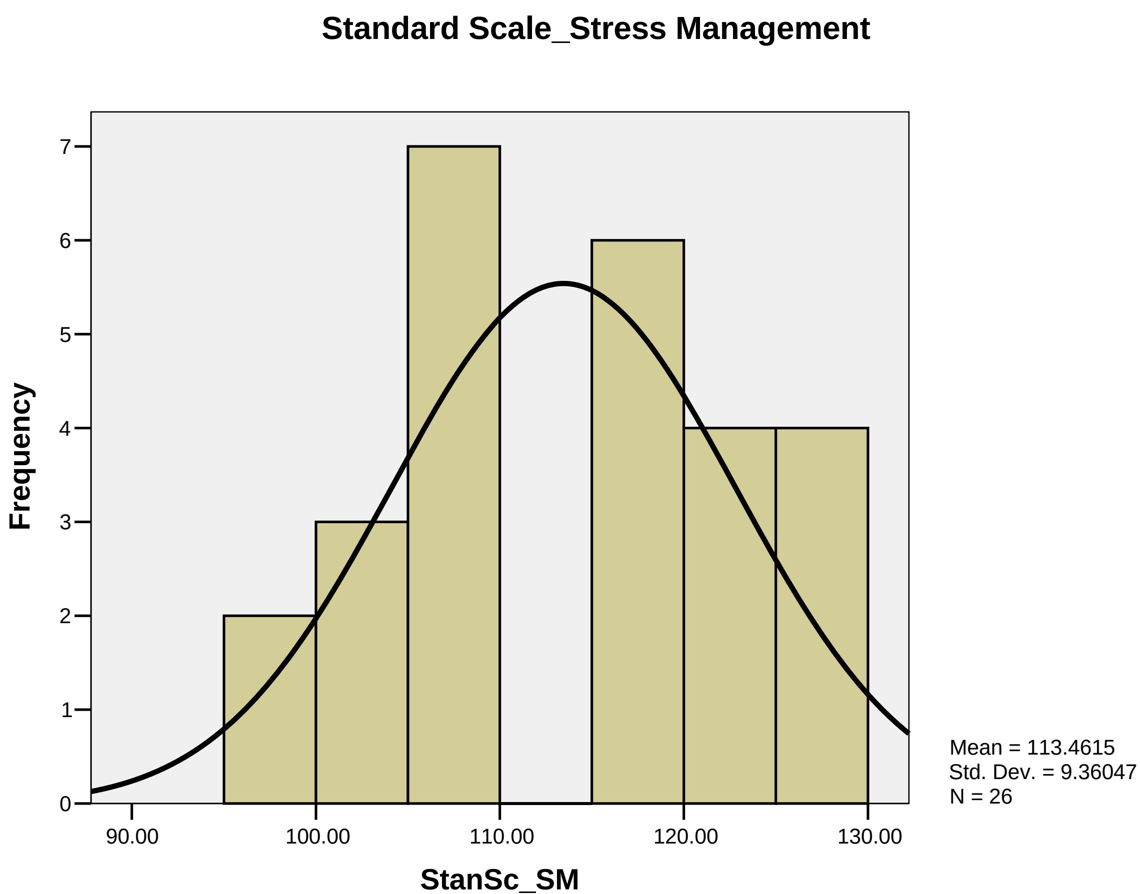
		StanSc_RA	StanSc_ER	StanSc_SM	StanSc_AD	StanSc_GM
N	Valid	26	26	26	26	26
	Missing	1	1	1	1	1
Mean		102.1923	110.3462	113.4615	119.2692	108.9231
Std. Deviation		17.20004	10.47642	9.36047	11.70831	15.15763
Skewness		-.381	-.188	-.094	-.028	-.654
Std. Error of Skewness		.456	.456	.456	.456	.456
Kurtosis		.030	-1.054	-1.046	-.842	.105
Std. Error of Kurtosis		.887	.887	.887	.887	.887
Minimum		66.00	91.00	98.00	94.00	73.00
Maximum		131.00	125.00	127.00	136.00	130.00

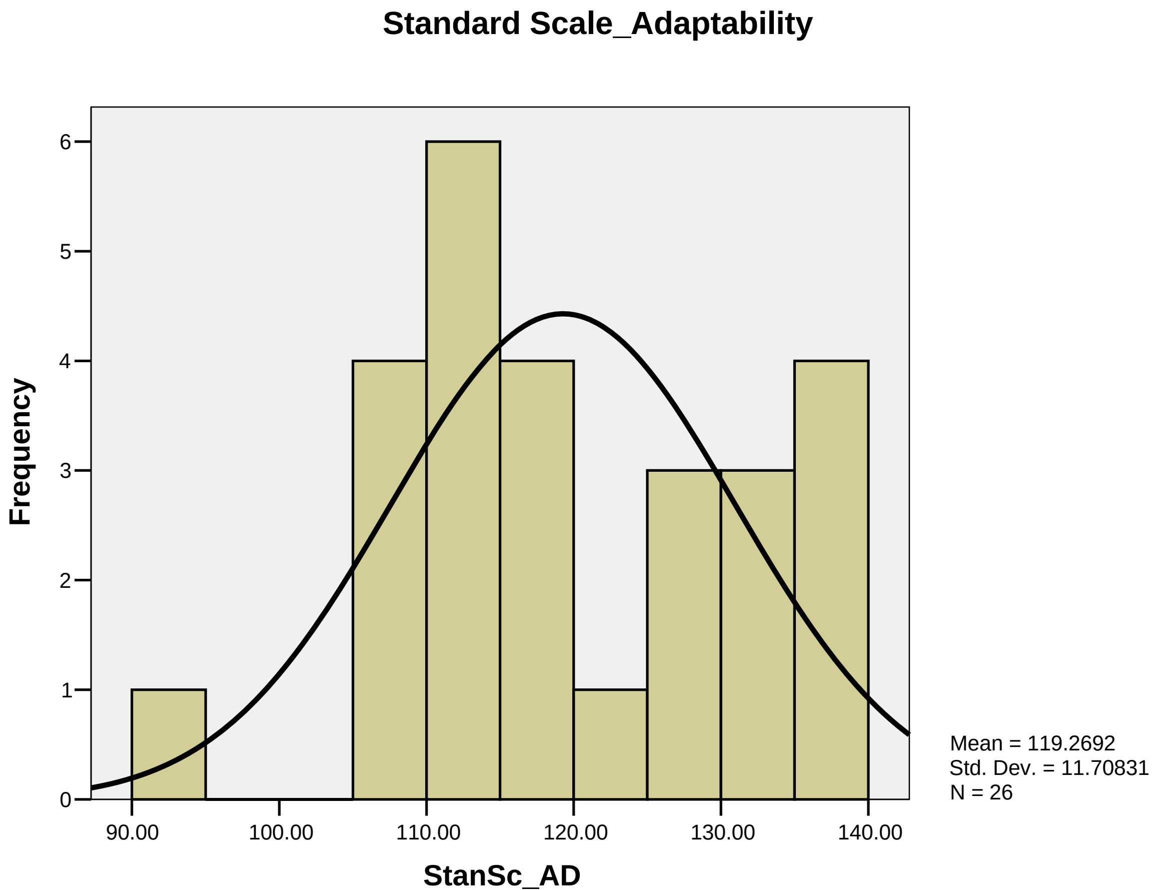
Statistics EQi:S Standard Scale

		StanSc_PI	StanSc_EQ
N	Valid	26	26
	Missing	1	1
Mean		116.7308	113.9615
Std. Deviation		16.89629	14.60543
Skewness		-.136	-.274
Std. Error of Skewness		.456	.456
Kurtosis		-.756	-.639
Std. Error of Kurtosis		.887	.887
Minimum		85.00	85.00
Maximum		149.00	139.00


Standard Scale_Intrapersonal
Frequency
0
1
2
3
4
5
6
7
60.00
80.00
100.00
120.00
140.00
StanSc_RA
Mean = 102.1923
Std. Dev. = 17.20004
N = 26


Standard Scale_Interpersonal
Frequency
0
1
2
3
4
90.00
100.00
110.00
120.00
130.00
StanSc_ER
Mean = 110.3462
Std. Dev. = 10.47642
N = 26


Standard Scale_Stress Management
Frequency
0
1
2
3
4
5
6
7
90.00
100.00
110.00
120.00
130.00
StanSc_SM
Mean = 113.4615
Std. Dev. = 9.36047
N = 26


Standard Scale_Adaptability
Frequency
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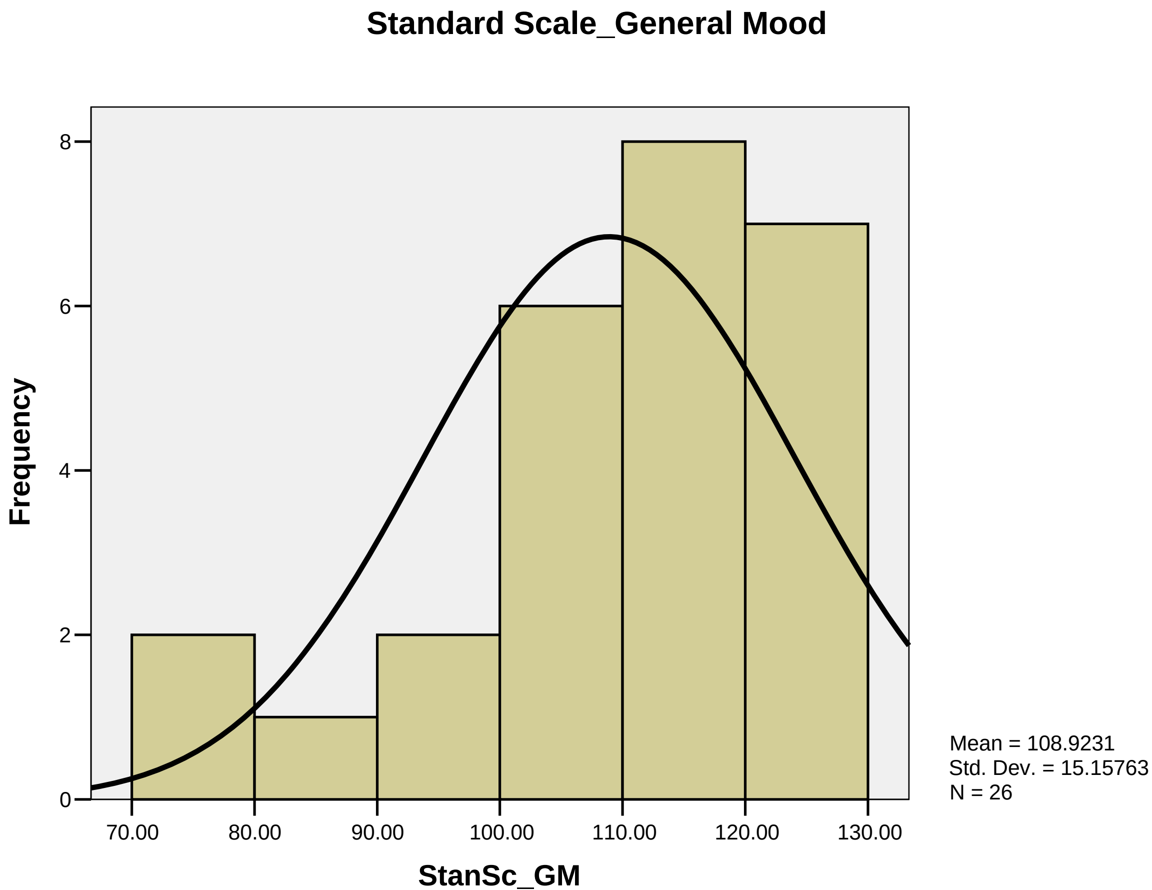
5
4
3
2
1
0
90.00
100.00
110.00
120.00
130.00
140.00
StanSc_AD
Mean = 119.2692
Std. Dev. = 11.70831
N = 26


Standard Scale_General Mood
Frequency
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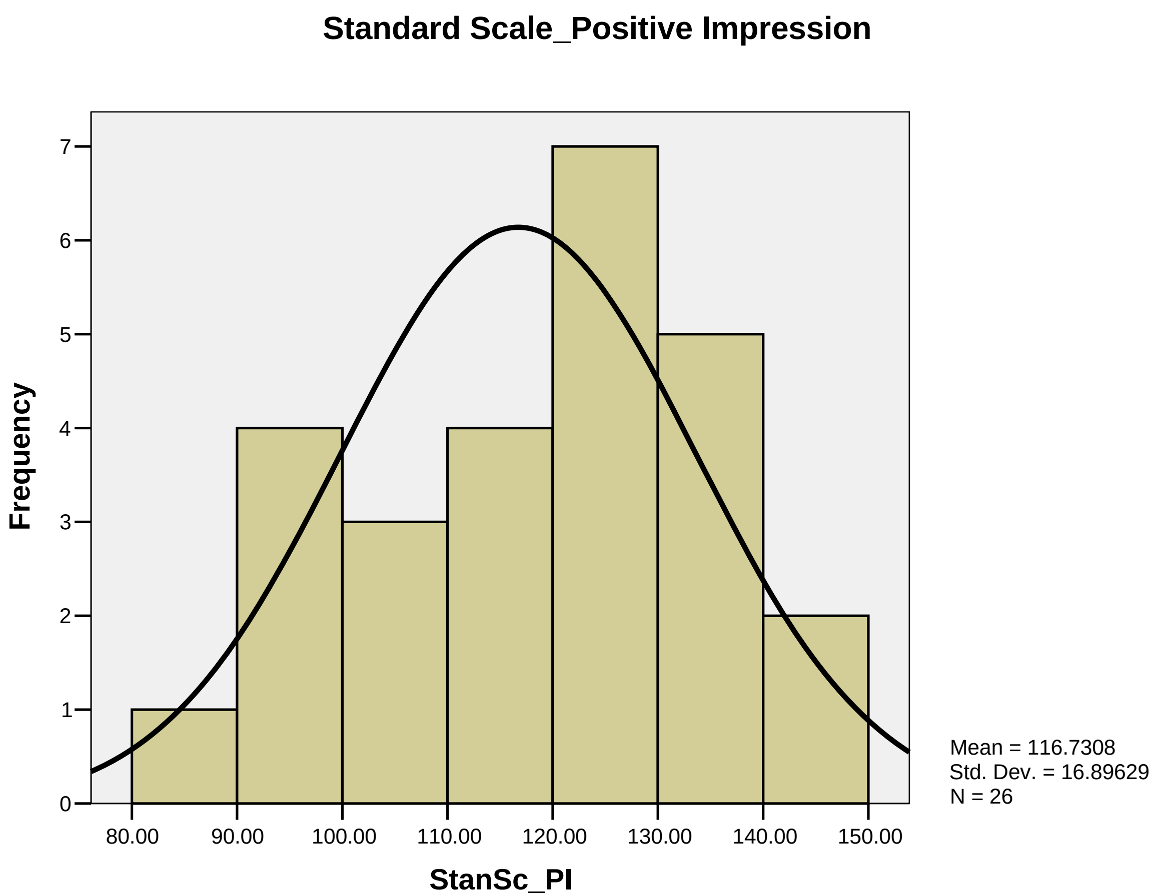
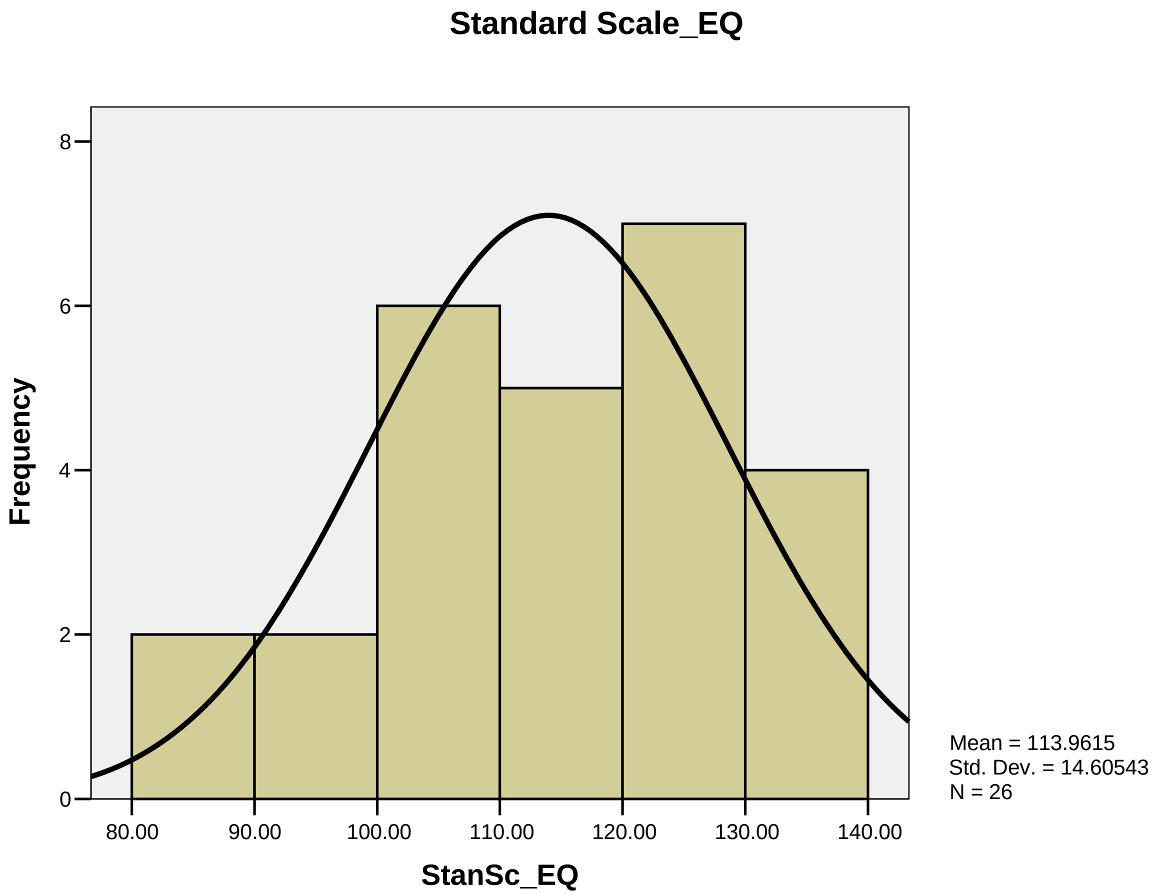
6
4
2
0
70.00
80.00
90.00
100.00
110.00
120.00
130.00
StanSc_GM
Mean = 108.9231
Std. Dev. = 15.15763
N = 26


Standard Scale_Positive Impression
Frequency
0
1
2
3
4
5
6
7
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
StanSc_PI
Mean = 116.7308
Std. Dev. = 16.89629
N = 26



Means

Measures of Association

	Eta	Eta Squared
StanSc_RA * StanSc_SM	.700	.490
StanSc_AD * StanSc_SM	.776	.602
StanSc_PI * StanSc_SM	.747	.558

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
StanSc_RA	Between Groups	7343.372	21	349.684	26.558	.003
	Within Groups	52.667	4	13.167		
	Total	7396.038	25			
StanSc_AD	Between Groups	3265.449	21	155.498	3.847	.100
	Within Groups	161.667	4	40.417		
	Total	3427.115	25			

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
StanSc_RA	Between Groups	7343.372	21	349.684	26.558	.003
	Within Groups	52.667	4	13.167		
	Total	7396.038	25			
StanSc_PI	Between Groups	6340.449	21	301.926	1.516	.373
	Within Groups	796.667	4	199.167		
	Total	7137.115	25			

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
StanSc_RA	Between Groups	7343.372	21	349.684	26.558	.003
	Within Groups	52.667	4	13.167		
	Total	7396.038	25			
StanSc_GM	Between Groups	5626.179	21	267.913	9.108	.022
	Within Groups	117.667	4	29.417		
	Total	5743.846	25			

ANOVA

StanSc_ER

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2640.718	21	125.748	4.876	.067
Within Groups	103.167	4	25.792		
Total	2743.885	25			

ANOVA

StanSc_SM

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1943.795	21	92.562	1.501	.377
Within Groups	246.667	4	61.667		
Total	2190.462	25			

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std.
	Statistic	Statistic	Statistic	Statistic	Statistic
Raw_RA	26	24.00	50.00	38.4231	6.87705
Raw_ER	26	38.00	50.00	44.6923	3.68531
Raw_SM	26	30.00	40.00	35.4615	3.16520
Raw_AD	26	23.00	35.00	30.1923	3.40610
Raw_GM	26	29.00	50.00	42.1923	5.53548
Raw_PI	26	11.00	29.00	20.0385	4.76219
Raw_II	26	1.00	9.00	3.6923	2.20489
Raw_EQ	26	31.00	45.00	38.2308	3.82944
Valid N (listwise)	26				

Descriptive Statistics

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Raw_RA	-.366	.456	.013	.887
Raw_ER	-.161	.456	-1.069	.887
Raw_SM	-.141	.456	-.979	.887
Raw_AD	-.007	.456	-.942	.887
Raw_GM	-.651	.456	.110	.887
Raw_PI	-.146	.456	-.751	.887
Raw_II	.861	.456	-.029	.887
Raw_EQ	-.191	.456	-.694	.887
Valid N (listwise)				

Frequencies

Statistics

Raw_RA

N	Valid	26
	Missing	1

Raw_RA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	24.00	2	7.4	7.7	7.7
	28.00	1	3.7	3.8	11.5
	32.00	1	3.7	3.8	15.4
	33.00	1	3.7	3.8	19.2
	35.00	1	3.7	3.8	23.1
	36.00	5	18.5	19.2	42.3
	37.00	1	3.7	3.8	46.2
	38.00	2	7.4	7.7	53.8
	39.00	2	7.4	7.7	61.5
	41.00	1	3.7	3.8	65.4
	42.00	1	3.7	3.8	69.2
	44.00	4	14.8	15.4	84.6
	46.00	1	3.7	3.8	88.5
	47.00	1	3.7	3.8	92.3
	50.00	2	7.4	7.7	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

Statistics

Raw_ER

N	Valid	26
	Missing	1

Raw_ER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	38.00	1	3.7	3.8	3.8
	39.00	2	7.4	7.7	11.5
	40.00	1	3.7	3.8	15.4
	41.00	2	7.4	7.7	23.1
	42.00	1	3.7	3.8	26.9
	43.00	3	11.1	11.5	38.5
	44.00	4	14.8	15.4	53.8
	46.00	2	7.4	7.7	61.5
	47.00	3	11.1	11.5	73.1
	48.00	2	7.4	7.7	80.8
	49.00	2	7.4	7.7	88.5
	50.00	3	11.1	11.5	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

Statistics

		Raw_SM	Raw_AD	Raw_GM	Raw_PI	Raw_II	Raw_EQ
N	Valid	26	26	26	26	26	26
	Missing	1	1	1	1	1	1

Raw_SM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30.00	2	7.4	7.7	7.7
	31.00	2	7.4	7.7	15.4
	32.00	1	3.7	3.8	19.2
	33.00	1	3.7	3.8	23.1
	34.00	6	22.2	23.1	46.2
	36.00	4	14.8	15.4	61.5
	37.00	2	7.4	7.7	69.2
	38.00	3	11.1	11.5	80.8
	39.00	1	3.7	3.8	84.6
	40.00	4	14.8	15.4	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

Raw_AD

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	23.00	1	3.7	3.8	3.8
	26.00	2	7.4	7.7	11.5
	27.00	2	7.4	7.7	19.2
	28.00	6	22.2	23.1	42.3
	29.00	2	7.4	7.7	50.0
	30.00	2	7.4	7.7	57.7
	31.00	1	3.7	3.8	61.5
	32.00	2	7.4	7.7	69.2
	33.00	1	3.7	3.8	73.1
	34.00	3	11.1	11.5	84.6
	35.00	4	14.8	15.4	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

Raw_GM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	29.00	1	3.7	3.8	3.8
	31.00	1	3.7	3.8	7.7
	35.00	1	3.7	3.8	11.5
	36.00	1	3.7	3.8	15.4
	37.00	1	3.7	3.8	19.2
	39.00	2	7.4	7.7	26.9
	40.00	3	11.1	11.5	38.5
	41.00	1	3.7	3.8	42.3
	43.00	3	11.1	11.5	53.8
	44.00	4	14.8	15.4	69.2
	46.00	1	3.7	3.8	73.1
	47.00	3	11.1	11.5	84.6
	49.00	2	7.4	7.7	92.3
	50.00	2	7.4	7.7	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

Raw_PI

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	11.00	1	3.7	3.8	3.8
	13.00	2	7.4	7.7	11.5
	14.00	2	7.4	7.7	19.2
	16.00	2	7.4	7.7	26.9
	17.00	1	3.7	3.8	30.8
	18.00	1	3.7	3.8	34.6
	19.00	2	7.4	7.7	42.3
	20.00	1	3.7	3.8	46.2
	21.00	4	14.8	15.4	61.5
	22.00	2	7.4	7.7	69.2
	23.00	1	3.7	3.8	73.1
	24.00	2	7.4	7.7	80.8
	25.00	2	7.4	7.7	88.5
	26.00	1	3.7	3.8	92.3
	27.00	1	3.7	3.8	96.2
	29.00	1	3.7	3.8	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

Raw_II

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	3	11.1	11.5	11.5
	2.00	7	25.9	26.9	38.5
	3.00	5	18.5	19.2	57.7
	4.00	3	11.1	11.5	69.2
	5.00	2	7.4	7.7	76.9
	6.00	3	11.1	11.5	88.5
	7.00	1	3.7	3.8	92.3
	8.00	1	3.7	3.8	96.2
	9.00	1	3.7	3.8	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

Raw_EQ

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	31.00	2	7.4	7.7	7.7
	33.00	1	3.7	3.8	11.5
	34.00	1	3.7	3.8	15.4
	35.00	3	11.1	11.5	26.9
	36.00	1	3.7	3.8	30.8
	37.00	4	14.8	15.4	46.2
	38.00	2	7.4	7.7	53.8
	39.00	1	3.7	3.8	57.7
	40.00	2	7.4	7.7	65.4
	41.00	3	11.1	11.5	76.9
	42.00	3	11.1	11.5	88.5
	43.00	1	3.7	3.8	92.3
	44.00	1	3.7	3.8	96.2
	45.00	1	3.7	3.8	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

Frequencies

Statistics

		StanSc_RA	StanSc_ER	StanSc_SM	StanSc_AD	StanSc_GM	StanSc_PI	StanSc_EQ
N	Valid	26	26	26	26	26	26	26
	Missing	1	1	1	1	1	1	1

Frequency Table

StanSc_RA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	66.00	2	7.4	7.7	7.7
	76.00	1	3.7	3.8	11.5
	86.00	1	3.7	3.8	15.4
	89.00	1	3.7	3.8	19.2
	94.00	1	3.7	3.8	23.1
	96.00	5	18.5	19.2	42.3
	99.00	1	3.7	3.8	46.2
	101.00	2	7.4	7.7	53.8
	104.00	2	7.4	7.7	61.5
	109.00	1	3.7	3.8	65.4
	111.00	1	3.7	3.8	69.2
	116.00	4	14.8	15.4	84.6
	121.00	1	3.7	3.8	88.5
	124.00	1	3.7	3.8	92.3
	131.00	2	7.4	7.7	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

StanSc_ER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	91.00	1	3.7	3.8	3.8
	94.00	2	7.4	7.7	11.5
	97.00	1	3.7	3.8	15.4
	100.00	2	7.4	7.7	23.1
	103.00	1	3.7	3.8	26.9
	106.00	3	11.1	11.5	38.5
	108.00	4	14.8	15.4	53.8
	114.00	2	7.4	7.7	61.5
	117.00	3	11.1	11.5	73.1
	120.00	2	7.4	7.7	80.8
	123.00	2	7.4	7.7	88.5
	125.00	3	11.1	11.5	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

StanSc_SM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	98.00	2	7.4	7.7	7.7
	100.00	2	7.4	7.7	15.4
	103.00	1	3.7	3.8	19.2
	106.00	1	3.7	3.8	23.1
	109.00	6	22.2	23.1	46.2
	115.00	4	14.8	15.4	61.5
	118.00	2	7.4	7.7	69.2
	121.00	3	11.1	11.5	80.8
	124.00	1	3.7	3.8	84.6
	127.00	4	14.8	15.4	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

StanSc_AD

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	94.00	1	3.7	3.8	3.8
	105.00	2	7.4	7.7	11.5
	108.00	2	7.4	7.7	19.2
	112.00	6	22.2	23.1	42.3
	115.00	2	7.4	7.7	50.0
	119.00	2	7.4	7.7	57.7
	122.00	1	3.7	3.8	61.5
	125.00	2	7.4	7.7	69.2
	129.00	1	3.7	3.8	73.1
	132.00	3	11.1	11.5	84.6
	136.00	4	14.8	15.4	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

StanSc_GM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	73.00	1	3.7	3.8	3.8
	78.00	1	3.7	3.8	7.7
	89.00	1	3.7	3.8	11.5
	92.00	1	3.7	3.8	15.4
	95.00	1	3.7	3.8	19.2
	100.00	2	7.4	7.7	26.9
	103.00	3	11.1	11.5	38.5
	106.00	1	3.7	3.8	42.3
	111.00	3	11.1	11.5	53.8
	114.00	4	14.8	15.4	69.2
	119.00	1	3.7	3.8	73.1
	122.00	3	11.1	11.5	84.6
	128.00	2	7.4	7.7	92.3
	130.00	2	7.4	7.7	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

StanSc_PI

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	85.00	1	3.7	3.8	3.8
	92.00	2	7.4	7.7	11.5
	95.00	2	7.4	7.7	19.2
	102.00	2	7.4	7.7	26.9
	106.00	1	3.7	3.8	30.8
	110.00	1	3.7	3.8	34.6
	113.00	2	7.4	7.7	42.3
	117.00	1	3.7	3.8	46.2
	120.00	4	14.8	15.4	61.5
	124.00	2	7.4	7.7	69.2
	127.00	1	3.7	3.8	73.1
	131.00	2	7.4	7.7	80.8
	134.00	2	7.4	7.7	88.5
	138.00	1	3.7	3.8	92.3
	141.00	1	3.7	3.8	96.2
	149.00	1	3.7	3.8	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

StanSc_EQ

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	85.00	1	3.7	3.8	3.8
	86.00	1	3.7	3.8	7.7
	95.00	1	3.7	3.8	11.5
	97.00	1	3.7	3.8	15.4
	102.00	3	11.1	11.5	26.9
	105.00	1	3.7	3.8	30.8
	108.00	1	3.7	3.8	34.6
	109.00	1	3.7	3.8	38.5
	111.00	2	7.4	7.7	46.2
	112.00	1	3.7	3.8	50.0
	114.00	1	3.7	3.8	53.8
	117.00	1	3.7	3.8	57.7
	120.00	1	3.7	3.8	61.5
	122.00	1	3.7	3.8	65.4
	124.00	2	7.4	7.7	73.1
	125.00	1	3.7	3.8	76.9
	128.00	1	3.7	3.8	80.8
	129.00	1	3.7	3.8	84.6
	130.00	1	3.7	3.8	88.5
	131.00	1	3.7	3.8	92.3
	135.00	1	3.7	3.8	96.2
	139.00	1	3.7	3.8	100.0
	Total	26	96.3	100.0	
Missing	System	1	3.7		
Total		27	100.0		

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std.
	Statistic	Statistic	Statistic	Statistic	Statistic
Raw_RA	26	24.00	50.00	38.4231	6.87705
Raw_ER	26	38.00	50.00	44.6923	3.68531
Raw_SM	26	30.00	40.00	35.4615	3.16520
Raw_AD	26	23.00	35.00	30.1923	3.40610
Raw_GM	26	29.00	50.00	42.1923	5.53548
Raw_PI	26	11.00	29.00	20.0385	4.76219
Raw_II	26	1.00	9.00	3.6923	2.20489
Raw_EQ	26	31.00	45.00	38.2308	3.82944
Valid N (listwise)	26				

Descriptive Statistics

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Raw_RA	-.366	.456	.013	.887
Raw_ER	-.161	.456	-1.069	.887
Raw_SM	-.141	.456	-.979	.887
Raw_AD	-.007	.456	-.942	.887
Raw_GM	-.651	.456	.110	.887
Raw_PI	-.146	.456	-.751	.887
Raw_II	.861	.456	-.029	.887
Raw_EQ	-.191	.456	-.694	.887
Valid N (listwise)				

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std.
	Statistic	Statistic	Statistic	Statistic	Statistic
StanSc_RA	26	66.00	131.00	102.1923	17.20004
StanSc_ER	26	91.00	125.00	110.3462	10.47642
StanSc_SM	26	98.00	127.00	113.4615	9.36047
StanSc_AD	26	94.00	136.00	119.2692	11.70831
StanSc_GM	26	73.00	130.00	108.9231	15.15763
StanSc_PI	26	85.00	149.00	116.7308	16.89629
StanSc_EQ	26	85.00	139.00	113.9615	14.60543
Valid N (listwise)	26				

Descriptive Statistics

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
StanSc_RA	-.381	.456	.030	.887
StanSc_ER	-.188	.456	-1.054	.887
StanSc_SM	-.094	.456	-1.046	.887
StanSc_AD	-.028	.456	-.842	.887
StanSc_GM	-.654	.456	.105	.887
StanSc_PI	-.136	.456	-.756	.887
StanSc_EQ	-.274	.456	-.639	.887
Valid N (listwise)				

Correlations

		StanSc_RA	StanSc_ER	StanSc_SM	StanSc_AD	StanSc_GM
StanSc_RA	Pearson Correlation	1	.497**	.473*	.564**	.888**
	Sig. (2-tailed)		.010	.015	.003	.000
	Sum of Squares and Cross-products	7396.038	2239.269	1904.692	2837.654	5787.385
	Covariance	295.842	89.571	76.188	113.506	231.495
	N	26	26	26	26	26
StanSc_ER	Pearson Correlation	.497**	1	.287	.544**	.580**
	Sig. (2-tailed)	.010		.155	.004	.002
	Sum of Squares and Cross-products	2239.269	2743.885	703.846	1667.577	2300.692
	Covariance	89.571	109.755	28.154	66.703	92.028
	N	26	26	26	26	26
StanSc_SM	Pearson Correlation	.473*	.287	1	.651**	.507**
	Sig. (2-tailed)	.015	.155		.000	.008
	Sum of Squares and Cross-products	1904.692	703.846	2190.462	1783.769	1797.923
	Covariance	76.188	28.154	87.618	71.351	71.917
	N	26	26	26	26	26
StanSc_AD	Pearson Correlation	.564**	.544**	.651**	1	.587**
	Sig. (2-tailed)	.003	.004	.000		.002
	Sum of Squares and Cross-products	2837.654	1667.577	1783.769	3427.115	2603.538
	Covariance	113.506	66.703	71.351	137.085	104.142
	N	26	26	26	26	26
StanSc_GM	Pearson Correlation	.888**	.580**	.507**	.587**	1
	Sig. (2-tailed)	.000	.002	.008	.002	
	Sum of Squares and Cross-products	5787.385	2300.692	1797.923	2603.538	5743.846
	Covariance	231.495	92.028	71.917	104.142	229.754
	N	26	26	26	26	26
StanSc_PI	Pearson Correlation	.541**	.233	.354	.331	.544**
	Sig. (2-tailed)	.004	.252	.076	.099	.004
	Sum of Squares and Cross-products	3929.346	1031.423	1399.231	1634.885	3483.462
	Covariance	157.174	41.257	55.969	65.395	139.338
	N	26	26	26	26	26
StanSc_EQ	Pearson Correlation	.907**	.700**	.669**	.779**	.929**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	Sum of Squares and Cross-products	5695.192	2679.346	2285.462	3331.269	5138.923
	Covariance	227.808	107.174	91.418	133.251	205.557
	N	26	26	26	26	26

Correlations

		StanSc_PI	StanSc_EQ
StanSc_RA	Pearson Correlation	.541**	.907**
	Sig. (2-tailed)	.004	.000
	Sum of Squares and Cross-products	3929.346	5695.192
	Covariance	157.174	227.808
	N	26	26
StanSc_ER	Pearson Correlation	.233	.700**
	Sig. (2-tailed)	.252	.000
	Sum of Squares and Cross-products	1031.423	2679.346
	Covariance	41.257	107.174
	N	26	26
StanSc_SM	Pearson Correlation	.354	.669**
	Sig. (2-tailed)	.076	.000
	Sum of Squares and Cross-products	1399.231	2285.462
	Covariance	55.969	91.418
	N	26	26
StanSc_AD	Pearson Correlation	.331	.779**
	Sig. (2-tailed)	.099	.000
	Sum of Squares and Cross-products	1634.885	3331.269
	Covariance	65.395	133.251
	N	26	26
StanSc_GM	Pearson Correlation	.544**	.929**
	Sig. (2-tailed)	.004	.000
	Sum of Squares and Cross-products	3483.462	5138.923
	Covariance	139.338	205.557
	N	26	26
StanSc_PI	Pearson Correlation	1	.529**
	Sig. (2-tailed)		.006
	Sum of Squares and Cross-products	7137.115	3260.731
	Covariance	285.485	130.429
	N	26	26
StanSc_EQ	Pearson Correlation	.529**	1
	Sig. (2-tailed)	.006	
	Sum of Squares and Cross-products	3260.731	5332.962
	Covariance	130.429	213.318
	N	26	26

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations

		Raw_RA	Raw_ER	Raw_SM	Raw_AD	Raw_GM	Raw_PI
Raw_RA	Pearson Correlation	1	.496**	.474*	.567**	.891**	.545**
	Sig. (2-tailed)		.010	.014	.003	.000	.004
	Sum of Squares and Cross-products	1182.346	314.385	257.923	331.885	847.885	446.577
	Covariance	47.294	12.575	10.317	13.275	33.915	17.863
	N	26	26	26	26	26	26
Raw_ER	Pearson Correlation	.496**	1	.287	.547**	.579**	.245
	Sig. (2-tailed)	.010		.155	.004	.002	.229
	Sum of Squares and Cross-products	314.385	339.538	83.692	171.538	295.538	107.308
	Covariance	12.575	13.582	3.348	6.862	11.822	4.292
	N	26	26	26	26	26	26
Raw_SM	Pearson Correlation	.474*	.287	1	.648**	.508**	.362
	Sig. (2-tailed)	.014	.155		.000	.008	.069
	Sum of Squares and Cross-products	257.923	83.692	250.462	174.692	222.692	136.538
	Covariance	10.317	3.348	10.018	6.988	8.908	5.462
	N	26	26	26	26	26	26
Raw_AD	Pearson Correlation	.567**	.547**	.648**	1	.588**	.342
	Sig. (2-tailed)	.003	.004	.000		.002	.087
	Sum of Squares and Cross-products	331.885	171.538	174.692	290.038	277.038	138.808
	Covariance	13.275	6.862	6.988	11.602	11.082	5.552
	N	26	26	26	26	26	26
Raw_GM	Pearson Correlation	.891**	.579**	.508**	.588**	1	.544**
	Sig. (2-tailed)	.000	.002	.008	.002		.004
	Sum of Squares and Cross-products	847.885	295.538	222.692	277.038	766.038	358.808
	Covariance	33.915	11.822	8.908	11.082	30.642	14.352
	N	26	26	26	26	26	26
Raw_PI	Pearson Correlation	.545**	.245	.362	.342	.544**	1
	Sig. (2-tailed)	.004	.229	.069	.087	.004	
	Sum of Squares and Cross-products	446.577	107.308	136.538	138.808	358.808	566.962
	Covariance	17.863	4.292	5.462	5.552	14.352	22.678
	N	26	26	26	26	26	26
Raw_II	Pearson Correlation	-.403*	-.519**	-.328	-.333	-.441*	-.445*
	Sig. (2-tailed)	.041	.007	.101	.097	.024	.023
	Sum of Squares and Cross-products	-152.615	-105.462	-57.308	-62.462	-134.462	-116.692
	Covariance	-6.105	-4.218	-2.292	-2.498	-5.378	-4.668
	N	26	26	26	26	26	26
Raw_EQ	Pearson Correlation	.909**	.697**	.667**	.778**	.924**	.530**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.005
	Sum of Squares and Cross-products	598.462	245.846	202.231	253.846	489.846	241.769
	Covariance	23.938	9.834	8.089	10.154	19.594	9.671
	N	26	26	26	26	26	26

Correlations

		Raw_II	Raw_EQ
Raw_RA	Pearson Correlation	-.403*	.909**
	Sig. (2-tailed)	.041	.000
	Sum of Squares and Cross-products	-152.615	598.462
	Covariance	-6.105	23.938
	N	26	26
Raw_ER	Pearson Correlation	-.519**	.697**
	Sig. (2-tailed)	.007	.000
	Sum of Squares and Cross-products	-105.462	245.846
	Covariance	-4.218	9.834
	N	26	26
Raw_SM	Pearson Correlation	-.328	.667**
	Sig. (2-tailed)	.101	.000
	Sum of Squares and Cross-products	-57.308	202.231
	Covariance	-2.292	8.089
	N	26	26
Raw_AD	Pearson Correlation	-.333	.778**
	Sig. (2-tailed)	.097	.000
	Sum of Squares and Cross-products	-62.462	253.846
	Covariance	-2.498	10.154
	N	26	26
Raw_GM	Pearson Correlation	-.441*	.924**
	Sig. (2-tailed)	.024	.000
	Sum of Squares and Cross-products	-134.462	489.846
	Covariance	-5.378	19.594
	N	26	26
Raw_PI	Pearson Correlation	-.445*	.530**
	Sig. (2-tailed)	.023	.005
	Sum of Squares and Cross-products	-116.692	241.769
	Covariance	-4.668	9.671
	N	26	26
Raw_II	Pearson Correlation	1	-.508**
	Sig. (2-tailed)		.008
	Sum of Squares and Cross-products	121.538	-107.154
	Covariance	4.862	-4.286
	N	26	26
Raw_EQ	Pearson Correlation	-.508**	1
	Sig. (2-tailed)	.008	
	Sum of Squares and Cross-products	-107.154	366.615
	Covariance	-4.286	14.665
	N	26	26

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

APPENDIX J

RESEARCH PRESENTATION

Dissertation Defense
Resiliency among Elementary Educators as measured by the POQA-R and EQi:S
October 27, 2006
University of Missouri, Columbia

Susan Stockton, D.C.
Alex Waigandt, Ph.D., Chair

Statement of the Problem

1. Effects of Stress on Health-the Influence of the Emotional dimension
2. A method best suited to address stress effects-Positive Emotion Selection
3. Population best suited to Implement this method-those influencing Behavior change early in life, e.g., Elementary Educators
4. Synergistic results of improved Health (Emotional Dimension) and Resilience (POQA-R) among teachers and students

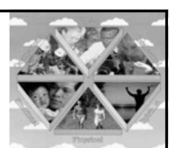
Stress Resilience

- **Resilience in education is defined as those successful fostering, empowering, *enthusiastic* attributes that create life-long learners among students and applies to how well students and teachers bounce back from *stress*, trauma, or risk in their lives, especially those events considered *negative* and the strategies used to combat these experiences, while becoming stronger in the process (Henderson & Milstein, 2003).**

Social Competence

- **In the Handbook of Emotional Intelligence (2000) Topping, Bremner, and Holmes state that *social competence* is a major component of resilience, those socially competent and integrated are more likely to be able to withstand the *stresses* of life and avoid those temptations involved in self-damaging behavior thus children need to *feel valued and secure* as well as teachers.**

Review of Literature



- **Emotional Dimension of Wellness-**
- **Bill Hettler, 2006** http://www.hettler.com/
- **Stress and Health- Arnetz and Ekman, 2006; Childre and Rozman, 2006; Guarneri,2006**
- **Positive Emotions- Izard,2002; Pressman and Cohen, 2005**

Resilience, Positive Emotions, and Education

- **Resilience and Education- BarOn, 2002; Fredrickson, 2000-2004; Goleman, 1995- 2006; Henderson and Milstein, 2003; Mayer and Salovey, 1996; Patterson, Collins, & Abbott, 2004**

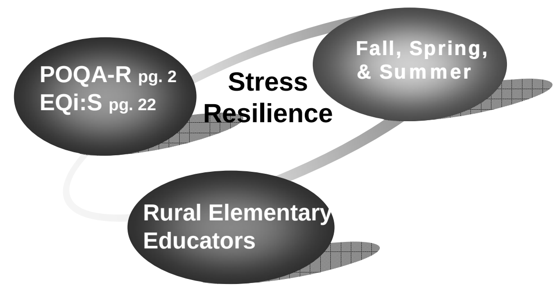
History

- Even though a power analysis was conducted to determine sample size for adequate power the number of valid tests were diminished necessitating abandoning the original quasi-experimental research design based on the following hypotheses:

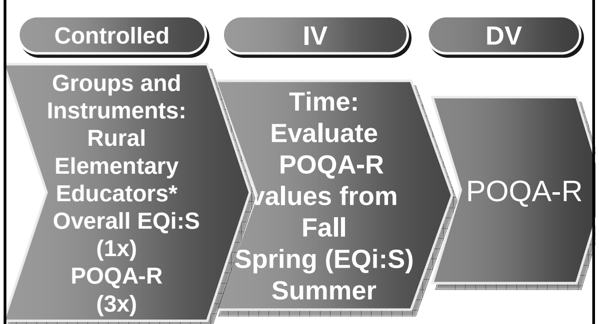
The heart and body generate signals to the brain, influencing the limbic system, the cortical area of emotional awareness (McCraty, 2004)

Learning requires a caring Relationship between Teacher and Student, which aids both, provides a source of emotional intelligence (coping) that facilitates resilience (Goleman, Boyatzis, & McKee, 2004)

Personal and Organizational Quality Assessment-Revised (POQA-R) and the Emotional Quotient Inventory: Short form (EQi:S)

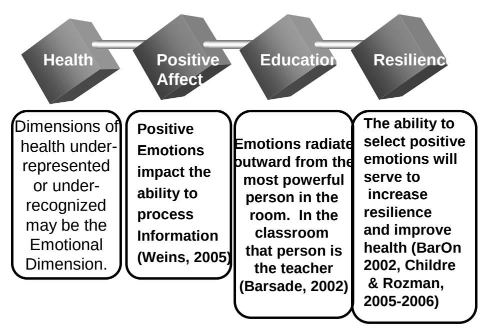


Variables



***Two matched districts in terms of student/teacher ratio-14; rural, mid-Western Missouri; 99% similar ethnicity; K through 5th grade; regular type of school**

Hypotheses



Data Analysis
One-way repeated measures ANOVA

	Value Observed*	*F*	Hypo df	Error df	Sig.	Power[a]
Calmness	.467	5.137[b]	2	9	.032	.673
Freedom of Expression	.483	4.816[b]	2	9	.038	.643
Communication Effectiveness	.483	4.189[b]	2	9	.052	.581

[a] computed using alpha =.05
[b] exact statistic
***Wilks' Lambda values**

Data Analysis
Pairwise Comparisons

Calmness	(I)Calm	(J)calm	Mean Difference (I)-(J)	Std. Error	Sig.[a]
Time 1 fall	1	2	-.424	.334	.697
		3	-.909*	.285	.029
Time 2 Spring	2	1	.424	.334	.697
		3	-.485	.260	.274
Time 3 Summer	3	1	.909*	.285	.029
		2	.485	.260	.274

Based on estimated marginal means.
***The mean difference is significant at the .05 level.**
[a]Adjustment for multiple comparisons: Bonferroni.

Data Analysis
Pairwise Comparisons

Freedom of Expression	(I)FreE	(J)FreE	Mean Difference (I)-(J)	Std. Error	Sig.[a]
Time 1 fall	1	2	-.303	.252	.771
		3	-.667*	.216	.034
Time 2 Spring	2	1	.303	.252	.771
		3	-.364	.198	.290
Time 3 Summer	3	1	.667*	.216	.034
		2	.364	.198	.290

Based on estimated marginal means.
***The mean difference is significant at the .05 level.**
[a]Adjustment for multiple comparisons: Bonferroni.

Data Analysis
Pairwise Comparisons

Communication Effectiveness	(I)ComEf	(J)ComEf	Mean Difference (I)-(J)	Std. Error	Sig.[a]
Time 1 fall	1	2	-.227	.217	.959
		3	-.682*	.236	.049
Time 2 Spring	2	1	.227	.217	.959
		3	-.455	.196	.129
Time 3 Summer	3	1	.682*	.236	.049
		2	.455	.196	.129

Based on estimated marginal means.
***The mean difference is significant at the .05 level.**
[a]Adjustment for multiple comparisons: Bonferroni.

Data Analysis Descriptive Statistics
Standardized Scale EQi:S

Index StanSc	Stat	Min. Stat.	Max. Stat.	Mean	Std. Dev. Stat.	Skew Stat	Skew Std. Error	Kurtosis Stat.	Kurtosis Std. Error
RA	26	66.00	131.00	102.19	17.20	-.381	.456	.030	.887
ER	26	91.00	125.00	110.35	10.48	-.188	.456	-1.05	.887
SM	26	98.00	127.00	113.46	9.36	-.094	.456	-1.05	.887
AD	26	94.00	136.00	119.27	11.71	-.028	.456	-.842	.887
GM	26	73.00	130.00	108.92	15.16	-.654	.456	.105	.887
PI	26	85.00	149.00	116.73	16.90	-.136	.456	-.756	.887
EQ	26	85.00	139.00	113.96	14.60	-.274	.456	-.639	.887

Valid N (listwise) 26
RA=intrapersonal, ER=interpersonal, SM=stress management, AD=Adaptability, GM=general mood, PI=Positive impression, EQ=overall emotional intelligence

Interpretive Guidelines for Standard Scores EQi:S

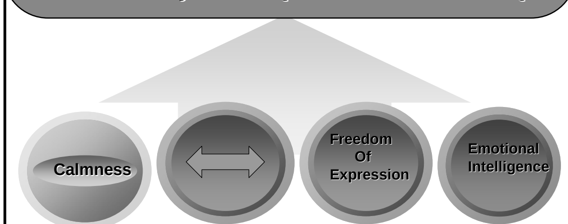
- **130+** — **Markedly high** — **atypically developed emotional and social capacity**
- **120-129** — **Very high** — **extremely well-developed emotional and social capacity**
- **110-119** — **High** — **well-developed emotional and social capacity**
- **90-109** — **Average** — **adequate emotional and social capacity**
- **80-89** — **Low** — **underdeveloped emotional and social capacity, with room for improvement**
- **70-79** — **Very Low** — **extremely underdeveloped emotional and social capacity, inc. room for improvement**
- **Under 70** — **Markedly Low** — **atypically impaired emotional and social capacity, with extensive room for improvement**

Emotional Intelligence

- **Normative Sample**
- **No significant difference between group means on any of the indices (pg 24) evaluated for emotional intelligence**
- **Research Group overall EQ was 113.96 indicating a HIGH or well-developed emotional and social capacity according to the Interpretive Guidelines for Standard Scores EQi:S (BarOn, 2002)**

Conclusion

Resilience Among Elementary Educators as measured by the POQA-R over time and EQi:S



Conclusions

- Significant differences on 3 indices of the POQA-R with this study suggest that a positive emotion intervention during the fall would be required to clarify findings. Findings indicate that calmness and freedom of expression were significantly lower at time 1 (fall) compared to time 3 (summer) implicating the difference between school and non-school interaction affects

Conclusions

- **Findings from the EQi:S suggest test subjects were comparable to the normative sample used to validate this instrument.**

Limitations

- **Limitations to this study include:**
- **Small Sample size**
- **Poor Subject compliance**
- **Lack of random assignment**
- **Minimal funding**
- **Predominant ethnicity and gender**

Discussion

- **Navigating the sea of emotions the buoy of resilience is upheld by positive emotion selection and generation. Reinforcing these new pathways with repeated positive emotion selection will accelerate healing opportunities and regeneration (*resilience*).**

Discussion

- Future research will address elementary teachers resilience and their students' learning, development, and health, collectively, via a heart-focused, positive emotion approach as described by the Institute of HeartMath in their text "The HeartMath Solution."

VITA

Susan Clark Stockton was born April 16, 1959, in Warrensburg, Missouri. She graduated from Warrensburg High School in 1977 and continued her education at Central Missouri State University earning a Bachelor of Science degree in Dietetics (1980) and a Master of Science in Fitness/Wellness (1999). She was employed as Food Service Director with the Warrensburg School District from 1981-1986 and earned a Doctor of Chiropractic degree from Cleveland Chiropractic College, Kansas City, Missouri in 1989. She maintained a private Chiropractic practice from 1989 until 1998. She is presently teaching health education classes at the University of Central Missouri.

Susan married Robert Mark Stockton of Warrensburg, Missouri in 1979. They have two sons and live on the family farm north and west of Warrensburg.