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Evaluation of guided visualizations and the relationships among perceived stress, differentiation of self, sense of coherence, dyadic satisfaction and quality of life

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EVALUATION OF GUIDED VISUALIZATIONS AND THE RELATIONSHIPS AMONG PERCEIVED STRESS, DIFFERENTIATION OF SELF, SENSE OF COHERENCE, DYADIC SATISFACTION AND QUALITY OF LIFE

by

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ABSTRACT

Evaluation of Guided Visualizations and the Relationships Among Perceived Stress, Differentiation of Self, Sense of Coherence, Dyadic Satisfaction and Quality of Life

by

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This study focused on three main areas. These areas involved (1) the relationship among perceived stress, global orientation to life and indicators of physical, psychological and dyadic relational distress, (2) the effect of a brief CBT-based relaxation/guided visualization intervention on these outcome indicators of distress, and (3) changes in physiological indicators during the intervention sessions. The study population was drawn from couples who perceived themselves as living highly stressed lifestyles.

Results suggested that global orientation to life as reflected by differentiation of self inventory (DSI) and sense of coherence scale (SOCS) scale scores mediated the relationship between stress and distress. More specifically, individuals with higher DSI and SOCS scores showed lower levels of physical, psychological and relational distress related to their relatively high levels of perceived stress. Results also indicated that after the three session intervention, participants showed lower levels of perceived stress, dyadic distress, physical and psychological complaints, and higher scores on the DSI and SOCS. Monitoring of physiological parameters (breathing rate, heart rate variability and salivary cortisol) during the intervention sessions suggested relationships among

controlled breathing instruction, breathing rates and heart rate variability (an indicator of sympathetic / parasympathetic nervous system balance). Clinical implications of these results within the framework of an integrated theoretical approach might suggest the use of relaxation / guided visualization techniques in conjunction with couple therapy in cases where couples report high levels of perceived stress.

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LIST OF ABREVIATIONS

A(1,2)	Assumptions
ANCOVA	Analysis of covariance
ANOVA	Analysis of variance
ANS	Autonomic nervous system
BP	Blood pressure
BSI-GSI	Brief symptom inventory-global severity index
CBT	Cognitive behavioral therapy
CD	Compact disc
DSI	Differentiation of self inventory
EC	Emotional cutoff
ER	Emotional reactivity
FO	Fusion with others
GDS	Global distress scale
GSI	Global severity index
H(1-3)	Hypothesis
HPA	Hypothalamic-pituitary-adrenal
HR	Heart rate
HRV	Heart rate variability
IP	I position
LES	Life event scale
MFT	Marriage and family therapy
MSI	Marital satisfaction inventory
PMR	Progressive muscle relaxation
PSDI	Positive symptom distress index
PSS	Perceived stress scale
PST	Positive symptom total
QoLI	Quality of life inventory
RSA	Respiratory sinus arrhythmia
SCL	Symptom checklist
SOC	Sense of coherence
SOCS	Sense of coherence scale
UNLV	University of Nevada Las Vegas
VT	Vascular tone

CHAPTER 1

INTRODUCTION

Statement of the Problem

Perceived stress and coping styles are important issues in couples counseling. Several studies have shown significant relationships between perceived levels of everyday stress and marital quality and satisfaction (Bodenmann & Shantinath, 2004). How individuals and couples manage perceived stress depends largely on the perspective or the *lens* that they use to view their lives. The concept of a world view in which we perceive our environment has been explored in *family systems theory* and *social theory*. One of the main principles in Bowen Theory is the concept of *differentiation of self* (Bowen, 1985). This concept has been defined in two parts. The first part involves an individual's ability to separate emotional and intellectual functioning and the degree to which they choose to apply this ability to their behaviors (Bartle-Haring, Rosen & Stith, 2002). The second part involves the ability to maintain close relationships without sacrificing autonomy (i.e., the *differentiated* person is able to maintain close relationships without becoming *emotionally reactive* under stressful situations). Bowen Theory further hypothesizes that differentiation of self moderates the relationship between stress and psychological dysfunction. More specifically, Kerr and Bowen (1988) suggested that "People at any point on the scale [of differentiation], if stressed sufficiently, can develop physical, emotional, or social symptoms. The higher the level of differentiation, however, the more stress is needed to trigger a symptom". (p. 110)

Chronic anxiety is one type of psychological dysfunction that Bowen Theory suggests, results from the impact of stress on less differentiated individuals. Kerr and Bowen (1988) also proposed that "The average level of chronic anxiety of a person and

of a ... family parallels the basic level of differentiation of that individual and family [and] the lower the level of basic differentiation, the higher the level of chronic anxiety". (p. 111)

Contemporary with Bowen, Hans Selye was highly influential in the areas of physiological effects of stress from a biological perspective. Selye discovered that a variety of stressors (somewhat Draconian by modern standards for humans) produced a non-specific stress response in rodents (Tache & Selye, 1985). Although the characteristic physiological changes that he observed might only be expected to be relevant for people living in catastrophic situations, the concepts and models that he outlined have proven relevant to everyday stressors in humans. The following concepts are extrapolated from his work.

1 All life events cause some stress.

2 Stress is not bad per se, but excessive or unnecessary stress should be avoided where possible.

3 The same pathways of non-specific adaptation [to stress] can be mobilized dozens of times a day, however, without the individual being aware of this as they experience diverse situations.

4 Removal of the stressor [or perceived stressor] eliminates stress.

Selye's model for stress (Tache & Selye, 1985) was very insightful not only in the way it characterized the relationship between the stressor and stress response but also in how this model suggested our limited understanding (in 1985 and to some extent 25 years later) about how people might improve their highly stressed lives. Herein proposed is a

synthesis concept derived from Lazarus (1993), Antonovsky (1996) and Bowen (1985) (Figure 1).

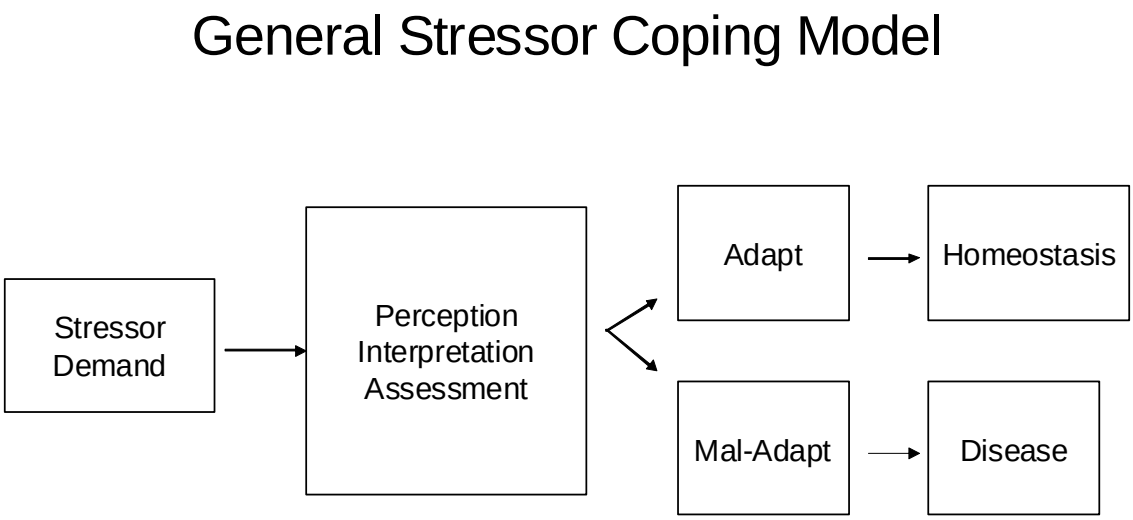

Figure 1. Model of everyday stress.

Like Selye and Bowen, Antonovsky (1987) similarly believed that how people manage stress is determined to a large extent by how they view and interact with life's challenges. This author further suggested that stress-related problems which individuals and couples experience do not result from the stressors themselves (we all experience stressors in our lives) but rather from three intertwined components he termed *comprehensibility* (i.e., does the person's world make sense to them), *manageability* (i.e., are there sufficient resources to manage current challenges), and *meaningfulness* (i.e., are life's challenges worth engaging). These interpretive lenses together can be measured using a concept termed *sense of coherence* (SOC). Because Antonovsky (1993) wanted to move the theoretical bar beyond simply measuring correlations between perceived stress

and related outcomes, he proposed a self report instrument SOC scale (SOCS) that has been used to assess how people manage stress in terms of comprehensibility, manageability, and meaningfulness. Over the past decade, the SOCS has also been widely used as an indicator of quality of life (Eriksson & Lindstrom, 2008), psychological well being, social support and adaptive coping (Olsson, Hansson, Lundblad, & Cederblad, 2006). In addition to being used as an independent variable to explain coping with stressors and various psychopathologies, a recent study has used the SOCS as a dependent variable. Several participant groups were used in this study to explain SOCS responses in terms of psychopathological and family relational indicators (Olsson et al., 2006). These authors reported that the family relational and psychopathological variables of interpersonal sensitivity (10 – 27%) and depression (26 – 50 %) contributed significantly but not overwhelmingly to the explanation of the SOCS scores (Olsson et al, 2006). These results would suggest a cyclic interaction between how we view the world (in terms of how comprehensible and manageable it seems to be) and the presence of relational or psychopathological problems or symptoms.

Significance of the Problem

The American Institute of Stress web site (www.stress.org) displays covers from Time and the American Psychological Association (APA) magazines with statements suggesting that stress is major health problem in the US. It is interesting to note that these statements appeared to be timely and relevant. A closer look, however, revealed that these magazine covers were from the late 1980s (nothing newer). This lack of recent public interest makes one wonder if stress has disappeared from our lives, or is it the case that we simply don't know anymore about how to manage it now than we knew then. One

interesting statement on this web site that was reported to have come from a recent study (not cited) was that "a *happy marriage or good long-term relationship* at age 50 was a leading indicator of being healthy at age 80, whereas having a low cholesterol level had very little significance" (www.stress.org). How couples manage stress and its effects on their relationship has been reported by a number of investigators in recent years. Studies by Bodenmann, Pihet and Kayser (2006), Murdock and Gore (2004), and Coyne and Smith (1991) have started to clarify what a happy marriage or a good long-term relationship mean with respect to stress and dyadic coping styles. Nevertheless, much of the theoretical work for stress-response, even in the family systems literature, has been directed toward individuals rather than couples.

The general relevance of this study with respect to the marriage and family therapy (MFT) practice and the use of guided visualizations that teach relaxation techniques, coping skills, and cognitive behavioral concepts might be inferred from a recent national survey of clinical members of the AAMFT where it was reported that 20 % of respondents indicated that they use relaxation and guided imagery in their practice as well as feel qualified to teach or supervise their use (Becvar, Caldwell & Winek, 2006).

Results of the proposed study may yield implications suggesting that guided visualizations that teach stress management, relaxation and coping techniques could provide value for use prior to or as adjunct exercises in early phases of couples therapy. It is also proposed that the results of this study may provide a better understanding of how the concepts of differentiation of self and sense of coherence may moderate the impact of perceived stress on outcome variables such as couple/dyadic satisfaction and quality of life.

The purposes of this study are as follows: a) examine the relationships between perceived stress, the proposed mediators differentiation of self and sense of coherence, and the indicator outcome variables martial/dyadic satisfaction, quality of life, and psychological/physical complaints; b) examine the effects of a guided visualization intervention on each of the previously outlined indicators; and c) examine the affect of individual relaxation sessions on the following physiological indicators of stress: breathing rate, heart rate variability (HRV) and salivary cortisol.

CHAPTER 2

LITERATURE REVIEW

Stress and Dyadic Relationships

Although Bowen (1985) and Antonovsky (1987) primarily presented their concepts of stress and outcome from an individual perspective, they also elaborated these ideas to some extent for couples and families from a systems orientation. Bowen (1985), for example, viewed the concept of differentiation of self in a broader sense which he termed *undifferentiated family [couple] egomass* and described as an excess of emotional reactivity in the family [couple]. Similarly, Antonovsky and Sourani (1988) modified some of the questions in the SOCS to be used with families to reflect the *family sense of coherence and adaptation*.

Bodenmann et al., (2006) have identified both positive and negative forms of dyadic coping that contribute to the relationship between environmental stress and marital distress. These authors define dyadic coping as "a process on the dyadic level in which coping reactions of one partner take into account the stress signals of the other partner" (Bodenmann et al. 2006, p. 486). They also suggest that dyadic support through effective coping interactions is strongly associated with higher marital quality and lower perceived stress as determined from self-reported measures.

Dyadic coping can take two forms which include *active engagement and protective buffering* (Coyne & Smith, 1991). Active engagement is when one partner engages the other in constructive attempts to solve problems. Protective buffering involves efforts by one partner to relieve the others' emotionality by suppressing their own anger and minimizing worries. Effective dyadic coping can positively impact marital quality by reducing the negative impact of outside stress on the marriage, by one partner moderating

its effect on the other, and by increasing intimacy and mutual trust resulting from the process of mutual problem solving.

Ineffective dyadic coping can also take several forms including; hostility such as disparagement, mocking, sarcasm or minimizing the other partner's feelings; ambivalence such as unwillingness to contribute or support the other; and superficial behaviors such as questioning without listening or minimal support without empathy (Coyne & Smith, 1991). Gottman and Silver (1999) also indicated that couples who are over-run by stress from sources outside their relationships (work, children, etc.) are more likely to divorce or separate than those who can find ways to reduce or manage stress and help each other to cope. Their research also suggested that intense emotions (even anger) alone do not predict marital distress but rather how certain negative emotions are played out in the relationship is the important factor (Gottman & Silver, 1999). Interactions that were most predictive of marital distress and eventual breakup were criticism, contempt, defensiveness, and stonewalling. In contrast to more general definitions, Gottman and Silver (1999) described these behaviors in relational terms. For example, as compared to a complaint which addresses a specific action, a criticism is global and personal (you always..., you never..., you just don't care). Within the context of a cognitive approach, one might recognize these types of statements to be associated with cognitive distortions. As an emotional communication, contempt can be expressed in a variety of ways including sarcasm, mockery, and hostile humor. Defensiveness and stonewalling although not typically considered to be intense emotional expressions, often serve to maintain the destructive emotional cycle that predicts dyadic distress.

One approach that has been shown to be effective for challenging the thinking or the interpretation of everyday stressful events is cognitive behavioral therapy (CBT). This approach involves recognizing and modifying psychological triggers that influence our interpretation of life events and amplify our physical, cognitive, and emotional responses to perceived stress.

Triggers that have been described under the CBT framework primarily involve cognitive distortions such as all-or-nothing thinking, generalization of single negative events, negative mental filtering, disqualifying positive events, jumping to negative conclusions, assuming to know the thoughts of others and assuming that they can read our minds, magnification of negative events, minimization of positive events, and personalization of events that we have no control over or responsibility for (Burns, 1999). The relationship between stress, cognitive distortions-physiological responses, and maladaptive behavior-dyadic coping can form a cycle resulting in negative relational responses or dyadic distress (Figure 2).

For this characterization, stress can drive the cognitive distortions that form an automatic path of least resistance (e.g., you always…, you never…, why can't you just…). One partner's negative or maladaptive response to the other may close the loop and appear to confirm their initial cognitive distortions. For example, when one person comes home after a highly stressed day, they are likely to find their partner equally stressed.

Although the negative responses that feed back into cognitive distortions may be different for each partner, they can fuel a mutual contribution to this destructive cycle. Another characterization of cyclic interactions that involves both emotional expression

and cognitive interpretation has been termed the *vulnerability cycle* (Scheinkman & Fishbane, 2004). In this model of problematic couples' interactions, each member of the couple adopts survival positions to protect their perceived vulnerabilities. The cyclical nature emerges when, by acting out their survival positions, both members of the dyad trigger their partners' vulnerabilities causing them to again react and be further entrenched in these automatic ways of thinking and behaving. In each of these characterizations, lowering the perceived stress and physiological response as well as managing cognitive distortions may interrupt or reduce the negative effects of this type of cycle.

Managing Stress

Although excessive stress is relatively easy to identify in a clinical setting, it is difficult to define. As suggested by Tache and Selye (1985), Bowen (1985) and Antonovsky (1987), a situation or event that is highly stressful to one individual or family may be experienced without much distress by another. In this context, researchers have often studied the type, intensity, and duration of stressors as independent variables with various physical or psychological outcomes as the dependent variables (Kerr, 2000). More specific stress models, however, have suggested that stress-induced symptoms arise from cognitive, somatic, or behavioral sources and that interventions should be targeted toward specific types and sources of stressors that may be causing the problems (Davidson & Schwartz, 1976). With respect to stress management interventions, researchers have primarily focused on two areas. The first area involves modifying the interpretation of stress through cognitive techniques and the second involves lowering the deleterious physiological responses to stress by using physical and mental relaxation

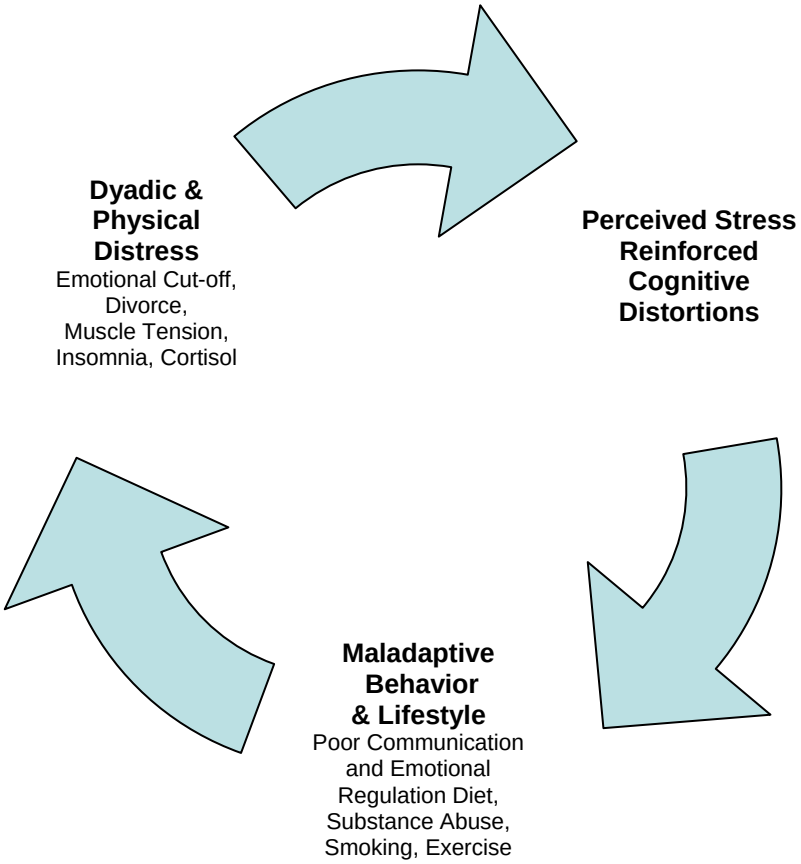

Figure 2. Cyclic inter-relations and the effects of stress.

techniques (Kerr, 2000). As suggested in Figure 2, physical, psychological and relational stressors may contribute to the negative stress response cycle. One approach described by Nakao, Fricchione, Myers, Zutermeister, Baim, Mandle, Medich, Wells-Federman, Arcari, Ennis, Barsky and Benson (2001) that has been used to address both of these areas and has been shown to be particularly effective in a therapeutic setting, especially for reducing the chronic anxiety that can result from excessive stress levels, is CBT. There are several components to this approach. One of the components in this approach

involves physical and psychological relaxation techniques such as progressive muscle relaxation (PMR). PMR was initially introduced by Jacobson (1938) and has been widely used in a range of cognitive-behavioral interventions (Kerr, 2000). This technique essentially involves a tense-release cycle for skeletal muscles progressing over each of the major muscle groups in the body followed by a passive release of all tension. In contrast to actually tensing muscle groups, studies have indicated that imagining or visualizing the tension-release process produces similar scores on a relaxation inventory assessment (Crist & Rickard, 1993). Another strategy involves the use of meditative relaxation techniques. Over the past 25 years, Benson and colleagues have amassed a significant body of evidence showing that what he terms the *relaxation response* is effective in treating a wide range of physical and psychological conditions including anxiety and mild depression (Benson & Klipper, 2000). Benson and Stuart (1992) further expanded on the previously described relaxation techniques, and suggested that controlled breathing exercises were similarly effective in contributing to the relaxation response.

Casey, Chang, Huddleston, Virani, Benson and Dusek (2009) have recently reviewed the physiological changes that have been measured during the relaxation response. Some of these physiological changes included decreases in blood pressure, pulse rate, breathing rate, and muscle tension. Additional changes have been noted in electroencephalogram (EEG) frequency distributions with a shift from beta wave frequencies (indicative of anxiety) to alpha and theta frequencies (indicative of a calm but alert state of mind) (Casey et al., 2009). Physiological and physiochemical parameters that are often correlated with and used to measure stress or relaxation are typically related to two main

control systems involved in physical/mental homeostasis. These systems include the hypothalamic-pituitary-adrenal (HPA) axis and the autonomic nervous system (ANS) (Ditzen, Neumann, Bodenmann, von Dawans, Turner, Ehlert & Heinrichs, 2007).

One of the important functions of the ANS is to control blood pressure (BP) over a wide range of physiological demands. This is accomplished through two interlinked feedback systems that instantaneously control heart rate and vascular tone (Vaschillo, Lehhrer, Rishe & Konstamtinov, 2002). In a well-adapted physiological system when blood pressure increases beyond what is required for the current demand, sensors in the aorta signal a decrease in heart rate (HR) and vascular tone (VT). Alternately, when BP decreases, HR and VT are increased. Regular oscillations in both HR and VT maintain BP while allowing for rapid changes required by physical or mental challenges. The most widely studied and best understood component of this system involves the study of HRV. HRV is the instantaneous change in HR over time. The relevance of these measurements, with respect to this study, relate to the relationship between mental and emotional states and their affect on HRV waveforms. Research suggests that "HRV dynamics are particularly sensitive to changes in emotional state, and that positive and negative emotions can be readily distinguished by changes in heart rhythm patterns which are independent of heart rate" (McCarty & Tomasino, 2004, p. 2). Nasermoaddeli, Sekine, and Kagamimori, (2004) have suggested that HRV is related to ANS function through the balance of sympathetic and parasympathetic modulation of heart rate. These authors have also suggested that cardiac parasympathetic activity was positively correlated to SOC.

Although the detailed function of the heart and its relation to stress and coping are well beyond the scope of this study, there are characteristic patterns of HRV that can be

easily measured. More specifically, when a person is relaxed, alert and experiencing neutral or positive mood or emotions, their HRV is likely to appear similar to a sine wave with a regular periodicity of about 0.1 Hz. When, however, they are agitated, anxious, or depressed such as after having viewed a distressing or objectionable image, their HRV is likely to appear angular and choppy with no regular pattern. Several software programs are commercially available that make the somewhat complex calculations and interpretation of HRV possible.

Although there are a number of physiological parameters that have been studied with respect to the consequences of stress (e.g., salivary immunoglobulin A (sIgGA), dehydroepiandrosterone, cortisol, etc.), many of these require specialized equipment and expertise to analyze (McCraty, Barrios-Choplin, Rozman, Atkinson & Watkins, 1998). For this study, three noninvasive physiological parameters were chosen to monitor stress responses during the guided visualization process. These parameters included salivary cortisol, breathing rate and HRV.

In addition to the physical relaxation component of CBT, another strategy commonly used in stress management focuses on cognitive functions that significantly influence our internal stress levels or how we interpret our external stressors. One approach for interrupting the previously described stress-related cycle can be accomplished through self awareness, cognitive restructuring, and positive reinforcement. Simple strategies that can be incorporated into an automatic-thought stopping exercise might use the following steps (stop, breathe, reflect, and chose a new interpretation). This strategy can be approached from an individual or relational perspective. Although most commonly described with respect to the individual, CBT techniques and exercises can also be

focused toward couples and family relationships. CBT-based techniques are not only effective in a traditional talk therapy format but can also be taught using recorded guided visualizations in a relaxed setting (Rogers, Ei, Rogers & Cross, 2007). These authors reported that a multi-component approach using cognitive behavioral techniques in a guided imagery format resulted in significant reductions in anxiety symptoms, relationship difficulties and depressive symptoms in a clinical population.

Guided Visualization Intervention

Guided imagery or guided visualization are terms generally defined in the literature as a mental function involving dynamic, quasi-real, and psychological processes (Menzies & Taylor, 2004). These techniques have been used alone or as part of a wide range of therapeutic processes. Antecedent situations for which these techniques are useful usually involve physical or psychological symptoms with improvement in outcome variables that include decreased anxiety, pain relief, reduced chemotherapy nausea, and motor skills development (Menzies & Taylor, 2004). Although many of the studies using imagery discussed by these authors used the terms relaxation and guided imagery together, the authors found little consensus in the literature as to whether relaxation is a prerequisite to imagery or the imagery process results in relaxation. Nevertheless, most of the papers that they reviewed suggested the operation of a systematic feedback loop between the mind (cognitions and emotions), brain, and body, and resulted in a more relaxed state after the visualization. In addition, autonomic functions such as HR, BP, and cortisol levels were often lowered during the process (Menzies & Taylor, 2004). Several general benefits that have also been reported for the use of guided visualization as a therapeutic technique include its effectiveness in a short time frame and the notion that the power to

change or improve resides with the client (i.e., the client often chooses their own particular visualization and interpretation) (Crow & Banks, 2004).

One of the limitations for the use of relaxation techniques with highly stressed clients is that they may find it difficult to relax sufficiently to fully participate in the relaxation/guided visualization experience. Some of the barriers described by Casey et al. (2009) for to eliciting and maintaining a relaxed state included muscle tension, chest breathing (as opposed to abdominal or diaphragmatic breathing), as well as anxiety promoting thoughts and emotions. Features that facilitated success in this exercise included finding a safe quiet place (both physical location and within the mind of the participant). Low lighting and a comfortable chair where the participant could let go of pressing thoughts and visualize a pleasant scene or environment were also important factors.

Rogers et al. (2007) reported that the use of *vibroacoustic* techniques along with guided visualizations seemed to give some of the participants "an immediate sense of deep relaxation". (p. 100) The term vibroacoustic was introduced by Skille (1991) and refers to the use of low frequency (30-120 Hz) sound delivered by vibrational transducers through a chair or bed. Vibroacoustic techniques have also been shown to reduce symptoms of tension, fatigue, pain, headache, and nausea as reported in an out-patient hospital population (Patrick, 1999).

Assumptions

In a recent study of stress, coping, and differentiation of self, Murdock and Gore (2004, p. 333) suggested that the level of "stress [experienced by an individual or couple] was the most robust indicator of both psychological and physiological problems". From

both a theoretical and a therapeutic perspective these authors suggested that "because differentiation of self is considered difficult to change, family interventions might be improved by first focusing on reducing client stress and then addressing differentiation" (Murdock & Gore, 2004, p. 333).

Once established and stabilized (by the age of 20-30 years), one's level of differentiation and/or sense of coherence are considered to be fairly stable and unlikely to change except by virtue of a significant life-changing event (Murdock & Gore, 2004; Richardson, Ratner & Zumbo, 2007; Antonovsky, 1987). Consequently, as suggested by Murdock and Gore (2004), reduction of stress in couples who perceive themselves to be highly stressed may improve their reported state of wellness. How they react to the original levels (or possibly reduced levels) of perceived stress; however, may also be mediated or interpreted through their relative level of differentiation and/or sense of coherence.

One of the assumptions for this thesis is that high levels of perceived stress will adversely affect marital satisfaction and quality of life as well as the number and intensity of reported physical and psychological complaints. Another assumption is that the visualizations/cognitive-behavioral interventions will lower stress and improve marital satisfaction. A third assumption is that perceived stress is interpreted through the measurable constructs of differentiation of self and/or sense of coherence and manifested through observed outcome measures (Figure 3).

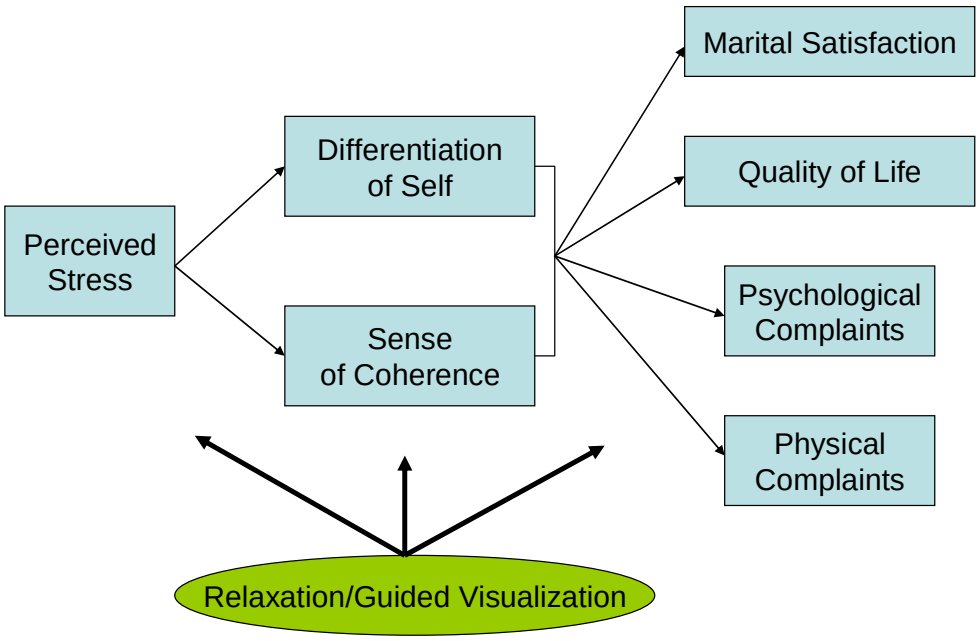

Figure 3. General stress mediation model.

Statement of Hypotheses

Hypothesis 1: An intervention consisting of three relaxation/guided visualization sessions designed to teach relaxation and coping skills will cause a decrease in perceived stress, an increase in marital/dyadic satisfaction indicators, an increase in quality of life indicators and a decrease in physical and psychological complaints over the waitlist control.

Hypothesis 2: Differentiation of self and/or sense of coherence scores will not change as a result of the intervention.

Hypothesis 3: The magnitude of the differentiation of self and/or sense of coherence scores will mediate the relationships between perceived stress and the outcome measures of marital distress, reported symptoms and quality of life: e.g., those with high levels of SOCS and/or differentiation will be better able to manage high levels of perceived stress with fewer detrimental consequences) will be addressed through a (6 x 6) multifactor-ANCOVA.

Hypothesis 4: During the guided visualization sessions (as compared to a five min pre-session baseline) a) the breathing rate will become slower and more rhythmic (as measured by abdominal distension), b) HRV (as measured using a pulse rate monitoring device) will increase and c) comparative salivary cortisol levels for each participant will decrease over the course of the relaxation session.

CHAPTER 3

METHODOLOGY

Participants

The participants for this study were primarily drawn from UNLV faculty, students, and staff. Fliers were displayed in the student wellness center and in other places on and off campus where couples who may be concerned about stress and health might visit. Notices were posted with UNLV Today and Rave, and a general interest article was published in the Rebel Yell. Initial phone contacts by participants were used to screen for eligibility which was defined as individuals that are dating their partner, living with their partner or are married to their partner. The American association for marriage and family code of ethics standards was adhered to for all investigator-participant interactions.

Upon initial contact, the contents of the announcement were reviewed, the participants were screened for eligibility, qualified for willingness to participate and potential scheduling conflicts, assigned a participant code and an intake appointment scheduled. The intake protocol involved the student co-investigator giving an overview of the informed consent followed by the participant reading and signing this document. The next steps involved collection of demographics and administration of the following self-report survey instruments: perceived stress scale (PSS), differentiation of self inventory (DSI), sense of coherence scale (SOCS), marital satisfaction inventory-revised (MSI), Quality of Life Inventory (QoLI), and Symptom Checklist 90-R (SCL). These tests were administered 3 times during the course of the study (Tables 1 and 2). At the first appointment, participants were scheduled for a second testing session and first visualization session after 4 weeks. After administration of the second inventory, participants were scheduled for the second of three weekly visualization sessions.

Table 1 Schedule of visits.

Week number	Activity
1	Pre-test 1
2	Wait
3	Wait
4	Wait
5	Pre-test 2, Session 1
6	Session 2
7	Session 3
8	Post-test

After each session the participants were given a copy of the session visualization on compact disc (CD) and asked to listen to the visualization uninterrupted in a quiet and comfortable setting once per day (if possible) until their next session appointment. Participants were asked to return the CDs from the last session at the beginning of the next session. After the three visualization sessions, an appointment was scheduled for the final inventory. Participants were given the 3-CD set to keep after completion of the study.

Guided Visualization Procedure

Prior to (and after) each guided visualization session, participants were asked to spit through a short straw into a plastic tube which was the sealed, labeled and frozen for later analysis. The participants were then seated in the vibroacoustic bed which was operated as previously described (Rogers et al., 2007). The breathing monitor was fitted (for the

Table 2 Outline of study protocol

Contact	Activity

Initial phone contact	Set appointment for first visit
First visit	Administer Informed Consent Collect demographics Administer pre-test1 Schedule next appointment
Second visit	Administer pre-test 2 Conduct session 1 Schedule next appointment
Third visit	Conduct session 2 Schedule next appointment
Fourth visit	Conduct session 3 Schedule next appointment
Fifth visit	Administer post-test

first session only) and the HRV finger monitor attached. The participants were fitted with noise cancellation headphones, the lights dimmed and the visualization recording started. After the visualization recording was completed, the participants were loaned a copy of the guided viaualization CD that they had listened to and the next appointment time was scheduled.

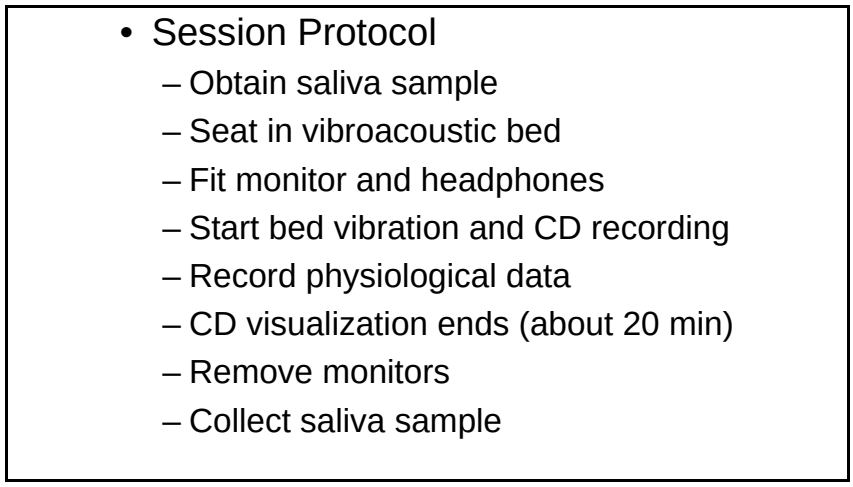

Figure 4. Guided visualization session protocol.

Measured Outcome Instruments

SOCS

Antonovsky (1987) developed the *salutogenic model of health* primarily to explain why it is that some people seem to manage life's stressors with an enduring and dynamic feeling of hope and confidence (even when the stressors are large and overbearing), while others seem to become both physically and mentally worn down by life's challenges. Central to the salutogenic model is the concept of sense of coherence, a concept which Antonovsky divided into three areas termed comprehensibility (the extent to which problems are viewed as clear, to some extent predictable, and understandable), manageability (the extent to which resources to solve problems are available and used), and meaningfulness (the extent for which life makes sense or has purpose). Although these areas would seem to be independent, Antonovsky suggested that they are in fact closely intertwined.

In order to better understand and provide a means to test his theories, Antonovsky (1989) interviewed individuals from a wide range of circumstances and formulated an array of questions which he further modified through a series of pilot studies. The final

version of the SOCS consisted of 29 questions concerning each of three previously stated concepts (comprehensibility, manageability, and meaningfulness). A shortened version of the SOCS was also published that contained 13 questions covering the three areas and representing past, present and future tenses. Each of the questions can be answered using a 7 point Likert scale with an example of response choices ranging from *never applies to always applies* and with each response set worded specifically for the question (Antonovsky, 1993).

A recent literature search using SCOPUS for the "sense of coherence" scale returned over 400 articles involving the correlation of SOCS with a wide range of outcome variables. With respect to this thesis, variables related to couples therapy outcomes and quality of life seemed most appropriate to discuss. In a recent study involving outcomes of couples therapy, results indicated an improvement on SOCS of at least one standard deviation for 22% of women and 37% of men (Lundblad & Hansson, 2005). These results are interesting in light of the belief by Antonovsky that SOC is not expected to change for individuals over 30 year of age. Richardson et al. (2007) reported that although the average SOCS scores for adult individuals over 30 years seemed relatively stable, a significant number of individuals changed more than the 10% threshold expected for normal variability. These results might suggest the presence of extraordinary events or new information (positive or negative) may significantly affect SOCS scores for specific individuals.

Another outcome variable that has been correlated with SOCS is quality of life. In a recent review Eriksson and Lindstrom (2008) found that the SOC seems to have an impact on quality of life; the stronger the SOC; the better the quality of life. Although

average scores for the 13 question SOCS varied slightly (2 or 3 points) by age group, a recent study using a relatively broad demographic population of over 5000 individuals between the ages of 30 and 50 years indicated an average score of 62 (Richardson et al., 2007). The 13 question SOCS along with the client instructions and scoring protocol is found in the appendix of Antonovsky (1987). No specific licensure requirements are given for its use.

DSI

One of the central concepts in Bowen theory is differentiation of self. This construct describes the client's ability to manage their emotions within interpersonal settings. More specifically, this concept describes the client's capacity to think, reflect, and not respond automatically to emotional pressures. Because Bowen theory encompasses a rather complex set of interlocking behavioral concepts, a diagnostic tool to evaluate a client's or client family's status in each of the theory's conceptual areas would be very helpful to a therapist. Skowron and Friedlander (1998) developed, validated, and published a diagnostic tool to measure differentiation of self using responses on four subscale concepts relevant to Bowen theory. These subscales included emotional reactivity (ER); I position (IP), emotional cutoff (EC), and fusion with others (FO). Each of these concepts/behavior styles are embedded in Bowen theory and comprise the concept of differentiation of self. More specifically, Skowron and Friedlander (1998) indicated that: (i) for the ER subscale, the "emotionally reactive person tends to find it difficult to remain calm in response to the emotionality of others", (ii) the IP subscale refers to "maintaining a clearly defined sense of self and thoughtfully adhering to personal convictions when pressured by others to do otherwise", (iii) FO subscale

describes individuals who "have few firmly held convictions and beliefs, are either dogmatic or compliant, and seek acceptance and approval above all other goals", and (iv) EC subscale is "personified by the reactive emotional distancer, who appears aloof and isolated from others and tends to deny the importance of family". (p. 235)

In the initial publication of the DSI (Skowron & Friedlander, 1998), the authors suggested that one of these subscales FO was lacking in its internal and external validation. Consequently, Skowron and Schmitt (2003) revised the FO subscale such that it showed a higher degree of correlation with other DSI subscales as well as independent personality and relationship test indicators. The authors of both studies indicated that the DSI is designed to be given and scored by a therapist with experience in Bowen theory. The papers, however, did not specify the discipline or licensure requirements.

The DSI-R consists of a brief instruction to clients section and a 46 one-sentence statements that should be responded to by circling responses that range between the extremes of 1 (not true at all of me) to 6 (very true of me). Although neither of the Skowron papers lists the average time required to complete the inventory (Skowron & Friedlander, 1998; Skowron & Schmitt, 2003), 10-15 min seems a reasonable estimate. Between 9 and 12 questions are presented for each of the four subscales and are randomly organized in the test. Scoring is done by summing the values for each of the subscales and dividing by the number of completed responses. A summation average (DSI score) can also be determined from the subscales. Normal distributions and standard deviations are reported for both the DSI Skowron and Friedlander (1998) and DSI-R Skowron and Schmitt (2003).

The content validity for the original version of the DSI was assessed using correlations with several validated instruments including the General Severity Index to measure overall symptoms, the Discord Assessment Scale to assess relationship discord and marital satisfaction, and the Trait version of the State-Trait Anxiety Inventory. In a subsequent study (Skowron & Schmitt, 2003), the FO subscale questions were revised (DSI) and compared to the Personal Authority in the Family System Questionnaire and Experiences in Close Relationships Inventory. These comparative instruments in both studies seemed to cover the range of content which is intended to be covered by the DSI-R. Results from correlations of the DSI or DSI-R subscales with the previously mentioned tests indicated that higher differentiation of self scores predicted less symptomatic distress, greater marital satisfaction, and greater attachment security.

The concept of differentiation of self as a cornerstone of Bowen theory is considered to be more indicative of a trait than state characteristic. This construct is not intended to reflect more variable *state characteristics*. In fact, the DSI was constructed based on *trait characteristics* and has been shown to predict *trait anxiety*. Although differentiation of self is not considered to be highly malleable, the authors suggested that psychotherapy may result in a moderate increase in a client's level of differentiation (Skowron & Friedlander, 1998). These authors also reported mean and standard deviation values for each of the subscales for both men and women. Their population demographics indicated that about 10% of the subjects for their studies were currently undergoing psychotherapy and 60% had previous experience with therapy. At present, a SCOPUS literature search of the DSI or DSI-R produced 62 citations covering a range of psychological problems, populations, and therapeutic outcomes. The DSI-R which is found in the appendix of

Skowron and Schmitt (2003) was used for this study and will be referred to as the DSI. It is copyrighted but apparently can be used free of cost.

PSS

The perceived stress scale (PSS) was developed and published by Cohen, Kamarack and Mermelstein (1983) to measure “the degree to which situations in one's life are appraised as stressful". (p. 385) Using a smoking cessation population of college students, comparisons were made to the life event scale (LES) developed by Holmes and Rahe (1967) with respect to depressive symptomology, physical symptomology and smoking cessation success rates after three months (Cohen, et al., 1983). Theoretical advantages and limitations for the PSS and objective measures of stress such as the LES were discussed by these authors. Although objective measures provided quantitative values for identifiable events that have actually occurred, they do not take into account personal or contextual factors. Next, "the use of objective measures of stress implies that the events themselves are the precipitating cause of the pathology" (Cohen, et al., 1983, p. 386). For their sample population (i.e., non-cessation vs. cessation), the PSS was predictive of depressive and physical symptomology as well as the number of visits to the student health center and smoking cessation success rates (i.e., the greater the PSS score the more cigarettes smoked). The coefficient alpha reliability for the three test groups ranged from 0.84 to 0.86. The PSS is a 14 item inventory where the questions (7 stated as positives and 7 stated as negatives) are scored from 0-never to 4-very often. The scale was published with instructions as an appendix and gave no prerequisites or restrictions for use (Cohen, et al., 1983).

SCL

The symptom checklist 90 (SCL) was introduced by Derogatis, Lipman and Covi (1973) and later revised in its commercial form SCL-90-R (Derogatis,1994). The SCL-90-R was used for this study and will be referred to as the SCL hereafter. It consists of a 90 item self-report inventory designed to assess psychological symptoms associated with the following areas: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. In addition, several summation indices are also included: global severity index (GSI), positive symptom distress index (PSDI), and positive symptom total (PST). The global indices which were designed to indicate the severity of the symptoms and their impact on psychological distress will likely be the most relevant outcome measures and were used for this thesis study.

The SCL has been used for a broad demographic of medical and psychiatric patients as well as individuals that are not currently patients. A number of cited studies have used the SCL (Murdock & Gore, 2004; Nakao, Fricchione, Myers, Zutermeister, Baim, Mandle, Medich, Wells-Federman, Arcari, Ennis, Barsky & Benson, 2001; Lundblad & Hansson, 2005). Although the SCL can yield a significant amount of information among the various subscales, research studies involving stress and stress reduction typically report only the global indices (Nakao et al., 2001; Lundblad & Hansson, 2005). With respect to the application of this inventory to stress, Derogatis (1994) has suggested that the anxiety subscale may be particularly useful because " …some theorists view stress as simply a variant of anxiety with perhaps a more explicit environmental linkage…". (p. 46)

The SCL requires 12-15 min to administer. It is copyright protected and scoring sheets are commercially available with an extensive scoring and procedures manual that includes norm-tables and over 200 literature citations. Internal consistency and a test-retest reliability values were determined on each of nine subscales. Coefficient alpha values ranged from about .77 to .90 and test-retest coefficients varied from about .70 to .86.

MSI

The Marital Satisfaction Inventory (MSI) is commercially available with a scoring manual and normative data for over 1000 couples (www.parinc.com). The inventory is composed all of 150 true-false questions that cover a broad range of issues including individual and family problems. There are also indices that can identify the effects of depression, substance abuse and trouble with children and adolescents on the relationship subscale.

QoLI

The Quality of Life Inventory (QoLI) was introduced by Frisch (1992) and is commercially available with a manual and treatment guide (Frisch, 1994). The inventory consists of 32 questions that are answered on one of two scales (i.e., 3-point; not important to extremely important or 6-point; very satisfied to very dissatisfied). In addition, there are 16 essay questions asking for "problems that get in the way of your satisfaction" in different areas ranging from health to neighborhood. (p. 57)

Because quality of life is not specific to any particularity disorder or disease, the QoLI has been used for a wide range of outcomes studies – about 150 studies are cited in the manual and treatment guide (Frisch, 1994). The time required to take the QoLI was

not specified in the manual, probably due to the variability of the essay responses. The inventory is copyright protected and scoring sheets are commercially available through Pearson assessments (Frisch, 1994). The test-retest reliability over a two week period was reported to yield a coefficient of .73 that was significant at $p < .001$. The internal consistency alpha was .79.

Data Analysis Conceptualization

Each of the outcome measures yielded numerical scores that consisted of summation and global indices, and in some cases, also have numerical scores on several subscales. For all of the measures, average and normative range information is available. Some of the commercial measures also included norms based on various demographics (gender, age, race, etc.). The physiological parameters (diaphramatic breathing rate and HRV) also yield numerical values and averages for each session.

Hypotheses 1 and 2 can be addressed by analysis of variance ANOVA for submission scores or subscale scores before and after the intervention. The wait list pre-assessment provided an indication of outcome measure stability. Hypothesis 3 was addressed through the correlation of summation and subscale scores for the DSI and SOCS. Hypothesis 4 was addressed as follows: a) changes in breathing were determined by using average rate and abdominal distension values before and during relaxation; b) changes in HRV were determined using commercially available hardware and software.

CHAPTER 4

RESULTS

Demographics

Announcements for this study were posted at various locations on the UNLV campus; however, the most significant influx of participants followed within several days of announcement email postings on UNLV Today (faculty and staff) and UNLV Rave (students). The only requirements for participation in this study were a committed relationship and the perception of living a *high stress lifestyle*.

For the 15 couples that responded to the announcement for this study, 11 couples (22 individuals) completed each of three evaluation sessions and three intervention sessions. The mean age for participants was 34 y and ranged from 18 to 54 y. The frequencies for participants by age group is shown in Figure 5. The largest age group was 25-30y followed by 31-36y. Perceived stress levels prior to the intervention (PSS pre-test1) appeared to trend upward by age group (Figure 6) with the following correlation coefficient (r= 0.88). The perceived stress levels after the intervention (PSS post-test) were lower for each group and seemed to follow a similar upward trend with age (r= 0.74). The sub-group populations were too small to yield statistical significance by sub-group.

The mean duration of the couples' relationship was 6.5 y with a maximum of 20 y and a minimum of 2 y. The frequencies for duration of relationship showed the largest number for the 0-3 y group (Figure 7). Although the sub-group populations were too small for statistical significance, the perceived stress levels prior to the intervention appeared to trend upward for the longer duration groups except for the 15-20y group which appeared to show slightly lower stress levels (Figure 8).

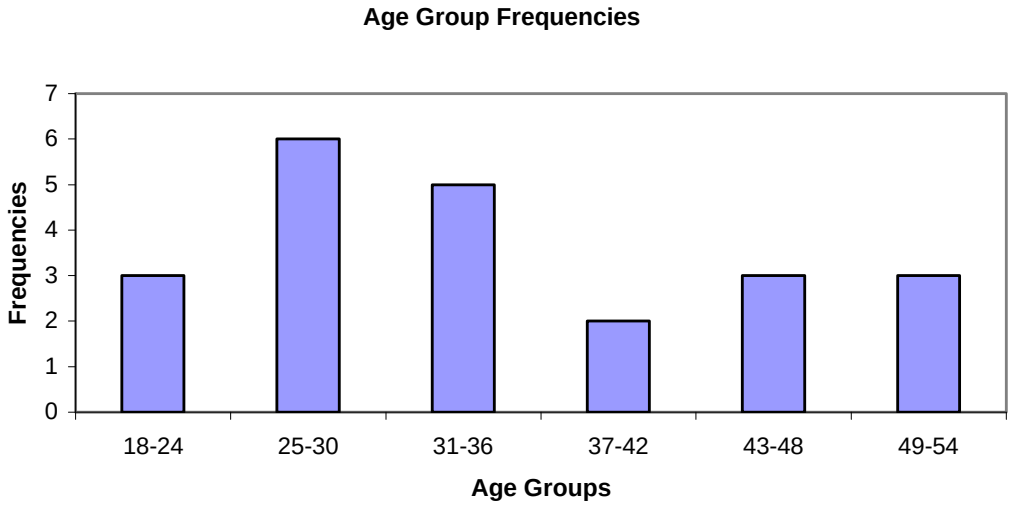

Figure 5. Frequencies by age group.

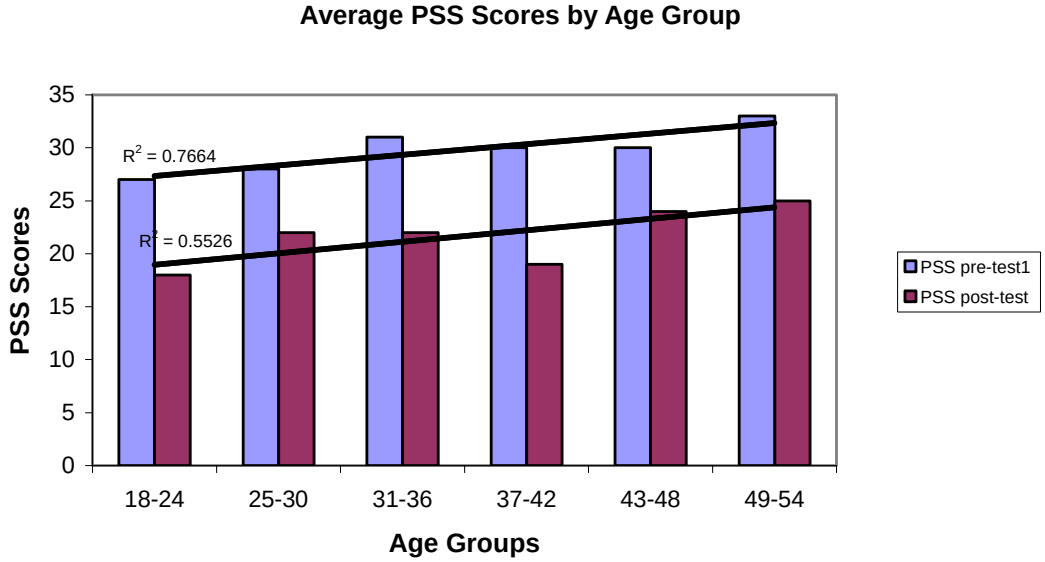

Figure 6. Average PSS score by age group.

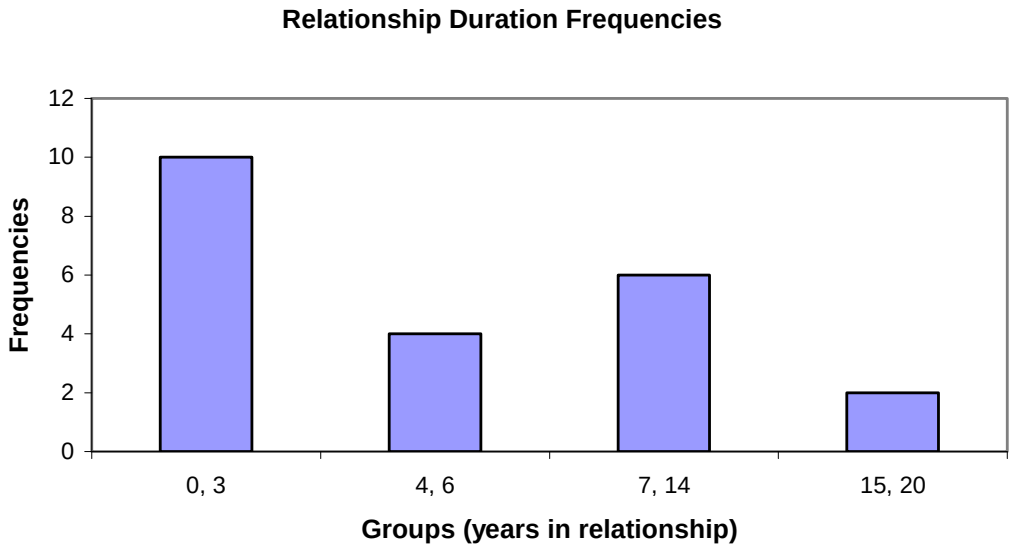

Figure 7. Relationship duration frequencies.

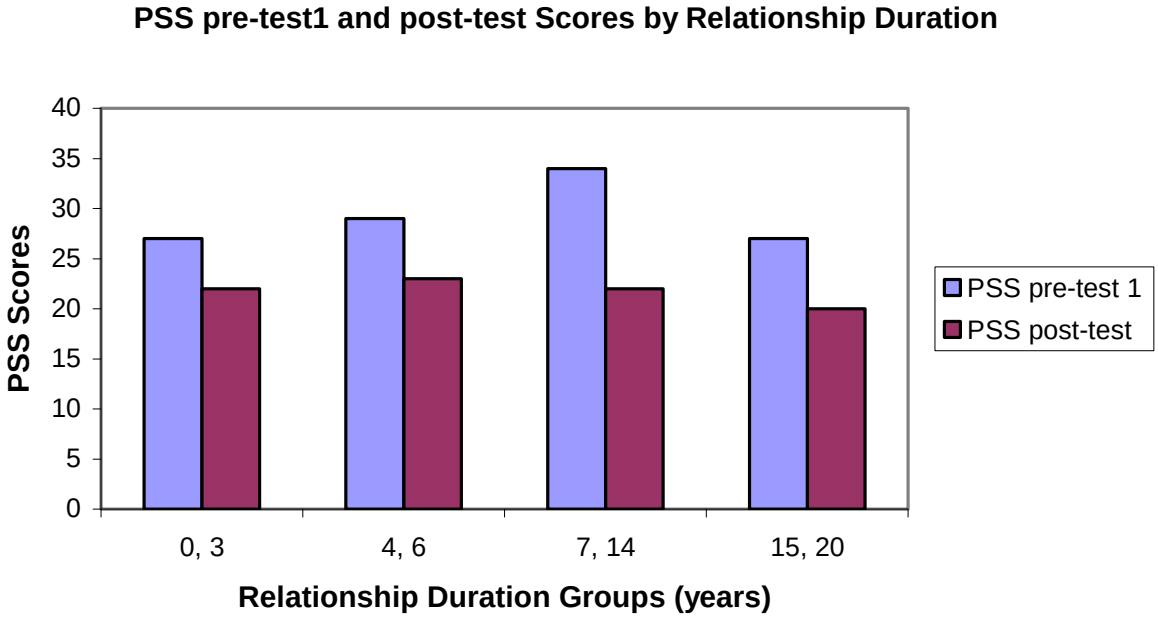

Figure 8. PSS pre-test and post-test scores by relationship duration.

The most commonly reported ethnic identity was White American (17 individuals) with two identified as Hispanic/ Latin American two as African American and one as other.

Religious affiliations were as follows: Christian (8), Catholic (4), Orthodox (2), Latter Day Saint (2), Lutheran (1), Pentecostal (1), and Not Applicable (4). Of those who reported religious affiliations, participation rates of monthly, yearly and never were almost evenly divided. It should be noted that at least two couples indicated that a weekly designation should have been included. Combined income demographics could not be determined because of inconsistencies often reported between members of the couple, possibly suggesting that one member may have been taking primary responsibility for the finances. The most common educational status levels were as follows: college graduate (11) with high school (5), some college (4) and post graduate (2). The most commonly reported daytime activity was professional salaried (11), followed by service hourly (6), home /children (3) and self-employed (1). The self evaluations of work and home life demands were consistent with the perception of a highly stressed lifestyle with the following responses: work demands high (16), medium (4) and low (2), home demands high (10), medium (9) and low (3). The demographic for this study might be described as mostly White, Christian, in their twenties and thirties, at least some college experience, employed, in a stable relationship (at least 2 y) and most of who were experiencing high levels of stress at work or at home.

Assumptions and Definitions

Hypotheses 1 (H1) and hypothesis 2 (H2) as interpreted in the experimental design contain the inherent assumption that outcome indicator scores from pre-test 1 and pre-test 2 sessions reflect random variations in the perceptions of the participants due to

environmental and interpersonal events that are part of everyday experiences. Given this assumption, these variations are taken into account by averaging each of the participants' responses on each of the outcome indicators. To determine potential effects for the intervention, these averaged responses were compared to the post-test results using a repeated measures ANOVA analysis with significance at the $p<0.05$ level. This treatment of the data will be referred to as Assumption 1 (A1) or the averaged wait-list control.

After preliminary analysis of the data from pre-tests 1 and 2, it became apparent that scores for some of the outcome indicators trended toward improvement before the first session of the intervention. As a result of these findings, a second assumption related to expectance effects was proposed. The second assumption predicts that an improvement in outcome scores between pre-test 1 and the post-test will be observed. For this assumption, pre-test 2 was considered part of the intervention process. Hypothesis 1, Assumption 2 (A2) was also tested using repeated measures ANOVA with significance at the $p<0.05$ level. An outline for data analysis is shown in Figure 9.

Effect of Intervention on Outcome Measures

(PSS, DSI, SOCS, MSI, SCL)

Averaged Wait List Control (H1, A1)

Participants for this study volunteered based on the study announcement requesting couples living a *high-stress* lifestyle. Consequently, it was expected that these individuals would score higher than an average college student control population on the PSS scale designed to measure the degree to which people perceive stress in their lives. The mean wait-list score for the averaged values for the pre-test 1 and pre-test 2 sessions

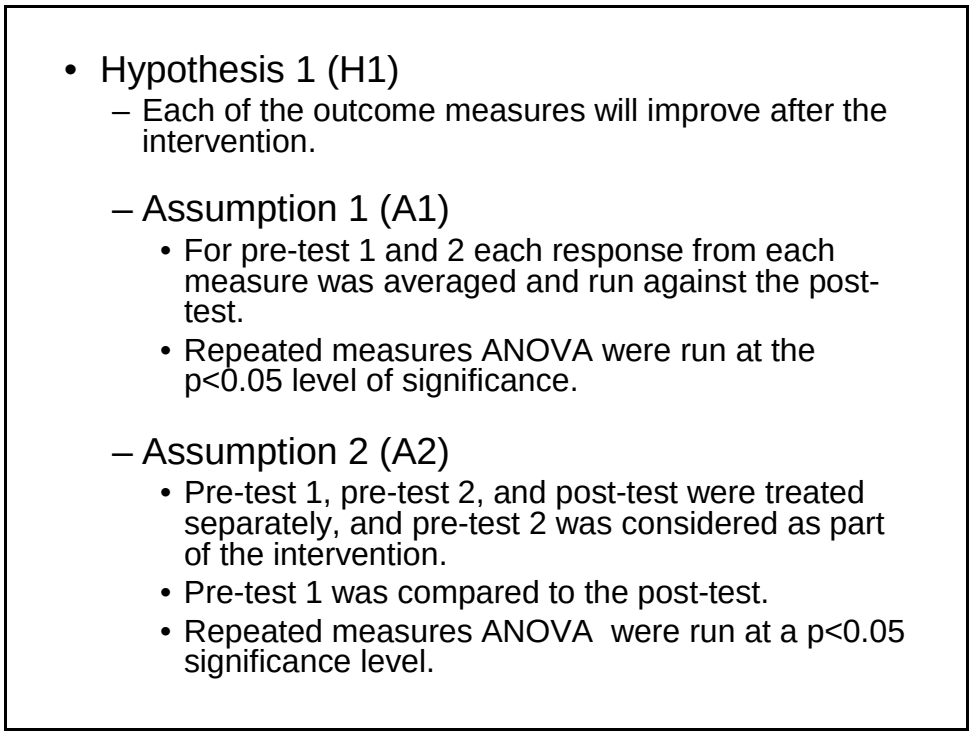

Figure 9. Outline for data analysis for H1, A1 and A2.

for the PSS was 28.2 ± 7.1 which was higher than previously reported by (Cohen et al., 1983) for student controls (men 23.2 ± 7.3 and women 23.7 ± 7.8). Post-test values for the current study showed a significant drop after the three intervention sessions of 6.5 to 21.8 ± 5.7 with a $p<0.01$ level of significance (Table 3, Figure 10).

The Marital Satisfaction Inventory (MSI) wait list average score for the global distress scale (GDS) prior to the intervention sessions was 7.4 ± 6.4. This roughly converts to a T score of 58 for men and 56 for women. T scores for the GDS scale of between 50 and 60 are reported as moderately distressed on the global distress scale. A mean score range of 56-58 is on the high side of the range which may suggest frequent arguments and difficulties in problem solving (Snyder, 2004). Although the mean MSI-

GDS score dropped to 6.8 after the three session intervention, this change did not reach the significance level of $p< 0.05$ (Table 3, Figure 11).

The QoLI measures life satisfaction in a broad range of areas including health, money, work, friends, neighborhood and community. The wait-list mean T score was 38.9 ± 12.7. This score was considered to be in the low category that ranges from 37 to 43 on the standard QoLI test scale (Frisch, 1994). Although the observed mean score slightly increased to 39.2 ± 11.5 after the intervention sessions, this change was not significant at the $p<0.05$ level (Table 3, Figure 12).

Three global scales of the SCL (global severity index, GSI; positive symptom distress index, PSDI; and positive symptom total, PST) reported for this study are single scores used to communicate an individual's levels of physical and psychological distress. The GSI scale combines information concerning the number of symptoms and intensity

Table 3 Change in test scores (H1, A1)

	Scores		Difference
Test	Wait-List Ave (SD)	Post-Test (SD)	Post-test & Wait-list Ave
PSS	28.2 (7.1)	21.8 (5.7)	-6.5**
DSI	3.73 (.59)	4.06 (.51)	0.32**
SOC	57.8 (11.4)	60.2 (10.2)	2.4*
MSI-GDT	7.4 (6.4)	6.8 (6.2)	-0.6
QoLI	38.9 (12.7)	39.2 (11.5)	0.3
SCL-GSI	0.97 (.55)	0.71 (.62)	-0.26**
SCL-PSDI	1.96 (.52)	1.71 (.59)	-0.25*
SCL-PST	43.1 (18.3)	34.8 (21.9)	-8.2**

* $p< 0.05$
** $p< 0.01$

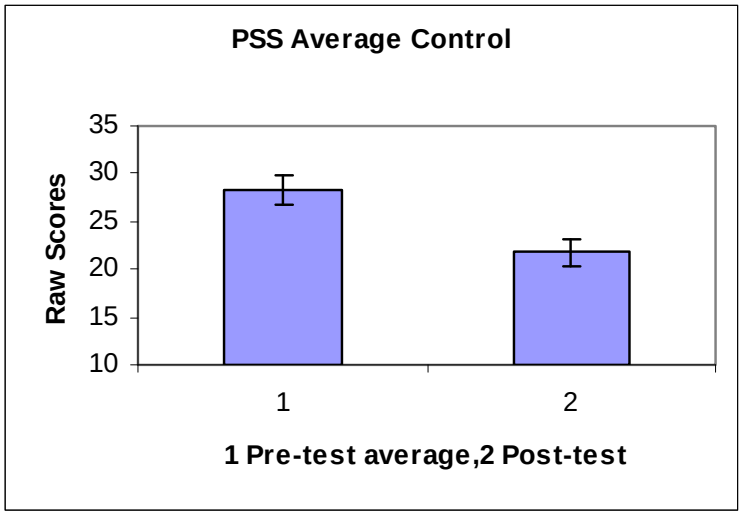

Figure 10. Change in perceived stress outcome scores (H1, AI), $p<0.01$.

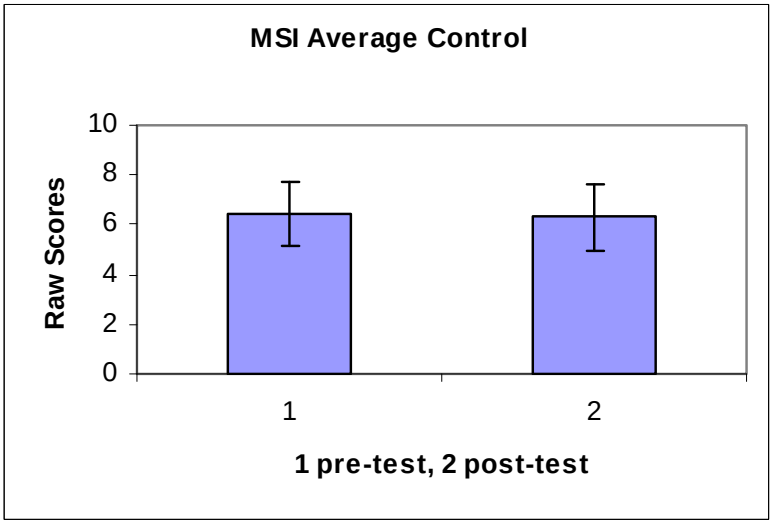

Figure 11. Change in marital satisfaction outcome scores (H1, A1).

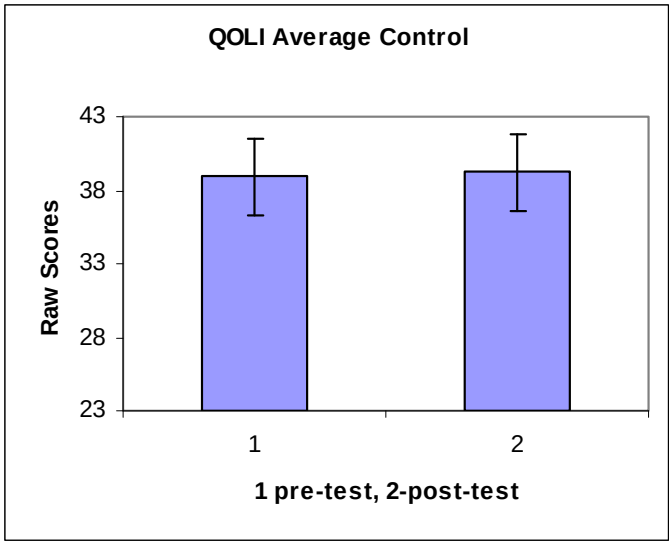

Figure 12. Change in quality of life outcome scores (H1, A1).

of the perceived distress and is considered to be the best single summary for the SCL (Dergoatis, 1994). The PSDI reflects the average level of distress for the symptoms that were endorsed. The PST scale reflects the number of symptoms that were endorsed. The mean raw scores for the GSI, PSDI and PST subscales (for the averaged wait-list control and the post-test) are shown in Table 3. T scores were determined from the raw scores (average of male and female scores) using the non-patient male and female normative scales and are shown in Table 4.

Although the pre-test average and post-test raw scores included contributions from both male and female participants and may limit the interpretation of the T score assessments, the purpose of the current discussion is simply to place the scores in context of the general non-patient population.

Table 4 SCL-global distress subscale T-score values

SCL subscale	Wait-list raw scores	T scores		Post-test raw scores	T scores	
		men	women		men	women
GSI	0.97	72	65	0.71	65	61
PSDI	1.96	64	63	1.71	62	59
PST	43.1	65	61	34.8	62	59

The mean average wait-list control score for the GSI subscale was 0.97 and converted to a T score of 72 for men and 65 for women. The operational rule whereby an individual might be considered a risk would be a T score of T >63 for either gender on the GSI scale (Derogatis, 1994). The relatively high distress levels shown by the participant population is consistent with their self-selection (to participate in this study) as highly stressed couples. The T scores determined from the averaged wait-list control for the GSI, PSDI and PST subscales, all trended downward after the intervention. Although the drop in global distress level was significant after the intervention sessions and most of the scores were below 63, the post-test scores may still be considered within the *positive risk range* (Derogatis, 1994). Changes in scores after the intervention sessions were significant at the $p<0.05$ level for the PSDI scale and were significant at the $p<0.01$ level for both the GSI and PST scales (Table 3, Figures 13, 14, 15).

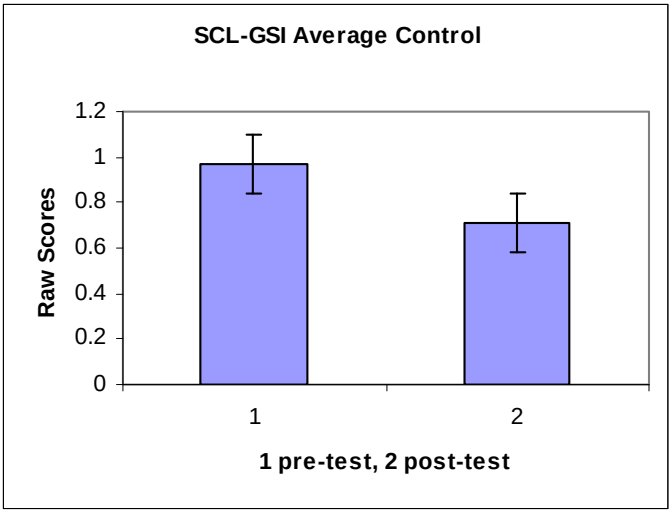

Figure 13. Change in SCL-GSI outcome scores (H1, A1), $p<0.01$.

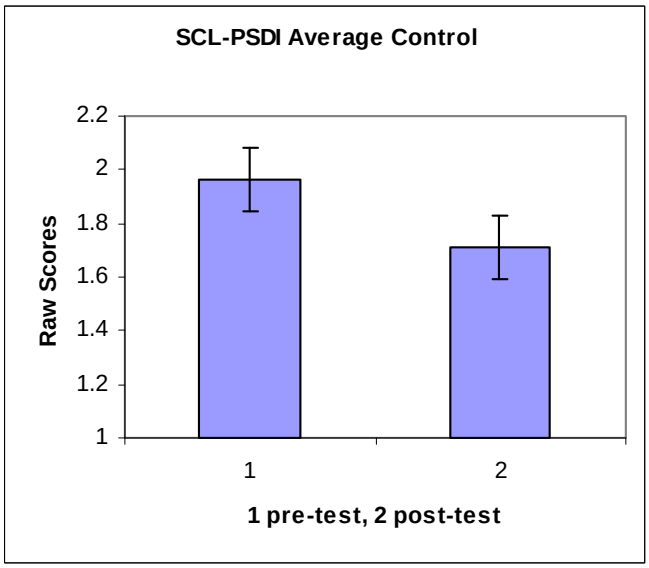

Figure 14. Change in SCL-PSDI outcome scores (H1, A1), $p<0.05$.

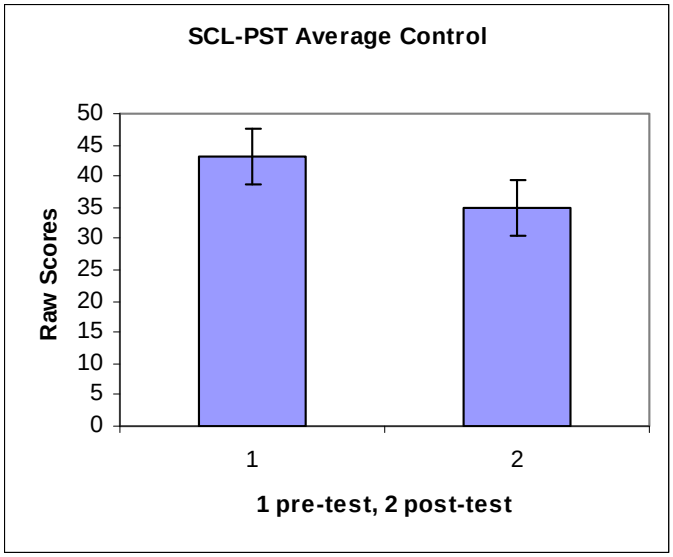

Figure 15 Change in SCL-PST outcome scores (H1, A1), $p<0.01$.

H1, A1 asserts that differences in outcome scores for pre-test 1 and pre-test 2 represent random variations in the attitudes and environmental conditions of the participants and thus could be averaged as the wait-list control. This hypothesis further predicts that the relaxation/guided visualization sessions would decrease the perceived stress on the PSS, decrease the global distress on the MSI, increase quality of life as measured using the QoLI and decrease distress on the three global indices of the SCL.

This hypothesis was validated with respect to outcome indicators for the PSS and each of the SCL global distress subscale indicators which measured the total symptom distress severity (GSI), endorsed symptom distress severity (PSDI), and total number of endorsed symptoms (PST) each of which showed positive changes at the significance level of $p<0.05$. Although the outcome scores for the global distress scale on the MSI

and QoLI trended toward improvement, neither of these indicators showed changes that reached a significance level of $p<0.05$. Consequently, H1, A1 was not validated for these outcome indicators (Table 5).

Table 5 Summary results for H1, A1

Test	H1 A1Validated[a]
PSS	Yes
MSI-GDS	No
QoLI	No
SCL-GSI	Yes
SCL-PSDI	Yes
SCL-PST	Yes

[a]($p<0.05$)

Observed Expectancy Effects (H1, A2)

It was observed that the outcome indicators trended toward improvement (in some cases, significant improvement) before the first intervention session. The theoretical basis for the observed improvement between pre-test 1 and pre-test 2 is primarily derived from the work of Kirsch (2005). Based on his work concerning the placebo effect in psychoactive pharmaceuticals, he proposed the following general assertion,

> If the control procedure is effective in treating the disorder, then it is a bona fide treatment. It must have psychologically active ingredients or else it would not work. And it does not matter what those active ingredients are. They may be hope or faith or response expectancy. In

> principle, these are no different from any other psychological factor that can alleviate distress (Kirsch, 2005, p. 800).

There are two important observations that might relate Kirsch's statement to this thesis study. First, the UNLV-IRB informed consent form required that the participants be informed of personal benefits potentially leading them to believe that they would benefit from participation in this study. Second, there was a three week time period between pre-tests 1 and 2, and to reduce the travel burden to the test location, the first intervention was administered directly after pre-test 2 (the participants knew this due to the extended time commitment required). Anecdotal comments from some of the participants seemed to reflect a positive anticipation for the treatment intervention during this combined session visit. The expectancy effect as previously outlined suggests that outcome scores may show improvement between pre-tests 1 and 2 and continue to improve for the post-test. With respect to A2, any improvement in the outcome scores for pre-test 2 will be considered part of the intervention process. H1, A2 will be valid if there is an improvement between pre-test 1 and the post-test at a significance level of $p< 0.05$.

It was observed that all of the outcome scores trended toward improvement between pre-test 1 and pre-test 2 (Table 6). Statistically significant improvements in outcome scores between pre-test 1 and the post-test as determined using a repeated measures ANOVA analysis were observed for the PSS and outcome measures MSI-GDS, SCL-GSI and SCL-PST. Significance was not observed for the QoLI or SCL-PSDI (Table 6, Figures 16, 17, 18, 19, 20, 21). H1, A2 predicts improvements between pre-test 1 and the post-test with significance levels of $p<0.05$ as measured using a repeated measures ANOVA analysis.

Table 6 Change in test scores for H1, A2

	Score	Difference	
Test	Pre-Test 1(SD)	Pre-Tests 2 & 1	Post-test & Pre-Test 1
PSS	29.3 (1.6)	-2.1	-7.5**
DSI	3.67 (0.16)	0.12*	0.39**
SOC	56.7 (2.3)	2.18	3.52*
MSI-GDS	8.36 (1.41)	-1.82**	-1.55*
QoLI	36.0 (3.0)	3.75	3.25
SCL-GSI	1.14 (0.12)	-0.34**	-0.43**
SCL-PSDI	2.05 (0.12)	-0.17	-0.34
SCL-PST	48 (3.5)	-9.8**	-13.1**

* $p < 0.05$
** $p < 0.01$

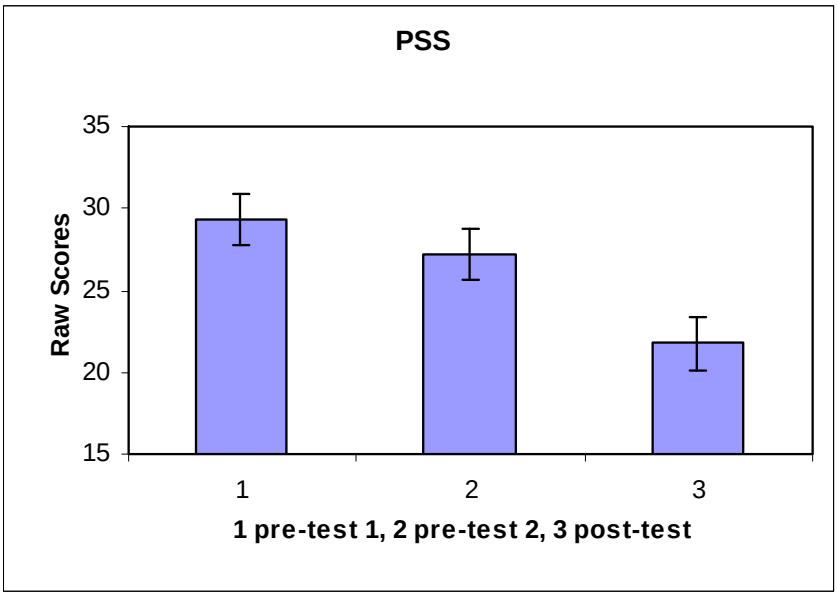

Figure 16. Change in PSI outcome scores (H1, A2), $p<0.01$ between 1 and 3.

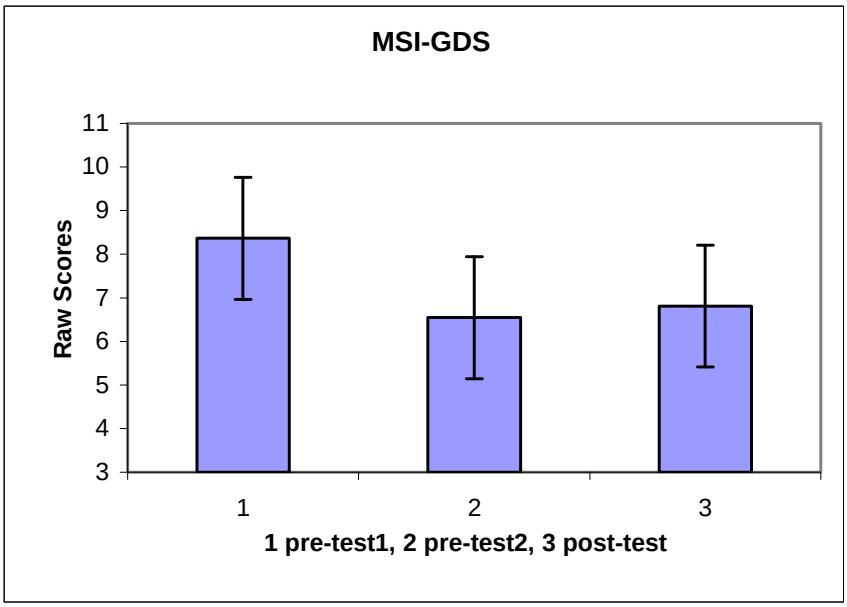

Figure 17. Change in MSI outcome scores (H1, A2), $p<0.05$ between 1 and 3.

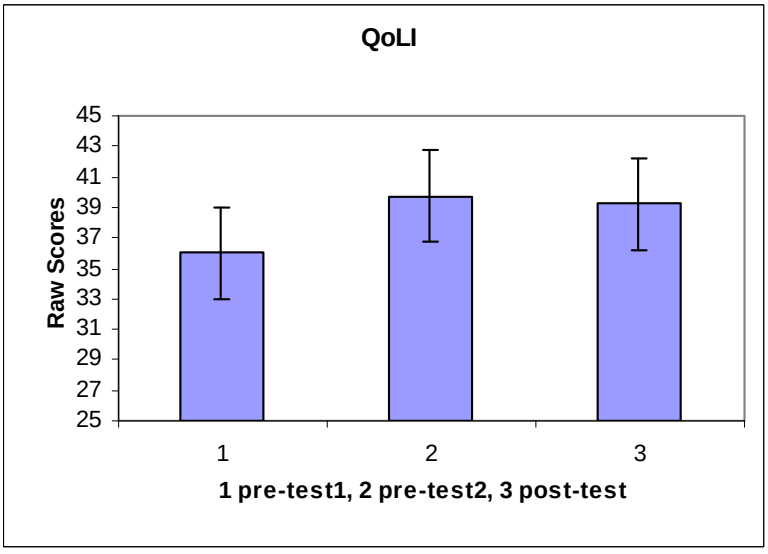

Figure 18. Change in quality of life outcome scores (H1, A2).

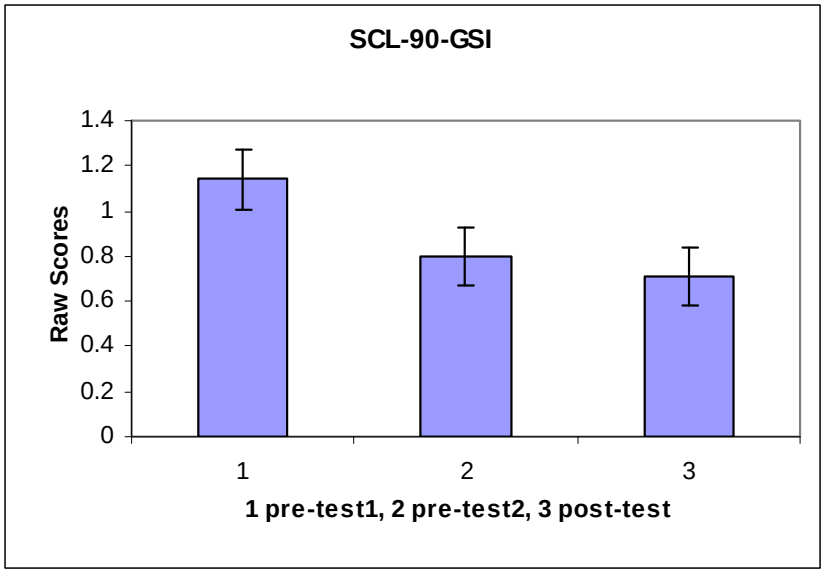

Figure 19. Change in SCL-GSI outcome scores (H1, A2), $p<0.01$ between 1 and 3).

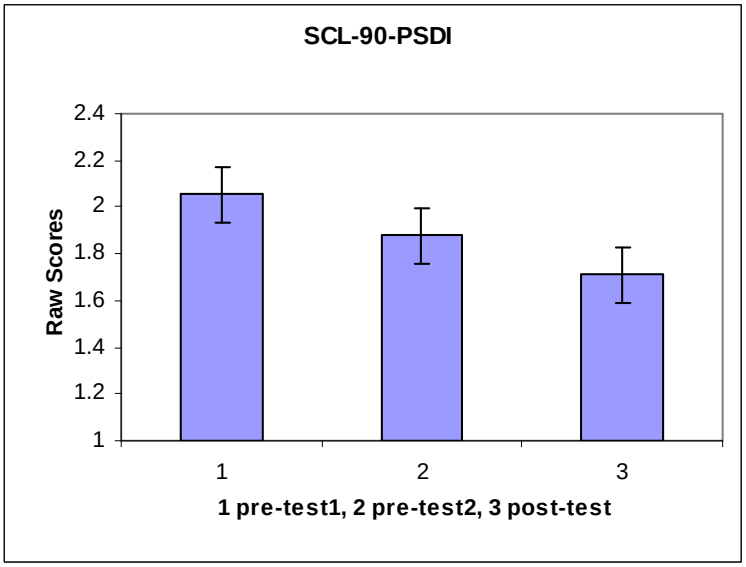

Figure 20. Change in SCL-PSDI outcome scores (H1, A1).

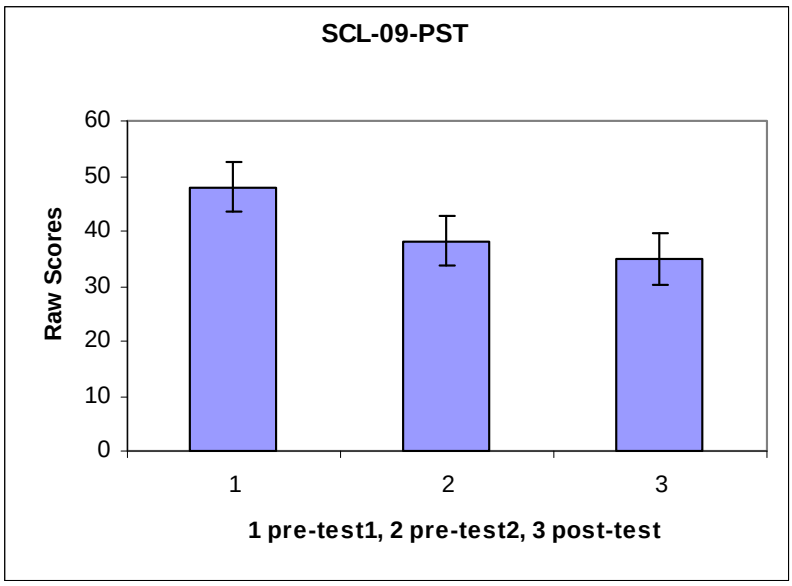

Figure 21. Change in symptom checklist positive symptom total outcome (H1, A2), $p < 0.01$ between 1 and 3.

Table 7 Summary results for H1, A2

Test	H1, A2[a]
PSS	Yes
MSI-GDS	Yes
QoLI	No
SCL-GSI	Yes
SCL-PSDI	No
SCL-PST	Yes

[a] ($p<0.05$)

This hypothesis with assumptions was validated for the PSS, MSI-GDS and SCL global scales (GSI and PST) but was not validated for the SCL-PSDI scale or the QoLI. A summary of the validated outcome measures for H1, A2 is shown in Table 7.

Effect of Intervention on the General Orientation Measures (DSI, SOCS)

Data analysis methods for the general orientation measures DSI and SOCS were consistent with the data treatment for the outcome measures. More specifically, assumptions 1 and 2 (A1, A2) were applied to Hypothesis 2 (H2). An outline of the data handling is shown in Figure 22.

The mean wait-list global score for the DSI (average of pre-tests 1 and 2) for the current study was 3.73 ± .59 which was lower than those reported by Skowron (Skowron & Friedlander, 1998; Skowron & Schmitt, 2003) (men 3.87 ± .55, women 3.64 ± .61) (Table 3, Figure 23). Again, this result might be expected given that the herein reported population consider themselves to be living a high stress lifestyle. Post-test session scores increased to 4.06 ± .51 at a $p<0.05$ significance level. Although the DSI is considered to

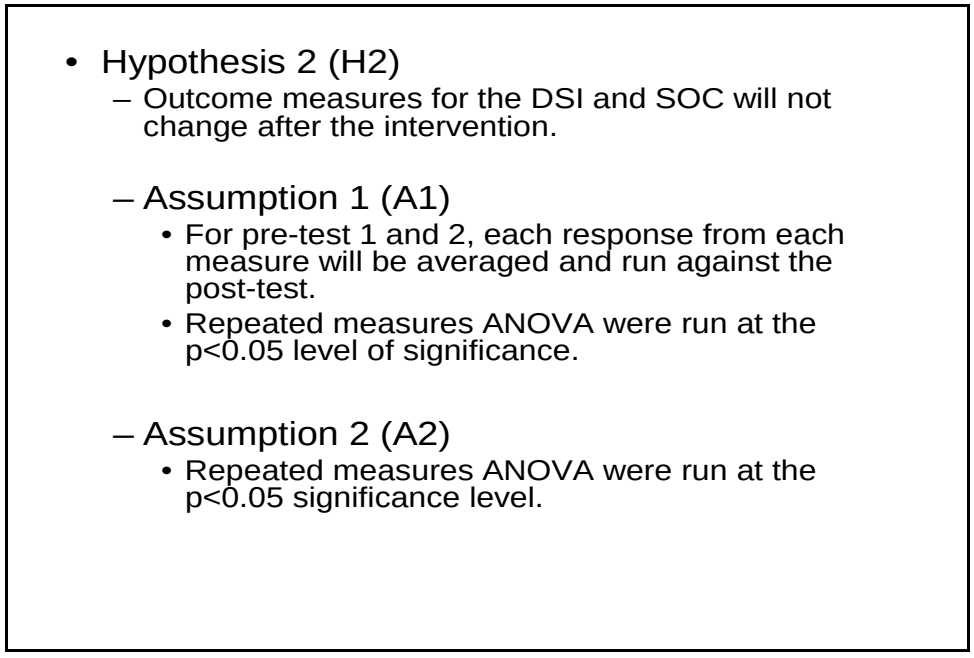

Figure 22. Outline for data analysis for H2, A1 and A2.

be more of a trait than state descriptor, the herein reported post-intervention score increased by a statistically significant level ($p<0.05$) and was above that reported by Skowron as controls in a student population.

Similar to the DSI, the SOCS is also considered to be a trait rather than state indicator of the Salutogenic Model of Health (Antonovsky, 1993) and is not expected to change significantly over time for individuals over 30 years of age. The herein reported results show a mean wait-list score (average for pre-tests 1 and 2) of 57.8 ± 11.4 which is similar to values (of between 59-61) reported for individuals experiencing relational or financial problems (Richardson et al., 2007). After the intervention, an increase in the SOC of 2.4 was observed with a post-test session score of 60.2 ± 10.2 at a significance level of $p<0.05$ (Table 3, Figure 24).

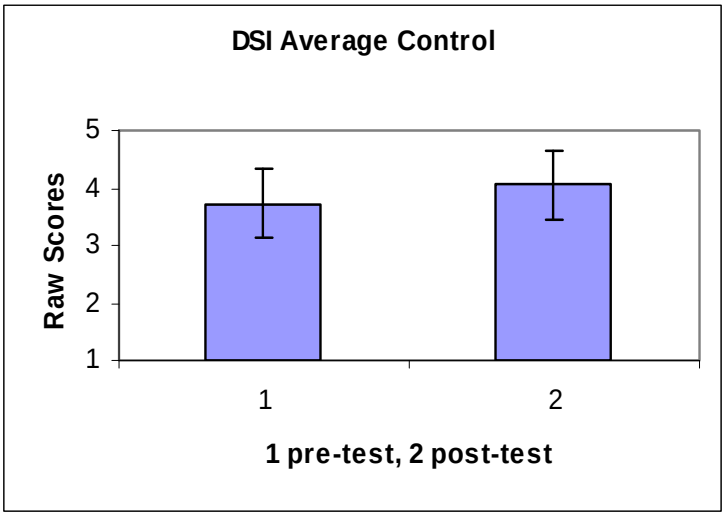

Figure 23. Change in differentiation of self scores (H1, A1), $p<0.01$.

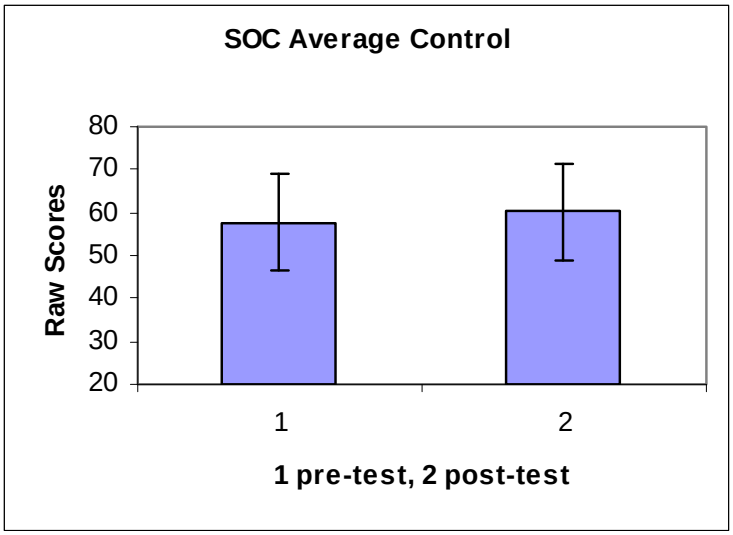

Figure 24. Change in sense of coherence scores (H2, A1), $p<0.05$.

In order to remain consistent with H1, A1and A2 were applied to H2. H2 states differentiation of self and/or sense of coherence scores will not change as a result of the intervention. Because the averaged wait list control scores for the global scales of the DSI and SOCS showed a significant improvement over the post-test scores, H2, A1 was not validated for either the DSI or the SOCS (Table 3). Similarly H2, A2 was not validated for either the DSI or SOC global scores which showed improvements between pre-test 1 and the post-test at a significance level of $p<0.05$ (Table 6, Figures 25, 26).

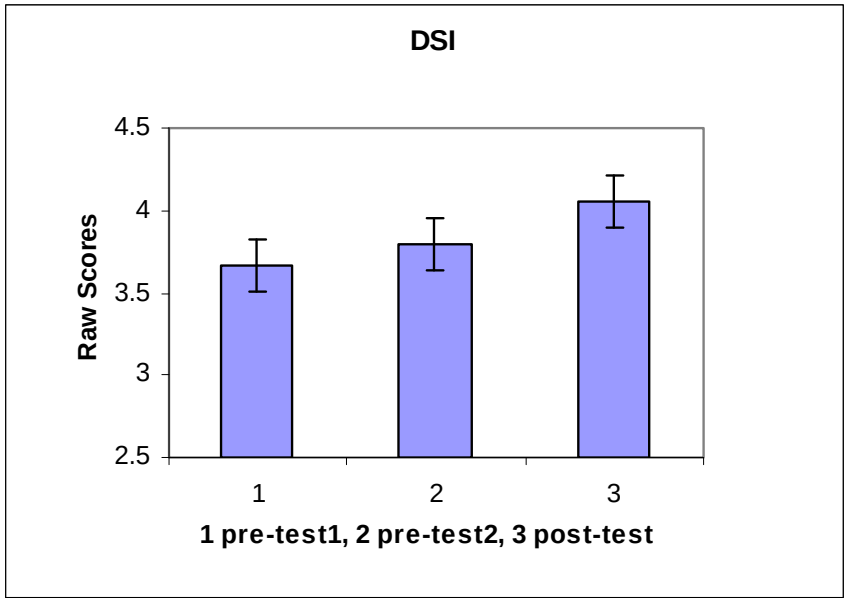

Figure 25 Change in differentiation of self scores (H2, A2), $p<0.05$ between 1 and 3.

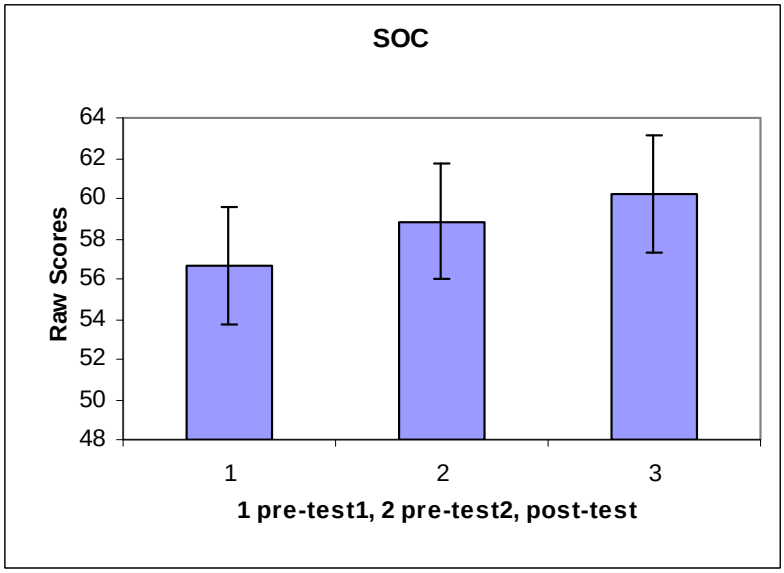

Figure 26. Change in sense of coherence scores (H2, A2), $p<0.05$ between 1 and 3.

Mediation of DSI and SOCS (H3)

H3 states that the magnitude of the differentiation of self and/or sense of coherence scores will mediate the relationships between perceived stress (PSS) and the outcome measures MSI-GDS, SCL-GSI, SCL-PSDI, SCL-PST and QoLI. The implication of this hypothesis may be stated as follows: those with high SOCS and/or DSI scores and will be better able to manage high levels of perceived stress with fewer detrimental consequences. An outline of the data analysis for H3 is shown in Figure 27.

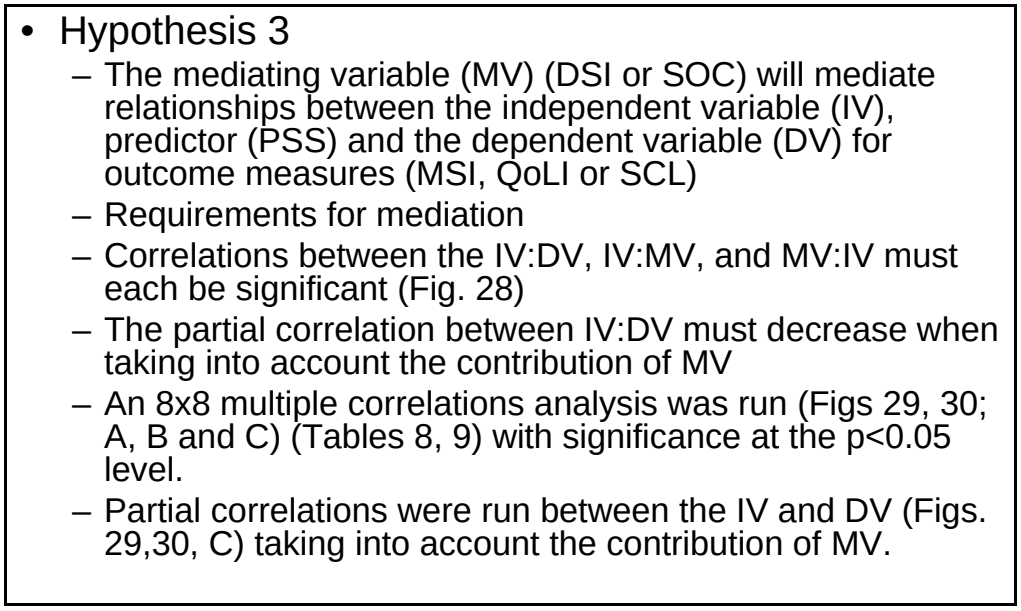

Figure 27. Outline for data analysis for H3.

Backenstrass, Schwartz, Fieldler, Joest, Reck, Mundt and Kronmueller (2006), suggested that "moderators are considered to be fixed parameters such as gender, race, etc., whereas mediators are expected to change over the course of an intervention. Since both the DSI and SOCS significantly changed from pre-test 1 to the post-test, the

mediator model appeared to be most appropriate and was tested for this study (Figure 28).

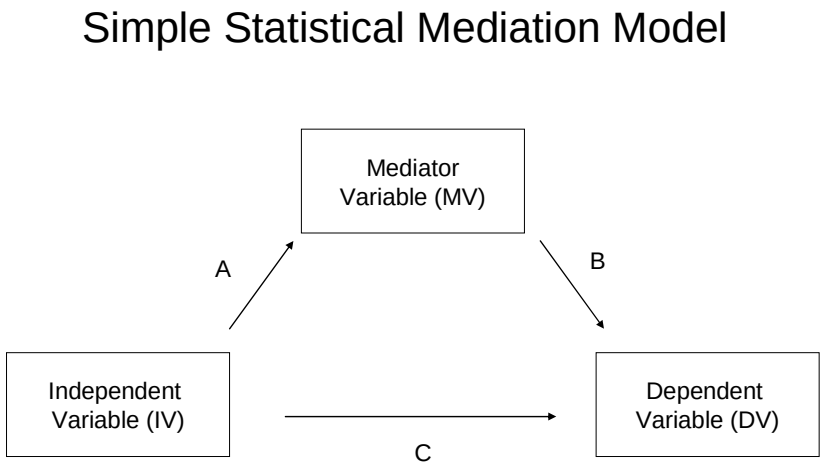

Figure 28. Simple statistical mediation model.

For this study, there are at least two ways to consider mediation between predictor and outcome variables. The first involves a temporal *snapshot in time* and the second involves the degree of change after an intervention. Because H3 implies that the DSI or SOCS score at a specific point in time will mediate the relationship between the perceived stress (PSS) score and outcome indicator scores, the snapshot in time option was used and both pre-intervention (pre-test 1) and post-intervention (post-test) time frames will be considered.

The mediator model used for this study (Figure 28) involves 3 variables which will be referred to as the independent variable (predictor, PSS), the mediating variable (DSI or

SOCS), and the dependent variable (MSI-GDS, QoLI, SCL-GSI, SCL-PSDI, or SCL-PST). In order to meet the conditions for the mediator model, all three variables must significantly correlate with each other and the significant correlation between the predictor and dependent variable must be diminished when the mediator is introduced into the model (Delsignore, Carraro, Mathier, Znoj & Schnyder, 2008). To test this model for the pre-test 1 data set and for the post-test data set, inter-correlations were run for each of the outcome variables for each data set (Tables 8, 9). Model diagrams were constructed showing the relevant Pearson correlations along with their associated levels of significance (i.e., $p<0.05$; $p<0.01$) (Figures 29, 30). For the relationships that met the first requirement of significant relationships, partial correlations accounting for the effect of the mediator were determined. Relationships that met both conditions (i.e., significant relationships and reduction in partial correlations) are shown with shaded triangles (Figures 29, 30).

Summary results for H3 are shown in Table 10. The results were mixed with respect to validation of this hypothesis. Although (with the exception of the SCL-PSDI), all of the outcome indicators showed a reduction in partial correlations when the mediators (DSI or SOCS) were considered, only half of the outcome indicators met both criteria (i.e., significant correlations on all sides of the triangle in Figures 29 and 30, and reduction in significance for partial correlations). The SOCS and DSI correlation profiles for mediation of outcome indicators were different between the pre-test and post-test time frames; however, one outcome indicator (SCL-PST) was mediated by both the DSI and SOCS over both time frames (Table 10).

Table 8 Inter-correlations between variables for pre-test (H3)

Test	1	2	3	4	5	6	7	8
1. PSS								
2. DSI	-.674**	----						
3. SOC	-.721**	.757**	----					
4. MSI-GDT	.444*	-.458*	-.503*	----				
5. QoLI	-.154	.317	.197	-.538*	----			
6. SCL-GSI	.506*	-.552**	-.422	.300	-.355	----		
7. SCL-PSDI	-.061	.076	.063	-.260	-1.19	.342	----	
8. SCL-PST	537*	-.470*	-.507*	.358	-.328	.767**	.134	----
Means	29.3	3.67	56.7	8.36	37.4	1.14	3.24	48.0
SD	7.5	.72	11	6.6	14	.69	5.8	16

* $p < 0.05$
** $p < 0.01$

Table 9 Inter-correlations between variables for post-test (H3)

Test	1	2	3	4	5	6	7	8
1. PSS								
2. DSI	-.556**	----						
3. SOC	-.617**	.757**	----					
4. MSI-GDT	.359	-.458*	-.503*	----				
5. QoLI	-.566**	.317	.197	-.538*	----			
6. SCL-GSI	.400	-.552**	-.422	.300	-.355	----		
7. SCL-PSDI	.211	.076	.063	-.260	-1.19	.342	----	
8. SCL-PST	.538**	-.470*	-.507*	.358	-.328	.767**	.134	---
Means	21.8	4.05	60.2	6.8	39.2	.71	1.71	34.8
SD	5.7	.51	10.1	6.2	11.5	.59	.58	21.9

* $p < 0.05$
** $p < 0.01$

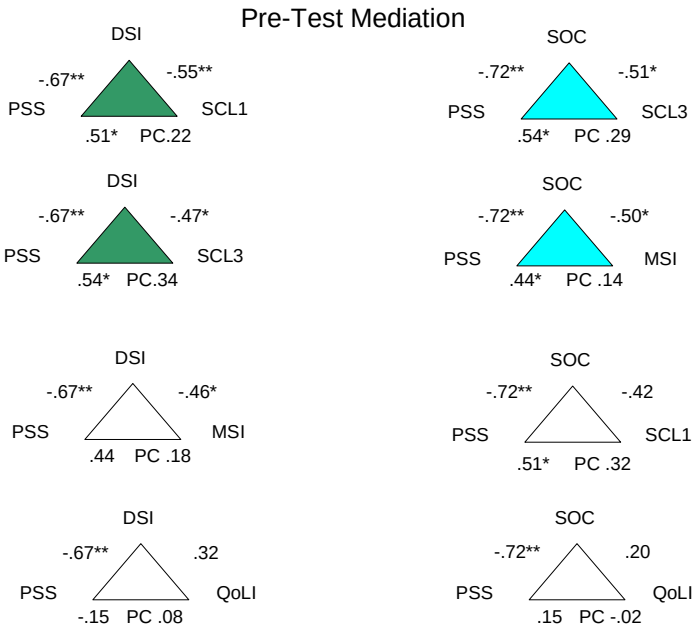

Figure 29. Schematic mediation model for pre-test results (*p<0.05, **p<0.01).

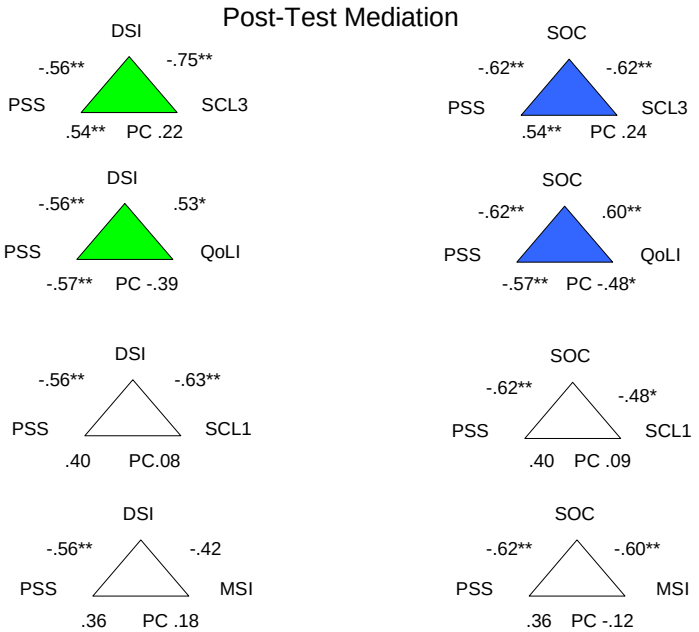

Figure30. Schematic mediation model for post-test results (*p<0.05, **p<0.01).

Table 10 Summary results for H3

	Mediation Demonstrated			
	Pre-Test1		Post-Test	
Test	DSI	SOCS	DSI	SOCS
MSI	No†	Yes	No†	No
QoLI	No	No	Yes	Yes
SCL-GSI	Yes	No†	No	No†
SCL-PST	Yes‡	Yes‡	Yes‡	Yes‡

†Outcome variable was mediated by either the DSI or SOCS over both time frames.
‡Outcome variable was mediated by both the DSI and SOCS over both time frames.

Physiological Parameters: Breathing Rate and HRV (H4)

The breathing rates during the one minute breathing exercise incorporated into the session 1 guided visualization resulted in reduced breathing rates during this period (Fig. 31). As recorded by the breath rate monitor, each of the participants followed the controlled breathing exercise in the first guided visualization. Some of the participants continued to breathe at slower rate after the exercise instructions ended (about 1 min duration) while others went back to their original breathing pattern. This change is reflected in the average breathing rate after the exercise which showed a breath per min (bpm) value between the rates observed before and during exercise. Each of these changes was significant at the $p< 0.05$ level.

Because breathing is the only function that can be under voluntary and involuntary control, it is considered to be a bridge between the voluntary and autonomic nervous systems (Lehrer, Vaschillo, Vaschillo, Lu, Ecberg, Edelberg, Shih, Lin, Kuusela &

Tahvanainen, 2003). The implication is that individuals are able to influence their autonomic nervous system functions through the use of controlled breathing techniques. This is facilitated through the respiratory sinus arrhythmia (RSA) or the natural variation in the heart rate that occurs during the breathing cycle. Essentially, the slowing down and speeding up of ones heart rate can be influenced and synchronized with our breathing (Lehrer et al., 2003). The synchrony between HRV and breathing rate that results in the greatest amplitude in the HRV has been shown to occur for most people at about 0.1 Hz (one cycle per every 10 s or about 6 bpm) (Yasuma & Hayano, 2004). This synchrony has been termed *cardiac coherence* (McCraty, Atkinson, Tomasino & Bradley, 2006) and is reflected as a semi-cummulative measure in Figure 32A or as a cumulative percentage as shown in Figures 33A and 34A. For accumulated coherence, the increase on the abscissa is maximum for high coherence, one half maximum for medium coherence and decreases at a level equal to high coherence when scoring at the low coherence levels (each of these levels is set in the software by the instrument manufacturer.

Commencement of the breathing exercise also had a measurable effect on the heart rate variability (HRV) as reflected in the *accumulated coherence score* and the instantaneous *heart rate tracing* shown for a representative session (participant 01F session 1) (Fig. 32).

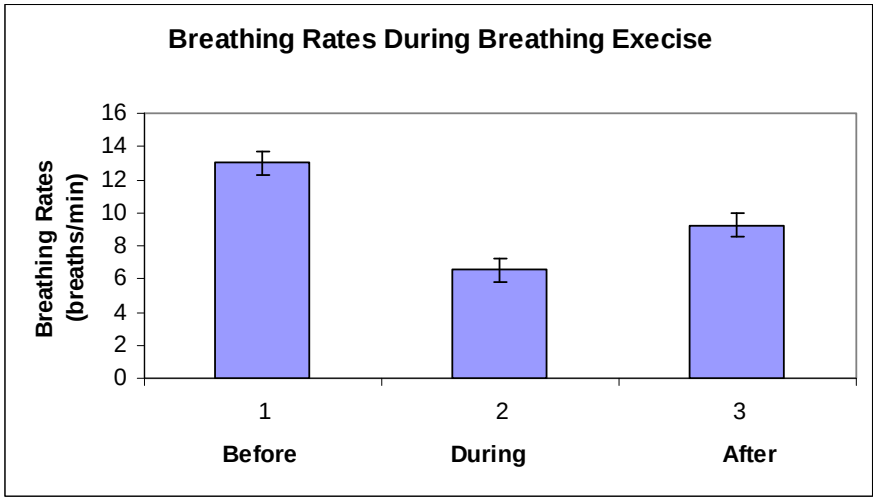

Figure 31. Breathing rates before, during and after the breathing exercise.

The *accumulated coherence score* (Figure 32, tracing A) is primarily calculated from the low frequency domain power spectrum (Fourier Transform of the variability tracing) and is the ratio of the area under the curve for the low frequency peak centered around 0.1 Hz compared to the total power spectrum (McCraty et al., 2006). This is essentially a measure of how smoothly and how regularly the heart rate is regulated (e.g., a sine wave would be nearly perfect). Approximate alignment of the time scales for breathing and HRV (indicated by the arrows) shows an increase in the amplitude (peak height) and regularity, and a decrease in the frequency (peak separation in time) of the HRV (Figures 32 and 33, Tracings B and C) during the breathing exercise. The relevant point being that an observed increase in HRV aligns with the time frame for a reduction in breathing rate, increase in breathing volume and increase in breathing regularity resulting from adherence to the breathing exercise in the guided visualization.

For the representative tracings is shown in Figure 33 (participant 14F, session 1), the *Coherence Ratio* (A) represents the percentage of session time spent in the low (a), medium (b) and high (c) coherence levels. These levels were set by the instrument, manufacturer within four challenge levels ranging from novice to expert. Similar to results shown in Figure 32, the frequency and depth of breathing for this participant (Fig 33, Tracing C) during the breathing exercise also corresponded to the relative changes in frequency and amplitude for the heart rate variability (Tracing B). It is also interesting to note that the increase in amplitude of the heart rate variability peaks occur as a decrease in baseline heart rate (i.e., the peaks extend downward from the previous baseline indicating a, lower heart rate, Tracing B at the arrows).

Several exceptions to the typical pattern of decreased breathing rate and increased HRV corresponding to the breathing exercise were observed. One example is shown in Figure 34. In this case (as was similar in several other exceptional cases), the breathing throughout the session was deep, slow and regular. The HRV was very high as reflected in the frequency and amplitude of the heart rate (Tracing B) and high coherence ratio (Panel A).

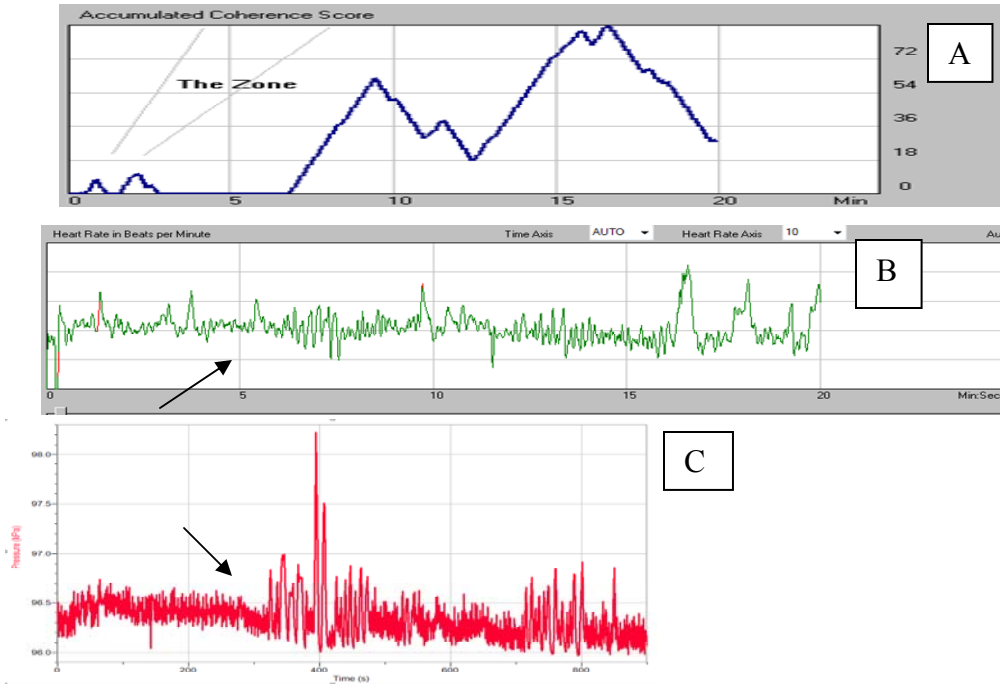

Figure 32. Accumulated coherence (A), HRV (B), breathing rate (C).

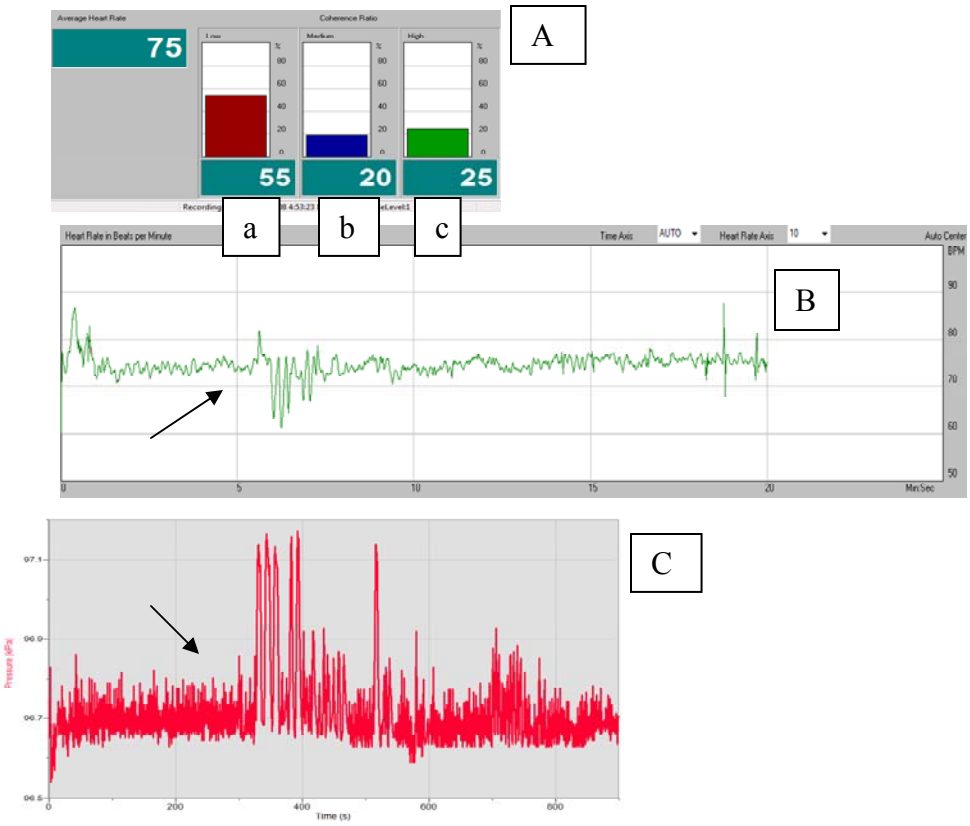

Figure 33. Coherence ration (A), low (a), medium (b), high (c), HRV (B), BR (C).

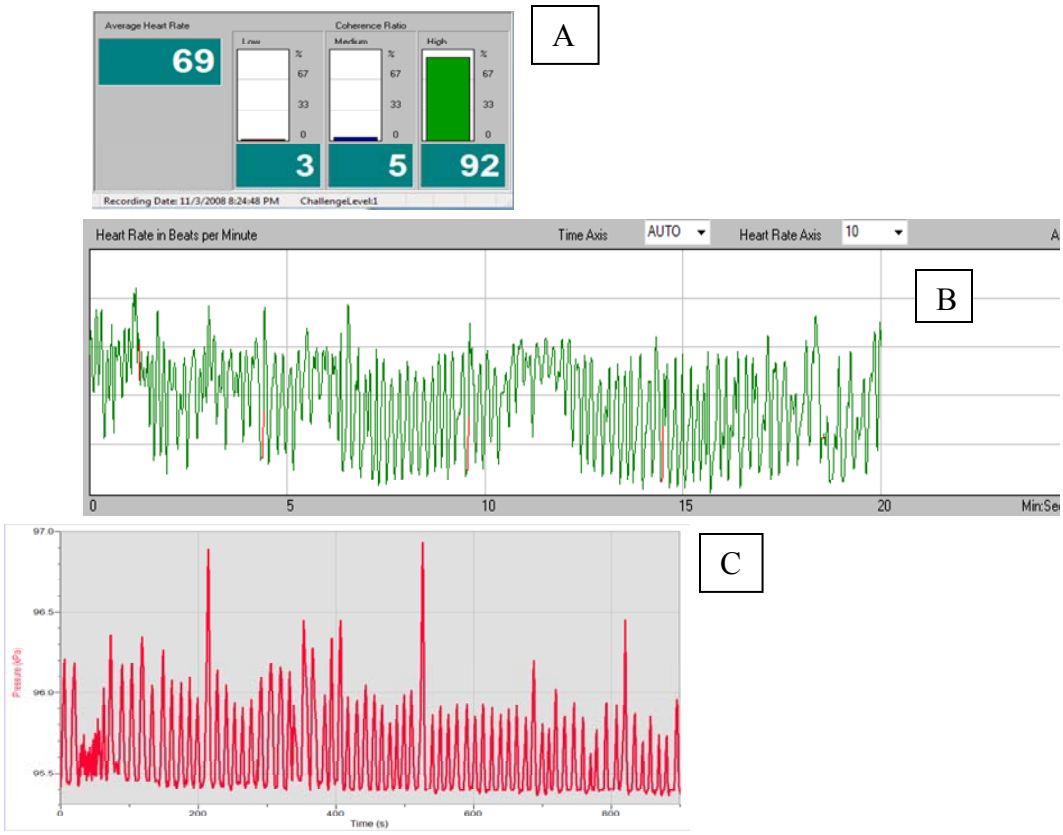

Figure 34. Coherence ratio (A), HRV (B), breathing rate (C).

In a brief post-study conversation, this participant indicated that she was a professional yoga instructor and regularly practiced controlled breathing. Several other similar exceptions were noted and these participants indicated that they also regularly practiced controlled breathing. These participants included a professional flutist, a scuba diver and a martial arts practitioner. Although the breathing exercise included in the visualization in session 1 appeared to increase HRV measures for a short duration for most participants (excluding the exceptions), the average HRV scores among the three sessions did not significantly change. The *coherence ratio* (sum of medium plus high) appeared to slightly increase between sessions 1 and 2; however, a repeated measures ANOVA did not yield significance at the $p<0.05$ level (Figure 35).

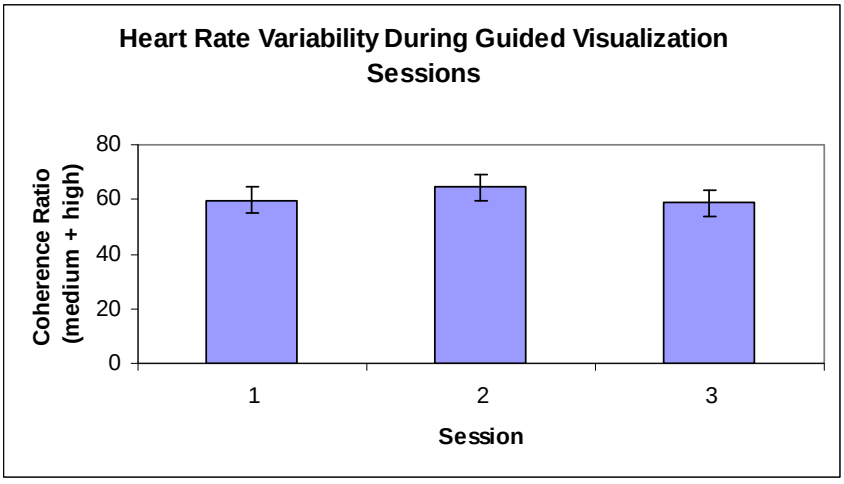

Figure 35. HRV during the three guided visualization sessions.

In summary, the results suggested that increases in HRV are influenced by changes in breathing rate directed by a controlled breathing exercise and that HRV does not appear

to be influenced by the guided visualizations independent of the incorporated breathing exercise.

The average change in salivary cortisol levels before and after each session is shown in Figure 36. Salivary cortisol levels increased between the beginning and end of each session for sessions 1 and 2 but decreased for session 3. Because cortisol has been associated with stress and relaxation, it was hypothesized that salivary cortisol levels would decrease over the course of the guided visualization. Cortisol levels; however, vary with circadian rhythm and show the lowest baseline levels in the evenings when the intervention sessions were performed.

H4 part (a) states: the average breathing rate will become slower and more rhythmic during the breathing exercise portion of first guided visualization (as measured by abdominal distension). This part of H4 was validated in that the average breathing rate during the exercise was in fact slower than before the exercise started.

H4 part (b) states: the HRV as measured using the coherence ratio (percentage of session spent in medium or high levels) will increase between each session. This part of hypothesis 4 was not validated.

H4 part (c) states: average salivary cortisol levels for each participant will decrease over the course of the relaxation session. This part of H4 was not validated for sessions 1 and 2 but appeared to be was valid for session 3.

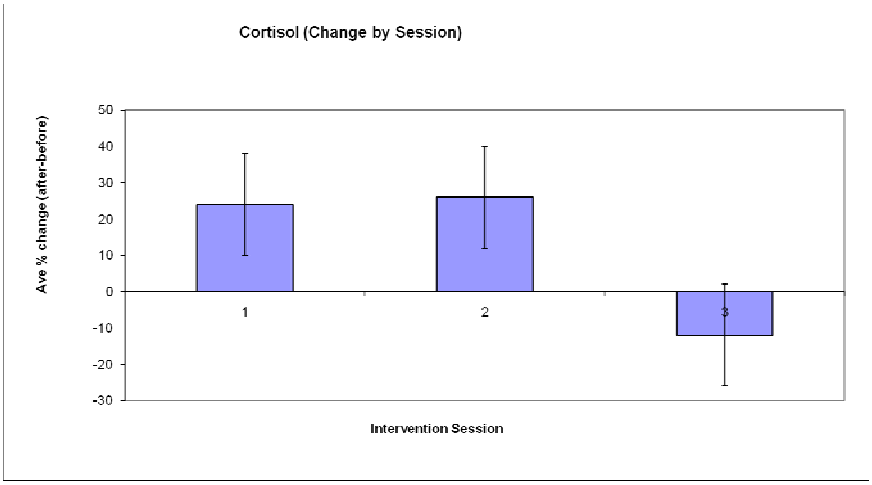

Figure 36. Salivary cortisol, change by session.

CHAPTER 5

DISCUSSION

The purposes for this study included the following; (1) investigation of the efficacy of a brief (3 sessions of CB-based guided visualizations) intervention on improvement of physical, psychological and relational well-being; (2) examination of the relationships among perceived stress (PSS), measures of generalized orientation toward the world (DSI, SOCS) and outcome measures of distress in the areas of dyadic relationship, quality of life, and physical and psychological symptoms and complaints (MSI, QoLI, SCL); and (3) examination of the effect of individual guided visualization sessions on physiological parameters including breathing rate, HRV and salivary cortisol levels.

Purpose 1, Efficacy of Brief Intervention

Outcome Measures (H1)

The most significant changes in outcome measures before and after the intervention were for the perceived stress (PSS) and general physical and psychological distress (SCL global scales GSI and PST, Tables 3, 6). The herein reported results were not unexpected in that the efficacy of both cognitive behavioral techniques and relaxation techniques such as Jacobson's progressive muscle relaxation and Benson's relaxation response have long been considered to be effective in reducing physiological and psychological symptoms in clinical and non-clinical populations (Butler, Chapman, Forman & Beck, 2006; Kerr, 2000; Nakao et al., 2001). What was unexpected, however, was that three sessions of about 30 min each over a three-week period showed results with a non-clinical population that were in some ways comparable to much longer intervention protocols using similar types of approaches (Deckro, Ballinger, Hoyt, Wilcher, Dusek, Myers, Greengerg, Rosenthal & Benson, 2002; Nakao et al., 2001; Lundblad & Hansson,

2005; Rogers et al., 2007). For example, a multi-component approach using CBT-based guided visualization sessions with a vibroacoustic chair (primarily to enhance relaxation) has been shown to reduce depressive symptoms and relationship difficulties in a clinical population (Rogers et al., 2007). The most significant improvements for this study were in the areas of depression and anxiety and were achieved after at least four sessions. In another study that measured the efficacy of reducing stress levels and symptoms of global distress using a mind-body experiential approach, Deckro et al. (2002) measured improvements in PSS and SCL outcome scores. Their population was composed of college students responding to a "maximize your potential" advertisement. These students participated in six, 90-min training sessions that focused on learning and practicing cognitive behavioral skills and the relaxation response exercise. The PSS scores for pre- and post-intervention were 30.24 and 25.13 (Δ -5.11). For the current study, the PSS wait-list control average value was 28.2 and post-test value was 21.8 yielding a change (Δ -6.5) that was similar to that reported by Deckro et al. (2002).

The average pre-intervention T score for the SCL-GSI scale for the same study by Deckro et al. (2002) was 63.92 with a post-intervention decrease of 4.49. In a similar study, Nakao et al. (2001) showed that for a clinical outpatient population, a 10-week behavioral medicine intervention reduced physical and psychological distress symptoms also measured using the SCL. In the case of the Nakao et al. (2001) study, the intervention included training in relaxation and cognitive restructuring. T scores for the GSI scale of the SCL decreased from an average value of 64 to 57 (Δ -8). The T score value for the current study for the wait-list control average was 74 with a post-intervention decrease of 7 if determined for men and 65 with a decrease of 4 if

determined for women (Table 4). Consequently, the decreases observed for the SCL global indicator scores for a brief intervention in the current study were similar to those observed by Deckro et al. (2002) and Nakao et al. (2001) using significantly longer and more involved treatment protocols.

The average SCL-GSI score observed by Decro et al. (2002) for a general college student control population was lower than observed for the highly stressed couples in the herein reported study; however, relatively high values for this indicator are not unusual for distressed couples. For example, Lundblad and Hansson (2005) reported SCL-GSI values of 85.6 for women and 65.6 for men in a distressed couples population. After 8 sessions of couples therapy, the GSI sub-scale values dropped to 53.5 for women and 47.4 for men. It is interesting that the GSI scale for the Lundblad and Hansson (2005) study seemed to capture the marital distress that brought the couples into counseling and that the decrease in distress after resolution of marital problems especially for the women in this clinical population (32 point drop), was quite large.

There is a significant literature base that suggests that "marital discord plays an important role in the etiology, course and treatment of a variety of psychological disorders" (Whisman, Snyder & Beach, 2009, p. 247). This view suggested that the interaction between psychological and relational distress works both ways. In other words, marital discord is associated with poorer treatment outcomes for mood and anxiety disorders and treatment of specific psychological disorders can improve marital satisfaction. Whisman et al. (2009) further suggest that because marital discord as measured by tools such as the MSI exists along a continuum, it is difficult to assess *clinical significance* even in a clinical population.

For the current study, MSI-GDS scores for the waitlist control and pre-test1 were considered to be in the moderately distressed range (Snyder, 2004). Although the change in the average MSI-GDS score (between the wait list control and the post-test) after the intervention did not meet the criteria for validation of H1, A1 and remained in the moderately distressed level, it did decrease after the intervention (Table 3). The change in the MSI-GDS score between pre-test 1 and the post-test did, however, meet the criteria for validation of H1, A2 (Table 6). As suggested in Bodenmann's relationship-stress model, the theoretical basis for relating chronic stress to marital dissatisfaction may be somewhat complex (Randall & Bodenmann, 2009). This model suggests that variables which mediate between stress and marital dissatisfaction include time together, communication quality, physical and psychological problems, and problematic personality traits. These appear to be variables that were not addressed in the guided visualization scripts for the current study.

Quality of life (a rather ambiguous term) is often measured as an outcome indicator in stress-related studies. A review of quality of life indicators has suggested that the concept is difficult to conceptualize and the commonly used screening tools seem to focus on different areas of life (Eriksson & Lindstrom, 2008). In a recent study that used CBT and meditation-based stress reduction for treatment of social anxiety disorder, changes in QoLI scores were reported as an outcome measure (Koszycki, Benger, Shlik & Bradwejn, 2007). Although these treatment modalities showed significant efficacy for the reduction of anxiety, changes in QoLI scores although trending upward (baseline 34.9, endpoint 41.2) did not meet statistical significance at the $p<0.05$ level (Koszycki et al., 2007). For the current study, outcome scores for the QoLI showed a small but not

significant (at $p < 0.05$) improvement between the wait-list control average and post-test (Table 3). This result might be expected, given that many of the questions on the QoLI do not seem to be directly related to stress. For example, at least half of the questions were focused on issues such as neighborhood, community, friends, helping, etc. (Frisch, 1994).

The Expectation Effect

There are certain operational and ethical advantages related to the use of an averaged wait-list control research design. First, by using the entire sample population as their own controls, greater statistical power can be obtained from a limited number of participants. Second, each participant gains the potential benefits of the proposed intervention over a sham treatment intentionally assumed to yield no improvement. An additional unexpected advantage in using this research design was the observation of a statistically significant expectancy effect for some of the outcome indicators.

The wait-list control approach (i.e., average of test-retest prior to the intervention) was initially envisioned and adopted to account for random variations in the participants' level of functioning over time. The procedure involved averaging the outcome indicator scores for each individual and comparing these to the post-intervention scores. Further analysis of the data; however, showed improvements between pre-test 1 and pre-test 2 for some of the outcome indicators.

Improvements in outcome indicator scores between pre-test 1 and pre-test 2 were significant (at the $p<0.05$ level) for the DSI, MSI-GDT, SCL-GSI and SCL-PST. With respect to improvement resulting from a therapeutic intervention, expectancy has often been associated with hope (for improvement) and suggested to account for as much as 15% of improvement in psychological and relational functioning achieved through the

therapeutic process (Lambert & Barley, 2002). In order to accommodate for the observed expectancy effect, an alternative treatment of the data was adopted. Based on the theoretical concepts of Kirsch (2005) and outlined in the Results Section, the second pre-test was considered to be part of the intervention and pretest 1 was compared to the post-test.

The specific values for the outcome indicators and levels of statistical significance were somewhat different for the two treatments (Tables 3 and 6). H1, A1 was validated for all outcome indicators except the MSI-GDS and QoLI (Table 5). H1, A2 was validated for the PSS, MSI-GDS, SCL-GSI and SCL-PST, and was not validated for the QoLI or SCL-PSDI (Table 7). The relatively small magnitude of change for the MSI-GDS and SCL-PSDI scores after the intervention may have contributed to the differences observed using the two forms of data analysis for these outcome indicators.

Purpose 2: Mediation by General Global Orientation Measures (H2, H3)

H2 was rejected for both the DSI and SOCS, indicating that scores for these indicators showed a significant change (improvement) after the intervention. Although differentiation of self is considered to be difficult to change (Murdock & Gore, 2004), life events or simply personal growth over decades of experience may result in an increase in an individual's baseline values (Bartle-Haring et al., 2002). In addition to a baseline level of differentiation, Bowen suggested a more transient or functional level of differentiation may influence behavior in certain situations (Bowen, 1985). In this respect, it is difficult to determine the relative contribution of either type of differentiation (baseline or functional) that was measured using the DSI in the current study. Although the questions

on the DSI are framed as trait indicators, they may be interpreted (by participants) in a more immediate sense (Skowron & Friedlander, 1998). In the cases of both A1 (change between wait-list control average and post-test) and A2 (change between pre-test 1 and post-test) DSI values significantly increased ($p<.01$) after the intervention (Tables 3 and 6).

It has also been suggested that one's sense of coherence as measured using the SOCS is also stable over time; however, studies have indicated that SOCS scores tend to increase with age in general populations (Richardson et al., 2007). In addition, SOCS scores have been shown to be more variable among lower scoring individuals (Hakanen, Feldt & Leskinen, 2007). Vastamaki, Moser, and Paul (2009) have also shown that life occurrences such as re-employment can significantly improve SOCS scores. These investigators found that the baseline average SOCS score during an extended period (20 months) of unemployment was 62.36 and after employment training and re-employment the mean score increased by 3.83. The herein reported average wait-list SOCS score for highly stressed couples was 57.8 and increased by 2.4 after the intervention (Table 3). The average SOCS score for pre-test 1 was 56.7 and increased by 3.5 compared to the post-test average score (Table 6). In either case, the magnitude of increase for the currently reported intervention was similar to that measured after job training and re-employment (Vastamaki et al., 2009). Because of these increases in both DSI and SOCS scores after the intervention as well as significant correlations among the DSI, SOCS, stress, and symptoms, a mediation model (Fig. 28) was used to test H3 in two timeframes using the pre-test 1 and post-test data sets.

H3 predicts that both the DSI and SOCS scores will mediate relationships among stress (PSS) and each of the outcome indicators for marital distress, quality of life and global indicators of physical and psychological distress. Data sets prior-to and after the intervention were used for these analyses and yielded mixed results. Although all of the indicators met the criteria of having partial correlations reduced when the mediator (DSI or SOCS) was considered, only about half of the outcome indicators met the criteria of significant correlations (i.e., $p<0.05$) for all three relationships (Table 10 and Figures 29 and 30). Nevertheless, the current results show that both the DSI and SOCS mediated the relationship between perceived stress (PSS) and the number of reported symptoms (SCL, PST) in both the pre-intervention and post-intervention time frames (Table 10). These results will be discussed in context of the literature.

Bowenian theory suggests that "differentiation [as measured by instruments such as the DSI] creates the context within which potentially stressful life events are experienced, which in turn leads to psychological and physical symptoms" [brackets are the current author's commentary] (Bartle-Haring et al., 2002, p. 570). In other words, individuals with higher levels of differentiation should be able to better adapt to high levels of stress and show lower levels of physical and psychological symptoms.

The current results showing DSI mediation between stress and distress symptoms are similar to those reported by Skowron, Wester and Azen (2004) in a college student population. These investigators reported that differentiation (measured using the DSI) mediated the relationship between stress (measured using the College Stress Inventory, CSI) and psychological adjustment (measured using the SCL-GSI scale). Their (Skowron et al., 2004) decision to use a mediation rather than a moderation model was based on the

work of Baron and Kenny (1986) who suggested that a moderator should be uncorrelated with the predictor and criterion variables. In this regard, the current results are also similar to those reported by Skowron et al. (2004) in that the measures of stress and symptoms for both studies showed significant correlation with differentiation (see Figures 29 and 30, current study).

Similar to the Skowron et al. (2004) study, Murdock and Gore (2004) also conducted a study to assess the relationships among stress, differentiation of self, and dysfunction in a college student population. Although Murdock and Gore (2004) also showed correlations between DSI and PSS (-0.59, $p<.01$), DSI and brief symptom inventory-global severity index (BSI-GSI) (-0.57, $p<.01$), and PSS and BSI-GSI (0.63, $p<.01$) (which would suggest use of a mediation model), they chose to use a moderation model to explain the observed effects. Nevertheless, they came to a similar conclusion to the current study and the Skowron et al. (2004) study. More specifically, "poorly differentiated people experiencing high stress reported significantly greater levels of psychological dysfunction than did well-differentiated people experiencing similar levels of stress" (Murdock & Gore, 2004, pp. 332).

Similar to Bowenian theory, Anatonovsky's salutogenic model defines sense of coherence as "a global orientation that expresses the extent to which one has a pervasive, enduring through dynamic feeling of confidence that one's internal and external environments are predictable and that there is a high probability that things will work out as well as can be reasonably expected" (Vastamaki et al., 2009, p. 161). This might be interpreted as meaning that the higher one's sense of coherence, the better one might be expected to manage stress with fewer physical and psychological complaints. The

currently reported data appear to validate this concept in that the SOCS mediated the relationship between perceived stress (PSS) and physical and psychological symptoms (SCL-PST) in both the pre-intervention and post-intervention data sets (Table 10).

Nielsen and Hansson (2007) conducted a study using a National Danish adolescent (13 to 18 y) population to assess the relationships among sense of coherence, stress and health status. These investigators reported that although health symptoms were not correlated with SOCS scores, both stress and sense of SOCS scores were generally associated with health. They also reported that "…girls with low sense of coherence who were exposed to stress reported recent illnesses twice as often as unstressed girls did…" and "…this difference disappeared in girls with a high 'sense of coherence'…" (Nielsen & Hansson, 2007, p. 331).

In another study, Darling, McWey, Howard and Olmstead (2007) investigated the relationships among SOC as well as physical and emotional reactions to stress in a college student population. These investigators observed a significant relationship between emotional health and SOCS scores in women. They also observed that for men, family relationships had the greatest effect on SOCS scores. Similar to the currently reported data, both of these studies came to the same general conclusion that higher SOCS scores allow individuals to better manage stress and exhibit fewer symptoms of physical and psychological distress (Nielson & Hansson, 2007).

A recent review by Eriksson and Lindstrom (2008, p. 940) suggested that "the stronger the SOC, the better the quality of life". The herein reported results are consistent with this suggestion in that the SOCS scores appeared to meet both criteria (i.e., significant correlation among PSS, SOCS, QoLI, and partial correlation between PSS and

QoLI being lowered by SOCS) for mediating the relationship between the PSS and the QoLI in the post-test data set but only one of the criteria (the second of the two) for the pre-test 1 data. Although it is beyond the scope and conclusions drawn in the current study, the cited literature (Darling et al., 2007; Hakanen et al., 2007; Murdock & Gore, 2004; Nielsen & Hansson, 2007; Richardson et al., 2007; Skowron et al., 2004; Vastamaki et al., 2009) taken together would suggest that high DSI and/or SOCS scores act as a kind of *inoculation* against the negative effects of everyday stress on physical, psychological and relational distress.

Given that the main tenants of differentiation of self and sense of coherence are primarily based on optimism, pragmatism and the ability to adapt to change, it would seem to make intuitive sense that a higher capacity in these areas would allow individuals to manage the cognitive and emotional challenges of stress. It was Bowen's contention, however, that the concept of differentiation of self extended beyond psychological dysfunction into the physical health area. In his interpretation of Bowenian Theory, Friedman (1991) suggested that "chronic anxiety is understood to be the primary promoter of all symptoms, from schizophrenia to cancer, from anorexia to birth defects. The antidote and the preventative medicine always is differentiation" (p.140). Although this assertion seems a bit extravagant with respect to the currently held medical model of disease, public and professional interest in complementary and alternative medicine seems to be shifting thinking in this general direction.

In his salutogentic model, Antonovsky (1996) suggested that SOC is one of the main determinants to maintenance of an individual's physical health throughout their adult life. Given the seemingly infinite number of variables associated with stress, disease and

health outcomes, validation of this theory has remained out of reach. Indirect and incremental progress, however, continues to be reported. For example, recent research has been reported by Wainwright, Surtees, Welch, Luben, Khaw and Bingham (2008), investigating the relationships between sense of coherence and lifestyle factors such as smoking, physical exercise and consumption of fruits, vegetables and fiber. These investigators concluded that "Individual differences in SOCS are associated with healthy lifestyle choices independent of social class and education, and may therefore aid in design of future health promotion interventions" (p. 871).

Purpose 3: Physiological Parameters

Chronic stress has been described as stressful events that occur too often, are too intense and remain unresolved for extended periods of time (Kerr, 2000). How an individual perceives and responds to stress, however, depends to a large extent on how they view life events in general (Antonovsky, 1996; Friedman, 1991). Consequently, stressful events that may be too much for one person to handle may not be a problem for another.

Although stress management approaches typically focus on two areas (i.e., modification of cognitive interpretation or lowering deleterious physiological response through relaxation) our mind and body are clearly linked in a variety of complex ways. The third purpose of this study involved the observation of physiological parameters (breathing rate, HRV and salivary cortisol levels) that were likely to influence the intervention used for this study. The current study was not intended to experimentally change physiological parameters in order to improve outcome measures but rather to observe possible effects of the intervention on these parameters.

The intervention protocol for this study included the use of several techniques designed to facilitate relaxation and enhance the experiential environment for learning CBT skills introduced in the guided visualizations. Techniques used in the experimental protocol included vibroacoustic sound delivered through a specially designed sound bed and the use of noise cancellation headphones to help isolate the participant from the distractions involved in the physiological measurement process. When asked how they found the session experience, the participant response in every case approximated "…this was a very relaxing experience" and that the physiological monitors did not seem to distract from the content of the guided visualization. Similar to our observations, vibroacoustic techniques coupled with relaxing music have been shown to decrease physical and psychological tension (Skille, 1991).

Breathing and Heart Rate Variability

Diaphragmatic breathing is a relaxation technique routinely used as part of stress management protocols (Deckro et al, 2002). In fact, Weil (1998) suggested that controlled breathing exercises which he term *breathwork* are the simplest and single most effective techniques for alleviating many of the stress-related symptoms and complaints his medical practice. In addition, Weil (1998) suggested that two sessions per day focusing on breathing slower, deeper, quieter and "more regular than usual" can help to reduce stress and improve general mood.

In the current study, the average baseline breathing rate measured during the first guided visualization and prior to the breathing exercise was 13 bpm (Figure 31). This rate was similar to an average baseline breathing rate of 12 bpm reported by Karavidas, Lehrer, Vaschillo, Vaschillo, Marlin, Buyske, Malinovsky, Radvanski & Hassett (2007)

for a clinically depressed population and 12.2 bpm for a group of yoga practitioners prior to intervention (Peng, Henry, Mietus, Hausdorff, Khalsa, Benson & Goldberger, 2004). During the controlled breathing exercise in the current study, the average breathing rate dropped to 6 bpm. For the yoga practitioners using the relaxation response protocol (Peng et al., 2004) the breathing rate was reduced to 8.3 bpm and for the Karavidas study (2007), participants' average breathing rate dropped to 6.5 bpm during the HRV biofeedback protocol. In each case, the breathing rate frequency was approximately 6 to 8 bpm which is suggested to be an optimal average for improvement in oxygen exchange and heart rate function (Lehrer et al., 2003).

Breathing is linked to HRV through the respiratory sinus arrhythmia (RSA) which has been described as the natural variation in the heart rate that occurs during the breathing cycle. In addition, HRV has been linked to both psychological symptoms of depression and a wide range of symptoms related to physical disease (Karavidas et al., 2007). Although the mechanism is not fully understood, it has been suggested that increased amplitude and regularity in HRV are linked to balance between the sympathetic and parasympathetic branches of the autonomic nervous system (Karavidas et al., 2007). For most people experiencing high levels of stress, this process involves decreasing sympathetic control (high arousal tied to stress hormones *fight or flight response*) and increasing parasympathetic control (McCraty et al., 2006). McCraty et al. (2006) further suggested the following "… while specific rhythmic breathing methods may induce heart rhythm coherence and physiological entrainment for brief periods, cognitively directed paced breathing is difficult for many people to maintain for more than one minute. On the other hand, we have found that individuals can intentionally maintain coherence for

extended periods by self-generating, modulating and sustaining a *heart-focused* positive emotional state." (p. 10) Due to limitations in the software used for the current study, it was not possible to quantitate HRV in separate periods during the guided visualizations. However, it was observed that individuals maintained a lower average breathing rate after the controlled breathing instruction was completed (Figure 31) and that controlled breathing appeared to increase HRV (Figures 32, 33). Consequently, it may be the case that an average increased HRV levels may have been maintained in addition to decreased breathing rates after the controlled breathing instruction had ended. It is suggested in the literature; however, that sustained changes in HRV require some type of HRV biofeedback administered on a regular basis (Karavidas et al., 2007).

Cortisol

Individual salivary cortisol levels in adults follow a daily circadian rhythm with maximum values observed in the hours between waking and noon and minimum values in the evening and during sleep. (Dorn, Lucke, Loucks & Berga, 2007). Salivary cortisol levels were measured before and after each guided visualization session. The measured values for the current study were consistent with the expected evening range reported by the test manufacturer and varied between 0.35 µg/dL and non-detect (Salimetrics, 2010), with 23% of the samples reported as non-detects. Average cortisol levels increased for the first two sessions and decreased in the third session.

Because the current study was not specifically designed with respect to measurement of cortisol, there were some limitations in the experimental design that may have contributed to ambiguous results. For example, when couple-participants presented for the guided visualization sessions, one member of the couple remained in the waiting

room for 30-45 min then the partners traded roles -- this lead to cortisol measurements for one member of the couple having spent an extended quiet time as compared to the other who immediately started the intervention after having traveled to the facility (many of the sessions started between 5:00 pm and 7:00 pm). In addition, participants received no instruction concerning smoking, eating, exercising strenuously, consuming caffeine or alcohol prior to the study all of which can affect salivary cortisol levels. In addition, participants were not screened for the use of cortisol-altering drugs such as anti-inflammatory or steroid medications.

Pawlow and Jones (2002) reported in a similar study that compared to a resting control, an experimental population of college students showed lower salivary cortisol levels after participating in an abbreviated Progressive Muscle Relaxation exercise. Their study was designed using strict physiological controls to avoid confounding factors as well as being conducted between the hours of 7:00 am and 10:00 am to maximize salivary cortisol levels. It is interesting that for the Pawlow and Jones (2002) study, the change in the perceived stress level (measured using the PSS) after the intervention (Δ -1.0) was smaller than that observed for the current study (difference between the average wait-list control and post-test score for the PSS was -6.4).

General Limitations

Population

There were two main areas where the population issues may limit the generalizability of the current results. First, the population was relatively small (22 individuals). Next, the participants responded to print or e-mail announcements (through distribution to UNLV

students, faculty and staff) requesting highly stressed couples and including the implication (required by the UNLV-IRB) that participation may result in improved coping in a high stress lifestyle. In addition, this population was defined as non-clinical; however, the average pre-intervention scores for perceived stress, marital satisfaction, quality of life and psychological and physical symptoms were indicative of distress levels that were typically higher than those reported in a general college student population (Butler et al., 2006; Nakao et al., 2001) or in a general non-clinical population (Derogatis, 1994; Frisch, 1994; Snyder, 2004).

Research Design

Although there were several advantages for a repeated measures-type research design, there were also several limitations. The absence of a sham treatment control group excluded random assignment of participants. In addition, the participants believed that they would receive a viable intervention and the investigator knew that all the participants received the same intervention. It was anticipated that the guided visualization CDs that were loaned to participants would be listened to between each session; however, at least half of the participants reported that they did not use them between sessions. Between 20% and 30% of the intervention sessions were not administered on a weekly schedule (two weeks in some cases) due to a range of issues including illnesses, holidays and unexpected scheduling events. As previously discussed, the second testing session was scheduled during the same appointment as the first intervention and due to the time required, participants were often aware of this which may have added to the observed expectancy effect. Finally, due to limited availability of

the facility, testing and intervention sessions were scheduled in the evening hours when salivary cortisol levels are at their lowest in the normal adult circadian cycle.

Clinical Implications

There are several areas where the results of this study may guide various aspects of clinical intervention. As might be expected from previous studies that have demonstrated the efficacy of CBT and relaxation techniques for treatment of anxiety, depression and symptoms of physical and psychological distress (Deckro et al., 2002; Nakao et al., 2001; Rogers et al., 2007), the current study shows the highest levels of change (significant at the $p<0.01$ level) for outcome measures related to perceived stress and symptoms of physical and psychological distress. In contrast to previous studies which required at least five hour of intervention over a 6 to 10 week period, the current intervention used three 30-minute sessions. Given the characteristics (i.e., highly stressed couples) of the non-clinical population and relatively brief intervention used in the current study, the reported protocol may be particularly attractive for stress management in a non-clinical population. In addition, this approach may be useful as an adjunct treatment intervention for stress-related problems in a pre-clinical or moderately symptomatic population.

Results from the current study suggest that controlled breathing as instructed in a guided visualization resulted in a temporary change in breathing characterized by slower, deeper and more regular breathing patterns. Due to the RSA effect, this change in breathing would be expected to increase HRV facilitating an increased balance between sympathetic and parasympathetic branches of the autonomic nervous system and resulting in a reduction in stress-related physiological effects (Lehrer et al., 2003). Karvitas et al. (2007) presented results indicating that the use of HRV biofeedback

reduced symptoms of depression and suggested the use of this technique as an adjunct in the treatment of depression. Although the current study did not attempt to directly change HRV through biofeedback, controlled breathing appeared to have a temporary effect on improvement of HRV during the sessions.

With respect to couples-related distress, results for the current study were encouraging but not definitive (H1, A1 was not validated, H1, A2 was validated). As suggested by Randall and Bodenmann (2009), marital dissatisfaction is complex and stress seems to be one of many contributing factors.

One of the relevant points of discussion with respect to the current work might be how the management of individual stress and reduction of reported distress that accompanied the relaxation / guided visualization intervention might be incorporated into an existing theoretical approach for marriage and family therapy. In one of the few integrated theoretical approaches that considers biology, Weeks (2005), suggested the use of an intersystem model based on a "…paradigm shift toward integration of the biological/medical, individual therapy, couple therapy, marital therapy and the broader cultural/historical, religious contexts" (p. 89). With the intersystem approach in mind, it would seem appropriate to assess, screen for, and perhaps therapeutically intervene to reduce high levels of perceived stress contributing to individual distress prior to or concurrent with couple therapy. The underlying concept being, that it may be more difficult to facilitate therapy (using any theoretical approach), for couples experiencing high levels of on-going stress (and associated physical tensions) in their lives.

Another model that integrates biology with family therapy is the medical family therapy approach described by McDaniel, Hepworth and Doherty (1992). Although this

model focuses mostly on the impact of medical illness and disability on the process of family therapy, the suggestion that attention should be given to the client's physiological disposition is consistent with currently reported results and potential clinical implications.

The use of pre-recorded guided visualizations in therapy and its affect on the client-therapist relationship is another consideration related to the clinical potential reported in the current protocol. As suggested by Lambert and Barley (2002) and Blow et al. (2009), the therapeutic alliance characterized by traits such as empathy, warmth and congruence contribute significantly to therapeutic efficacy. In this respect, a pre-intervention discussion concerning the client preferences and potential value of the guided visualization approach, and post-intervention processing dialogue may be helpful in facilitating and maintaining a therapeutic alliance. One previously reported feature of the guided visualization process that may enhance the therapeutic alliance involved presentation of the recording in the therapist's voice (Rogers et al., 2007).

Future Research

There are several areas where future research might contribute to a better understanding of how CBT-directed relaxation techniques (in particular, recorded guided visualizations) may be used as adjuncts to more commonly used evidence-based approaches for non-clinical, pre-clinical and clinical populations. In addition, carefully controlled physiological observations in conjunction with mental health therapies promise to open a window into the mind-body interactions that could potentially be valuable for clients to better understand and influence the physiological correlates of cognitions and emotions.

Mind-body interactions have been studied by physicians for the past 100 years and over the last several decades have been, in some limited cases, incorporated into current medical practice (Dusek & Benson, 2009). In this transition, the medical community has started to acknowledge, demonstrate and incorporate non-drug adjunct therapies such as relaxation and CBT to reduce symptoms and improve outcomes for a number of health-related problems.

In the evolution of couple therapy, biology and behavior have emerged as important factors (Feldman, 1985; Weeks & Hof, 1987). This transition may, in part, be what Gurman and Fraenkel (2002) refer to as Phase 4 (refinement, extension, diversification and integration, 1986-present) in the evolution of couple therapy. The current results indicate a link between perceived stress and marital distress. This link suggests that additional research using physiological and psychological indicators may provide a better understanding of the role of stress and coping in the function of dyadic relationships.

The herein reported research also suggests that reduction in perceived stress may have a positive effect on marital satisfaction. In more general terms, future research may provide a better understanding of the client's physiological correlates of emotional stress and emotional reactivity. For example, through the use of relaxation and guided visualization clients may learn to recognize muscle tension and other forms of physical distress as connected with and perhaps occurring prior to emotional stress in the relationship. Recent technological advances have lead to reduced cost, increased availability and convenience of non-invasive physiological and biochemical indicators of stress response (i.e., heart rate, blood pressure, HRV, electromyographic readings, and

salivary cortisol). Consequently, the incorporation of these tools into MFT research may become increasingly feasible.

In the current study, both the DSI and SOCS were shown to mediate the effects of stress on physical and psychological symptoms of distress. Another area where future research might be of value is the exploration of the use of the DSI and SOCS as clinical screening tools to identify specific areas for setting goals and focusing attention. The DSI is composed of four subscales with correlates in Bowenian theory (Skowron & Friedlander, 1998) and the SOCS also shows a substructure being composed of three subscales anchored in the salutogenic model (Antonovsky, 1996). Both of these assessment tools can be quickly administered, are easy to score and are public domain.

Although the DSI and SOCS have been widely used in research settings, few examples appear in the literature which describe their use as diagnostic screening tools. In one example, Beebe and Frisch (2009) report the use of differentiation of self as a means to assess internal aspects of workplace stress in nurses. In another example, Howard (2008) used the concepts of comprehensibility, manageability and meaning to direct dialog in clinical supervision for psychologists.

Results for the current study suggest that CBT-based relaxation/guided imagery can be useful in helping to reduce stress as well as physical, psychological and relational distress in a non-clinical couples population that perceive themselves to be living highly stressed lifestyles. These findings are consistent with studies that indicate that mind-body therapies including progressive muscle relaxation, mental imagery and biofeedback have been found to be effective for reducing depression, insomnia and anxiety (Taylor, Goehler, Galper, Innes & Bourguignon, 2010). It would appear that there is a window of

opportunity for future research to explore the candidate populations and clinical circumstances where a mind-body approach may be an effective adjunct to well established approaches in couples therapy.

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