THE EFFECT OF EXERCISE ON BODY AWARENESS AND MOOD

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ABSTRACT

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The purpose of this study was to examine the effects of exercise on awareness of body and mood states. The strenuousness of exercise was examined to determine whether nonstrenuous exercise programs improve mood states and body awareness as much as do traditional strenuous exercise programs.

Mood variables were identified as trait anxiety, tension, depression, anger, vigor, fatigue, and confusion. Body awareness variables were measured by the self-awareness questionnaire as well as by the physical emotional management questionnaire, both of which were designed for this study. The body awareness components included posture, breathing patterns, hand gestures, and facial movements. These components were based on three approaches: the relationship between specific motor behaviors and internal states identified by Ekman (1969), physiological intervention strategies for athletes (Loehr, 1990), and the effects of Eastern exercises, such as yoga and t'ai chi (Patel, 1991). Five different exercise programs (yoga, stretching, t'ai chi, aerobics, and NIA) were used.

The data analysis used was the within subjects methodology as reviewed in Hunter and Schmidt (1990). The mean changes in mood for the five programs studied were compared to meta-analysis findings for strenuous programs.

In regard to mood components, the findings from this study for the strenuous programs were largely consistent with the average meta-analysis results across many studies. For all mood variables, t'ai chi produced improvements that were very close to those produced by strenuous programs. Yoga and stretching were just as effective as the other programs for expression and worked better than the other programs for anxiety and general mood. Thus nontraditional exercise programs are just as successful as strenuous exercise and may even work better.

In regard to body awareness components, the critical finding was that for the strenuous programs, there was considerable improvement in mood but no increase in any of the three measures of awareness. Thus the strenuous program results show that there can be improvement in mood without improvement of awareness. For t'ai chi, yoga, and stretching there were large increases in awareness on all three awareness dimensions. For the nonstrenuous programs, the increase in awareness was considerably larger than the improvement in mood.

The results of this study support the theory that Eastern exercises increase the awareness of body and mood states because the participants can learn how to use various physical tactics to become conscious of mood states and kinesthetic movements. By learning these tactics, by becoming aware, and by increasing experience and practice, people can improve mood states and become more conscious of both body and mind for the mental health.

Upon receiving the protection of the Guardian of Heaven and Earth, and under the mercy of our Founder Shinnyo Kyoshu-sama and Spiritual Originator Shojuin-sama, with their powers of Saisho and Shoju, together with Kyodoin-sama and Shindoin-sama's divine power, and to my parents for their supports, here I would like to humbly express my heartfelt gratitude and dedicate this dissertation.

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Chapter 1

INTRODUCTION

The purpose of this study was to examine the effects of exercise on mood and body awareness. The body awareness components included posture, breathing patterns, hand gestures, and facial movements. The moods included anxiety, tension, depression, anger, fatigue, confusion, and vigor. Because there were no standardized tests of the body awareness components, two new scales were designed and utilized.

The first goal was to develop the scales to measure awareness. Because specific motor behaviors are considered a reflection of the internal states of the individual (Ekman, 1982; Ellgring, 1989; Troishi, Chiaie, Russo, Russo, Mosco, and Pasini, 1996), awareness of emotion-related body states was used in this study. The scales were used to determine whether awareness of internal states and body movements could be increased by specific exercise programs (stretching, aerobics, yoga, t'ai chi, and NIA, which are discussed in detail in Chapter two) thereby enhancing the ability to cope with stress and increasing healthy emotions.

The second goal was to examine the five different exercise groups to determine whether non-strenuous exercise programs would improve mood states (anxiety, tension, depression, anger, vigor, fatigue, and confusion) and body awareness to the same

degree as traditional strenuous exercise programs. The effect on these variables would result from the intensity of the participants' physical movements and the purpose of their activities.

The third goal was to examine how the initial individuals' mood levels and body awareness levels would affect their improvement on their outcome variables.

Five different exercise programs were used in this study, and each program ran for five weeks. Four different instruments were used in pretest and posttest conditions. The two categories of dependent variables were mood and body awareness. Mood variables were identified as trait anxiety, measured by subscales of the Spielberger's State-Trait Anxiety Inventory (see Appendix B); and tension, depression, anger, vigor, fatigue, and confusion, measured by the Profile of Mood States. (See Appendix C.) The body awareness variables were measured by the self-awareness questionnaire (see Appendix D), and by the physical emotional management questionnaire. (See Appendix E.)

In sports and exercise psychology research, there have been a series of studies that examine the effects of exercise on emotion (Kubitz & Landers, 1993; Raglin & Morgan, 1987; Morgan & Goldston, 1987; Folkins & Sime, 1981). This research focuses on how much exercise reduces disturbance mood levels. There are, however, few studies that examine the awareness of internal states or kinesthetic sense from body movements and controlling disturbing emotions as a result of participating in physical exercise. The idea of awareness of internal states and

controlling emotions came from Eastern exercises such as yoga and t'ai chi (Grade, 1972; Patel, 1991), research on nonverbal expression (Ekman, 1969; Knapp, 1972), emotional management research (Loehr, 1990), and behavioral research (Bem, 1972).

It is important to know how an athlete show his motivation, confidence, or ability to the opponents, peers, and coach, in a competitive sports situation. According to Loehr (1990), behavioral management is an important tactic in competitive sports because athletes have to deal with negative emotions. He teaches the practical management of behavior in order to overcome negative emotions. His professional and nonprofessional clients learn to manage the physical manifestations of their behavior, such as their breathing patterns, heart rate, eye contact, and posture. As a result, the athletes are better prepared to compete in a given competitive situation. Although Loehr's model lacks discussion of the athletes' awareness of what they actually feel and how they behave, his model is worth studying. Being aware of these physical manifestations of behavior is the important first step in athletes' learning to manage their negative emotions.

To examine awareness of internal states and the subsequent behavioral management based on this research, the "self-perception theory" as discussed in Bem (1972) was used. The main argument of self-perception theory is that people are unaware of their inner states until someone points out their behavior (Laird & Bresler, 1992). That is, if the internal cues that signal an inner state are weak, ambiguous, or uninterpretable,

people must rely on their own behavior as a guide to interpreting their inner state.

People may be unaware of their kinesthetic feedback (sensory cues) or even of their behavior, according to the theory of self-perception (Bem, 1972). Self-perception is especially useful in investigating any relationship between emotion, self-awareness, and body movements which generate complex perceptual experiences. Is training effective in making one aware of internal states? And does knowing one's internal states enable one to change emotions in a given situation?

Among various physical activities, some exercises, such as yoga, and t'ai chi, emphasize stress management. Such meditative activities are growing in popularity, even though they do not focus on the benefits of popular fitness exercise, which involves fast movement and energy expenditure. Both yoga and t'ai chi involve slower, quieter, more controlled motor activities and also require more flexibility and greater concentration than do popular energy- expending forms of exercise. For example, yoga and t'ai chi exercises focus on the inner sensations of the body, which may have less impact on the emotions than energy-expending exercises.

Both yoga and t'ai chi exercises were developed in Eastern cultures, where it is believed that exercising and controlling the body may result in controlling emotions. Therefore, practitioners of yoga and t'ai chi, for example, expect their physical disciplines to lead them to a balanced, calm, and healthier concept of the inner self. Breathing is considered

an important factor in reaching this goal. Regulation of the respiratory system, body position, posture, and all motor movements are considered important factors that bring an adjustment of mind to the practitioner as well. The regulation of behavior and the psychological effects of such regulation have been studied by researchers examing nonverbal behavior, such as postures and expression of moods (Bushman, 1990; Levy, 1988; Overby, 1990; Rachman, 1980), or gaze and moods (Knapp, 1972). Although these meditative exercises have been examined for their psychological and physiological benefits, the issues of awareness and control have not been studied. These meditative exercises suggest that there might be an awareness component that the practitioner must develop in order to know what he feels, thinks, and does.

The present study was formulated from these speculations about the effects of meditative exercises, and from research on nonverbal expression, emotional management research, and behavioral research.

Statement of the Problems

The contribution of exercise programs to healthier psychological outcomes has been a source of much popular investigation (Fillingim & Blumenthal, 1993; Kubitz & Landers, 1993; Raglin & Morgan, 1987; Morgan & Goldston, 1987; Folkins & Sime, 1981). The present study, however, investigates the effects of exercise on awareness of internal states and the kinesthetic sense of body action which is considered to be a

reflection of internal states.

The signals from a specific mood as well as the individual's body language were considered to be the tools for identifying emotions at a given time and for modifying specific behaviors. The question asked in this study is whether a person's awareness of his specific moods and the body language derived from these moods are increased by meditative exercise programs, such as yoga, t'ai chi, and stretching. In addition, this study attempts to determine how well people think they can control their emotions by using specific tactics that were emphasized in the exercise programs and that the students might have learned. It also examines mood states and whether moods can be improved by various modes of exercise. The exercise programs used in this study differed in their intensity of activity.

Two assessments were created: a self-awareness questionnaire and a physical emotional management questionnaire. The Profile of Mood States (POMS) developed by McNair, Lorr, and Droppleman (1992) and Spielberger's State-Trait Anxiety Inventory (STAI) developed by Spielberger (1983), which have been used as tools for looking at the direct relationship of exercise to emotion, were used to measure the healthier outcomes made possible by participation in exercise.

Therefore, this research was designed to investigate 1) the effects of exercise on the awareness of internal states, which can be observed by behavioral cues such as posture, breathing patterns, and other physical expressions; and 2) the

effects of exercise on the ability to manage negative emotion. Students in five different exercise groups -- 1) Anderson's (Anderson, 1980) stretching; 2) yoga, 3) tai chi, 4) aerobics, 5) and NIA -- participated in this research.

Exploratory hypotheses

Several hypotheses were formulated in an exploratory manner based on a literature review of research in this area:

1. It was predicted that over a five week period, each exercise program would reduce the subjects' trait anxiety. Spielberger's STAI (see Appendix B) was used to measure trait anxiety.

2. It was predicted that over a five-week period, each exercise program (stretching, aerobics, yoga, t'ai chi, and NIA) would improve the subjects' mood state. More specifically, it was also predicted that: (1) a subscale score of tension-anxiety would decrease over the five weeks; (2) a sub-scale score of depression-dejection would decrease over the five weeks; (3) a sub-scale score of anger-hostility would decrease over the five weeks; (4) a subscale score of fatigue-inertia would decrease over the five weeks; (5) a subscale score of confusion-bewilderment would decrease over the five weeks; (6) a subscale score of vigor would increase over the five weeks; and (7) a total disturbance score -- which was obtained by adding the anger, fatigue, confusion, tension, and

depression scores -- would decrease over the five weeks. The POMS (see Appendix C) was used to measure mood.

3. It was predicted that over a five-week period, the exercise programs (stretching, yoga, and t'ai chi) would enhance subjects' awareness of their moods in comparison to the awareness of their moods before the start of the program.. A questionnaire was designed to assess this self-awareness. (See Appendix D.)

4. It was predicted that over a five-week period, the exercise programs (stretching, yoga, and t'ai chi) would enhance the subjects' body awareness with tactics such as verbal expressions, physical control, posture, breathing patterns, hand gestures, or facial movements in comparison to their body awareness before the start of the program. A questionnaire was designed to assess this physical and emotional management. (See Appendix E.)

5. It was predicted that among the five different exercise groups, similar effects on the dependent variables (mood, anxiety, awareness, and copying efficacy) would result from similarity in the intensity of physical movements and the purpose of the activities. That is, aerobics and NIA would produce similar results for dependent variables, and t'ai chi, yoga, and stretching would produce similar results for dependent variables.

6. Finally, it was predicted that individuals' initial level of the dependent variables (mood, anxiety, awareness, and coping efficacy) would affect the degree of their improvement on these dependent variables.

Delimitations

Because research participants did not have clinical mental diseases, results from this research cannot be generalized to patients with such diseases. Instead, this research utilized a behavioral and cognitive assessment in typical situations. The questionnaires used in this research must be revised before they are used in other situations, such as clinical settings. Measurement of awareness of internal states and the subsequent subjects' behavior was limited to the items on the questionnaire.

Definitions

The following operational definitions apply to this experiment:

Emotion -- Any of the strong feelings of the human spirit: love, hatred, and grief; an excited state of feelings (Longman Dictionary, 1st ed.). Emotional phenomena are noninstrumental behaviors and non-instrumental features of behavior, physiological changes, and evaluative, subject-related experiences, as evoked by external or mental events, and primarily by the significance of such events. An emotion is either an occurrence of phenomena

of these three kinds or the inner determinant of such phenomena (Frijda, 1986).

Mood -- Mood is generally defined as a state of feelings at a particular time or affective arousal of varying, but not permanent, duration (Longman Dictionary, 1st ed.). Moods are typically viewed as milder than emotions, which are considered more intense and of shorter duration. Moods are often thought of as dispositions to respond in certain emotional ways and to experience certain feelings (Campbell, Gorman, & Muncer, 1990, p.43).

Stretching -- Stretching is defined literally as reaching out or extending to something (Longman Dictionary, 1st ed.). When the stretching is used as an exercise, it is commonly used before and after the workout. It is not stressful, but peaceful, relaxing and noncompetitive, and helps to maintain flexibility and prevent common injuries such as shin splints or Achilles tendonitis from running, and sore shoulders or elbows from tennis. In addition, stretching regulates and relaxes muscle tension, thereby allowing people to be more aware of their muscles (Anderson, 1980).

T'ai chi -- A unique Chinese soft-intrinsic exercise which dates back to 1000 A.D. and is extremely popular in China as well as in some other Asian countries. As an exercise

that demands no physical strength to begin with and that involves techniques adjusted to, and developing with, individual capacities, it is practical for any physiology. Consisting of slow movement, with its organic and intrinsic harmony, t'ai chi is believed to train both body and mind (Delza, 1974).

Yoga -- A Hindu system of exercises designed to free the self from the body (Longman Dictionary, 1st ed.). More precisely, yoga consists of a series of postures and breathing that are believed to help the balance of body and mind. The goal of yoga is self-realization (Smith, 1982).

NIA (Neuromuscular Integrative Action) -- This exercise has been designed to help people approach everything with purpose and passion. The choreography of this exercise encourages a new way of moving that allows for more creativity and individual expression. The movements are creative, barefoot, non-impact, and aerobic, blending principles and concepts from t'ai chi, taekwondo, aikido, jazz, Duncan and modern dance, ballet, yoga, the Feldenkrais technique and the Alexander technique. NIA offers an experience that embraces individual creativity, self-inquiry and free expression, making it possible for one to stay fit, reap holistic benefits, and bring a sense of well-being that filters into every aspect of the

practitioner's life.

Aerobics -- Aerobics refers to a variety of exercises that stimulate heart and lung activity long enough to produce beneficial changes in the body. Running, swimming, cycling, and jogging are typical aerobic exercises. The main objective of an aerobic exercise program is to increase the maximum amount of oxygen that the body can process within a given time. It depends upon efficient lungs, a powerful heart, and a good vascular system (Cooper, 1970). For this study, an aerobics floor exercise with music was chosen.

Body movement therapy (also known as body therapy) -- The general aim of this exercise is self-body awareness, so that each person becomes aware of his or her body's functioning with the aim of improving balance, walking, or any other body function (Costonis, 1978).

Basic Assumptions

1. Subjects had to have a motivation to participate in this research and be willing to identify awareness of their internal states and their subsequent behavior.
2. Subjects in this research study had to understand the purpose and objects of the questionnaires and be willing to describe their behavior and emotional experiences.

Limitations

1. The amount of practice time the participants had in addition to the practice for this study was not controlled for any exercise group.

2. All the participants from aerobics and some participants from the t'ai chi classes were taking these classes to earn required one credit. Therefore, their motivation and the work they had to do were different from that of the participants who did not need this exercise class to earn a credit.

3. The sample size in yoga (N = 8),t'ai chi (N = 19), stretching (N = 5), and NIA (N = 8) in this study limited the statistical power of the analyses and increased sampling error.

Chapter 2

REVIEW OF THE LITERATURE

The review of pertinent literature in this chapter was focused mainly on awareness of the internal states and the subsequent behavior that might be influenced by participating in exercise. The exercises discussed in this chapter were alternative and meditative. Their main purpose is to increase psychological well-being rather than to provide cardiovascular benefits or to build muscles. The skills people can use to manage or overcome stressful emotion through meditative exercise were also discussed.

The research concept stems from the concept in Eastern philosophy of "oneness of body and mind." The traditional exercises that were developed in Eastern cultures were different from those developed in Western culture. Unlike cardiovascular training, which emphasizes running, jumping, or pumping muscles to increase physiological and psychological health, exercises such as yoga and tai chi, for example, concentrate on remaining calm and listening to the body and the emotions. Few studies analyze the effects of meditative exercise, which focuses on awareness of the internal state and develops the skills necessary for managing negative emotion.

This chapter is comprised of four sections: (1) internal awareness, which was divided into two subsections (sports and observed emotional expressions, emotion and nonverbal behavior); (2) the effect of exercise, which was divided into four subsections (exercises emphasizing awareness of internal states, cardiovascular exercises, meta-analysis of the effects of exercise on emotion, alternative exercise, particularly, yoga, and tai chi); (3) awareness and self-control; and (4) a summary section.

Internal awareness

Sports and observed emotional expressions. Various emotional expressions can be seen in sports arenas. It is interesting to watch the expressions of mood or emotion of the athletes in any sport, whether professional or amateur. It is also easier for us to understand the situation of individual athletes or teams if they express their thoughts and emotions. A TV commentator can often tell us what an athlete might be thinking in a given situation. If a tennis player sits in a chair with his head down, hands covering the head, and his back is rounded during a losing set, what might another person perceive as the player's attitude? One might perceive that the player is trying to concentrate on the next set, or that he is depressed because of performing poorly. But the player's emotional expression or cognitive processes may not be known for certain until someone interviews him later. It seems, however, that some messages are transmitted through behavior toward others.

It is interesting to ask whether or not it is wrong for athletes to show emotion during a game. The answer will vary depending on the kind of sport and the situation. The opponent may feel an advantage when a player's posture is perceived as indicating depression -- for example, walking slowly with head down, or a curved back after missing an important point in a game. In any case, the athlete's nonverbal expressions are considered to be reflective of his mental state, and they sometimes communicate to others, who are then able to understand his thoughts and feelings.

This question has not received a great deal of attention in sports psychology research, but managing the athlete's behavior in a competitive setting has recently been introduced as a research topic. Loehr (1990) has introduced tennis-specific training models based on his experience as a sports psychologist. Through his training, tennis players learn how to control their behavior in a tennis match.

In his model (see Figure 1) there are instructions about physiological strategies that deal with the way a player walks on the court, his posture, eye control, breath control, awareness of heart rate, and relaxation-activation strategies during and between points in the on-court situation. Although these interventions seem to have been carefully designed and appear to be very effective, research evidence has not been reported on such strategies.

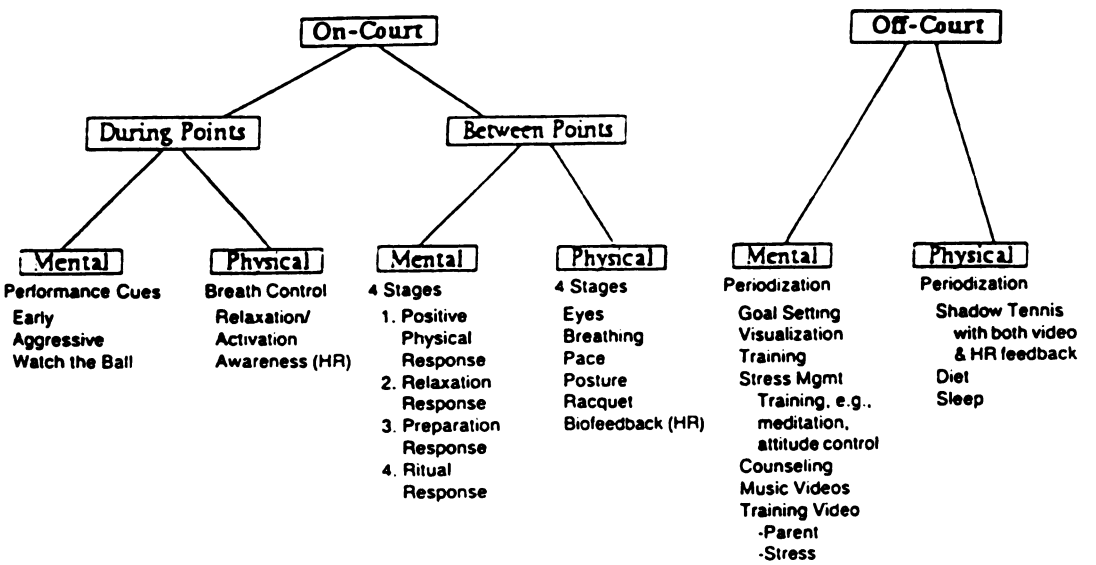

Figure 1 - Psychological intervention strategies by Loehr (1990)

Another example of research related to intervention strategies is that of Burwash and Tullius (1989), who discussed the importance of controlling emotion. These researchers gave athletes instructions about how to play a match by controlling emotions, building self-confidence, and concentrating. They also pointed out the importance of controlling body language as a significant strategy. In their method, walking with confidence and keeping the head up were considered to be important. They warn athletes never to blurt out such negative statements as "Boy, I am choking!"

As examples, they discussed professional players, such as Bjorn Borg, Jimmy Connors, and Andre Agassi, who knew how to use body language as a psychological weapon to boost their morale and intimidate their opponents. It was said that Bjorn Borg would have never allowed his emotions to show, even though his body was trembling and he could hardly hold his racket. Jimmy Connors often bounced up and down, and he was usually the first one out of his chair at the changeover. The authors also mentioned that Andre Agassi has such effective body language that people cannot tell if he is winning or losing.

Based on their observations, they concluded that if athletes control their emotions on the surface, they can control them underneath. No matter what the score, athletes should try to give the impression that all is right with the game and with the world. If athletes can do this, they can fool not only the opponent, but himself as well. It is not easy for athletes to try to prevent others from knowing how they feel. It is necessary

to get extra training to be aware of emotions and to handle them so that they do not run wild.

It is important that athletes be careful about their behavior in competitive situations and they need some training to manage their behavior. Questions could be raised, however, about how they can be aware of emotions as well as their body expressions, which might be conscious or unconscious, in a given situation. Based on the observations of these researchers, it would seem that body language and emotional control in sports are worth studying, yet studies of this subject are rare.

Emotion and nonverbal behavior. A series of experimental studies have shown that nonverbal behaviors in social situations are related to the emotional state of the person exhibiting the behavior (Ekman, 1982; Grant, 1969; Troishi et al., 1996).

For example, Troishi et al.(1996) used normal subjects to examine the relationship between nonverbal behavior and emotional states by using structured clinical interviews. Behavior was judged based on behavioral categories and definitions of behavioral patterns. For example, looking away from the interviewer, closing the eyes, or drawing the chin in toward the chest indicated the impulse to "fight." Using the fingernails to scratch part of the body, twisting and fiddling finger movements, twisting a wedding ring or handkerchief, biting the lips or drawing them into the mouth and holding them between the teeth indicated "conflict." The researchers found that when the subjects had difficulty answering a question, they had poor nonverbal expressions. At the same time, these subjects

showed a high frequency of self-directed behavior patterns, which were ethnological indicators of tension and anxiety.

In the study of nonverbal expression, gestures, body movements, and postures were perceived as aids in defining internal states. It has been shown that emotion could be transmitted by a performer, and the emotional meaning could be communicated accurately. According to Hewes' (1957) research, postural choices were largely determined by cultural influences.

Hewes claims that the study of body movement in the United Sates has primarily focused on attitudes, status, affective states or moods, approval seeking, quasi-courtship behavior, inclusiveness, leakage or deception, warmth, and interaction "markers" (cited in Knapp, 1972, p.97). In the attempt to understand human communication, it has been popular to study specific body parts, such as the face and eyes, as well as hand signals, touching, posture, space, etc.

In regard to posture and position, Mehrabian (1972, p.30) stated that there were two dimensional schemes that characterize posture and position cues in the communication of liking and status relations. The first dimension included immediacy, touching, closer position, forward leaning, eye contact, and more direct body orientation. The second dimension, relaxation, included those cues that indicate an asymmetrical rather than a symmetrical position of the posture and of the limbs. A person assumes a more immediate position with someone he likes, and greater liking is inferred when the other person is more immediate toward oneself. Higher-status members in a

social situation are more relaxed than were lower-status members. Relaxation was also related to liking. We tend to be moderately relaxed with those we like and to assume very relaxed postures with those we dislike or do not respect.

Wallbott's study (as cited in Ellgring, 1989, p.129) described specific movement characteristics of schizophrenia and depression. He characterized the gestures of depressed patients as follows: (1) by spatio-temporal aspects (speed, acceleration), which tend to be slow, tired, oppressed, and dragging; (2) by energy and power aspects (intensity, tension, etc.), which tend to be powerless, faint, limp, without tension, and ponderous; (3) by categorical aspects (frequency and movement), which tend to be scarce with little or decreased activity; (4) by spatial aspects (extension of movements, usage of space), which tend to be narrow, with little radius; and (5) by Gestalt aspects (behavioral flow, qualitative features), which tend to be soft, rounded, disharmonic, unelastic, monotonous, and without expression.

The overall research on nonverbal communication conducted by Ekman (1992) suggests that behavioral patterns that they label as self-adaptors "leak more;" that is to say, they give more veridical information about the subject's emotional states than does facial expression, which was subject to greater conscious deception or unconscious masking. The occurrence of frequent self-manipulation by the subjects during the experiments indicated that they experienced increased emotional arousal that was not manifested through facial expression.

The Effects of exercise

Exercises promoting awareness of internal states and mind-body balance. Why do people exercise? There are many possible answers to this question. Different purposes, times, fashions, interests, tastes, ages, abilities, and degree of availability, are among the reasons that determine the individual's choice of exercise. Age and sex are factors that seem to influence the importance assigned to the psychological outcomes of exercise. For example, older adults tend to place greater importance on psychological benefits (Heitmann, 1986), while for children this outcome is among the lowest of values (Passer, 1982). Women seem to appreciate the potential psychological benefits more than men do (Biddle and Bailey, 1985).

Cardiovascular exercise. Among the various exercises, aerobics training has been very popular in the field of fitness in the decades since Cooper (1970) introduced it to the public. The main object of an aerobic exercise program is to increase the maximum amount of oxygen that the body can process within a given time (aerobic capacity). Aerobic training offers an ample choice of different forms of exercise, including many popular sports. They have one thing in common: because they make one work hard, they demand plenty of oxygen (Cooper, 1970).

There is a large body of research attempting to identify the benefits of cardiovascular training for physiological as well as psychological well-being (Fillingim and Blumenthal, 1993; Kubitz and Landers, 1993; Raglin and Morgan, 1987; Morgan

and Goldston, 1987). For example, aerobic training enhances a variety of physical and psychological adaptations, including alterations in affects, such as depression, anxiety, and fatigue (Fillingim and Blumenthal, 1993; Blumenthal, et al., 1989); it is also increased maximal oxygen uptake and anaerobic threshold (Blumenthal et al., 1989) and decreased blood pressure (Raglin and Morgan, 1987).

Research comparing the moods of runners to those of aerobic dancers, weight lifters, and nonexercising controls indicates that aerobic exercise had especially positive psychological effects (Berger, 1983; Dyer and Crough, 1988).

Morgan and Goldston (1987) found that physical activity could play a role in the primary and secondary prevention of emotional disorders such as anxiety, depression, and in the reduction of stress. According to his summary, physical fitness was positively associated with mental health and well-being in general; and it is associated with the reduction of stress (i.e., state anxiety). If the level was mild to moderate, fitness reduces depression and anxiety. Long-term exercise was associated with reduction of some traits, such as trait anxiety or trait neuroticism; appropriate exercise decreased stress indices, neuromuscular tension, resting heart rate, and some stress hormones. Folkins and Sime (1981) also summarized the mental health benefits of exercise from the psychological perspective. They interpreted exercise as a form of meditation that could trigger an altered state of consciousness and that

provided a distraction or diversion from anxiety-producing stimuli.

Meta-analysis of the effects of exercise on emotion. A meta-analysis found several effects of exercise on depression: (1) both intense and habitual but less intense exercise decreased depression level, and the antidepressant effect continued through follow-up measures; (2) all subject groups, that is, all age groups, both males and females, in all categories of health status decreased depression; (3) all modes of exercise were effective antidepressants, including anaerobic exercise; (4) the longer the exercise program and the greater the total number of exercise sessions, the greater the decrease in depression; (5) exercise was a better antidepressant than relaxation and other enjoyable activities; (6) exercise was as effective as psychotherapy; and (7) exercise plus psychotherapy were better than exercise alone in reducing depression (North, McCullagh, and Tran, 1990).

Although the meta-analysis on depression showed that exercise decreased depression, the effects of exercise on anxiety were minimal (Schlicht, 1994, 1995). This finding was also supported by an another meta-analysis in coronary patients (Kugler, Seelbach, and Kruskemper, 1994).

The importance of the interaction of body and mind can be observed from the various studies of exercises, especially meditative exercises. In the next section, exercises that use the holistic approach -- the interaction between mind and body -- are discussed. Exercise was considered as a method of

behavioral regulation, and the emotional change after exercise was seen to be significant evidence of the body's effect on the control of emotion and mood.

Alternative exercise. Despite the popularity and significant positive effects of aerobics training, it seems that the focus has been shifted from aerobics to more holistic exercise. According to Newsweek (Marin, Miller, and Biddle, 1995), "At health clubs around the country, breathing and stretching are replacing jumping and pumping. The number of Americans doing traditional aerobics dropped from 28 million in 1992 to 23 million in 1995. Meanwhile, 6 million Americans are doing yoga, more than are doing cross-country skiing or skateboarding. Hard-core freaks are addicting themselves to all manner of hybrid mind/body activities, yogarobics, Trance Dance, Pilates. In big cities such as New York and Chicago, people are going inward as opposed to just exploding energy outward. Therefore, people in fitness clubs demand more "conscious exercise."

Why have people been engaging in meditative exercise to experience internal effects? Yoga and t'ai chi, as examples of meditative exercises, will now be discussed, with a focus on their structure and effects.

Yoga. Actress Ali MacGraw's "Yoga Mind & Body" video ranks high on Billboard's fitness charts. People think of this video as providing a "meditative workout" (Marin et al., 1995). This is one example of why meditative exercises such as yoga has been popular in recent years. Public attention seems to be drawn

to yoga as a means of preventing health problems and managing stress through therapeutic meditation.

It is said that yoga practice leads to greater harmony of body and mind and moves practitioners toward a higher state of consciousness (Smith, 1982). What do people say about the effects of yoga? Yoga practice involves various breathing exercises, of which simple abdominal breathing is only the first, and over 200 physical postures to exercise every muscle in the body. These postures are the key to tuning up all organs in the body and insuring their healthy functioning (Satchidanananda, 1970).

The postures include stretching the various parts of the body, backward arching, twisting, and loosening actions, which seem to help to elongate the spine, and to release bodily and emotional stress. As the practice progresses, practitioners learn to achieve good body alignment, flexibility, concentration, and awareness (Smith, 1982). Relaxation of body and emotion leads to reflecting on their thoughts or emotions. Unfortunately, few studies have investigated the mechanism of achieving "harmony between mind and body." More investigation is needed to explore this relationship.

In spite of the lack of investigation of " the relationship of mind and body," according to Yellin (1983), yoga has already been adopted by many members of the American health profession as a means of controlling weight and treating insomnia, headaches, and heart conditions.

Goyeche et al.(1992) reviewed the medical benefits of addressing the "somatopsychic imbalance" in asthma. Their general picture of this imbalance stresses certain factors that have been neglected in orthodox and even psychosomatically oriented medicine. In addition, the psychological status of suppressed emotion, anxiety, depression, and hyperself-consciousness was seen to be accompanied by generalized and localized muscle tension, including that of the voluntary respiratory musculature. As a means of preventing such conditions, yoga was used for asthma patients. Learning the various body postures had positive effects on the correction of distorted posture; and yoga breathing changed the faulty breathing habits of patients, increased the amount of breathing and alveolar ventilation, lowered the rate of breathing, and distributed oxygen throughout the body. Yoga practitioners learned to use the entire lung, especially its lower portion, and to achieve complete expiration, reduction of residual air, free and copious diffusion of gases, and recovery of lung elasticity. Therefore, the authors concluded that yoga was relevant to psychosomatic disorders. They did not find that psychosomatic disease-specific body postures in yoga, but the approach taught the patients a new lifestyle, way of thinking, and way of being in the world.

In psychiatric therapy for hypertension, according to Patel (1993), many patients' symptoms appeared to originate from psychological, social, and spiritual malaise, yet they did not

feel that their symptoms warranted their seeing a psychiatrist. Other symptoms seemed actually to be caused by modern medicine.

Patel reported a case study of a middle-aged hypertensive woman whose blood pressure had remained uncontrolled by the strongest antihypertensive drugs. However, after ten - fifteen minutes of diaphragmatic yoga breathing exercises and deep muscle relaxation in a consultation session, her blood pressure fell from 200/120 to 140/90 mm Hg in only a few days. Within these weeks her blood pressure had reached 120/80 mm Hg, which would rise to about 140/90, but quickly fall down again to 120/80 mm Hg.

The psychological effects of the various body postures of yoga that help to release suppressed emotion have also been reported. When the "lion" posture was first introduced to the patients, they executed the posture in a rather mild "pussy cat" manner. As the practice progressed, the suppressed or stressful feelings of the patients seemed to be released, and angry feelings and behavior associated with the lion posture were often observed on the ward (Goyeche, 1992).

Breathing is more than just the gaseous exchange that takes place between inspired air and blood circulating in the lungs. Emotional states are reflected in the pattern of breath, so that practicing breathing patterns influences both the body and the mind. For example, an anxious person tends to breathe rapidly and often, using only the upper part of the chest. A depressed person tends to sigh. A person who is hysterical tends to overbreathe (Patel, 1991).

Several researchers reported other psychological effects. Participating in yoga practice reduced anxiety (Bali, 1976) and depression (Wadded, 1984), and increase the participant's sense of well-being (Peters, Benson, and Peters, 1977).

In school settings, yoga training has been shown to produce long-term positive effects. Some educators have used the exercises and principles of yoga as a means of helping young children achieve a relaxed state in which the mind and body were centered or balanced in a holistically integrated fashion (Yellin, 1983). In order to achieve psychological well-being, yoga may be alternated with energy-expending exercises, even though yoga masters usually spend years learning the correct postures.

Research in yoga practice has focused on its physiological effects as well as the psychological effects, but yoga instructors emphasize the awareness of emotion and the relationship of mind and body. Research demonstrating these effects, however, has not proven to be empirically valid.

T'ai Chi. As an another example of meditative exercises, a popular Chinese exercise, t'ai chi chuan (usually called t'ai chi), has now become popular among Western countries. T'ai chi is performed by Chinese people of all ages.

It involves dance-like, graceful movements consisting of specific patterns and sequencing. T'ai chi represents the yin and the yang, which broadly symbolize a passive mode and an active

mode, respectively. These characteristics can be readily seen in the physical performance of t'ai chi.

The movements of t'ai chi are fluent and consummately precise because specificity of joint angles and body position is of critical importance in accurately and correctly performing each form. The forms depend on body balance, posture, precise respiration, and muscle contraction. Blance is interlocking and the movements flow and melt together. The movements of many forms represent characteristic animal motions colorfully described: "White crane spreads wings," "golden rooster stands on the edge," and "snake crouches down." Other movements depicting imaginative human movements are "carry the tiger to the mountain," "ride the tiger," and "both hands wave like clouds" (Delza, 1974).

Because of the benefits of t'ai chi, Western researchers have begun to investigate its effects. Research regarding t'ai chi has been done on both its physical and its psychological effects. Physiological research indicates that t'ai chi practitioners had significantly greater oxygen uptake (VO_2), oxygen (O_2), and work rate than nonpractitioners at similar training intensities (Lai, Wong, Chong, and Lien, 1993). Practitioners were also found to have lower ventilatory and similar cardiovascular responses (Brown et al., 1995).

It has been found that t'ai chi exercise significantly decreases chronic psychological stress, such as tension, anger, depression, confusion, fatigue and state anxiety caused by

mental stressors (Brown, Wang, Ebbeling, Fortlage, Puleo, Benson, and Rippe, 1995; Jin, 1989, 1992).

In Brown's study, t'ai chi was used as a mind-and-body exercise for 45 minutes, 3 times per week for 16 weeks. The total number of subjects was 18 (7 women and 11 men), and the mean age was 54.8 for men, and 50.6 for women. A comparison of gender differences in regard to the effects of t'ai chi practice indicated that women benefited from t'ai chi more than did men. The researcher comments that the effects of t'ai chi depend on gender, personality, and ability to perform the exercise.

The slow movements in t'ai chi training seem to help people to realize how they are unbalanced and help to become centered as they reestablish balance in the body. Lee (1989) suggests that t'ai chi can lead to learning increased postural control. Postural control and balance have been defined as the ability to maintain equilibrium and return the center of body mass to the current or anticipated base of support. Current studies demonstrate that the kinesthetic sense, lateral stability and balance, and knee extension strength are improved by the slow, guided, and precise movements in the practice of t'ai chi (Jacobean, Ho-Change, Cashed, and Guerrero, 1997).

Because slow movements are easier for elderly people, t'ai chi seems to benefit them. An elderly group (ranging in age from 66 to 86 years) who participated in t'ai chi for one year, had significantly better postural control than their sedentary counterparts in balance tests (Tse and Bailey, 1992). Other studies show that t'ai chi practice reduces the risk of

falling among elderly person after fifteen weeks of practice sessions (Wolf, Kutner, Green, and McNeely, 1993), and that displacement of pressure was decreased among elderly participants (Judge, Underwood, and Winsemius, 1993).

The reason that t'ai chi has potential value for improving balance and postural control and increasing awareness is that in the flow of t'ai chi movements, the participants develop a sense of awareness, and a sense of their total being, both mind and body (Delza, 1974). Precise joint angles and positioning, steady posture and balance, and hip, knee, and ankle strength for low, sweeping movements are demonstrated by the nature of the activity. The mind must be concentrated on the body parts as the body moves, so that the body and the mind move together in t'ai chi exercise. In training to acquire a sense of awareness and a sense of the total being, a sense of balance in the movements comes first. Tse (1992) explains why t'ai chi has potential value for promotion of awareness: 1) the movements are circular, slow, continuous, even smooth, and this facilitates a sensory awareness of the speed, force, trajectory, and execution of movement; 2) the movements are well controlled: all unnecessary exertion is avoided, and as a result, muscle coordination rather than rigid coordination can be promoted; 3) the body is constantly shifted from one foot to the other, which facilitates improvement of dynamic standing balance; 4) the different parts of the body take turns in playing the role of stabilizer and mover, and the relationship between postural stabilization and the moving parts of the body is enhanced.

Breathing is not considered as a separate skill in t'ai chi, because breathing follows the movements. A continuous circular breathing pattern is used to produce a better movement flow (Delza, 1974). As one experiences t'ai chi, one can easily observe this breathing pattern. The practitioner naturally learns how to control breathing without forcing on it in a movement, just as people attending a classic concert are likely to control their breathing and posture as the musicians play. They do not want to make a noise that would disturb others in the concert hall.

It is difficult to conceptualize how the body and breathing are managed during t'ai chi. T'ai chi may be one of many ways to rediscipline the body to release the tension within. Yoga and t'ai chi are similar in that they both focus on detailed internal body sensation, thereby increasing personal body awareness in the process of training. More research is needed on this process.

Awareness and self-control

Awareness of physiological and psychological states has been the subject of psychosomatic research. Awareness was developed as a means to modify emotions or at least recognize the emotions that the individual needs help in controlling. For instance, through awareness one can learn to control blood pressure (Fahrenberg, Franck, Baas, and Jost, 1995), affects and affect consciousness (Monsen and Eilertsen, 1995), and chronic muscular tension (Konno, 1993).

Generally speaking, without conscious attention it is not easy for us to recognize what we feel and how feeling affects our behavior at any given time. From a therapeutic perspective, the goal of knowing ourselves can be reached by psychoanalysis, counseling, transactional analysis, etc. These methods can tell us the patterns of our behavior or cognitive processes in a specific situation. If we are able to control our verbalization and behavior at a specific time in a specific situation, and with specific people, we can avoid conflicts and stress. Self-control will not work perfectly at all times because we are not computers that can execute verbal and physical commands precisely. Sometimes we have to face difficult situations in daily life, and we must struggle to keep calm or to suppress emotion.

In reviewing literature on self-control and behavior modification (Meichenbaum, 1977; Patterson, 1982), it was found that most therapeutic methods are based on manipulating the cognition of the subjects. By examining the body movement or actions of a person, we can see more directly the cause of emotional change in subjects. Yoga and t'ai chi emphasize training the body as a tool for controlling movements, and perceiving emotions through the body.

Summary

In summary, despite the similar research findings of the various studies or meta-analysis of the psychological effects of exercise, it seems that there might be different effects from

alternative exercises that should be explored. Because each exercise has its own goals and conceptual basis, the general term "exercise" is not appropriate.

In the present study I did not intend to make a comparative study of conventional cardiovascular exercise, such as aerobics, and meditative exercises, such as t'ai chi and yoga, in order to find out which would be superior for recognizing or controlling a particular emotion. Instead, this is an exploratory study in which "awareness" of emotions and "coping" with them were considered as important factors to be explored.

Meditative exercises are low-impact and require slow motion and intentional movements using various body parts. They have become popular as stress management techniques and are different from conventional, more energetic exercises. People participating in meditative disciplines seem to naturally establish "awareness" and "coping" skills that are useful for stress management. Physical related tactics such as breathing control and paying attention to the body's posture and balance seem to be the key goals to be accomplished.

"Awareness" in the present study was focused on behavioral patterns that were considered to be reflections of emotions. The overall research on nonverbal communication suggests that behavioral patterns "leak more," that is reveals more, than do personal expressions about the subject's emotional states.

In sports arenas, this "leaking" is obvious and readily observed. How can we become aware of our emotions, both conscious or unconscious and the way our bodies express them?

Training can help us toward this goal. The tactics taught in meditative exercises and understanding the meaning of nonverbal expressions in a given situation can provide us with "awareness" and "coping" skills.

Chapter 3

METHOD

Subjects

A total number of eighty-three exercisers, who participated in both pre-test and post-test conditions, were engaged in the various activities as follows: t'ai chi (N = 19; mean age = 31.7, SD = 16.4; male = 6, female = 14); yoga (N = 8, mean age = 37.0, SD = 11.6; male = 2, female = 6); NIA (N = 8; mean age = 40.4, SD = 13.5; male = 0, female = 8); aerobics (N = 43; mean age = 19.9, SD = 1.7; male = 1, female = 41), and stretching (N = 5; mean age = 34.2, SD = 4.0; male = 0, female = 5). The total subjects' age ranged between 18 and 70 (SD = 12.4).

The participants in the stretching exercise consisted of five females from the Cherry Lane Community Center at Michigan State University, in East Lansing, Michigan. The participants in t'ai chi were from either a physical activity class in Michigan State University or the East Lansing Recreation Center. The participants in yoga were from the East Lansing Recreation Center. The participants in NIA program were from Lansing Community College, Lansing, Michigan. The participants in aerobics were from a physical activity class at Michigan State University. Each subject in each activity met twice a week for

five weeks beginning in January, 1997. These subjects participated in pre-test and post-test assessments. All participants signed a consent form which indicated their willingness to participate in this study (see Appendix A).

Design

The study employed a pre- and post- comparison to see the improvements on the eleven dependent variables (the trait anxiety sub-scale of Spielberger's State-Trait Anxiety Inventory; six mood sub-scales (anger, tension, depression, fatigue, confusion, and vigor, and two types of total mood disturbance score of the Profile of Mood States; one scale of a physical emotional management questionnaire, and two scales of the self-awareness questionnaire). I will discuss each of these variables later in the chapter.

Due to the small number of subjects in each exercise group, the significant test was not performed; instead, the lists of mean changes in standard scores (d), the self-impact correlation (ir), and the standard score of standard deviation of gain (s) was measured in order to report the results for testing the hypotheses on the trait-anxiety and mood changes.

The mean effect size (d) was expressed in standard scores using Time 1 standard deviation or using the within group standard deviation as the basis for the standard score. In a meta-analysis, by reporting conventions, most studies are forced to use the within group standard deviation for the standard score measure. If the effect size statistic for a

within subjects study is to be comparable to the effect size statistic for independent group studies, the within group standard deviation must be used even though the Time 1 standard deviation is known. The standardized mean gain score was computed as follows: d = Mean gain / within group standard deviation of the raw scores in a study (Hunter, 1995).

In most social science studies, the unit of measurement for the dependent variable varies from one study to next. In order to get a statistic with the same meaning across studies, the standard score of standard deviations(s) were computed:

s = the standard score standard deviation of gain scores
= the standard deviation of true gain scores / within group standard deviation

The effects of error of measurement were corrected in the process of the analyses. The sample size of each exercise group was smaller, thus all were subjected to the sampling error.

The self-impact correlation (ir) was also reported which was measured by the correlation between the initial level and the effect size. If there is an interaction, then a key question is the extent to which differences in the effect size can be explained by differences in the initial level. This is measured by the correlation between the initial level and the effect size -- the "self-impact correlation." If gain was correlated with some other variable, that correlation was considered as a simple impact correlation (Hunter, 1982).

General format in exercise program

For each exercise group, the class was coordinated in such a way that an instructor demonstrated the exercise or movements in front of the class, and at the same time the students followed the sequences of exercise or movements with the instructor. The components of movements in aerobics and NIA were different from each other in intensity. Aerobics exercise consisted of stronger, speedy impact, more jumping, and more pressure on the various muscle groups than did in the NIA. On the other hand, NIA demanded less impact on the joints of the body, so that it seemed less stressful and slower, and more movements were introduced from various different types of exercises. Various high impact and rhythmic music was used both in aerobics and NIA in order to pump up the emotion of the students in the class.

In contrast to the energetic exercise such as aerobics and NIA, yoga, t'ai chi, and stretching groups were designed to focus more on internal feeling, flexibility and balance of the body, and relaxation from the various sources of the stress. Among these meditative exercise groups, music was used only in the yoga class during the class periods. And , in contrast to the aerobics and NIA class, the music aimed at getting a relaxed state of mind during the class period.

In the aerobics, NIA, yoga, and t'ai chi classes, preliminary stretching of the muscles to be used in the class periods was not included during the class. Instead, especially in the aerobics class, reducing the repetition and the speed of the movements was used to calm down the students. In NIA and

yoga classes, relaxing meditative breathing or imagery were sometimes used at the end of the class. Special breathing was not used in the aerobics, NIA, stretching, and t'ai chi. Only in the yoga class was deep breathing emphasized.

Yoga. The participants in yoga met once a week for a 90 minute program. The format of the class consisted of a female instructor leading the various yoga postures in front of the class, then the students following each posture one by one. The instructor checked the students' postures to see whether they were doing them correctly. In addition, breathing was emphasized during the class, and in the relaxation period. The instructor explained to the students that deep breathing through various body postures increased the healthy circulation of blood and air throughout the body; circulation improved, and a concurrent relaxed state of mind was achieved in which the mind and body were centered or holistically integrated. In the classroom the students brought their own soft mat on which they performed yoga. Eastern music was used during the class. The last ten minutes of the class were used for relaxation in which the instructor told how the body and mind relaxed. During the relaxation periods, the students sat as they liked with closed eyes in order to concentrate on their thoughts or feelings.

Aerobics. In the aerobics exercise class, a female instructor led a typical aerobics training period, which included bouncing the body and the legs, bending the lower arms and legs, and raising legs to the rock music used throughout the class period. Subjects in the aerobics class met twice a week

for 50 minutes. Stretching at the beginning of class or relaxation at the end were not included during the class. Instead reducing the repetition and the speed of the movements was used.

NIA. In NIA exercise, the students met twice a week for sixty minutes. Since this exercise was designed to be non-impact, aerobically-grounded movement, blending principles and concepts from t'ai chi, tae-kwon-do, aikido, jazz dance, Duncan and modern dance, ballet, yoga, and the Feldenkrais technique, it worked a wide range of motion without great intensity. The students followed the movements of the female instructor throughout the class. There were fewer arm movements than there were in aerobics, but more intensity; movements were broader and wider than in aerobics movements, which used the whole body. An eclectic blend of music was used during the class. The visualizations given by the instructor were meant to free the body from physical tension and emotional restrictions, and therefore, NIA has an impact on emotional as well as physical health. Stretching at the beginning, and relaxation meditative breathing exercises at the end were sometimes used in the class.

T'ai chi. The t'ai chi group met twice a week for 50 minutes. In the t'ai chi class, in general, an instructor demonstrated an entire sequence of movements at the beginning of the class. The instructor then explained the meaning of the movements step by step. The students was then instructed to follow a certain segment of the movements because the length of the sequence was usually long. After the whole sequence was

explained and understood by the students, the whole sequence of movements was practiced during the class. The same style of movements were used during the five weeks. Students were instructed to use their normal breathing. Difficulties lay in the slow movements, controlling the body's balance, and remembering the sequence of movements using the whole body. Music was not used in this class. Stretching at the beginning and end of class was done individually in a relatively short time.

Stretching. The stretching group met twice a week for 40 minutes. Stretching exercises were presented by a female instructor, consisting of contraction and relaxation training on various parts of the body such as the neck, shoulders, arms, and legs. The class aimed to increase flexibility, create a relaxed feeling, and increase strength by using sit-ups for the upper or lower abdominal muscles. This stretching format was based on the stretching technique by Anderson (1980). The static contractions technique was used, performed by slowly moving the limb to the point of discomfort, holding the position for eight to ten seconds, and then relaxing. It involves working systematically around the body, contracting, holding the contraction, then relaxing the major muscle groups.

Instrumentation

The Spielberger's State-Trait Anxiety Inventory (STAI) was chosen to assess trait anxiety, referring to the relatively stable individual differences in anxiety proneness during the test periods, which may also reflect individual differences in the frequency and intensity with which anxiety states have manifested themselves in the past. The Profile of Mood States (POMS) was chosen to assess the change in mood during the weeks. The self-awareness (SA) inventory was designed to assess the awareness of movement-related body states and the emotion-related body states. The physical-emotion management questionnaire (PEM) was designed to assess how well people thought they could control their emotional state by using various external or "body" responses. Both the physical-emotion management questionnaire and the self-awareness inventory were designed by the experimenter. Psychometric properties of each instrument are presented in Chapter 4.

Profile of Mood States. Initially, all research participants completed the Profile of Mood States (POMS)(see Appendix B). This instrument was used for measurement of kinesthetic awareness. The Profile of Mood States (POMS) is a 65-item self-report inventory which measures the following identifiable affective or mood states: tension, depression, anger, vigor, fatigue, confusion.

The POMS utilizes a 5-point Likert-type scale, representing the refinement of a total of 100 different adjective points by means of repeated factor analysis, and

consisting of six sub-classes ranging from 7 to 15 items each. The minimum and maximum scores for each sub-scales are as follows: tension (0/36), depression (0/60), anger (0/48), vigor (0/32), fatigue (0/28), confusion (0/28). The instructions necessary to yield reliable and valid responses are simple. The wording used on the usual form of the POMS is:

Below is a list of words that describe feelings people have. Please read each one carefully. Then fill in ONE space under the answer to the right which best describes HOW YOU HAVE BEEN FEELING DURING THE PAST WEEKS INCLUDING TODAY. The numbers refer to following descriptive phrases.

0 = Not at all
1 = A little
2 = Moderately
3 = Quite a bit
4 = Extremely

Numerous psychometric evaluations have shown the POMS to have high factorial, concurrent, and predictive validity (McNair, Lorr, & Droppleman, 1992). The POMS was administered once in the first week of the class for a baseline measure to compare possible differences after the five week period.

The Spielberger's State-Trait Anxiety Inventory.

Spielberger's STAI (Spielberger, 1983) has been used extensively in research and clinical practice (see Appendix C). It is comprised of separate self-report scales for measuring state and trait anxiety. The State Anxiety scale consists of twenty statements that evaluate how respondents feel now in an anxiety situation. On the other hand, the Trait-Anxiety scale consists of twenty statements that assess relatively stable

individual differences or the tendency to perceive a stressful situation as dangerous or threatening. In this research a Trait Anxiety scale was used to measure the anxiety level of subjects during the period of five weeks.

Trait anxiety refers to relatively stable individual differences in anxiety-proneness, that is, to the differences between people in the tendency to perceive stressful situations as dangerous or threatening and respond to such situations with elevations in the intensity of their state anxiety reactions. Trait anxiety may also reflect individual differences in the frequency and intensity with which anxiety states have been manifested in the past, and in the probability that state-Anxiety will be experienced in the future (Spielberger, 1983). The wording used on the usual form of the State Trait Anxiety Inventory were:

A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

1 = Almost Never
2 = Sometimes
3 = Often
4 = Almost Always

Each item in the trait anxiety scale of STAI item was given a weighted score of 1 to 4. A rating of 4 indicated the presence of a high level of anxiety for eleven trait anxiety items (e.g., I feel frightened; I feel upset). A high rating indicated the

absence of anxiety for the remaining nine trait anxiety items (e.g., I feel calm; I feel relaxed). The scoring weights for the anxiety-present items were the same as the blackened numbers on the test form. The scoring weights for anxiety-absent items are reversed; that is, responses marked 1, 2, 3, or 4 were scored 4, 3, 2, or 1, respectively. The anxiety absent items for which the scoring weights were reversed on the trait-anxiety scales were: 21, 23, 26, 27, 30, 33, 34, 36, and 39. Trait anxiety was considered to be a relatively stable characteristic.

Individuals who scored high on this scale tend to report elevated anxiety in a variety of situations. The trait anxiety portion of the STAI was administered once in the first week of the class for a baseline measure to compare possible differences after the five week period.

Self-awareness Questionnaire. A questionnaire for self-awareness (see Appendix E) was designed to assess internal awareness of the movement-related body state and emotion-related body state. Assessments of movement-related body states were posed as questions, such as: how much attention do you pay to your posture, gestures, breathing, and facial expression in a given situation? Assessments of emotion-related body states were posed as questions, such as: how much are you aware of your mood or feeling in a given situation? The scale of an SA item was given a weighted score of 1 to 5 (i.e., not at all; slightly; somewhat; very; and always). A rating of five indicated the presence of a high level of awareness for each goal. The self-awareness questionnaire was administered once in the first

week of the class for a baseline measure to compare possible differences after the five week period.

Physical, emotional, behavioral management questionnaire. A questionnaire (see Appendix D) was designed and used to assess how well people think they can control their emotional states using various external or body controls. The assessment consisted of five tactics under four goals, the tactics being used to achieve those goals. The five tactics were: (1) using verbal expression; (2) using body control; (3) controlling breathing; (4) using facial expression; and (5) using hand (arm) gestures. The four goals were: (1) the ability to restrain anger; (2) the ability to suppress anxiety or nervousness; (3) the ability to change mood (i.e., calm) positively; and (4) the ability to relax muscles. The scale of PEM items was given a weighted score of 1 to 5 (i.e., not at all; slightly; somewhat; very; and always). A rating of five indicated the presence of a high level of control for each tactic. The physical, emotional, behavioral management questionnaire was administered once in the first week of the class for a baseline measure to compare possible differences after the five week period.

Personal information. The following personal information (see Appendix E) was asked of each subject: (I) age, sex, weight, height, ethnic group, and occupation; (II) attitudes toward exercise; (III) patterns of attitudes and behavior in daily life; (IV) awareness of emotion. Each question was open-ended, so that the participants could answer each

question in detail. The questionnaire was administered once in the first week of the class for a baseline measure to compare possible differences during the five week period.

Procedure

Explanation of experiment. The participants were enrolled in physical exercise classes at a local and university. Prior to the research, telephone contact with the instructors (yoga, t'ai chi, aerobics, and NIA) of the exercise groups was arranged to discuss the nature and the purpose of the study. Permission was obtained from the instructors to allow the students to volunteer as subjects. During the first week of the new semester, the experimenter contacted the students during class to inform them of their rights as subjects and to ask them to consider participating in this study. A consent form was signed by all students who indicated a willingness to participate in this study. (see Appendix A) The experimenter distributed a packet of questionnaires, which contained the Spielberger's Trait anxiety inventory, the POMS, the self-awareness questionnaire, the physical emotional behavioral management questionnaire, and the personal information lists, which were then introduced to the subjects. Subjects were told that the purpose of this study was to understand how students perceive emotions from participating in an exercise program. Subjects were asked to read the instructions and to provide the appropriate answer for each questionnaire. It was emphasized that there were no right or wrong answers. After five weeks,

the experimenter distributed the same packet of questionnaires to the same subjects who answered the first questionnaire. The data, therefore, were gathered in two different times by five different exercise groups: (1) stretching; (2) t'ai chi; (3) yoga; (4) NIA; and (5) aerobics.

Chapter 4

MEASUREMENT RESULTS

Psychometric analysis

There are two categories of measurement for this study. Mood and emotional variables were assessed using established measures; the Spielberger's State-Trait Anxiety Inventory (STAI) and the Profile of Mood States (POMS). However awareness was measured using new scales specially developed for this study. This chapter presents the findings for these scales.

New scales for awareness were developed because no alternative measures could be found. Thus findings to show congruent validity are impossible. Furthermore, since there is no literature in this area, the potential problems with construct validity have not been identified. Thus it is not possible to fully test construct validity for the new scales. That is, all consideration of construct validity for these scales is currently dependent on the reader's interpretation of item content. The content will be carefully spelled out for this reason.

The primary methodology is that of generalizability theory. If items are thought to measure the same thing, then you can test that belief by looking at the extent to which the items correlate with each other. It is critical to this

examination to control for random error of measurement. Random error of measurement causes as imperfect correlation between observed measurements even if two instruments measure exactly the same construct.

In order to eliminate the effects of random error of measurement, construct correlations were determined using confirmatory factor analysis. Some readers expressed concern because the analysis used traditional least squares methods for the confirmatory factor analysis instead of using program LISREL. In part, this is just a matter of using a different computer program to do the computations. If the predicted measurement model is correct, then there are only trivial differences between methods. However it is well known that if the predicted model has errors, those errors are much easier to detect and identify if least squares methods are used. LISREL has two problems in this regard. First, LISREL uses "full information" estimation which spreads errors across terms. If there are no errors, this is a moot problem. But since the awareness variables are completely new measurements, there is no guarantee that the predicted measurement model will work. Indeed some bad items were found and it would have been difficult to find them using LISREL. Second, the LISREL output is very abstract and it is hard to determine the substantive nature of errors from the LISREL output.

It should also be noted that the basic measurement model for this study is a hierarchical model. Consider awareness of mood. There are various aspects of mood such as anger,

nervousness, or shame. It makes sense to talk about a higher order "awareness of mood" construct only if the primary aspects are highly correlated with each other. Thus the first step in the analysis of awareness of mood items is to compute a primary factor analysis to look at the correlations between the specific mood variables. In this primary factor analysis, confirmatory factor methods eliminate the attenuating effect of random error of measurement.

There is a question for such an analysis that is subject to judgment, but which sounds like it calls for an objective analysis. That question is: How high must the correlations be before you accept the results as showing that the higher order factor dominates the overall measurement? Some readers expect to have a magic number such as a significance test to answer this question. However this is logically impossible. As long as the correlations are lower than 1.00, the specific mood aspects measure specific factors as well as the higher order factor. If all the specific factors are trivial, then the level of correlation between aspects could be quite low and still pose no potential problem for construct validity. On the other hand, if any specific factor is related to other variables in the research, then there could be a problem with construct validity no matter how high the average level of correlation might be.

Note that the lack of a magic number is not due to a lack of psychometric knowledge or theory. The lack of a magic number is because the concept of a magic number is illogical. This is true of most magic numbers (such as significance tests), but so

far no one has yet invented an arbitrary social convention to create a spurious magic number in this domain. All psychometricians agree that spurious magic numbers should be avoided.

The dominant concern for completely new measurement is this: Is there a specific item type that seems very different from the others? That item type would be suspect. These are the bad items identified in the analysis presented.

The second question that can be answered quantitatively is whether the specific factors are large or small. This can be done by subtraction. If the average level of correlation between primary factors is r, then the average size of the specific factors is 1-r in variance terms. For example, if the average level of correlation between primary factors is .70, then the specific factors account for only 30% of the variance in the primary factors. That is, the higher order factor accounts for 70% of the variance in the primary factors.

The fundamental problem with completely new measurement is that the size of a factor is not the same as the conceptual importance of a factor. Just because a specific factor accounts for only 20% of the variance, that does not rule out the possibility that the information in the specific factor might be more important than the information in the higher order factor. This poses a fundamental constraint on the measurement in the present study. Because there is no literature on the measurement of body awareness, there is as yet no substantive basis for determining the importance of the specific factors.

By looking at the common elements across specific aspects, we can hope to interpret the higher order factor. However at present, there is no way of knowing exactly what information is lost by using only the higher order factor.

The physical emotional management (PEM) questionnaire

This chapter presents the psychometric analysis of each instrument used in this study. The physical emotional management (PEM) assessment was created for the purpose of measuring how well people think they can control their negative emotions by using various tactics.

Four goals were defined by the most common emotional problems: anger, anxiety, mood, and tension. Five tactics were identified for dealing with emotional problems. Each tactic can be used to try to control any given emotion. Thus each tactic can be used to attain any of the four goals. Goal 1 was "to restrain anger," Goal 2 was "to suppress anxiety," Goal 3 was "to change mood," and Goal 4 was "to relax muscle tension." Tactic 1 was "using verbal expressions," Tactic 2 was "using body control," Tactic 3 was "controlling breathing," Tactic 4 was "using facial expression," and Tactic 5 was "using hand (arm) gestures." Each item is defined by a combination of one of the 4 goals with one of the 5 tactics. An item is constructed by asking the person whether they use a given tactic to attain a given goal. Since there are 4 goals and 5 tactics, there are 20 combinations and hence 20 items. Table 1 on p. 67 shows how

the 20 items were constructed from the four goals and five tactics.

Table 1. Goal and Items of Physical Emotional Behavioral Management Questionnaire(PEM).

Goal 1. to restrain anger whenever necessary
Items(1-5)
1 by using verbal expressions
2 by using body control
3 by controlling breathing
4 by using facial expression
5 by using hand (arm) gestures

Goal 2. to suppress anxiety or nervousness
Items(6-10)
6 by using verbal expressions
7 by using body control
8 by controlling breathing
9 by using facial expression
10 by using hand (arm) gestures

Goal 3. to change mood (i.e., calm) positively
Items(11-15)
11 by using verbal expressions
12 by using body control
13 by controlling breathing
14 by using facial expression
15 by using hand (arm) gestures

Goal 4. ability to relax muscle tension
Items(16-20)
16 by using verbal expressions
17 by using body control
18 by controlling breathing
19 by using facial expression
20 by using hand(arm)gestures

Scale: 1= not at all, 2= slightly, 3= somewhat, 4=very, 5=always

The items in Table 1 are organized by goal, but they could just as easily have been organized by tactic. That is, the items could

have been organized as five sets - one for each tactics - with four items in each set, one for each goal.

Factor structure of the PEM

The PEM items can be considered in any of three ways. First, the items could be clustered by goal: there would then be 4 such clusters with 5 items in each cluster. Second, the items could be clustered by tactic: there would then be 5 such clusters with 4 items in each cluster. Third, the items could be considered as a two-way dimensional set and examined using a multitrait, multimethod analysis.

A confirmatory factor analysis (CFA) was run for the four goal clusters; and it showed considerable differentiation between goals. A confirmatory factor analysis was run for the five tactics clusters; but it showed virtually no differentiation between tactics. Since differences between tactics do NOT cause any differences between responses, a multitrait analysis would be moot. Table 2 shows the results of the CFA analysis for goals and for tactics. Since this is a longitudinal study, each CFA can be done twice: once for the pretest data and again for the posttest data. So Table 2 shows four CFA's: pre and post for goals and pre and post for tactics.

Consider first the findings for tactics. Four of the tactics (i.e., tactics 1, 2, 4, 5) are all correlated with each other with correlations in the 90's; an average of .97 for both the pretest data and the posttest data.

Table 2.
Confirmatory Factor Analysis of the PEM Items.

(1) CONFIRMATORY FACTOR ANALYSIS BY GOALS (4 goals):

Factor correlations

PRETEST DATA

	G1	G2	G3	G4
G1	1.00	.87	.64	.71
G2	.87	1.00	.85	.73
G3	.64	.85	1.00	.82
G4	.71	.73	.82	1.00

Factor correlations

POSTTEST DATA

	G1	G2	G3	G4
G1	1.00	.63	.73	.49
G2	.63	1.00	.67	.59
G3	.73	.67	1.00	.78
G4	.49	.59	.78	1.00

(2) CONFIRMATORY FACTOR ANALYSIS BY TACTICS (5 tactics):

Factor correlations

PRETEST DATA

	T1	T2	T3	T4	T5
T1	1.00	.97	.82	.96	.98
T2	.97	1.00	.84	.90	.94
T3	.82	.84	1.00	.78	.75
T4	.96	.90	.78	1.00	1.00
T5	.98	.94	.75	1.00	1.00

Factor correlations

POSTETST DATA

	T1	T2	T3	T4	T5
T1	1.00	.97	.79	1.07	1.00
T2	.97	1.00	.86	.79	.89
T3	.79	.86	1.00	.66	.55
T4	1.07	.79	.66	1.00	.97
T5	1.00	.89	.55	.97	1.00

Note. 4 goals: G1 = to restrain anger whenever necessary; G2 = to suppress anxiety or nervousness; G3 = to change mood (i.e., become calm) positively; and G4 = to relax muscle tension. 5 tactics: T1 = by using verbal expressions; T2 = by using body control; T3 = by controlling breathing; T4 = by using facial expression; and T5 = by using hand (arm) gestures.

Thus respondents did NOT report any differential use of these tactics. The exceptional tactic is Tactic 3; "controlled breathing." This tactic correlated only .80 with the other tactics in the pretest data and correlated only .72 in the posttest data. It seems likely that this tactic has been effected by cultural references to yoga (pretest) and even more by the specific training given in the yoga exercise program (one of the five programs studied here). Differentiation between

tactics is so minor that it was ignored in all subsequent analysis.

Consider the CFA for goals. The correlations between the four goal clusters are high, but still a good difference from 1.00. The average correlation is .77 for the pretest data and .65 for the posttest data. Thus there is enough differentiation between goals that this difference should be considered in future research. Some analyses were carried out for separate goals in this study, but no differences were noted. Since the potential differences between goals never materialized in differences in findings, all further results will be reported only for the total score for PEM; i.e. the sum across all 20 items. The reliability of the total score was .89 on the pretest and .82 on the posttest.

Development of Self-awareness (SA) questionnaire

One hypothesis for the effect of exercise on mood is the awareness hypothesis. Exercise makes you more aware of your body and that awareness has a positive effect on your mood. To test this hypothesis, 37 items were written to measure awareness. These items can be gathered in several clusters.

First, there were 9 items that assessed awareness of mood. Three key words were used for mood: "mood," "body feeling," and "emotion." For each mood aspect, inquiry was made about three contexts: general or non-specific, before exercise, and after exercise. Given 3 aspects of mood and 3 contexts, there are 9

items formed by the combinations. These items are shown in Table 3.

Table 3. The Items Measuring Awareness of Mood.

Block 1: Items 1-3
How much are you:
1 aware of your mood
2 aware of body feeling
3 aware of your emotion
Block 2: Items 4-6
Before exercise, how much are you
4 aware of your mood
5 aware of body feeling
6 aware of emotion
Block 3: Items 7-9
After exercise, how much are you
7 aware of your mood
8 aware of body feeling
9 aware of emotion

Second, there are items which measure the extent of awareness of tactics used to control mood. Four tactics were considered: posture, hand and arm gestures, breathing pattern, and facial expression. Subjects were directed to five contexts where they might be aware of these tactics: walking, sitting, standing, thinking, and speaking. Given 4 tactics and 5 contexts, there are 20 items defined by the combinations. These 20 items are shown in Table 4.

Table 4.
Items that Measure Awareness of Tactics Related to Emotion.

Block 5: Items 12-16	
How much attention do you pay to your posture,	
12	when you walk
13	when you sit
14	when you stand
15	when you think(ponder)
16	when you speak
Block 6: Items 17-21	
How much attention do you pay to your arm (hand)gestures (movements),	
17	when you walk
18	when you sit
19	when you stand
20	when you think (ponder)
21	when you speak
Block 7: Items 22-26	
How much attention do you pay to your breathing pattern,	
22	when you walk
23	when you sit
24	when you stand
25	when you think (ponder)
26	when you speak
Block 8: Items 27-31	
How much attention do you pay to your facial expression,	
27	when you walk
28	when you sit
29	when you stand
30	when you think (ponder)
31	when you speak

Finally, there were 8 items written without a clear content structure. These items are shown in Table 5. After factor analysis, the items in Blocks 4 and 9 were dropped from further consideration.

Table 5. Miscellaneous Additional Awareness Items.

Block 4: Items 10-11	
How much are your muscles relaxed	
10	are your shoulders relaxed
11	is your neck relaxed
Block 9: Items 32-33	
How much attention do you pay to your level of nervousness	
32	when you are in the middle of a situation
33	when you recall the situation
Block 10: Items 34-37	
How do you perceive your level of nervousness?	
34	by perceiving your posture
35	by perceiving tightness in your face
36	by perceiving your breathing pattern
37	by perceiving the sweat

The structure of the items measuring awareness of mood

All 37 items were subjected to exploratory factor analysis. This analysis showed a clear distinction between the items measuring awareness of mood (Table 3) and the items measuring awareness of tactics (Table 4). Follow up confirmatory factor analysis also showed this distinction. This section presents the key results for the analysis of the items measuring awareness of mood. The next section will consider the items measuring awareness of tactics. The 9 items measuring awareness of mood can be classified in two ways: by mood aspect or by context. Confirmatory factor analysis was done using both ways of classifying the items. That is, in one analysis, there are three clusters of items clustered by mood aspect:

(a) For "mood" -- Items 1, 4, 7
(b) For "body feeling" -- Items 2, 5, 8
(c) For "emotion" -- Items 3, 6, 9

In the other analysis, there are three clusters of items clustered by context:

(a) General ("How much ...") -- Items 1, 2, 3
(b) Before exercise -- Items 4, 5, 6
(c) After exercise -- Items 7, 8, 9

The results for the two confirmatory factor analyses on the pretest data are shown in Table 6.

Table 6. Confirmatory Factor Analysis of the Items Measuring Awareness of Mood (pretest data).

Clustered by mood				Clustered by context			
	K1	K2	K3		C1	C2	C3
K1	1.00	.85	.93	C1	1.00	.86	.78
K2	.85	1.00	.89	C2	.86	1.00	.75
K3	.93	.89	1.00	C3	.78	.75	1.00

Note. 3 key words: K1 = mood; K2 = body feeling; and K3 = emotion. 3 contexts: C1 = in general; C2 = before exercise; and C3 = after exercise.

The results for the posttest data are similar. The average correlation between mood constructs is .89; so there is little differentiation in awareness between different mood foci. The average correlation between context constructs is .80; so there is little differentiation in awareness between different contexts. As a result, all 9 items were combined into one scale measuring awareness of mood. The reliability of this scale was .90 for the pretest and .92 for the posttest.

The structure of the items measuring awareness of tactics

This section presents the key results for the analysis of the items measuring awareness of tactics (Table 4). The 20 items measuring awareness of tactics can be classified in two ways: by tactic or by context. Confirmatory factor analysis was done using both ways of classifying the items. That is, in one analysis, there are four clusters of items clustered by tactics:

(a) For posture -- Items 12, 13, 14, 15, 16
(b) For gestures -- Items 17, 18, 19, 20, 21
(c) For breathing-- Items 22, 23, 24, 25, 26
(d) For facial -- Items 27, 28, 29, 30, 31

In the other analysis, there are five clusters of items clustered by context:

(a) Walking -- Items 12, 17, 22, 27
(b) Sitting -- Items 13, 18, 23, 28
(c) Standing -- Items 14, 19, 24, 29
(d) Thinking -- Items 15, 20, 25, 30
(e) Speaking -- Items 16, 21, 26, 31

The results for the two confirmatory factor analyses on the pretest data are shown in Table 6. The results for the posttest data are similar. The average correlation between tactics constructs is .52. Although the tactics are highly correlated with each other, there is considerable differentiation in the awareness of different tactics. The average correlation between context constructs is .92; so there would appear to be little differentiation between different contexts. However this overall average is somewhat misleading. Three contexts show no differentiation at all: walking, sitting, and standing. However thinking and speaking are different from

the others and different from each other to some extent. If the first three are combined, then the correlation between those three with thinking is .79, and with speaking is .85. The correlation between thinking and speaking is .71.

A second order factor model (Table 7) shows that the factor defined by walking, sitting, and standing IS the general factor.

Table 7.
Confirmatory Factor Analysis of the Items Measuring Awareness of Tactics (pretest data).

	Clustered by tactics					Clustered by context				
	T1	T2	T3	T4		C1	C2	C3	C4	C5
T1	1.00	.66	.42	.46	C1	1.00	1.13	1.24	.76	.84
T2	.66	1.00	.55	.68	C2	1.13	1.00	1.22	.79	.81
T3	.42	.55	1.00	.37	C3	1.24	1.22	1.00	.81	.91
T4	.46	.68	.37	1.00	C4	.76	.79	.81	1.00	.71
					C5	.84	.81	.91	.71	1.00

Note. 4 tactics: T1 = postures; T2 = gestures; T3 = breathing; and T4 = facial expression.
5 contexts: C1 = walking; C2= sitting; C3 = standing; C4 = thinking; and C5 = speaking.

Thinking and speaking each have specific factors which are not related to each other. Some analysis was done to see if other variables might show some difference in correlation pattern for these clusters but no such differences were found in this study. So the 20 items were combined into one scale measuring awareness of tactics.

The 8 miscellaneous items (Table 5) were related to all of the other awareness items. The items in Blocks 4 and 9 showed no consistent patterns and were dropped from all subsequent analyses (i.e., items 10,11,32,33 were dropped).

Table 8.
The Correlations between the Constructs for Nervousness (Block 10 in Table 5; Items 34-37) and the Constructs Measuring Awareness of Tactics (see Table 7; pretest data).

	T1	T2	T3	T4
T1	1.00	.66	.42	.46
T2	.66	1.00	.55	.68
T3	.42	.55	1.00	.37
T4	.46	.68	.37	1.00
B10	.36	.33	.33	.37

Note. 4 tactics: T1 = postures; T2 = gestures; T3 = breathing; T4 = facial expression. Block 10: 1) by perceiving your posture; 2) by perceiving tightness in your face; 3) by perceiving your breathing pattern; and 4) by perceiving the sweat.

The items in Block 10 ask a slightly different question from the other items: "How do your perceive your nervousness?" These items form a coherent cluster on both exploratory and confirmatory factor analysis. While these items ask about awareness, they also ask for interpretation. None the less, this cluster of items correlates with the clusters asking about awareness of tactics. The correlations for the pretest data are shown in Table 8. While the tactics constructs correlate .52 with each other, the nervousness construct correlates .35 with

them. In other analyses, the nervousness construct seemed to be parallel with the tactics constructs.

Since nervousness was parallel to the other tactics clusters, the nervousness items were added to the scale measuring awareness of tactics. Thus the SA-TACTICS scale has 24 items; the 20 strictly tactics items and the 4 nervousness items. The reliability of this scale was .92 for the pretest and .93 for the posttest.

Measuring mood -- the POMS inventory

The POMS inventory is often scored for one overall score measuring "mood." However the inventory was developed to measure 6 different aspects of mood and it is by no means obvious that exercise would have similar effects on all aspects. In particular, one of the POMS subscales is for "vigor;" feelings of energy and initiative. It would be plausible to predict that exercise might directly improve feelings of vigor because of improved muscle tone.

Table 9 presents the correlations between the POMS subscales for the pretest data (the posttest data followed exactly the same pattern). The diagonal entries are the communalities for the scales as determined by a one factor model. The correlations for Vigor have been reversed in sign because Vigor is scored in the opposite direction from the other subscales.

X Anxiety → Anger

R. Kanwar
April 7, 2020

Table 9.
Correlations between the POMS Subscales with Communalities in the Diagonal.

	Ten	Dep	Anx	Fat	Con	Vig
Tension	.62	.61	.57	.45	.73	.26
Depression	.61	.55	.54	.47	.64	.25
~~Anxiety~~Anger	.57	.54	.44	.40	.56	.22
Fatigue	.45	.47	.40	.45	.50	.48
Confusion	.73	.64	.56	.50	.70	.32
Vigor	.26	.25	.22	.48	.32	.17

Five of the POMS scales are traditionally regarded as indicators for neuroticism: anxiety, tension, confusion, fatigue, and depression (though there is some controversy for any given indicator; especially depression). These subscales are all highly correlated with each other given the low reliability for short scales (average r = .55). Vigor is both logically and statistically in the opposite direction from the neuroticism indicators.

The correlations in Table 9 are positive because they were reversed to show how Vigor would correlate if scored in the same direction as the neuroticism indicators (as is done in the POMS total score). However, these correlations are much lower than the correlations for the other POMS subscales. While the neuroticism indicators correlate an average of .55 with each other, the average correlation between Vigor and the others is only .31. Note that the communality for Vigor is only .17; which is far below its reliability of .92.

In order to be compatible with other research reports, the traditional POMS total score will be used. However, results will also be reported for a POMS total with vigor excluded; i.e., a sum across the traditional neuroticism indicators. In some tables, results will also be reported for the separate POMS scales. In all key tables, results for Vigor will be reported separately.

Chapter 5

RESULTS: TREATMENT EFFECTS

This chapter presents the results showing the impact of exercise on emotion and awareness. First, the dependent variables are reviewed and listed. Second, the results for the overall or pooled exercise sample are presented. The methodology used is the within subjects methodology as reviewed in Hunter and Schmidt (1990, pp. 339-404). Third, the results are presented for the five exercise programs separately. The exercise programs can be put in three clusters: strenuous exercise (aerobics and NIA), non-strenuous (yoga and stretching), and t'ai chi which is intermediate between the strenuous and non-strenuous programs. Extensive results are presented for the three program categories.

Emotional response is measured by a variety of dependent variables. The STAI is called "trait anxiety" and is widely accepted as an excellent measure of anxiety. However the items actually cover a rather broad number of dimensions of both positive and negative emotional functioning. A better label might be "neuroticism" or "emotional adjustment." As noted above, the POMS can either be scored for a total score for "mood" or as subscales measuring a variety of mood problems. The subscale for Vigor is quite different from the others. Results will be presented for the traditional POMS total score which

includes vigor, a modified POMS total with vigor excluded, and for each POMS subscales separately.

Awareness is measured by three variables: PEM (the extent to which respondents believe they can use various tactics to control their emotions, SD-MOOD (the respondent's assessment of the extent to which they are aware of their mood), and SA-TACTICS (the extent to which they think they are aware of using various tactics for emotional control).

All together there are 12 dependent variables: 9 measures of emotional outcome and 3 measures of awareness outcomes. In order to compare results across dependent variables, it is important to eliminate artificial differences due to the fact that different dependent variables are measured in entirely different units. This can be done by using standard score units. The mean difference in standard score units is denoted "d" and is usually attributed to Jacob Cohen. This is the most common measure of effect size used in contemporary meta-analysis.

Most current researchers ignore individual differences in the effect of treatments. This is poor practice, since there are many cases where it is known that different people respond in very different ways to the same treatment. This report will follow the advice given by Hunter and Schmidt (1990); extensive analysis of individual differences was performed and will be reported. The standard deviation of change in standard score units has been denoted "s" by Hunter and Schmidt (1990) and that notation will be used here. When large individual differences are found - as was the case here - the first hypothesis to be

tested is that there are differences in impact for people who start at different levels. In particular, it would not be surprising to find that people who start out with strong emotional problems might profit more from exercise than people who feel good before they start. The self impact correlation (denoted "ir" for "impact correlation") was computed for this purpose.

Table 10 presents the results for the entire sample, i.e., the sample pooled across the five exercise programs. The statistic "d" is the mean change in standard score units. The statistic "s" is the standard deviation of change in standard score units. The statistic "ir" is the self-impact correlation: the correlation between change and initial level. All results have been corrected for distortion due to error of measurement.

Mean change. The results for mean change were complicated by the variation in direction of scoring. Mood (POMS and the sub-scales) and anxiety were measured so that a high score meant higher levels. Improvement thus registered as a negative change; for example, anxiety was reduced and mood problems were reduced. The hypotheses for the POMS and STAI were confirmed and consistent with other findings in the exercise and emotion research (Jin, 1992; Morgan & Goldston, 1987). For vigor and the awareness variables (SA-mood, SA-tactics, and PEM), a high score was good and improvement showed as a positive change. That is, the statistic d was negative for the POMS and STAI showing improvement: a reduction in anxiety and mood problems. The statistic d was positive for the other variables showing an

increase in vigor, and all dimensions of awareness (SA-mood, SA-tactics, and PEM). As was hypothesized, vigor, PEM, and SA (mood and tactics) improved in the post-test, so that the hypotheses were confirmed.

Table 10. Key Results for the Pooled Exercise Groups (Standard Score Units); Mean Gain (d), Standard Deviation of Gain (s), and the Self-Impact Correlation (ir) between Change and Initial Level.

Variable	d	s	ir
POMS-NV	-.41	.44	-.58
STAI	-.32	.42	-.53
Vigor	.32	.91	-.56
PEM	.29	1.17	-.69
SA-MOOD	.18	1.15	-.53
SA-TACTICS	.37	.98	-.44
POMS-ALL	-.46	.43	-.67
Anger	-.37	.94	-.58
Depression	-.34	.72	-.64
Tension	-.38	.75	-.69
Fatigue	-.19	.73	-.50
Confusion	-.23	.44	-.47
N	83	83	83

Note. POMS-ALL was obtained was obtained by sum of the scores of anger, depression, tension, fatigue, and confusion, minus vigor. POMS-NV was obtained by the sum of the scores of anger, depression, tension, fatigue, and confusion.

Standard deviation of change. The standard deviation of change was high for all variables. Since this standard deviation was corrected for attenuation due to error of measurement, the variation measured by "s" signified real differences in how individuals responded to the treatment. There was large

variation, as shown in Table 10. Some of this variation will be explained in a later analysis. Some of the variation was explained by differences among the treatment programs. Some of the variation was due to difference in response by people at different initial levels.

Self-impact correlation. The impact correlation (ir) is the correlation between initial level and the size of the effect. Consider mood awareness (SA-mood), where the impact correlation was -.53. This indicates that the higher the initial level of awareness (SA-mood), the smaller the improvement on the participant's score of his awareness variable. That is, a person who started out with high awareness increased his score a little while a person who started out with low awareness increased his score much more.

Despite the reversal of scoring, the same rule applies to the mood (POMS and sub-scales) and anxiety variables: all show negative self-impact correlations. Thus, on all outcome variables, the lower the person started, the higher the level of improvement. If the person started already high, then exercise produced little further improvement.

Improvement as a function of initial level

The self impact correlation is strongly negative for every dependent variable. That is, for every dependent variable, improvement is largest for those who start at the lowest level, and improvement is smallest for those who start at the highest level.

To show this, improvement can be compared for three groups formed on the basis of initial level: the bottom third, the middle third, and the top third. The means for these groups can be computed using the regression of change onto initial level. In standard score form, the regression of change onto initial level is:

```
Y   = Improvement for subgroup
X   = Mean initial level for subgroup
M   = Overall mean improvement
r   = Correlation between improvement and initial level
SD  = Standard deviation of change
Y   = M + r SD
```

In the notation currently used in meta-analysis (as used in the tables above), we have:

```
M   = d
SD  = s
r   = ir (the self impact correlation)
```

In standard scores, the means for the bottom, middle, and top thirds are approximately the scores -1, 0, +1 respectively. So in the notation of the table above

```
Bottom third:    Y = d + ir x s x (-1)  = d - s x ir
Middle third:    Y = d + ir x s x (0)   = d
Top third :      Y = d + ir x s x (+1)  = d + s x ir
```

Note that for the middle subgroup, mean improvement is the same as for the total group.

To show how this works, the computations are shown explicitly for two examples, an awareness variable and an emotional variable. For the awareness variables, scoring is in the usual direction; a positive value for d is an improvement. The three results for SA-tactics (or body awareness) are d=.37, s=.98, ir=-.44.

Subgroup computations for SA-tactics:

Bottom third : Y = .37 - (.98)(-.44) = .80
Middle third : Y = .37 = .37
Top third : Y = .37 + (.98)(-.44) = -.06

That is, for body awareness, we have a large increase of .80 standard deviations for those who start the bottom third on body awareness. The change for those who start in the middle third on body awareness, we get the same average improvement as for the whole sample: a moderate improvement of .37 standard deviations. For those who start in the top third, there is little improvement. Indeed the computation shows a small shift in the opposite direction. But that small negative value is almost certainly due to sampling error.

The computations for an emotional variable such as the POMS or the STAI is complicated by the fact that the emotions are scored high for higher levels of mood. Thus to score the results so that "improvement" registers as a positive number, we must reverse the sign of d. For the POMS total score, this means reversing d = -.46 to M = +.46. Thus the improvement results for the POMS total scores are : d =.46, s =.43, ir =-.67.

Subgroup computations for POMS total score:
Bottom third : Y = .46 - (.43)(-.67) = .75
Middle third : Y = .46 = .46
Top third : Y = .46 + (.43)(-.67) = .17

Thus for overall mood, there is very large mean improvement of .75 standard deviation for those who start in the bottom third. For those who start in the middle, the mean improvement is a more moderate .46 standard deviations. For those who start in the top third, the improvement is only .17 standard deviations; i.e.,

only about one fifth as much as those who start in the bottom third.

Table 11 presents mean improvement as a function of initial level for all the dependent variables. Note that the results for the negative emotions (all except vigor) are reversed in sign so that a positive value represents improvement. With this reversal, the results look similar for all dependent variables; much larger improvement for those who start out low than for those who start out high.

Table 11. Mean Improvement as a Function of Initial Level for the Whole Sample; i.e., the Sample Pooled Across Exercise Groups.

	d	Low	Medium	High	Total
POMS-NV	-.41	+.67	+.41	+.15	+.41
STAI	-.32	+.64	+.32	+.10	+.32
Vigor	.32	+.83	+.32	-.19	+.32
PEM	.29	+1.10	+.29	-.52	+.29
SA-mood	.18	+.81	+.17	-.47	+.18
SA-tactics	.37	+.80	+.37	-.06	+.37
POMS-ALL	-.46	+.75	+.46	+.17	+.46
Anger	-.37	+.92	+.37	-.18	+.37
Depression	-.34	+.80	+.34	-.12	+.34
Tension	-.38	+.88	+.38	-.14	+.38
Fatigue	-.19	+.56	+.19	-.18	+.19
Confusion	-.23	+.44	+.23	-.02	+.23

Note. POMS-ALL was obtained was obtained by sum of the scores of anger, depression, tension, fatigue, and confusion, minus vigor. POMS-NV was obtained by the sum of the scores of anger, depression, tension, fatigue, and confusion.

The five exercise programs considered separately

Results were also examined for each exercise program separately. There were five different programs and too many results to be put in one table. Table 12 presents the mean change for each program. HOWEVER, the reader is warned to look at the sample size for each subgroup. While there were 43 subjects in the aerobics classes, 19 in t'ai chi, and the other three programs had extremely small samples: N=8 for NIA and yoga, N=5 for stretching. Sampling error can be very large for such small samples.

Table 12. Mean Change in Standard Scores (d) for Each Exercise Program.

Variable	aerobics	NIA	t'ai chi	yoga	stretch
POMS-NV	-.33	-.30	-.33	-.53	-1.05
STAI	-.20	-.51	-.24	-1.33	-.31
Vigor	.26	-.01	.30	.81	.50
PEM	-.23	-.23	.85	1.45	1.54
SA-MOOD	.18	-.68	.33	1.23	1.60
SA-TACTICS	-.09	-.58	.71	1.41	1.78
POMS-ALL	-.35	-.27	-.40	-.63	-1.00
Anger	-.30	-.06	-.33	-1.33	-1.48
Depression	-.40	-.17	-.30	-.34	-.31
Tension	-.34	-.45	-.26	-.46	-.70
Fatigue	-.10	-.34	-.01	-.54	-.39
Confusion	-.14	-.43	-.10	-.37	-.77
Sample size	43	8	19	8	5

Note. POMS-ALL was obtained was obtained by sum of the scores of anger, depression, tension, fatigue, and confusion, minus vigor. POMS-NV was obtained by the sum of the scores of anger, depression, tension, fatigue, and confusion.

Mean change. Table 12 shows the mean change for each exercise program separately. For the mood (POMS and the sub-scales) and anxiety variables, the mean change was negative in all groups. Thus all exercise programs produced an improvement in mood and a reduction in anxiety. This confirms the hypothesis that exercise will improve mood and reduce anxiety. However, the more strenuous programs (aerobics and NIA) produced less improvement than did the non-strenuous programs (yoga and stretching).

For all five exercise groups, values of d were positive for vigor. This confirms the hypothesis that exercise will increase vigor.

For the awareness variables (SA-mood, SA-tactics, and PEM), there was a big difference among the programs. Three programs (t'ai chi, yoga, and stretching) showed an increase in the awareness variables. However the two strenuous programs (aerobics and NIA) showed a negative value for d on all awareness variables.

Standard deviation of change. Table 13 presents the standard deviation of gain for all five exercise programs. The reader is warned to examine this table with care because of the small sample sizes for most groups and because the standard deviation is especially subject to sampling error because of the process of correcting for measurement error. The table shows 0's for several programs, but only for very small sample size programs. All these zeroes are probably due to sampling error.

The level of sampling error is so large for the standard deviations that no analysis of initial level was attempted for the separate exercise programs.

Table 13.
The Standard Deviation of Gain (s) for Each Exercise Group.

variable	aerobics	NIA	t'ai chi	yoga	stretch
POMS-NV	.59	.66	.00	.10	1.05
STAI	.50	.00	.00	.80	.00
Vigor	.75	1.06	.81	.00	.00
PEM	1.08	.40	1.22	.50	1.60
SA-MOOD	1.30	.75	1.00	.00	.75
SA-TACTICS	.93	.61	.77	.00	1.04
POMS-All	.57	.88	.36	.21	.95
Anger	.79	1.38	.50	1.16	.86
Depression	.95	.35	.24	.19	.34
Tension	.77	.99	.58	.25	1.16
Fatigue	.65	.56	.90	.55	.30
Confusion	.54	.00	.00	.00	1.17
Sample size	43	8	19	8	5

Note. POMS-ALL was obtained was obtained by sum of the scores of anger, depression, tension, fatigue, and confusion, minus vigor. POMS-NV was obtained by the sum of the scores of anger, depression, tension, fatigue, and confusion.

Self-impact correlation. The self-impact correlation (ir) is the correlation between the initial level and the size of the effect. Table 14 presents self-impact correlations of each exercise group. Most of the correlations follow the same pattern as was observed for the pooled analysis. That is, most of the self impact correlations are negative. On the other hand, there are a random smattering of apparently conflicting results.

Note that all of the contrary results are for very small samples. It seems likely that all of the contrary results are due to sampling error.

The sampling error in the self impact correlations is so severe that no attempt was made to look at change as a function of initial level for the separate exercise groups.

Table 14.
Self Impact Correlation (ir).

variable	aerobics	NIA	t'ai chi	yoga	stretch
POMS-NV	-.51	-.78	.00	-1.00	-.94
STAI	-.67	.00	.00	-.50	.00
Vigor	-.34	-.54	-.54	.00	.00
PEM	-.72	.25	-.60	-.20	-.75
SA-MOOD	-.14	-.83	-.60	.00	-.59
SA-TACTICS	-.26	-.94	-.37	.00	-.48
POMS-ALL	-.51	-.80	.00	-1.00	-1.00
Anger	-.61	-.71	.00	-.64	-.41
Depression	-.78	.15	-.56	-.70	-.41
Tension	-.69	-.89	-.36	-1.51	-.55
Fatigue	-.40	-.53	-.43	-.30	-1.30
Confusion	-.37	.00	.00	.00	-1.00
N	43	8	19	8	5

Note. POMS-ALL was obtained was obtained by sum of the scores of anger, depression, tension, fatigue, and confusion, minus vigor. POMS-NV was obtained by the sum of the scores of anger, depression, tension, fatigue, and confusion.

Further analysis of mean change: strenuousness of exercise

The following pattern was noticed in the table of mean change for the separate exercise programs. First, all of the emotional variables showed about the same results. Second, all

of the awareness variables showed about the same results. Therefore the table was simplified by averaging across the emotional variables to form one overall mood result.

The table was similarly simplified by averaging across the three awareness variables to form one overall "body awareness" result. Results for the simplified table are shown in Table 15.

Table 15.
The Mean Changes (d) on the Mood and Awareness of Sub-groups.

Variable	aerobics	NIA	t'ai chi	yoga	stretch	Total
MOOD	-.28	-.39	-.31	-.98	-.66	-.39
AWARENESS	-.17	-.50	.64	1.36	1.64	.28
N	8	43	19	8	5	83

Note. MOOD = (POMS-TDS + STAI) / 2; and
BODY AWARENESS = (PEM + SA-Mood + SA-Tactics) / 3

When the table was simplified, it was clear that the exercise program results suggest that the programs be grouped on the basis of the strenuousness of the exercise in the program. The NIA and aerobics programs are both very rigorous and they both show the same pattern of results. Yoga and stretching are much less rigorous and they show results that are similar to each other and very different from the results for the two strenuous programs. T'ai chi is less rigorous than NIA or aerobics but much more strenuous than yoga or stretching. The results for

t'ai chi tend to be intermediate between the results for the two strenuous programs and the two non-strenuous programs.

Three groups were thus defined by combining NIA and aerobics and by combining yoga and stretching. T'ai chi is the third group which is intermediate between the other two groups. The three groups are:

Strenuous	=	aerobics + NIA
t'ai chi	=	t'ai chi
Non-strenuous	=	stretching + yoga

The simplified results for the three groups are shown in Table 16. Table 16 presents the summary table of the effects of the strenuous activities, t'ai chi, and the non-strenuous activities on mood and awareness. The non-strenuous activities, such as yoga and stretching, showed that awareness improved more highly than in the strenuous activities, and t'ai chi was between the non-strenuous and strenuous activities. The non-strenuous activities had higher effect on mood than the other two groups.

Table 16.
The strenuous of activity on mood and awareness.

Variable	strenuous	t'ai chi	non-strenuous	total
MOOD	-.30	-.31	-.86	-.39
AWARENESS	-.22	.64	1.45	.28
N	51	19	13	83

Note. MOOD = (POMS-TDS + STAI) / 2; BODY AWARENESS = (PEM + SA-Mood + SA-Tactics) / 3

The simplified table shows that all five exercise groups showed considerable improvement in mood, though the results are stronger for the non-traditional exercise groups than for the NIA and aerobics classes. On the other hand, the results for the awareness variables are quite different for different groups. The strenuous programs actually show a reduction in awareness. The other programs all show an increase in awareness, with t'ai chi showing only half the improvement found for yoga and stretching.

Table 17 presents the key results for each of the three combined groups; i.e., mean change (d), standard score standard deviation of gain (s), and self-impact correlation (ir) for three strenuousness groups. The mean results are consistent with the simplified table. The standard deviations and self impact correlations are still quite erratic for the small groups; i.e., t'ai chi and non-strenuous. The sampling error in these results are so severe that no attempt was made to analyze the separate programs for differences across initial levels.

Table 17.
The Mean Change, Standard Deviation, & Self-Impact Correlation for Each Dependent Variable for Each of the Combined Groups Formed on the Basis of Strenuousness.

strenuous		(N=51)	
	d	s	ir
POMS-All	-.40	.57	-.67
POMS-NV	-.37	.55	-.61
STAI	-.26	.45	-.66
Vigor	.25	.98	-.52
PEM	.12	1.04	-.71
SA-MOOD	-.08	1.30	-.49
SA-TACTICS	.04	.97	-.42

t'ai chi		(N=19)	
	d	s	ir
POMS-All	-.40	.00	.00
POMS-NV	-.33	.00	.00
STAI	-.24	.00	.00
Vigor	.30	.81	-.55
PEM	.85	1.22	-.60
SA-MOOD	.33	1.00	-.60
SA-TACTICS	.71	.77	-.37

non-strenuous		(N=13)	
	d	s	ir
POMS-All	-.73	.00	.00
POMS-NV	-.64	.00	.00
STAI	-.71	.51	.17
Vigor	.72	.21	-1.00
PEM	1.37	.98	-.48
SA-MOOD	.88	.22	-.78
SA-TACTICS	1.39	.52	-.33

Note. POMS-ALL was obtained was obtained by sum of the scores of anger, depression, tension, fatigue, and confusion, minus vigor. POMS-NV was obtained by the sum of the scores of anger, depression, tension, fatigue, and confusion.

CHAPTER 6

DISCUSSION

There are two innovations in this study. One innovation was to gather data on t'ai chi, yoga, and stretching to see if they improve mood by as much as traditional strenuous exercise programs. The other innovation was the creation of new instruments to measure awareness of mood and to measure body awareness. The discussion will address both innovations.

First, the mostly positive results for the new measurements will be discussed. Second, the mean change in mood for the five programs studied will be compared to meta-analysis findings for strenuous programs. Finally, the discussion will consider the process model that lead to the design of this study : the hypothesis that improvement in mood is produced by increased body awareness. There will first be a section to summarize the findings on change in awareness followed by a discussion of the hypothesis itself.

New scales to measure awareness

Three new scales were developed; two measuring body awareness and one scale to measure awareness of mood. Body awareness was measured by focusing on key motor behaviors: posture, breathing patterns, hand gestures, and facial movements. Subjects were asked whether they were aware of these behaviors

in various contexts (the SA-tactics scale). They were also asked whether they believed that they could use such behaviors to control their mood (the PEM scale). That is, two measures of body awareness were created for this study. Subjects were also asked how much they are aware of their mood (the SA-mood scale). That is, three aspects of awareness were measured; two measures of body awareness and a measure of awareness of mood.

The SA-mood scale. Awareness of mood was measured by 9 items. Three aspects of mood were presented to the subject: "mood," "body feeling," and "emotion." Subjects were asked how much there were aware of each mood aspect in each of three contexts: in general, before exercise, and after exercise. Subscales formed by context showed little distinction between contexts (an average correlation of .80). Subscales formed by mood aspect also showed little distinction (an average correlation of .89). The reliability for the 9 item scale was high (.90 for the pretest and .92 for the posttest).

The SA-tactics scale. The body control tactics that are believed to control mood were taken from Loehr's (1990) intervention study and from Ekman's (1969) research on nonverbal aspects of emotion. The tactics considered in this study were: "using verbal expressions," "using body control," "controlling breathing," "using facial expression," and "using hand (arm) gestures."

The SA-tactics scale was developed from items that ask about awareness of each four tactics in each of five different contexts. Because this scale was developed before the PEM scale,

the use of verbal expressions was not considered as a tactic in developing these items. The scale would be improved if items were added for this tactic.

While there is some evidence of differences between contexts, these differences seem to be small. Thus it is reasonable to form a subscale for each tactic by summing across contexts. The resulting four tactics subscales are highly correlated (an average correlation of .52. Furthermore, all show parallel correlations with the other measures in this study. Thus the four tactics subscales were summed to produce the overall SA-tactics awareness scale.

There were also 4 items measuring awareness of nervousness that did not use the context structure of the other tactics subscales. An improved scale would use nervousness items with the same form as the other tactics. The nervousness subscale was parallel to the other four subscales though it was less highly correlated with the others than they were with each other.

The resulting scale of 24 items has high reliability (.92 for the pretest and .93 for the posttest).

The PEM scale. The 20 items for the PEM scale were developed to measure the extent to which subjects think they can use various tactics to control their mood. Four mood goals were used : restrain anger, suppress anxiety, change mood, and relax muscle tension. Five tactics were considered; the five tactics from Loehr (1990): "using verbal expressions," "using body control," "controlling breathing," "using facial expression," and "using hand (arm) gestures." For each tactic and each goal,

there was an item asking if the subjects use that tactic to achieve that goal.

Subscales formed for each goal showed some distinction between goals though not strong distinction (an average correlation of .77 between subscales). Thus it is reasonable to sum items across goals to form subscales for tactics.

Subscales formed for each tactic showed that four of the tactics are extremely highly correlated while "controlled breathing" was slightly different. The other four tactics correlated in the 90's with each other, but breathing only correlated .80 with the others. Nonetheless, there is only minor distinction between the tactics and so only a total score was considered. The reliability of the 20 item scale was high (.89 on the pretest and .82 on the posttest).

Improvement in mood

The impact of exercise on mood has been known to some researchers for over 20 years. This has resulted in many studies of the effect of strenuous exercise on improvement in mood. Four meta-analyses have been done on various subsets of these studies (Kugler, Seelbach, & Kruskemper, 1994; North, McCullagh, & Tran, 1990; Schlicht, 1994; and Rowley et al., 1995). The difference between findings of the meta-analyses is primarily due to differences in the subject population treated. Table 18 reports the results of each meta-analysis.

Table 18.
Meta-analysis on the Effect of Strenuous Exercise on Mood Using d as the Measure of Effect Size.

Authors	Population	General Dep.	Anxiety
North et al. (1990)	Normal	-.53	
Schlicht (1994)	Normal		-.15
Kugler et al. (1994)	Coronary patients	-.46	-.31
Rowley et al. (1995)	Successful athletes	-.15	

Note. General Dep. = General Depression.

Overall mood. We start with the findings for overall mood. Most studies of this type use the total POMS score. Rowley et al. (1995) report an average value for d of -.15. For the strenuous programs in the present study, the effect for total POMS is d = -.34 which is a much stronger effect than that reported by Rowley et al. However note that Rowley reviewed studies on successful athletes. This study found considerable evidence that there is much more improvement for those who start out with poor mood than for those who start out with good mood. Successful athletes would have participated in extremely rigorous strenuous exercise programs for years before those studies were run. Thus they are likely to have better mood elevation than the general population. If we average change for those in the top two thirds in the present study, the mean improvement is d = -.20. This value almost perfectly matches the findings reviewed by Rowley et al.

For t'ai chi, the d value for overall mood was d = -.40; the same as for strenuous exercise. For yoga and stretching,

the improvement was d = -.77 which is a much larger effect than for any of the other three programs. Thus t'ai chi works as well as strenuous exercise and the non-traditional programs work even better.

Depression. Consider the findings on depression. If we average the findings from North et al. (1990) and Kugler et al. (1994), we get a value of d = -.49. For the strenuous programs in the present study, the d value for depression is -.36. Given a sample size of only 51, this finding is not significantly different from the value for the meta-analyses.

For t'ai chi, the d value for depression was -.30; only slightly less that for strenuous exercise. For yoga and stretching, the improvement was -.33 which is about the same as for any of the other three programs. Thus t'ai chi and the non-traditional programs work as well as strenuous exercise.

Anxiety. Schlicht (1994) found an average effect on anxiety of d = -.15. This is in sharp contrast to the findings for depression: an average of d = -.49. Given the very high correlation between depression and anxiety (about r = .77), this difference is peculiar. From the product rule of path analysis, the improvement for anxiety should be at least (.77) (-.49) = -.38. The Schlicht study has some kind of problem. Note that the average in the Kugler et al. (1994) is d = -.31 which is much closer to the value predicted by path analysis.

The present study found a value of d = -.36 for the strenuous programs. This is inconsistent with the findings of Schlicht but exactly congruent to the path analytic prediction

from the findings for depression. The findings from this study thus tend to confirm the problem in Schlicht (1994) that is evident from path analysis. For a sample size of 13, the study value is not significantly different from d = -.31 as found in the review by Kugler et al.

For t'ai chi, the d value for anxiety was -.26; not significantly less than that for strenuous exercise. For yoga and stretching, the improvement was -.55 which is a much larger effect than for any of the other three programs. Thus t'ai chi works almost as well as strenuous exercise and the non-traditional programs work even better.

Summary. The findings from this study for the strenuous programs are largely consistent with meta-analysis results that average across many studies. The major departure is from the findings reported by Schlicht (1994) for anxiety; though the Schlicht findings are themselves inconsistent with both the findings from Kugler et al. (1994) and the value predicted from the findings on depression using path analysis. The findings from this study are most consistent with the value predicted by path analysis. The strenuous programs produced considerable improvement on all aspects of mood; an average value of d = -.30 across the mood variables.

On all mood variables, t'ai chi produced improvement that was very close to that produced by the strenuous programs. Yoga and stretching was just as effective as the other programs for expression and worked better than the other programs for anxiety and general mood. Thus the non-traditional exercise programs

were just as successful as strenuous exercise and may even work better.

Improvement as a function of initial level

If an individual already has a high mood level, there is little room for improvement. An individual at a low mood level has a lot of room for improvement. Thus it was predicted that all dependent variables would show a pattern of differences in improvement as a function of their initial level; with more improvement in those who start low than in those who start in the middle, and with more improvement in those who start in the middle than for those who start out high.

For the whole sample pooled across exercise programs, there was strong support for the initial level hypothesis. Averaged across mood variables, the improvement was only d = .15 for those who start high, but a higher d = .41 for those who start in the middle, and a still higher d = .67 for those who started with very poor mood.

The results for awareness are similar but with complications. Averaged across awareness variables, the improvement was largest for those who started with low awareness: d = .90. For the middle group, the improvement was much lower: d = .27. For the highest group, the improvement was not only lower but actually in the wrong direction: d = -.35. However, use of the pooled group is suspect for this analysis because there were striking differences between the strenuous programs and the other programs in terms of change in awareness. There was no

increase in awareness for the strenuous groups but a very large increase in awareness in the other two groups; especially for yoga and stretching.

Attempts to check the initial level hypothesis for separate treatment programs were extremely tenuous because of the small sample sizes for the separate programs. The overall pattern was similar in all groups, but many of the results were wildly influenced by sampling error.

Body awareness

This study was designed with two agendas in mind. On the one hand, the study tested the hypothesis that non-strenuous exercise programs can improve mood. This hypothesis was confirmed; mean change for yoga and stretching was d = -.73 which is higher than either t'ai chi (d = -.40) or the strenuous programs (d = -.40). However, this hypothesis was derived from a more fundamental hypothesis about body awareness. The theory was that exercise increases awareness of the body. Awareness of the body increases awareness of mood. This in turn makes it possible to better control mood. This hypothesis was at least partially disconfirmed.

Body awareness was measured by focusing on key motor behaviors: posture, breathing patterns, hand gestures, and facial movements. Subjects were asked whether they were aware of these behaviors in various contexts (the SA-tactics scale). They were also asked whether they believed that they could use such behaviors to control their mood (the PEM scale). That is,

two measures of body awareness were created for this study. Subjects were also asked how much they are aware of their mood (the SA-mood scale). That is, three aspects of awareness were measured; two measures of body awareness and a measure of awareness of mood.

The critical finding is that for the strenuous programs, there was considerable improvement in mood (d = -.40) but no increase on any of the three measures of awareness (for SA-tactics, d = .04; for PEM, d = -.12; and for SA-mood, d = -.08). Thus the strenuous program results show that there can be improvement in mood without improvement of awareness.

For t'ai chi, yoga, and stretching there were large increases in awareness on all three awareness dimensions. For the non-strenuous programs, the increase in awareness was considerably larger than the improvement in mood (awareness: d = 1.39, d = 1.37, d = .88 for SA-tactics, PEM, and mood respectively) (mood: d = -.73). There are two possibilities. First, it may be that for these programs awareness does play a role in the mood improvement. Alternatively, the increase in mood may stem from the instruction process in these programs. For the t'ai chi, yoga, and stretching programs, instructors make frequent comments on body awareness. These instructions may simply make subjects more aware of their body while having no effect on their mood.

There is some indirect evidence for a difference between strenuous and non-strenuous processes. The strenuous exercise program produced an improvement in mood of d = -.40 but the

non-strenuous program had a larger effect of d = -.73. Suppose that the physical movement aspects of the non-strenuous programs produces an effect of about the same size as the strenuous programs (probably less). That is, mean change in mood would have been about d = -.40 if these programs had no psychological emphasis on awareness. The further improvement to a mean of d = -.73 may then be due to the impact of increased body awareness on mood.

The results of this study support the theory that Eastern exercises such as t'ai chi, yoga, and even simple stretching increase the awareness of body and mood states because the participants can learn how to use various physical tactics to become conscious of mood states and kinesthetic movements. Awareness of moods through the physical tactics taught in these exercises, such as postures and breathing patterns and hand gestures, have been studied in nonverbal research (Ekman, 1969) in various contexts. These tactics are also identified in behavioral management strategies in sports settings (Loehr, 1990) in order to help athletes to modify emotions. By learning these tactics, by becoming aware, and by increasing experience and practice, people can become more conscious of both body and mind.

In a future study, I would like to examine the effects of non-strenuous exercise on awareness or other variables. For this purpose, I would like to try to develop a scale of PEM and SA on the basis of the present study. In sports and exercise, there is little empirical research on physical management, and

I would therefore like to do such research and apply it to sports settings.

This research could be applied by coaches and teachers in sports settings. They could encourage and train students to become aware of their body movements and moods in order to perform well. By learning nonstrenuous exercises such as yoga and t'ai chi, students could learn physical tactics step-by-step because they would be instructed in such tactics as how to breathe or how to execute a posture with slow movements, and instruction could be geared to the level of individual students. As the present study shows, using these tactics can reduce negative emotions, improve moods, and increase body awareness, which might be the key to balancing and controlling emotions. Any beginner can learn these tactics and be prepared whenever he or she participates in strenuous activities. Breathing, for example, is an important tactic in any sports setting, and in yoga we can teach the student how to breathe in any setting. As the student increases awareness of moods and the body, he or she can correctly interpret moods states and body tactics, thereby reducing negative emotions. I would like to encourage coaches and teachers to learn nonstrenuous exercises to help students improve moods and performance.

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APPENDIX A

Consent Form

Department of Physical Education and Exercise Science
Michigan State University

Rika Kawano, a doctoral student at Michigan State University, has requested my participation in a research study. This study is concerned with the relationship among self-awareness, emotion, and exercise.

I have been informed that the purpose of the research is to assess the effects of body exercise on participants in this program.

I understand that the results of the research study may be published but my name and identify will not be revealed. A numbering system will be used to differentiate the subjects. In order to maintain confidentiality of my records, Rika Kawano will secure the completed questionnaires and no one will have access to these questionnaires except the principal investigators.

I am free to refuse to participate in certain procedures, answer certain questions, or discontinue my participation at any time without penalty.

I have read the above information. The nature, demand, and benefits of the project have been explained to me. I understand that I may withdraw my consent and discontinue participation at any time without penalty or loss of benefit to myself. In signing this consent form, I am not waiving any legal claims, rights or remedies.

Signature:_____ Date:_____

APPENDIX B

The Profile of Mood States (POMS)

NAME _____ DATE _____

SEX. Male M Female F

Below is a list of words that describe feelings people have. Please read each one carefully. Then fill in ONE circle under the answer to the right which best describes HOW YOU HAVE BEEN FEELING DURING THE PAST WEEK INCLUDING TODAY.

The numbers refer to these phrases.

0 = Not at all
1 = A little
2 = Moderately
3 = Quite a bit
4 = Extremely

	0 NOT AT ALL	1 A LITTLE	2 MODERATELY	3 QUITE A BIT	4 EXTREMELY
1. Friendly	0	1	2	3	4
2. Tense	0	1	2	3	4
3. Angry	0	1	2	3	4
4. Worn out	0	1	2	3	4
5. Unhappy	0	1	2	3	4
6. Clear-headed	0	1	2	3	4
7. Lively	0	1	2	3	4
8. Confused	0	1	2	3	4
9. Sorry for things done	0	1	2	3	4
10. Shaky	0	1	2	3	4
11. Listless	0	1	2	3	4
12. Peeved	0	1	2	3	4
13. Considerate	0	1	2	3	4
14. Sad	0	1	2	3	4
15. Active	0	1	2	3	4
16. On edge	0	1	2	3	4
17. Grouchy	0	1	2	3	4
18. Blue	0	1	2	3	4
19. Energetic	0	1	2	3	4
20. Panicky	0	1	2	3	4
21. Hopeless	0	1	2	3	4
22. Relaxed	0	1	2	3	4
23. Unworthy	0	1	2	3	4
24. Spiteful	0	1	2	3	4
25. Sympathetic	0	1	2	3	4
26. Uneasy	0	1	2	3	4
27. Restless	0	1	2	3	4
28. Unable to concentrate	0	1	2	3	4
29. Fatigued	0	1	2	3	4
30. Helpful	0	1	2	3	4
31. Annoyed	0	1	2	3	4
32. Discouraged	0	1	2	3	4
33. Resentful	0	1	2	3	4
34. Nervous	0	1	2	3	4
35. Lonely	0	1	2	3	4
36. Miserable	0	1	2	3	4
37. Muddled	0	1	2	3	4
38. Cheerful	0	1	2	3	4
39. Bitter	0	1	2	3	4
40. Exhausted	0	1	2	3	4
41. Anxious	0	1	2	3	4
42. Ready to fight	0	1	2	3	4
43. Good natured	0	1	2	3	4
44. Gloomy	0	1	2	3	4
45. Desperate	0	1	2	3	4
46. Sluggish	0	1	2	3	4
47. Rebellious	0	1	2	3	4
48. Helpless	0	1	2	3	4
49. Weary	0	1	2	3	4
50. Bewildered	0	1	2	3	4
51. Alert	0	1	2	3	4
52. Deceived	0	1	2	3	4
53. Furious	0	1	2	3	4
54. Efficient	0	1	2	3	4
55. Trusting	0	1	2	3	4
56. Full of pep	0	1	2	3	4
57. Bad-tempered	0	1	2	3	4
58. Worthless	0	1	2	3	4
59. Forgetful	0	1	2	3	4
60. Carefree	0	1	2	3	4
61. Terrified	0	1	2	3	4
62. Guilty	0	1	2	3	4
63. Vigorous	0	1	2	3	4
64. Uncertain about things	0	1	2	3	4
65. Bushed	0	1	2	3	4

APPENDIX C

The Spielberger's State-Trait Anxiety Inventory (STAI)

SELF-EVALUATION QUESTIONNAIRE

STAI Form Y-2

Name _____ Date _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

		ALMOST NEVER	SOME-TIMES	OFTEN	ALMOST ALWAYS
1.	I feel pleasant	①	②	③	④
2.	I feel nervous and restless	①	②	③	④
3.	I feel satisfied with myself	①	②	③	④
4.	I wish I could be as happy as others seem to be	①	②	③	④
5.	I feel like a failure	①	②	③	④
6.	I feel rested	①	②	③	④
7.	I am "calm, cool, and collected"	①	②	③	④
8.	I feel that difficulties are piling up so that I cannot overcome them	①	②	③	④
9.	I worry too much over something that really doesn't matter	①	②	③	④
10.	I am happy	①	②	③	④
11.	I have disturbing thoughts	①	②	③	④
12.	I lack self-confidence	①	②	③	④
13.	I feel secure	①	②	③	④
14.	I make decisions easily	①	②	③	④
15.	I feel inadequate	①	②	③	④
16.	I am content	①	②	③	④
17.	Some unimportant thought runs through my mind and bothers me	①	②	③	④
18.	I take disappointments so keenly that I can't put them out of my mind	①	②	③	④
19.	I am a steady person	①	②	③	④
20.	I get in a state of tension or turmoil as I think over my recent concerns and interests	①	②	③	④

APPENDIX D

The Physical Emotional Management (PEM) Questionnaire

Name: _____ Date: _____

On the following pages are listed a number of statements concerning human movement which are related to your ability of physical management. Consider each item listed and circle the number on the answer scale after each item which best represents your feelings according to the following scale.

For each statement below, please circle one of the following numbers using the scale below:

Scale:
- not at all ---------- 1
- slightly ---------- 2
- somewhat ---------- 3
- very ---------- 4
- always ---------- 5

Emotions/mood by physical management:

1. ability to restrain anger whenever necessary

1-1	with using verbal expressions		1----2----3----4----5
1-2	with using body control		1----2----3----4----5
1-3	with controlling breathing		1----2----3----4----5
1-4	with using facial expression		1----2----3----4----5
1-5	with using hand (arm) gestures		1----2----3----4----5
1-6	by using (	)	1----2----3----4----5
1-7	by using (	)	1----2----3----4----5

2. ability to suppress anxiety or nervousness whenever necessary

2-1	with using verbal expressions		1----2----3----4----5
2-2	with using body control		1----2----3----4----5
2-3	with controlling breathing		1----2----3----4----5
2-4	with using facial expression		1----2----3----4----5
2-5	with using hand(arm) gestures		1----2----3----4----5
2-6	by using (	)	1----2----3----4----5
2-7	by using (	)	1----2----3----4----5

3. ability to change mood (i.e., calm) positively whenever necessary

3-1	with using verbal expressions		1----2----3----4----5
3-2	with using body control		1----2----3----4----5
3-3	with controlling breathing		1----2----3----4----5
3-4	with using facial expression		1----2----3----4----5
3-5	with using hand(arm) gestures		1----2----3----4----5
3-6	by using (	)	1----2----3----4----5
3-7	by using (	)	1----2----3----4----5

4. ability to relax muscle tension whenever necessary

4-1	with using verbal expressions		1----2----3----4----5
4-2	with using body control		1----2----3----4----5
4-3	with controlling breathing		1----2----3----4----5
4-4	with using facial expression		1----2----3----4----5
4-5	with using hand(arm) gestures		1----2----3----4----5
4-6	by using (	)	1----2----3----4----5
4-7	by using (	)	1----2----3----4----5

APPENDIX E

The Self-awareness (SA) Questionnaire and Personal Information

Directions: This questionnaire is designed to help us understand the relationship between your attitude toward exercise and your body condition in your life. Most responses will only require a short answer or a check in a ( ). Your responses are important to us. As a participant in this study, please understand that your responses will be confidential. We really appreciate your willingness to help us learn more about your sense of body-awareness and exercise.

I) Personal Information:

Sex: Male / Female Weight: (lbs) Height: (ft in)
Age: ( ) Occupation: ( )

Ethnic group: ( ) White ( ) Black/African American
( ) Asian American ( ) Hispanic or Latino American
( ) Native-American ( ) Other

II) Attitudes toward Exercise:

(1) Are you currently participating in any other exercise program or are you exercising periodically by yourself? If Yes, please answer following questions.

2-1)
kind of program:

_____

how often: _____min./day _____days/wk _____min./session
purpose:

_____

mood after exercise:

_____

2-2)
kind of program:

_____

how often: _____min./day _____days/wk _____min./session
purpose: _____

mood after exercise:

_____

2-3) If No, why don't you exercise?

_____

II) Behavior in daily life:

3-1) What do you usually do when you feel tired during the day?

_____

_____

3-2) Which parts of your body usually feel tight when you experience stress?

_____

3-3) What do you usually do to reduce the tightness of your body?

_____

_____

3-4) What do you usually do when you experience a stressful situation? (e.g., bad day at work)

_____

_____

3-5) Do you have any body pain? _____ Yes _____ No
If yes, in which part of your body do you feel pain most of the time?

_____

3-6) How intense the pain is?

_____

3-7) What do you do to reduce the pain?

_____

_____

3-8) What do you do when you are depressed?

_____

_____

3-9) What do you do when you are in anxiety situation?

_____

_____

IV) For Questions 4, please circle one of the numbers using
the scale below:

not at all ---------- 1
slightly ---------- 2
somewhat ----------3
very ---------- 4
always ---------- 5

4-1) In general, how much are you

4-1-1	aware of your mood	1----2----3----4----5
4-1-2	aware of body feeling	1----2----3----4----5
4-1-3	in which part of the body	( )
4-1-4	aware of emotion	1----2----3----4----5

4-2) Before exercise, how much are you

4-2-1	aware of your mood	1----2----3----4----5
4-2-2	aware of body feeling	1----2----3----4----5
4-2-3	in which part of the body	( )
4-2-4	aware of emotion	1----2----3----4----5

4-3) After exercise, how much are you

4-3-1	aware of your mood	1----2----3----4----5
4-3-2	aware of body feeling	1----2----3----4----5
4-3-3	in which part of the body	( )
4-3-4	aware of emotion	1----2----3----4----5

4-4) How much are your muscle relaxed

4-4-1	shoulder relaxed	1----2----3----4----5
4-4-2	neck relaxed	1----2----3----4----5

4-5) How much attention do you pay to your posture,

4-5-1	when you walk	1----2----3----4----5
4-5-2	when you sit	1----2----3----4----5
4-5-3	when you stand	1----2----3----4----5
4-5-4	when you think (ponder)	1----2----3----4----5
4-5-5	when you speak	1----2----3----4----5

4-6) How much attention do you pay to your arm (hand) gestures (movements),

4-6-1	when you walk	1----2----3----4----5
4-6-2	when you sit	1----2----3----4----5
4-6-3	when you stand	1----2----3----4----5
4-6-4	when you think (ponder)	1----2----3----4----5
4-6-5	when you speak	1----2----3----4----5

4-7) How much attention do you pay to your breathing pattern,

4-7-1	when you walk	1----2----3----4----5
4-7-2	when you sit	1----2----3----4----5
4-7-3	when you stand	1----2----3----4----5
4-7-4	when you think (ponder)	1----2----3----4----5
4-7-5	when you speak	1----2----3----4----5

4-8) How much attention do you pay to your facial expression,

4-8-1	when you walk	1----2----3----4----5
4-8-2	when you sit	1----2----3----4----5
4-8-3	when you stand	1----2----3----4----5
4-8-4	when you think (ponder)	1----2----3----4----5
4-8-5	when you speak	1----2----3----4----5

4-9) How much attention do you pay to perceive your level of nervousness?

4-9-1	when you are middle of the situation	1----2----3----4----5
4-9-2	when you recall the situation	1----2----3----4----5

4-10) How do you perceive by perceive your level of nervousness?

4-10-1	butterfliesŦ in your stomach	1----2----3----4----5
4-10-2	by perceiving your posture	1----2----3----4----5
4-10-3	by perceiving tightness in your face	1----2----3----4----5
4-10-4	by perceiving your breathing pattern	1----2----3----4----5
4-10-5	by perceiving your voice(speaking)	1----2----3----4----5
4-10-6	by perceiving the sweat	1----2----3----4----5
4-10-7	by perceiving other ( )	1----2----3----4----5
4-10-8	by perceiving other ( )	1----2----3----4----5

APPENDIX F

22 Correlations
The 22x22 variable correlation matrix for attenuation
Correlation matrix - Corrected for error of measurement

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	100	98	-54	74	-21	-17	-11	76	74	-29	68	-5	-20	2	-67	-57	33	-30	14	-3	12	-11
2	98	100	-37	71	-16	-12	-5	78	79	-18	67	-10	-18	5	-53	-58	23	-26	6	-6	9	-6
3	-54	-37	100	-46	32	25	29	-29	-17	59	-34	-19	16	11	48	38	-56	31	-38	-10	-19	30
4	74	71	-46	100	-34	-15	-7	59	56	-29	84	-19	-23	-10	-41	-40	23	-53	16	-8	-5	-3
5	-21	-16	32	-34	100	46	18	-15	-9	30	-29	28	25	4	10	10	-5	14	-69	-18	-14	28
6	-17	-12	25	-15	46	100	45	4	9	22	-12	12	31	6	25	27	-5	5	-35	-53	-38	29
7	-11	-5	29	-7	18	45	100	7	10	11	-4	-3	-6	48	25	21	-23	8	-16	-44	-44	21
8	76	78	-29	59	-15	4	7	100	98	-42	64	-11	-24	5	9	7	-9	-9	2	-25	-2	1
9	74	79	-17	56	-9	9	10	98	100	-21	63	-12	-22	8	8	8	-2	-6	-4	-27	-2	4
10	-29	-18	59	-29	30	22	11	-42	-21	100	-24	-1	19	12	-6	4	34	16	-23	-1	-1	10
11	68	67	-34	84	-29	-12	-4	64	63	-24	100	-21	-24	-7	-25	-24	15	3	8	-11	-4	7
12	-5	-10	-19	-19	28	12	-3	-11	-12	-1	-21	100	20	24	-14	-9	22	0	50	6	26	-23
13	-20	-18	16	-23	25	31	-6	-24	-22	19	-24	20	100	25	-5	-4	4	3	-9	61	31	-7
14	2	5	11	-10	4	6	48	5	8	12	-7	24	25	100	2	2	-1	12	17	18	55	-22
15	-67	-53	48	-41	10	25	25	9	8	-6	-25	-14	-5	2	100	97	-62	35	-20	-26	-21	19
16	-57	-58	38	-40	10	27	21	7	8	4	-24	-9	-4	2	97	100	-40	35	-17	-27	-18	14
17	33	23	-56	23	-5	-5	-23	-9	-2	34	15	22	4	-1	-62	-40	100	-19	20	10	20	-26
18	-30	-26	31	-53	14	5	8	-9	-6	16	3	0	3	12	35	35	-19	100	-15	-3	5	18
19	14	6	-38	16	-69	-35	-16	2	-4	-23	8	50	-9	17	-20	-17	20	-15	100	22	32	-42
20	-3	-6	-10	-8	-18	-53	-44	-25	-27	-1	-11	6	61	18	-26	-27	10	-3	22	100	60	-32
21	12	9	-19	-5	-14	-38	-44	-2	-2	-1	-4	26	31	55	-21	-18	20	5	32	60	100	-46
22	-11	-6	30	-3	28	29	21	1	4	10	7	-23	-7	-22	19	14	-26	18	-42	-32	-46	100

Name of the variables and the descriptive statistics

	Mean	SD	N
(1) pretest of totalPOMS= (c+a+d+f+t)-v	31.6790	31.4419	81
(2) pretest a+t+d+f+c	48.6296	28.4247	81
(3) pretest of POMS (vigor)	17.0366	6.5911	82
(4) pretest of Spielberger's T-anx	38.6118	10.0748	85
(5) pretest all pre scores of pem	62.5556	14.0757	81
(6) pretest SAmood	33.5904	5.7106	83
(7) pretest SAtactics	64.8500	15.0485	80
(8) post test of totalPOMS= (c+a+d+f+t)-v	19.6829	25.7978	82
(9) post a+t+d+f+c	38.7195	23.9749	82
(10) post test of POMS (vigor)	19.0366	5.7958	82
(11) post test of Spielberger's T-anx	35.7470	8.6671	83
(12) post scores of pem	66.0732	11.9678	82
(13) post factor1 of SA	34.6173	6.0551	81
(14) post sa factor 2	70.3951	15.8214	81
(15) post-pre=poms all	-10.9625	20.5220	80
(16) post-pre=poms no-v	-9.0125	17.5842	80
(17) post-pre=vigor	1.9506	5.6544	81
(18) post-pre=T-anxiety	-2.8193	5.4686	83
(19) post-pre=pem total	3.6795	15.7698	78
(20) post-pre=sa mood	1.0500	6.9735	80
(21) post-pre=sa tactics	5.6364	16.0336	77
(22) strenuousness of activity**	2.45	.75	84

Note. **strenuousness of activity: 1= nia & aero, 2 = tai chi, 3 = yoga & stretching

APPENDIX G

Reliability analysis of pre-test of Physical Emotional Management (PEM)

Goal 1

		Mean	Std Dev	Cases
1.	PREPEM11	3.2048	.9208	83.0
2.	PREPEM12	3.6145	1.0221	83.0
3.	PREPEM13	3.2048	.9971	83.0
4.	PREPEM14	2.9880	1.0300	83.0
5.	PREPEM15	3.1446	1.0947	83.0

Covariance Matrix

	PREPEM11	PREPEM12	PREPEM13	PREPEM14	PREPEM15
PREPEM11	.8478				
PREPEM12	.3726	1.0447			
PREPEM13	.4088	.4824	.9941		
PREPEM14	.4171	.2880	.4659	1.0608	
PREPEM15	.4578	.5076	.3969	.6115	1.1984

Correlation Matrix

	PREPEM11	PREPEM12	PREPEM13	PREPEM14	PREPEM15
PREPEM11	1.0000				
PREPEM12	.3959	1.0000			
PREPEM13	.4452	.4733	1.0000		
PREPEM14	.4399	.2736	.4537	1.0000	
PREPEM15	.4542	.4537	.3636	.5424	1.0000

N of Cases = 83.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	16.1566	13.9630	3.7367	5

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.2313	2.9880	3.6145	.6265	1.2097	.0537

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	1.0292	.8478	1.1984	.3506	1.4135	.0160

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4409	.2880	.6115	.3235	2.1235	.0071

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4296	.2736	.5424	.2688	1.9826	.0049

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PREPEM11	12.9518	9.8025	.5746	.3314	.7487
PREPEM12	12.5422	9.6171	.5208	.3369	.7648
PREPEM13	12.9518	9.4611	.5719	.3662	.7483
PREPEM14	13.1687	9.3371	.5664	.3964	.7500
PREPEM15	13.0120	8.8169	.6072	.4172	.7364

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	228.9928	82	2.7926		
Within People	210.8000	332	.6349		
Between Measures	17.8410	4	4.4602	7.5817	.0000
Residual	192.9590	328	.5883		
Total	439.7928	414	1.0623		
Grand Mean	3.2313				

Reliability Coefficients 5 items

Alpha = .7893 Standardized item alpha = .7901

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Reliability analysis of pre-test of Physical Emotional Management (PEM)

Goal 2

		Mean	Std Dev	Cases
1.	PREPEM21	3.0366	.9993	82.0
2.	PREPEM22	3.1585	.9996	82.0
3.	PREPEM23	3.2805	.9199	82.0
4.	PREPEM24	2.8902	1.0887	82.0
5.	PREPEM25	2.9024	1.1179	82.0

Covariance Matrix

	PREPEM21	PREPEM22	PREPEM23	PREPEM24	PREPEM25
PREPEM21	.9986				
PREPEM22	.5991	.9992			
PREPEM23	.3847	.5723	.8463		
PREPEM24	.7942	.6226	.4880	1.1853	
PREPEM25	.6703	.8181	.5709	.8040	1.2496

Correlation Matrix

	PREPEM21	PREPEM22	PREPEM23	PREPEM24	PREPEM25
PREPEM21	1.0000				
PREPEM22	.5997	1.0000			
PREPEM23	.4184	.6223	1.0000		
PREPEM24	.7300	.5720	.4872	1.0000	
PREPEM25	.6000	.7321	.5552	.6606	1.0000

N of Cases = 82.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	15.2683	17.9271	4.2340	5

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.0537	2.8902	3.2805	.3902	1.1350	.0281

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	1.0558	.8463	1.2496	.4033	1.4766	.0262

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.6324	.3847	.8181	.4335	2.1268	.0192

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5978	.4184	.7321	.3137	1.7497	.0092

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PREPEM21	12.2317	12.0321	.7063	.5853	.8590
PREPEM22	12.1098	11.7039	.7638	.6326	.8458
PREPEM23	11.9878	13.0492	.6066	.4228	.8804
PREPEM24	12.3780	11.3245	.7393	.6195	.8513
PREPEM25	12.3659	10.9509	.7740	.6291	.8427

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	290.4195	81	3.5854		
Within People	146.4000	328	.4463		
Between Measures	9.2098	4	2.3024	5.4376	.0003
Residual	137.1902	324	.4234		
Total	436.8195	409	1.0680		
Grand Mean	3.0537				

Reliability Coefficients 5 items

Alpha = .8819 Standardized item alpha = .8814

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Reliability analysis of pre-test of Physical Emotional Management (PEM) Goal 3

		Mean	Std Dev	Cases
1.	PREPEM31	3.2963	.9930	81.0
2.	PREPEM32	3.2469	.9291	81.0
3.	PREPEM33	3.2963	.9006	81.0
4.	PREPEM34	3.1852	1.1081	81.0
5.	PREPEM35	3.0494	1.0595	81.0

Covariance Matrix

	PREPEM31	PREPEM32	PREPEM33	PREPEM34	PREPEM35
PREPEM31	.9861				
PREPEM32	.6009	.8633			
PREPEM33	.4111	.4509	.8111		
PREPEM34	.7319	.6662	.4444	1.2278	
PREPEM35	.6227	.7377	.4602	.8532	1.1225

Correlation Matrix

	PREPEM31	PREPEM32	PREPEM33	PREPEM34	PREPEM35
PREPEM31	1.0000				
PREPEM32	.6513	1.0000			
PREPEM33	.4597	.5389	1.0000		
PREPEM34	.6652	.6471	.4454	1.0000	
PREPEM35	.5918	.7493	.4823	.7268	1.0000

N of Cases = 81.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	16.0741	16.9694	4.1194	5

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.2148	3.0494	3.2963	.2469	1.0810	.0106

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	1.0022	.8111	1.2278	.4167	1.5137	.0304

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5979	.4111	.8532	.4421	2.0755	.0218

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5958	.4454	.7493	.3040	1.6825	.0114

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PREPEM31	12.7778	11.2500	.7106	.5331	.8563
PREPEM32	12.8272	11.1948	.7899	.6498	.8393
PREPEM33	12.7778	12.6250	.5521	.3205	.8898
PREPEM34	12.8889	10.3500	.7562	.6160	.8460
PREPEM35	13.0247	10.4994	.7788	.6643	.8396

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	271.5111	80	3.3939		
Within People	132.8000	324	.4099		
Between Measures	3.4469	4	.8617	2.1318	.0767
Residual	129.3531	320	.4042		
Total	404.3111	404	1.0008		
Grand Mean	3.2148				

Reliability Coefficients 5 items

Alpha = .8809 Standardized item alpha = .8805

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Reliability analysis of pre-test of Physical Emotional Management (PEM)

Goal 4

		Mean	Std Dev	Cases
1.	PREPEM41	2.7108	1.0064	83.0
2.	PREPEM42	3.2289	.9150	83.0
3.	PREPEM43	3.3494	.9296	83.0
4.	PREPEM44	2.7952	1.0793	83.0
5.	PREPEM45	2.8554	1.0375	83.0

Covariance Matrix

	PREPEM41	PREPEM42	PREPEM43	PREPEM44	PREPEM45
PREPEM41	1.0129				

PREPEM42	.4816	.8372			
PREPEM43	.4681	.5776	.8642		
PREPEM44	.7327	.6450	.5359	1.1649	
PREPEM45	.5918	.5823	.4658	.8237	1.0764

Correlation Matrix

	PREPEM41	PREPEM42	PREPEM43	PREPEM44	PREPEM45
PREPEM41	1.0000				
PREPEM42	.5230	1.0000			
PREPEM43	.5003	.6790	1.0000		
PREPEM44	.6746	.6532	.5341	1.0000	
PREPEM45	.5668	.6134	.4829	.7356	1.0000

N of Cases = 83.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	14.9398	16.7646	4.0945	5

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	2.9880	2.7108	3.3494	.6386	1.2356	.0801

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.9911	.8372	1.1649	.3277	1.3914	.0194

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5904	.4658	.8237	.3579	1.7685	.0130

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5963	.4829	.7356	.2527	1.5233	.0072

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PREPEM41	12.2289	11.2031	.6751	.4889	.8641
PREPEM42	11.7108	11.3544	.7416	.5979	.8497
PREPEM43	11.5904	11.8058	.6409	.4915	.8713
PREPEM44	12.1446	10.1252	.7970	.6711	.8341
PREPEM45	12.0843	10.7611	.7238	.5769	.8527

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	274.9398	82	3.3529		
Within People	158.0000	332	.4759		
Between Measures	26.5783	4	6.6446	16.5834	.0000
Residual	131.4217	328	.4007		
Total	432.9398	414	1.0457		
Grand Mean	2.9880				

Reliability Coefficients 5 items

Alpha = .8805 Standardized item alpha = .8807

Reliability analysis for post-test of Physical Emotional Management (PEM)

Goal 1

		Mean	Std Dev	Cases
1.	POPEM11	3.4878	.8351	82.0
2.	POPEM12	3.6098	.9396	82.0
3.	POPEM13	3.5976	.8729	82.0
4.	POPEM14	3.2317	.9597	82.0
5.	POPEM15	3.0610	1.0226	82.0

Covariance Matrix

	POPEM11	POPEM12	POPEM13	POPEM14	POPEM15
POPEM11	.6974				
POPEM12	.4149	.8829			
POPEM13	.2234	.3472	.7620		
POPEM14	.4782	.3631	.2672	.9210	
POPEM15	.3526	.5056	.2718	.5042	1.0456

Correlation Matrix

	POPEM11	POPEM12	POPEM13	POPEM14	POPEM15
POPEM11	1.0000				
POPEM12	.5288	1.0000			
POPEM13	.3065	.4233	1.0000		
POPEM14	.5967	.4027	.3190	1.0000	
POPEM15	.4129	.5262	.3045	.5138	1.0000

N of Cases = 82.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	16.9878	11.7653	3.4301	5

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.3976	3.0610	3.6098	.5488	1.1793	.0585

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.8618	.6974	1.0456	.3482	1.4994	.0187

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.3728	.2234	.5056	.2821	2.2628	.0097

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4334	.3045	.5967	.2922	1.9598	.0103

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
POPEM11	13.5000	8.1296	.6170	.4557	.7410
POPEM12	13.3780	7.6207	.6287	.4394	.7339
POPEM13	13.3902	8.7841	.4289	.2072	.7950
POPEM14	13.7561	7.6188	.6088	.4510	.7404
POPEM15	13.9268	7.4514	.5854	.3867	.7494

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	190.5976	81	2.3531		
Within People	177.6000	328	.5415		
Between Measures	19.1854	4	4.7963	9.8098	.0000
Residual	158.4146	324	.4889		
Total	368.1976	409	.9002		
Grand Mean	3.3976				

Reliability Coefficients 5 items

Alpha = .7922 Standardized item alpha = .7928

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Reliability analysis of post test -Physical Emotional Management (PEM)
Goal 2

		Mean	Std Dev	Cases
1.	POPEM21	3.2683	.9564	82.0
2.	POPEM22	3.3049	.9255	82.0
3.	POPEM23	3.5488	.9316	82.0
4.	POPEM24	3.0976	1.0014	82.0
5.	POPEM25	2.9756	.9810	82.0

Covariance Matrix

	POPEM21	POPEM22	POPEM23	POPEM24	POPEM25
POPEM21	.9148				
POPEM22	.5592	.8565			
POPEM23	.4312	.5343	.8680		
POPEM24	.5908	.5131	.4396	1.0027	
POPEM25	.5992	.6125	.4333	.7061	.9624

Correlation Matrix

	POPEM21	POPEM22	POPEM23	POPEM24	POPEM25
POPEM21	1.0000				
POPEM22	.6317	1.0000			
POPEM23	.4839	.6197	1.0000		
POPEM24	.6169	.5537	.4712	1.0000	
POPEM25	.6386	.6746	.4741	.7188	1.0000

N of Cases = 82.0

Statistics for	Mean	Variance	Std Dev	N of Variables
Scale	16.1951	15.4429	3.9298	5

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.2390	2.9756	3.5488	.5732	1.1926	.0476

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.9209	.8565	1.0027	.1462	1.1707	.0038

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5419	.4312	.7061	.2749	1.6376	.0077

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5883	.4712	.7188	.2476	1.5254	.0073

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
POPEM21	12.9268	10.1674	.7149	.5223	.8495
POPEM22	12.8902	10.1483	.7527	.6025	.8409
POPEM23	12.6463	10.8981	.5978	.4120	.8762
POPEM24	13.0976	9.9410	.7125	.5685	.8503
POPEM25	13.2195	9.7784	.7664	.6401	.8367

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	250.1756	81	3.0886		
Within People	138.4000	328	.4220		
Between Measures	15.6244	4	3.9061	10.3080	.0000
Residual	122.7756	324	.3789		
Total	388.5756	409	.9501		
Grand Mean	3.2390				

Reliability Coefficients 5 items

Alpha = .8773 Standardized item alpha = .8772

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Reliability analysis of post test -Physical Emotional Management (PEM)

Goal 3

		Mean	Std Dev	Cases
1.	POPEM31	3.4268	.9167	82.0
2.	POPEM32	3.4634	.9454	82.0
3.	POPEM33	3.5732	.9167	82.0
4.	POPEM34	3.3049	.9899	82.0
5.	POPEM35	3.0610	.9981	82.0

Covariance Matrix

	POPEM31	POPEM32	POPEM33	POPEM34	POPEM35
POPEM31	.8403				
POPEM32	.4911	.8937			
POPEM33	.2462	.4348	.8403		
POPEM34	.5843	.3014	.1935	.9800	
POPEM35	.5786	.5146	.2486	.5985	.9962

Correlation Matrix

	POPEM31	POPEM32	POPEM33	POPEM34	POPEM35
POPEM31	1.0000				
POPEM32	.5667	1.0000			
POPEM33	.2930	.5018	1.0000		
POPEM34	.6439	.3221	.2132	1.0000	
POPEM35	.6324	.5454	.2717	.6057	1.0000

N of Cases = 82.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	16.8293	12.9335	3.5963	5

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.3659	3.0610	3.5732	.5122	1.1673	.0382

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.9101	.8403	.9962	.1560	1.1856	.0056

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4192	.1935	.5985	.4050	3.0934	.0235

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4596	.2132	.6439	.4307	3.0202	.0262

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
POPEM31	13.4024	8.2928	.7198	.5799	.7368
POPEM32	13.3659	8.5559	.6299	.5057	.7635
POPEM33	13.2561	9.8472	.3904	.2565	.8310
POPEM34	13.5244	8.5982	.5780	.5010	.7797
POPEM35	13.7683	8.0568	.6848	.5280	.7451

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	209.5220	81	2.5867		
Within People	171.6000	328	.5232		
Between Measures	12.5366	4	3.1341	6.3840	.0001
Residual	159.0634	324	.4909		
Total	381.1220	409	.9318		
Grand Mean	3.3659				

Reliability Coefficients 5 items

Alpha = .8102 Standardized item alpha = .8096

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Reliability analysis of post test -Physical Emotional Management (PEM)

Goal 4

		Mean	Std Dev	Cases
1.	POPEM41	2.9024	.9637	82.0
2.	POPEM42	3.4634	.9711	82.0
3.	POPEM43	3.6341	.9231	82.0
4.	POPEM44	3.0610	1.0346	82.0
5.	POPEM45	3.0000	1.0062	82.0

Covariance Matrix

	POPEM41	POPEM42	POPEM43	POPEM44	POPEM45
POPEM41	.9286				
POPEM42	.3791	.9431			
POPEM43	.3466	.6037	.8522		
POPEM44	.4875	.5269	.5164	1.0703	
POPEM45	.6543	.4198	.3457	.6420	1.0123

Correlation Matrix

	POPEM41	POPEM42	POPEM43	POPEM44	POPEM45
POPEM41	1.0000				
POPEM42	.4051	1.0000			
POPEM43	.3896	.6735	1.0000		
POPEM44	.4890	.5245	.5407	1.0000	
POPEM45	.6748	.4296	.3722	.6167	1.0000

N of Cases = 82.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	16.0610	14.6506	3.8276	5

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.2122	2.9024	3.6341	.7317	1.2521	.1012

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.9613	.8522	1.0703	.2182	1.2560	.0070

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4922	.3457	.6543	.3086	1.8929	.0130

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5116	.3722	.6748	.3027	1.8132	.0124

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
POPEM41	13.1585	9.9869	.6132	.4804	.8156
POPEM42	12.5976	9.8484	.6331	.5032	.8103

POPEM43	12.4268	10.1736	.6155	.5086	.8151
POPEM44	13.0000	9.2346	.6911	.5042	.7939
POPEM45	13.0610	9.5148	.6643	.5683	.8016

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	237.3390	81	2.9301		
Within People	185.2000	328	.5646		
Between Measures	33.2098	4	8.3024	17.6984	.0000
Residual	151.9902	324	.4691		
Total	422.5390	409	1.0331		
Grand Mean	3.2122				

Reliability Coefficients 5 items

Alpha = .8399 Standardized item alpha = .8397

Overall Reliability of Physical Emotional Management (PEM) pre-test by using 20 items: 4 Goal & 5 Tactics

		Mean	Std Dev	Cases
1.	PREPEM11	3.2222	.9220	81.0
2.	PREPEM12	3.6173	1.0071	81.0
3.	PREPEM13	3.2099	1.0089	81.0
4.	PREPEM14	2.9753	1.0365	81.0
5.	PREPEM15	3.1605	1.1006	81.0
6.	PREPEM21	3.0494	.9988	81.0
7.	PREPEM22	3.1605	1.0057	81.0
8.	PREPEM23	3.2840	.9251	81.0
9.	PREPEM24	2.9012	1.0909	81.0
10.	PREPEM25	2.9136	1.1202	81.0
11.	PREPEM31	3.2963	.9930	81.0
12.	PREPEM32	3.2469	.9291	81.0
13.	PREPEM33	3.2963	.9006	81.0
14.	PREPEM34	3.1852	1.1081	81.0
15.	PREPEM35	3.0494	1.0595	81.0
16.	PREPEM41	2.7160	.9904	81.0
17.	PREPEM42	3.2469	.9156	81.0
18.	PREPEM43	3.3580	.9395	81.0
19.	PREPEM44	2.8025	1.0888	81.0
20.	PREPEM45	2.8642	1.0459	81.0

Covariance Matrix

	PREPEM11	PREPEM12	PREPEM13	PREPEM14	PREPEM15
PREPEM11	.8500				
PREPEM12	.3611	1.0142			
PREPEM13	.4153	.4938	1.0179		
PREPEM14	.4306	.2779	.4802	1.0744	
PREPEM15	.4514	.4997	.4034	.6290	1.2114
PREPEM21	.4014	.3441	.3395	.5387	.5170
PREPEM22	.2389	.4497	.5409	.5040	.4989
PREPEM23	.2361	.3475	.6147	.4071	.3789
PREPEM24	.4347	.2742	.4335	.8100	.6535
PREPEM25	.4069	.3290	.5684	.6478	.7265
PREPEM31	.4208	.2398	.2745	.2824	.3269
PREPEM32	.2319	.2582	.3475	.3687	.4474
PREPEM33	.2208	.1398	.3495	.3324	.3894
PREPEM34	.2458	.2593	.3606	.4546	.5199
PREPEM35	.2764	.1816	.3645	.3762	.5170
PREPEM41	.3514	.3650	.4478	.3679	.5086
PREPEM42	.4069	.3332	.3100	.3187	.4099
PREPEM43	.3444	.1762	.3614	.2215	.3043
PREPEM44	.3694	.3360	.3545	.5201	.5071
PREPEM45	.4181	.2349	.2789	.5716	.5846

Covariance Matrix

	PREPEM21	PREPEM22	PREPEM23	PREPEM24	PREPEM25
PREPEM21	.9975				
PREPEM22	.6045	1.0114			
PREPEM23	.3858	.5789	.8559		
PREPEM24	.7924	.6285	.4909	1.1901	
PREPEM25	.6668	.8265	.5748	.8039	1.2549
PREPEM31	.6352	.4144	.3648	.5171	.4759
PREPEM32	.5877	.6224	.3665	.5872	.6966
PREPEM33	.4352	.3144	.3898	.5546	.3509
PREPEM34	.6532	.5824	.3968	.6310	.6412
PREPEM35	.7225	.5420	.2983	.6049	.7168
PREPEM41	.4642	.4336	.3566	.4341	.6252
PREPEM42	.4752	.4724	.3040	.3497	.4341
PREPEM43	.3696	.3293	.4596	.3483	.3563
PREPEM44	.5099	.5071	.3818	.5677	.6452
PREPEM45	.6068	.4221	.2640	.6239	.5756

Covariance Matrix (cont.)

	PREPEM31	PREPEM32	PREPEM33	PREPEM34	PREPEM35
PREPEM31	.9861				
PREPEM32	.6009	.8633			
PREPEM33	.4111	.4509	.8111		
PREPEM34	.7319	.6662	.4444	1.2278	
PREPEM35	.6227	.7377	.4602	.8532	1.1225
PREPEM41	.4977	.5210	.2977	.5407	.6017
PREPEM42	.5884	.4633	.3009	.5287	.4377
PREPEM43	.5301	.3855	.4801	.4079	.3821
PREPEM44	.6093	.5494	.3343	.7120	.5849
PREPEM45	.4907	.5215	.4657	.5005	.6318

	PREPEM41	PREPEM42	PREPEM43	PREPEM44	PREPEM45
PREPEM41	.9809				
PREPEM42	.4710	.8383			
PREPEM43	.4779	.5855	.8827		
PREPEM44	.7682	.6619	.5466	1.1855	
PREPEM45	.6235	.5965	.4742	.8353	1.0938

Correlation Matrix

	PREPEM11	PREPEM12	PREPEM13	PREPEM14	PREPEM15
PREPEM11	1.0000				
PREPEM12	.3889	1.0000			
PREPEM13	.4465	.4860	1.0000		
PREPEM14	.4505	.2663	.4592	1.0000	
PREPEM15	.4448	.4508	.3633	.5514	1.0000
PREPEM21	.4359	.3421	.3369	.5204	.4703
PREPEM22	.2576	.4440	.5331	.4835	.4507
PREPEM23	.2768	.3730	.6585	.4245	.3721
PREPEM24	.4322	.2496	.3938	.7164	.5443
PREPEM25	.3940	.2916	.5029	.5579	.5893
PREPEM31	.4597	.2398	.2740	.2744	.2990
PREPEM32	.2708	.2759	.3707	.3828	.4375
PREPEM33	.2660	.1542	.3847	.3561	.3928
PREPEM34	.2406	.2323	.3226	.3958	.4263
PREPEM35	.2830	.1702	.3410	.3426	.4433
PREPEM41	.3848	.3659	.4482	.3584	.4666
PREPEM42	.4821	.3613	.3356	.3358	.4067
PREPEM43	.3976	.1863	.3813	.2274	.2943
PREPEM44	.3680	.3064	.3227	.4608	.4232
PREPEM45	.4336	.2230	.2643	.5273	.5078

	PREPEM21	PREPEM22	PREPEM23	PREPEM24	PREPEM25
PREPEM21	1.0000				
PREPEM22	.6018	1.0000			
PREPEM23	.4175	.6222	1.0000		
PREPEM24	.7273	.5729	.4864	1.0000	
PREPEM25	.5960	.7336	.5547	.6578	1.0000
PREPEM31	.6404	.4149	.3971	.4774	.4278
PREPEM32	.6333	.6661	.4264	.5793	.6693
PREPEM33	.4838	.3471	.4679	.5645	.3478
PREPEM34	.5903	.5226	.3870	.5220	.5166
PREPEM35	.6828	.5086	.3043	.5234	.6039
PREPEM41	.4693	.4354	.3892	.4018	.5635
PREPEM42	.5196	.5130	.3589	.3501	.4232
PREPEM43	.3939	.3485	.5287	.3398	.3386
PREPEM44	.4689	.4631	.3790	.4780	.5290
PREPEM45	.5809	.4013	.2729	.5468	.4913

Correlation Matrix

	PREPEM31	PREPEM32	PREPEM33	PREPEM34	PREPEM35
PREPEM31	1.0000				
PREPEM32	.6513	1.0000			
PREPEM33	.4597	.5389	1.0000		
PREPEM34	.6652	.6471	.4454	1.0000	
PREPEM35	.5918	.7493	.4823	.7268	1.0000
PREPEM41	.5060	.5662	.3337	.4927	.5734
PREPEM42	.6472	.5446	.3649	.5211	.4512
PREPEM43	.5682	.4416	.5674	.3918	.3839
PREPEM44	.5635	.5431	.3409	.5902	.5070
PREPEM45	.4725	.5366	.4945	.4319	.5702

	PREPEM41	PREPEM42	PREPEM43	PREPEM44	PREPEM45
PREPEM41	1.0000				
PREPEM42	.5194	1.0000			
PREPEM43	.5136	.6806	1.0000		
PREPEM44	.7124	.6640	.5343	1.0000	
PREPEM45	.6019	.6229	.4826	.7336	1.0000

N of Cases = 81.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	62.5556	198.1250	14.0757	20

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.1278	2.7160	3.6173	.9012	1.3318	.0474

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	1.0235	.8111	1.2549	.4438	1.5472	.0205

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4675	.1398	.8532	.7134	6.1026	.0213

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4566	.1542	.7493	.5952	4.8610	.0160

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PREPEM11	59.3333	183.9500	.5328	.5745	.9430
PREPEM12	58.9383	185.3086	.4304	.5195	.9447
PREPEM13	59.3457	181.6290	.5692	.6556	.9425
PREPEM14	59.5802	179.9716	.6141	.6623	.9418
PREPEM15	59.3951	178.3670	.6309	.5885	.9416
PREPEM21	59.5062	177.0281	.7563	.7566	.9394
PREPEM22	59.3951	178.0920	.7086	.7561	.9402
PREPEM23	59.2716	182.0753	.6086	.6889	.9418
PREPEM24	59.6543	175.8540	.7286	.7766	.9398
PREPEM25	59.6420	174.7327	.7475	.7611	.9395
PREPEM31	59.2593	179.0694	.6799	.7396	.9407
PREPEM32	59.3086	178.4410	.7582	.7653	.9396
PREPEM33	59.2593	183.0694	.5845	.6436	.9422
PREPEM34	59.3704	176.6361	.6879	.7264	.9406
PREPEM35	59.5062	177.1781	.7029	.7843	.9403
PREPEM41	59.8395	178.8364	.6911	.6698	.9405
PREPEM42	59.3086	180.3910	.6870	.7663	.9407
PREPEM43	59.1975	182.1605	.5947	.7132	.9421
PREPEM44	59.7531	176.3383	.7124	.7747	.9401
PREPEM45	59.6914	177.5910	.6974	.7640	.9404

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	792.5000	80	9.9063		
Within People	918.0500	1539	.5965		
Between Measures	72.9698	19	3.8405	6.9077	.0000
Residual	845.0802	1520	.5560		
Total	1710.5500	1619	1.0565		
Grand Mean	3.1278				

Reliability Coefficients 20 items

Alpha = .9439 Standardized item alpha = .9438

Overall Reliability of PEM
Reliability analyses for Physical Emotional Management (PEM) post-test by using 20 items

		Mean	Std Dev	Cases
1.	POPEM11	3.4878	.8351	82.0
2.	POPEM12	3.6098	.9396	82.0
3.	POPEM13	3.5976	.8729	82.0
4.	POPEM14	3.2317	.9597	82.0
5.	POPEM15	3.0610	1.0226	82.0
6.	POPEM21	3.2683	.9564	82.0
7.	POPEM22	3.3049	.9255	82.0
8.	POPEM23	3.5488	.9316	82.0
9.	POPEM24	3.0976	1.0014	82.0
10.	POPEM25	2.9756	.9810	82.0
11.	POPEM31	3.4268	.9167	82.0
12.	POPEM32	3.4634	.9454	82.0
13.	POPEM33	3.5732	.9167	82.0
14.	POPEM34	3.3049	.9899	82.0
15.	POPEM35	3.0610	.9981	82.0
16.	POPEM41	2.9024	.9637	82.0
17.	POPEM42	3.4634	.9711	82.0
18.	POPEM43	3.6341	.9231	82.0
19.	POPEM44	3.0610	1.0346	82.0
20.	POPEM45	3.0000	1.0062	82.0

Covariance Matrix

	POPEM11	POPEM12	POPEM13	POPEM14	POPEM15
POPEM11	.6974				
POPEM12	.4149	.8829			
POPEM13	.2234	.3472	.7620		
POPEM14	.4782	.3631	.2672	.9210	
POPEM15	.3526	.5056	.2718	.5042	1.0456
POPEM21	.2255	.3035	.2945	.2334	.4155
POPEM22	.0593	.3056	.2724	.2001	.3145
POPEM23	.2105	.3279	.3964	.2046	.1760
POPEM24	.2111	.2855	.2373	.3351	.5125
POPEM25	.1478	.3854	.2370	.3637	.5694
POPEM31	.2707	.4279	.2603	.3443	.3317
POPEM32	.2033	.4670	.4357	.3234	.3788
POPEM33	.1367	.1647	.4064	.1989	.2239
POPEM34	.2445	.3180	.2477	.3112	.2775
POPEM35	.0687	.3945	.2841	.1338	.4036
POPEM41	.1223	.2824	.2072	.1463	.2653
POPEM42	.1168	.2818	.2011	.2370	.2677
POPEM43	.1313	.2011	.2337	.1722	.1460
POPEM44	.1798	.3080	.2100	.2943	.3666
POPEM45	.0123	.2469	.0988	.2222	.3580

Covariance Matrix

	POPEM21	POPEM22	POPEM23	POPEM24	POPEM25
POPEM21	.9148				
POPEM22	.5592	.8565			
POPEM23	.4312	.5343	.8680		
POPEM24	.5908	.5131	.4396	1.0027	
POPEM25	.5992	.6125	.4333	.7061	.9624
POPEM31	.3285	.2139	.2197	.4146	.3933
POPEM32	.3556	.4866	.3722	.2629	.4435
POPEM33	.3752	.3046	.4223	.2150	.2858
POPEM34	.2629	.1775	.2133	.4390	.3285
POPEM35	.2674	.3392	.1143	.3397	.4583
POPEM41	.1746	.2647	.1900	.3553	.3433
POPEM42	.2569	.3508	.3969	.3123	.3077
POPEM43	.1981	.2240	.4625	.2337	.1885
POPEM44	.2550	.2157	.2501	.4014	.3101
POPEM45	.2593	.3457	.2963	.5062	.4815

	POPEM31	POPEM32	POPEM33	POPEM34	POPEM35
POPEM31	.8403				
POPEM32	.4911	.8937			
POPEM33	.2462	.4348	.8403		
POPEM34	.5843	.3014	.1935	.9800	
POPEM35	.5786	.5146	.2486	.5985	.9962
POPEM41	.4002	.3174	.2294	.2523	.4752
POPEM42	.4294	.4863	.2867	.3631	.2924
POPEM43	.3927	.3815	.4592	.3104	.2572
POPEM44	.4304	.3171	.2239	.5367	.3913
POPEM45	.3951	.2840	.1481	.3333	.4198

	POPEM41	POPEM42	POPEM43	POPEM44	POPEM45
POPEM41	.9286				
POPEM42	.3791	.9431			
POPEM43	.3466	.6037	.8522		
POPEM44	.4875	.5269	.5164	1.0703	
POPEM45	.6543	.4198	.3457	.6420	1.0123

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Correlation Matrix

	POPEM11	POPEM12	POPEM13	POPEM14	POPEM15
POPEM11	1.0000				
POPEM12	.5288	1.0000			
POPEM13	.3065	.4233	1.0000		
POPEM14	.5967	.4027	.3190	1.0000	
POPEM15	.4129	.5262	.3045	.5138	1.0000
POPEM21	.2824	.3377	.3527	.2542	.4249
POPEM22	.0768	.3515	.3371	.2253	.3323
POPEM23	.2705	.3746	.4875	.2288	.1847
POPEM24	.2524	.3034	.2715	.3488	.5005
POPEM25	.1805	.4181	.2767	.3864	.5676
POPEM31	.3536	.4968	.3253	.3914	.3539
POPEM32	.2575	.5258	.5280	.3565	.3919
POPEM33	.1786	.1912	.5078	.2261	.2388
POPEM34	.2958	.3419	.2866	.3276	.2741
POPEM35	.0824	.4206	.3261	.1397	.3955
POPEM41	.1519	.3119	.2463	.1582	.2692
POPEM42	.1441	.3089	.2373	.2543	.2696
POPEM43	.1703	.2319	.2900	.1944	.1547
POPEM44	.2081	.3169	.2326	.2965	.3465
POPEM45	.0147	.2612	.1125	.2301	.3480

	POPEM21	POPEM22	POPEM23	POPEM24	POPEM25
POPEM21	1.0000				
POPEM22	.6317	1.0000			
POPEM23	.4839	.6197	1.0000		
POPEM24	.6169	.5537	.4712	1.0000	
POPEM25	.6386	.6746	.4741	.7188	1.0000
POPEM31	.3747	.2522	.2572	.4517	.4373
POPEM32	.3933	.5562	.4226	.2777	.4783
POPEM33	.4279	.3590	.4945	.2342	.3178
POPEM34	.2776	.1937	.2313	.4429	.3383
POPEM35	.2801	.3672	.1229	.3398	.4681
POPEM41	.1895	.2968	.2116	.3682	.3631
POPEM42	.2765	.3903	.4387	.3211	.3230
POPEM43	.2244	.2622	.5378	.2528	.2082
POPEM44	.2578	.2253	.2595	.3875	.3056
POPEM45	.2694	.3712	.3161	.5024	.4878

	POPEM31	POPEM32	POPEM33	POPEM34	POPEM35
POPEM31	1.0000				
POPEM32	.5667	1.0000			
POPEM33	.2930	.5018	1.0000		
POPEM34	.6439	.3221	.2132	1.0000	
POPEM35	.6324	.5454	.2717	.6057	1.0000
POPEM41	.4530	.3484	.2598	.2645	.4940
POPEM42	.4824	.5297	.3220	.3777	.3016
POPEM43	.4640	.4372	.5427	.3397	.2791
POPEM44	.4539	.3242	.2361	.5241	.3789
POPEM45	.4283	.2985	.1606	.3347	.4180

	POPEM41	POPEM42	POPEM43	POPEM44	POPEM45
POPEM41	1.0000				
POPEM42	.4051	1.0000			
POPEM43	.3896	.6735	1.0000		
POPEM44	.4890	.5245	.5407	1.0000	
POPEM45	.6748	.4296	.3722	.6167	1.0000

N of Cases = 82.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	66.0732	143.2291	11.9678	20

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.3037	2.9024	3.6341	.7317	1.2521	.0583

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.9135	.6974	1.0703	.3729	1.5348	.0087

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.3288	.0123	.7061	.6938	57.1951	.0167

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.3591	.0147	.7188	.7041	48.9217	.0183

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
POPEM11	62.5854	134.9124	.3928	.6304	.9181
POPEM12	62.4634	129.6838	.5917	.5921	.9140
POPEM13	62.4756	132.2031	.5113	.5396	.9158
POPEM14	62.8415	131.6412	.4844	.5828	.9164
POPEM15	63.0122	128.9011	.5720	.6175	.9145
POPEM21	62.8049	129.5417	.5867	.6409	.9141
POPEM22	62.7683	129.7852	.5969	.7408	.9139
POPEM23	62.5244	130.1784	.5731	.7505	.9144
POPEM24	62.9756	127.6043	.6463	.7050	.9127
POPEM25	63.0976	127.0768	.6868	.7437	.9118
POPEM31	62.6463	128.0833	.6895	.7212	.9119
POPEM32	62.6098	127.8211	.6790	.7121	.9121
POPEM33	62.5000	131.9815	.4941	.5744	.9162
POPEM34	62.7683	129.6617	.5583	.6734	.9148
POPEM35	63.0122	129.0739	.5802	.7417	.9143
POPEM41	63.1707	130.5137	.5353	.6358	.9153
POPEM42	62.6098	129.2532	.5902	.6195	.9141
POPEM43	62.4390	130.7678	.5499	.7174	.9150
POPEM44	63.0122	128.4319	.5854	.6240	.9142
POPEM45	63.0732	129.2785	.5655	.7001	.9146

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	580.0780	81	7.1615		
Within People	990.7000	1558	.6359		
Between Measures	90.9000	19	4.7842	8.1828	.0000
Residual	899.8000	1539	.5847		
Total	1570.7780	1639	.9584		
Grand Mean	3.3037				

Reliability Coefficients 20 items

Alpha = .9184 Standardized item alpha = .9181

Overall reliability of pre-test of Physical Emotional Management (PEM) pretest of sums of each goal (Goal 1-4)

		Mean	Std Dev	Cases
1.	S1PEM1	16.1852	3.7487	81.0
2.	S1PEM2	16.1728	9.1225	81.0
3.	S1PEM3	16.0741	4.1194	81.0
4.	S1PEM4	14.9877	4.1307	81.0

Covariance Matrix

	S1PEM1	S1PEM2	S1PEM3	S1PEM4
S1PEM1	14.0528			
S1PEM2	12.3551	83.2198		
S1PEM3	8.1861	13.9120	16.9694	
S1PEM4	9.4023	13.0772	12.3634	17.0623

Correlation Matrix

	S1PEM1	S1PEM2	S1PEM3	S1PEM4
S1PEM1	1.0000			
S1PEM2	.3613	1.0000		
S1PEM3	.5301	.3702	1.0000	
S1PEM4	.6072	.3470	.7266	1.0000

N of Cases = 81.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	63.4198	269.8966	16.4285	4

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	15.8549	14.9877	16.1852	1.1975	1.0799	.3368

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	32.8261	14.0528	83.2198	69.1670	5.9219	1130.6291

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	11.5494	8.1861	13.9120	5.7259	1.6995	4.5726

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4904	.3470	.7266	.3795	2.0937	.0223

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
S1PEM1	47.2346	195.9568	.5706	.4048	.6025
S1PEM2	47.2469	107.9883	.4150	.1768	.8321
S1PEM3	47.3457	184.0040	.6167	.5516	.5679
S1PEM4	48.4321	183.1485	.6233	.5974	.5643

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	5397.9321	80	67.4742		
Within People	5188.2500	243	21.3508		
Between Measures	81.8364	3	27.2788	1.2821	.2811
Residual	5106.4136	240	21.2767		
Total	10586.1821	323	32.7746		
Grand Mean	15.8549				

Reliability Coefficients 4 items

Alpha = .6847 Standardized item alpha = .793

Overall reliability of pre-test of Physical Emotional Management (PEM) posttest of sums of each goal (Goal 1-4)

		Mean	Std Dev	Cases
1.	S2PEM1	16.9878	3.4301	82.0
2.	S2PEM2	16.1951	3.9298	82.0
3.	S2PEM3	16.8293	3.5963	82.0
4.	S2PEM4	16.0610	3.8276	82.0

Covariance Matrix

	S2PEM1	S2PEM2	S2PEM3	S2PEM4
S2PEM1	11.7653			
S2PEM2	7.2246	15.4429		
S2PEM3	7.2572	8.0337	12.9335	
S2PEM4	5.3094	7.5805	8.8130	14.6506

Correlation Matrix

	S2PEM1	S2PEM2	S2PEM3	S2PEM4
S2PEM1	1.0000			
S2PEM2	.5360	1.0000		
S2PEM3	.5883	.5685	1.0000	
S2PEM4	.4044	.5040	.6402	1.0000

N of Cases = 82.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	66.0732	143.2291	11.9678	4

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	16.5183	16.0610	16.9878	.9268	1.0577	.2102

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	13.6981	11.7653	15.4429	3.6777	1.3126	2.7574

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	7.3697	5.3094	8.8130	3.5036	1.6599	1.2449

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5402	.4044	.6402	.2358	1.5832	.0060

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
S2PEM1	49.0854	91.8815	.6019	.4065	.7976
S2PEM2	49.8780	82.1084	.6414	.4146	.7811
S2PEM3	49.2439	82.0879	.7398	.5611	.7351
S2PEM4	50.0122	85.1727	.6144	.4392	.7931

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	2900.3902	81	35.8073		
Within People	1589.5000	246	6.4614		
Between Measures	51.7195	3	17.2398	2.7242	.0449
Residual	1537.7805	243	6.3283		
Total	4489.8902	327	13.7306		
Grand Mean	16.5183				

Reliability Coefficients 4 items

Alpha = .8233 Standardized item alpha = .8246

APPENDIX H

1/5
1

Factor Analysis of Physical Emotional Management (PEM)

Listwise deletion of cases with missing values

	Mean	Std Dev	Label
S1PEM1	16.18519	3.74870	
S1PEM2	16.17284	9.12249	
S1PEM3	16.07407	4.11940	
S1PEM4	14.98765	4.13066	

Number of Cases = 81

Correlation Matrix:

	S1PEM1	S1PEM2	S1PEM3	S1PEM4
S1PEM1	1.00000			
S1PEM2	.36129	1.00000		
S1PEM3	.53011	.37021	1.00000	
S1PEM4	.60720	.34704	.72658	1.00000

Determinant of Correlation Matrix = .2388371

Inverse of Correlation Matrix:

	S1PEM1	S1PEM2	S1PEM3	S1PEM4
S1PEM1	1.68016			
S1PEM2	-.25364	1.21470		
S1PEM3	-.25305	-.25598	2.22998	
S1PEM4	-.74831	-.08155	-1.37778	2.48375

1-tailed Significance of Correlation Matrix:

' . ' is printed for diagonal elements.

	S1PEM1	S1PEM2	S1PEM3	S1PEM4
S1PEM1	.			
S1PEM2	.00046	.		
S1PEM3	.00000	.00033	.	
S1PEM4	.00000	.00075	.00000	.

Extraction 1 for analysis 1, Principal Components Analysis (PC)

Initial Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
S1PEM1	1.00000	*	1	2.50342	62.6	62.6
S1PEM2	1.00000	*	2	.74622	18.7	81.2
S1PEM3	1.00000	*	3	.48880	12.2	93.5
S1PEM4	1.00000	*	4	.26156	6.5	100.0

PC extracted 1 factors.
Factor Matrix:

	Factor 1
S1PEM1	.80033
S1PEM2	.60488
S1PEM3	.85440
S1PEM4	.87579

Final Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
S1PEM1	.64054	*	1	2.50342	62.6	62.6
S1PEM2	.36588	*				
S1PEM3	.73000	*				
S1PEM4	.76700	*				

Reproduced Correlation Matrix:

	S1PEM1	S1PEM2	S1PEM3	S1PEM4
S1PEM1	.64054*	-.12282	-.15370	-.09372
S1PEM2	.48411	.36588*	-.14660	-.18271
S1PEM3	.68381	.51681	.73000*	-.02169
S1PEM4	.70092	.52975	.74827	.76700*

The lower left triangle contains the reproduced correlation matrix; the diagonal, reproduced communalities; and the upper right triangle residuals between the observed correlations and the reproduced correlations.

There are 5 (83.0%) residuals (above diagonal) with absolute values > 0.05.
VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.

>Warning # 11310
>Only one factor was extracted. The solution cannot be rotated.
Factor Score Coefficient Matrix:

	Factor 1
S1PEM1	.31970
S1PEM2	.24162
S1PEM3	.34129
S1PEM4	.34984

Covariance Matrix for Estimated Regression Factor Scores:
Factor 1

Factor 1	1.00000

Following factor scores will be added to the working file:

Name	Label
FAC1_1	REGR factor score 1 for analysis 1

APPENDIX I

Reliability Analysis Self-awareness (SA)

pretest: Q411-413

		Mean	Std Dev	Cases
1.	PRSA411	3.7738	.7501	84.0
2.	PRSA412	3.5238	.8846	84.0
3.	PRSA413	3.7619	.8158	84.0

Covariance Matrix

	PRSA411	PRSA412	PRSA413
PRSA411	.5627		
PRSA412	.3609	.7826	
PRSA413	.4154	.3913	.6655

Correlation Matrix

	PRSA411	PRSA412	PRSA413
PRSA411	1.0000		
PRSA412	.5438	1.0000	
PRSA413	.6788	.5422	1.0000

N of Cases = 84.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	11.0595	4.3458	2.0847	3

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.6865	3.5238	3.7738	.2500	1.0709	.0199

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.6703	.5627	.7826	.2199	1.3908	.0121

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.3892	.3609	.4154	.0545	1.1510	.0006

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5883	.5422	.6788	.1366	1.2519	.0049

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PRSA411	7.2857	2.2306	.6929	.5045	.7016
PRSA412	7.5357	2.0590	.5925	.3513	.8070
PRSA413	7.2976	2.0670	.6878	.5033	.6984

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	120.2341	83	1.4486		
Within People	50.0000	168	.2976		
Between Measures	3.3413	2	1.6706	5.9437	.0032
Residual	46.6587	166	.2811		
Total	170.2341	251	.6782		
Grand Mean	3.6865				

Reliability Coefficients 3 items
Alpha = .8060 Standardized item alpha = .8108

pretest: Q421-423

		Mean	Std Dev	Cases
1.	PRSA421	3.5181	.8605	83.0
2.	PRSA422	3.5060	.9289	83.0
3.	PRSA423	3.5181	.7548	83.0

Covariance Matrix

	PRSA421	PRSA422	PRSA423
PRSA421	.7405		
PRSA422	.4664	.8628	
PRSA423	.4600	.3932	.5698

Correlation Matrix

	PRSA421	PRSA422	PRSA423
PRSA421	1.0000		
PRSA422	.5834	1.0000	
PRSA423	.7082	.5608	1.0000

N of Cases = 83.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	10.5422	4.8122	2.1937	3

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.5141	3.5060	3.5181	.0120	1.0034	.0000

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.7244	.5698	.8628	.2930	1.5142	.0217

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4399	.3932	.4664	.0732	1.1861	.0013

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.6175	.5608	.7082	.1474	1.2629	.0050

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PRSA421	7.0241	2.2189	.7227	.5522	.7088
PRSA422	7.0361	2.2304	.6196	.3841	.8250
PRSA423	7.0241	2.5360	.7098	.5346	.7356

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	131.5341	82	1.6041		
Within People	46.6667	166	.2811		
Between Measures	.0080	2	.0040	.0141	.9860
Residual	46.6586	164	.2845		
Total	178.2008	248	.7186		
Grand Mean	3.5141				

Reliability Coefficients 3 items
Alpha = .8226 Standardized item alpha = .8288

pretest: Q431-433

		Mean	Std Dev	Cases
1.	PRSA431	4.0714	.8034	84.0
2.	PRSA432	4.0952	.8866	84.0
3.	PRSA433	3.8690	.9022	84.0

Covariance Matrix

	PRSA431	PRSA432	PRSA433
PRSA431	.6454		
PRSA432	.4509	.7860	
PRSA433	.4312	.4705	.8140

Correlation Matrix

	PRSA431	PRSA432	PRSA433
PRSA431	1.0000		
PRSA432	.6331	1.0000	
PRSA433	.5948	.5882	1.0000

N of Cases = 84.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	12.0357	4.9505	2.2250	3

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	4.0119	3.8690	4.0952	.2262	1.0585	.0154

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.7485	.6454	.8140	.1685	1.2611	.0082

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4509	.4312	.4705	.0393	1.0912	.0003

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.6054	.5882	.6331	.0450	1.0764	.0005

Item-total Statistics

Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted

PRSA431	7.9643	2.5409	.6888	.4765	.7406
PRSA432	7.9405	2.3217	.6821	.4701	.7428
PRSA433	8.1667	2.3333	.6542	.4285	.7731

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	136.9643	83	1.6502		
Within People	52.0000	168	.3095		
Between Measures	2.5952	2	1.2976	4.3600	.0143
Residual	49.4048	166	.2976		
Total	188.9643	251	.7528		
Grand Mean	4.0119				

Reliability Coefficients 3 items
Alpha = .8196 Standardized item alpha = .8215

pretest: Q441-442

		Mean	Std Dev	Cases
1.	PRSA441	3.1463	.9179	82.0
2.	PRSA442	3.0122	.8957	82.0

Covariance Matrix

	PRSA441	PRSA442
PRSA441	.8425	
PRSA442	.6649	.8023

Correlation Matrix

	PRSA441	PRSA442
PRSA441	1.0000	
PRSA442	.8087	1.0000

N of Cases = 82.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	6.1585	2.9746	1.7247	2

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.0793	3.0122	3.1463	.1341	1.0445	.0090

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.8224	.8023	.8425	.0402	1.0501	.0008

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.6649	.6649	.6649	.0000	1.0000	.0000

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.8087	.8087	.8087	.0000	1.0000	.0000

Item-total Statistics

Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted

PRSA441	3.0122	.8023	.8087	.6539	.
PRSA442	3.1463	.8425	.8087	.6539	.

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	120.4695	81	1.4873		
Within People	13.5000	82	.1646		
Between Measures	.7378	1	.7378	4.6828	.0334
Residual	12.7622	81	.1576		
Total	133.9695	163	.8219		
Grand Mean	3.0793				

Reliability Coefficients 2 items

Alpha = .8941 Standardized item alpha = .8942

Pretest: Q451-455

		Mean	Std Dev	Cases
1.	PRSA451	3.1310	1.1062	84.0
2.	PRSA452	3.0357	.9371	84.0
3.	PRSA453	3.1905	.9753	84.0
4.	PRSA454	2.4405	.9098	84.0
5.	PRSA455	3.0119	1.1353	84.0

Covariance Matrix

	PRSA451	PRSA452	PRSA453	PRSA454	PRSA455
PRSA451	1.2236				
PRSA452	.7904	.8782			
PRSA453	.9507	.7281	.9512		
PRSA454	.3633	.2853	.2765	.8277	
PRSA455	.6852	.4574	.5640	.5369	1.2890

Correlation Matrix

	PRSA451	PRSA452	PRSA453	PRSA454	PRSA455
PRSA451	1.0000				
PRSA452	.7625	1.0000			
PRSA453	.8812	.7966	1.0000		
PRSA454	.3610	.3346	.3116	1.0000	
PRSA455	.5456	.4299	.5093	.5197	1.0000

N of Cases = 84.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	14.8095	16.4452	4.0553	5

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	2.9619	2.4405	3.1905	.7500	1.3073	.0902

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	1.0340	.8277	1.2890	.4613	1.5573	.0437

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance

.5638	.2765	.9507	.6741	3.4378	.0479

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5452	.3116	.8812	.5695	2.8275	.0391

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PRSA451	11.6786	9.6424	.8121	.7992	.7877
PRSA452	11.7738	11.0446	.7260	.6566	.8152
PRSA453	11.6190	10.4555	.7988	.8162	.7954
PRSA454	12.3690	12.6935	.4510	.2921	.8772
PRSA455	11.7976	10.6694	.6049	.4236	.8484

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	272.9905	83	3.2890		
Within People	186.4000	336	.5548		
Between Measures	30.2952	4	7.5738	16.1078	.0000
Residual	156.1048	332	.4702		
Total	459.3905	419	1.0964		
Grand Mean	2.9619				

Reliability Coefficients 5 items

Alpha = .8570 Standardized item alpha = .8570

pretest: Q461-465

		Mean	Std Dev	Cases
1.	PRSA461	2.5714	.9605	84.0
2.	PRSA462	2.5238	.9629	84.0
3.	PRSA463	2.7857	1.0874	84.0
4.	PRSA464	2.4286	.9853	84.0
5.	PRSA465	3.1071	1.0868	84.0

Covariance Matrix

	PRSA461	PRSA462	PRSA463	PRSA464	PRSA465
PRSA461	.9225				
PRSA462	.6730	.9271			
PRSA463	.8589	.7762	1.1824		
PRSA464	.4509	.5318	.5146	.9707	
PRSA465	.4682	.6179	.6738	.4475	1.1812

Correlation Matrix

	PRSA461	PRSA462	PRSA463	PRSA464	PRSA465
PRSA461	1.0000				
PRSA462	.7277	1.0000			
PRSA463	.8223	.7414	1.0000		
PRSA464	.4765	.5606	.4803	1.0000	
PRSA465	.4485	.5905	.5702	.4179	1.0000

N of Cases = 84.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	13.4167	17.2098	4.1485	5

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	2.6833	2.4286	3.1071	.6786	1.2794	.0732

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	1.0368	.9225	1.1824	.2599	1.2817	.0179

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.6013	.4475	.8589	.4114	1.9192	.0194

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5836	.4179	.8223	.4044	1.9676	.0180

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PRSA461	10.8452	11.3854	.7563	.7157	.8343
PRSA462	10.8929	11.0848	.8107	.6641	.8213
PRSA463	10.6310	10.3802	.8059	.7423	.8193
PRSA464	10.9881	12.3493	.5617	.3354	.8784
PRSA465	10.3095	11.6139	.5960	.4099	.8738

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	285.6833	83	3.4420		
Within People	169.2000	336	.5036		
Between Measures	24.6095	4	6.1524	14.1267	.0000
Residual	144.5905	332	.4355		
Total	454.8833	419	1.0856		
Grand Mean	2.6833				

Reliability Coefficients 5 items

Alpha = .8735 Standardized item alpha = .8751

pretest: Q471-475

		Mean	Std Dev	Cases
1.	PRSA471	2.7711	1.0857	83.0
2.	PRSA472	2.2771	.9148	83.0
3.	PRSA473	2.3253	.8849	83.0
4.	PRSA474	2.2530	.9607	83.0
5.	PRSA475	2.6024	1.1146	83.0

Covariance Matrix

	PRSA471	PRSA472	PRSA473	PRSA474	PRSA475

PRSA471	1.1787				
PRSA472	.4545	.8369			
PRSA473	.4534	.6527	.7831		
PRSA474	.3269	.5632	.5752	.9230	
PRSA475	.4445	.5749	.5943	.5043	1.2424

Correlation Matrix

	PRSA471	PRSA472	PRSA473	PRSA474	PRSA475
PRSA471	1.0000				
PRSA472	.4576	1.0000			
PRSA473	.4719	.8062	1.0000		
PRSA474	.3134	.6408	.6766	1.0000	
PRSA475	.3673	.5638	.6025	.4709	1.0000

N of Cases = 83.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	12.2289	15.2518	3.9054	5

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	2.4458	2.2530	2.7711	.5181	1.2299	.0526

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.9928	.7831	1.2424	.4593	1.5865	.0425

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5144	.3269	.6527	.3257	1.9964	.0087

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5371	.3134	.8062	.4927	2.5721	.0212

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PRSA471	9.4578	10.7147	.4725	.2486	.8623
PRSA472	9.9518	9.9245	.7791	.6801	.7788
PRSA473	9.9036	9.9174	.8166	.7225	.7712
PRSA474	9.9759	10.3897	.6360	.4879	.8147
PRSA475	9.6265	9.7734	.6078	.3899	.8256

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	250.1301	82	3.0504		
Within People	174.4000	332	.5253		
Between Measures	17.4699	4	4.3675	9.1285	.0000
Residual	156.9301	328	.4784		
Total	424.5301	414	1.0254		
Grand Mean	2.4458				

Reliability Coefficients 5 items

Alpha = .8432 Standardized item alpha = .8530

pretest: Q481-485

		Mean	Std Dev	Cases
1.	PRSA481	2.5000	1.1564	84.0
2.	PRSA482	2.3929	1.0757	84.0
3.	PRSA483	2.4762	1.1245	84.0
4.	PRSA484	2.5000	1.2074	84.0
5.	PRSA485	3.2381	1.3137	84.0

Covariance Matrix

	PRSA481	PRSA482	PRSA483	PRSA484	PRSA485
PRSA481	1.3373				
PRSA482	1.0181	1.1571			
PRSA483	1.1325	1.1239	1.2645		
PRSA484	.8916	.9337	.9157	1.4578	
PRSA485	.9398	.8812	.9816	.9398	1.7258

Correlation Matrix

	PRSA481	PRSA482	PRSA483	PRSA484	PRSA485
PRSA481	1.0000				
PRSA482	.8184	1.0000			
PRSA483	.8709	.9292	1.0000		
PRSA484	.6385	.7189	.6744	1.0000	
PRSA485	.6186	.6236	.6645	.5925	1.0000

N of Cases = 84.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	13.1071	26.4583	5.1438	5

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	2.6214	2.3929	3.2381	.8452	1.3532	.1208

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	1.3885	1.1571	1.7258	.5687	1.4915	.0475

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.9758	.8812	1.1325	.2513	1.2852	.0076

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.7150	.5925	.9292	.3367	1.5683	.0130

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PRSA481	10.6071	17.1571	.8313	.7646	.8977
PRSA482	10.7143	17.3873	.8822	.8797	.8897
PRSA483	10.6310	16.8863	.8989	.9055	.8850
PRSA484	10.6071	17.6390	.7258	.5575	.9187
PRSA485	9.8690	17.2477	.6860	.4855	.9301

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	439.2071	83	5.2917		
Within People	177.6000	336	.5286		
Between Measures	40.5810	4	10.1452	24.5821	.0000
Residual	137.0190	332	.4127		
Total	616.8071	419	1.4721		
Grand Mean	2.6214				

Reliability Coefficients 5 itemsAlpha = .9220 Standardized item alpha = .9262

pretest: Q491-492

		Mean	Std Dev	Cases
1.	PRSA491	3.3333	1.0100	84.0
2.	PRSA492	3.4167	1.0321	84.0

Covariance Matrix

	PRSA491	PRSA492
PRSA491	1.0201	
PRSA492	.4618	1.0653

Correlation Matrix

	PRSA491	PRSA492
PRSA491	1.0000	
PRSA492	.4431	1.0000

N of Cases = 84.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	6.7500	3.0090	1.7347	2

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.3750	3.3333	3.4167	.0833	1.0250	.0035

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	1.0427	1.0201	1.0653	.0452	1.0443	.0010

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4618	.4618	.4618	.0000	1.0000	.0000

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4431	.4431	.4431	.0000	1.0000	.0000

Item-total Statistics

	Scale Mean if Item	Scale Variance if Item	Corrected Item-Total	Squared Multiple	Alpha if Item

	Deleted	Deleted	Correlation	Correlation	Deleted
PRSA491	3.4167	1.0653	.4431	.1963	.
PRSA492	3.3333	1.0201	.4431	.1963	.

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	124.8750	83	1.5045		
Within People	48.5000	84	.5774		
Between Measures	.2917	1	.2917	.5022	.4805
Residual	48.2083	83	.5808		
Total	173.3750	167	1.0382		
Grand Mean	3.3750				

Reliability Coefficients 2 items
Alpha = .6139 Standardized item alpha = .614

pretest: Q 4101-4106

		Mean	Std Dev	Cases
1.	PRSA4101	3.3951	1.1584	81.0
2.	PRSA4102	2.4815	1.0382	81.0
3.	PRSA4103	2.6296	1.0775	81.0
4.	PRSA4104	3.1358	1.1484	81.0
5.	PRSA4105	3.8148	3.4355	81.0
6.	PRSA4106	2.7654	1.1861	81.0

Covariance Matrix

	PRSA4101	PRSA4102	PRSA4103	PRSA4104	PRSA4105
PRSA4101	1.3420				
PRSA4102	.1949	1.0778			
PRSA4103	.0106	.4056	1.1611		
PRSA4104	.1457	.5838	.4384	1.3188	
PRSA4105	-.0384	.1653	.3431	.2755	11.8028
PRSA4106	.0938	.5894	.2370	.5948	.5310

	PRSA4106
PRSA4106	1.4068

Correlation Matrix

	PRSA4101	PRSA4102	PRSA4103	PRSA4104	PRSA4105
PRSA4101	1.0000				
PRSA4102	.1621	1.0000			
PRSA4103	.0085	.3625	1.0000		
PRSA4104	.1095	.4897	.3543	1.0000	
PRSA4105	-.0097	.0463	.0927	.0698	1.0000
PRSA4106	.0683	.4786	.1855	.4366	.1303

	PRSA4106
PRSA4106	1.0000

N of Cases = 81.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	18.2222	27.2500	5.2202	6

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.0370	2.4815	3.8148	1.3333	1.5373	.2583

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.0182	1.0778	11.8028	10.7250	10.9510	18.5354

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.3047	-.0384	.5948	.6332	-15.4779	.0438

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.1990	-.0097	.4897	.4993	-50.7157	.0298

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PRSA4101	14.8272	25.0948	.0701	.0321	.4148
PRSA4102	15.7407	22.2944	.3955	.3760	.2951
PRSA4103	15.5926	23.2194	.2763	.1825	.3376
PRSA4104	15.0864	21.8549	.3796	.3295	.2897
PRSA4105	14.4074	12.8944	.1035	.0238	.6386
PRSA4106	15.4568	21.7512	.3699	.2945	.2901

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	363.3333	80	4.5417		
Within People	1190.0000	405	2.9383		
Between Measures	104.5926	5	20.9185	7.7090	.0000
Residual	1085.4074	400	2.7135		
Total	1553.3333	485	3.2027		
Grand Mean	3.0370				

Reliability Coefficients 6 itets

Alpha = .4025 Standardized item alpha = .5985

Rerun Self-Awareness Test Q4102, 4103, 4104, & 4106
(took off 4101 & 4105)

		Mean	Std Dev	Cases
1.	PRSA4102	2.4815	1.0382	81.0
2.	PRSA4103	2.6296	1.0775	81.0
3.	PRSA4104	3.1358	1.1484	81.0
4.	PRSA4106	2.7654	1.1861	81.0

Covariance Matrix

	PRSA4102	PRSA4103	PRSA4104	PRSA4106
PRSA4102	1.0778			
PRSA4103	.4056	1.1611		
PRSA4104	.5838	.4384	1.3188	
PRSA4106	.5894	.2370	.5948	1.4068

Correlation Matrix

	PRSA4102	PRSA4103	PRSA4104	PRSA4106
PRSA4102	1.0000			
PRSA4103	.3625	1.0000		
PRSA4104	.4897	.3543	1.0000	
PRSA4106	.4786	.1855	.4366	1.0000

N of Cases = 81.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	11.0123	10.6623	3.2653	4

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	2.7531	2.4815	3.1358	.6543	1.2637	.0785

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	1.2411	1.0778	1.4068	.3290	1.3053	.0222

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4748	.2370	.5948	.3577	2.5091	.0186

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.3845	.1855	.4897	.3042	2.6402	.0116

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PRSA4102	8.5309	6.4272	.5998	.3631	.5929
PRSA4103	8.3827	7.3392	.3703	.1743	.7227
PRSA4104	7.8765	6.1096	.5696	.3276	.6049
PRSA4106	8.2469	6.4133	.4731	.2844	.6679

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	213.2469	80	2.6656		
Within People	203.0000	243	.8354		
Between Measures	19.0864	3	6.3621	8.3023	.0000
Residual	183.9136	240	.7663		
Total	416.2469	323	1.2887		
Grand Mean	2.7531				

Reliability Coefficients 4 items

Alpha = .7125 Standardized item alpha = .7142

Overall Reliability analysis of Self-Awareness pretest (s1) by using sums of each item

		Mean	Std Dev	Cases
1.	S1SA41	11.0633	2.1204	79.0
2.	S1SA410B	11.1013	3.2565	79.0
3.	S1SA42	10.6582	2.1655	79.0
4.	S1SA43	12.1139	2.2187	79.0
5.	S1SA45	14.6709	4.1285	79.0
6.	S1SA46	13.4684	4.2361	79.0
7.	S1SA47	12.3038	3.9038	79.0
8.	S1SA48	13.2278	5.1688	79.0
9.	S1SA49	6.7722	1.7537	79.0

Covariance Matrix

	S1SA41	S1SA410B	S1SA42	S1SA43	S1SA45
S1SA41	4.4959				
S1SA410B	1.2884	10.6050			
S1SA42	3.3937	1.3556	4.6894		
S1SA43	3.0953	1.4883	2.8856	4.9228	
S1SA45	3.2134	3.3030	3.6040	3.4226	17.0441
S1SA46	3.6751	4.1827	3.3801	3.0357	10.4253
S1SA47	1.5959	4.6868	1.7462	1.4649	6.2167
S1SA48	3.0880	4.7715	2.6814	4.1404	9.6144
S1SA49	1.2838	1.3182	.9852	1.3212	2.8087

	S1SA46	S1SA47	S1SA48	S1SA49
S1SA46	17.9445			
S1SA47	7.7918	15.2399		
S1SA48	13.3919	6.2760	26.7167	
S1SA49	2.2235	.9547	4.3218	3.0756

Correlation Matrix

	S1SA41	S1SA410B	S1SA42	S1SA43	S1SA45
S1SA41	1.0000				
S1SA410B	.1866	1.0000			
S1SA42	.7391	.1922	1.0000		
S1SA43	.6579	.2060	.6006	1.0000	
S1SA45	.3671	.2457	.4031	.3736	1.0000
S1SA46	.4092	.3032	.3685	.3230	.5961
S1SA47	.1928	.3687	.2066	.1691	.3857
S1SA48	.2818	.2835	.2396	.3610	.4506
S1SA49	.3452	.2308	.2594	.3395	.3879

	S1SA46	S1SA47	S1SA48	S1SA49
S1SA46	1.0000			
S1SA47	.4712	1.0000		
S1SA48	.6116	.3110	1.0000	
S1SA49	.2993	.1395	.4768	1.0000

N of Cases = 79.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	105.3797	373.5975	19.3287	9

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	11.7089	6.7722	14.6709	7.8987	2.1664	5.1195

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	11.6371	3.0756	26.7167	23.6410	8.6866	66.0132

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.7342	.9547	13.3919	12.4372	14.0270	7.7409

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.3551	.1395	.7391	.5997	5.3001	.0210

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
S1SA41	94.3165	327.8345	.5374	.6439	.7934
S1SA410B	94.2785	318.2035	.3855	.1885	.8048
S1SA42	94.7215	328.8445	.5101	.5879	.7952
S1SA43	93.2658	326.9669	.5198	.5055	.7940
S1SA45	90.7089	271.3372	.6265	.4505	.7735
S1SA46	91.9114	259.4408	.7050	.5791	.7605
S1SA47	93.0759	296.8916	.4569	.2964	.7984
S1SA48	92.1519	250.3100	.5905	.4970	.7866
S1SA49	98.6076	340.0876	.4705	.3230	.8012

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	3237.8453	78	41.5108		
Within People	8166.8889	632	12.9223		
Between Measures	3235.4937	8	404.4367	51.1759	.0000
Residual	4931.3952	624	7.9029		
Total	11404.7342	710	16.0630		
Grand Mean	11.7089				

Reliability Coefficients 9 items

Alpha = .8096 Standardized item alpha = .8321

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Overall Reliability analysis of Self-Awareness posttest (s2) by using sums of each item not include 441-442 4101 & 4105 because they had low correlations

		Mean	Std Dev	Cases
1.	S2SA41	11.3704	2.3262	81.0
2.	S2SA410B	12.2963	3.4404	81.0
3.	S2SA42	10.9630	2.3315	81.0
4.	S2SA43	12.2840	2.0990	81.0
5.	S2SA45	15.7284	4.2633	81.0
6.	S2SA46	14.4938	4.0655	81.0
7.	S2SA47	13.7284	3.8891	81.0
8.	S2SA48	14.1481	4.8273	81.0
9.	S2SA49	6.9259	1.8626	81.0

Covariance Matrix

	S2SA41	S2SA410B	S2SA42	S2SA43	S2SA45
S2SA41	5.4111				
S2SA410B	1.6514	11.8361			
S2SA42	4.2389	.7611	5.4361		
S2SA43	3.2810	.6273	3.1856	4.4059	

S2SA45	3.8769	5.3815	3.0023	2.6031	18.1753
S2SA46	2.9648	4.9769	2.7935	1.7830	10.6483
S2SA47	1.7644	4.9315	.8023	.7281	7.4503
S2SA48	1.1819	6.4681	.3806	-.5801	10.8032
S2SA49	.8028	3.5347	.6222	.5088	2.2671

	S2SA46	S2SA47	S2SA48	S2SA49
S2SA46	16.5281			
S2SA47	9.2108	15.1253		
S2SA48	13.7634	9.0407	23.3028	
S2SA49	3.6120	2.6046	4.8486	3.4694

Correlation Matrix

	S2SA41	S2SA410B	S2SA42	S2SA43	S2SA45
S2SA41	1.0000				
S2SA410B	.2063	1.0000			
S2SA42	.7816	.0949	1.0000		
S2SA43	.6720	.0869	.6509	1.0000	
S2SA45	.3909	.3669	.3020	.2909	1.0000
S2SA46	.3135	.3558	.2947	.2089	.6144
S2SA47	.1950	.3686	.0885	.0892	.4493
S2SA48	.1053	.3895	.0338	-.0573	.5249
S2SA49	.1853	.5516	.1433	.1301	.2855

	S2SA46	S2SA47	S2SA48	S2SA49
S2SA46	1.0000			
S2SA47	.5826	1.0000		
S2SA48	.7013	.4816	1.0000	
S2SA49	.4770	.3596	.5392	1.0000

N of Cases = 81.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	111.9383	376.7336	19.4096	9

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	12.4376	6.9259	15.7284	8.8025	2.2709	6.6731

Item Variances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	11.5211	3.4694	23.3028	19.8333	6.7166	51.3826

Inter-item Covariances	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.7923	-.5801	13.7634	14.3435	-23.7263	11.4189

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.3404	-.0573	.7816	.8388	-13.6517	.0443

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
S2SA41	100.5679	331.7985	.4664	.6862	.8043
S2SA410B	99.6420	308.2327	.4691	.3784	.8023
S2SA42	100.9753	339.7244	.3674	.6606	.8123
S2SA43	99.6543	348.0540	.3099	.5288	.8169
S2SA45	96.2099	266.4929	.6614	.4939	.7761
S2SA46	97.4444	260.7000	.7579	.6621	.7608
S2SA47	98.2099	288.5429	.5530	.3933	.7921
S2SA48	97.7901	261.6179	.5879	.6277	.7917
S2SA49	105.0123	335.6623	.5509	.4696	.8016

Analysis of Variance

Source of Variation	Sum of Sq.	DF	Mean Square	F	Prob.
Between People	3348.7435	80	41.8593		
Within People	9270.6667	648	14.3066		
Between Measures	4324.2003	8	540.5250	69.9360	.0000
Residual	4946.4664	640	7.7289		
Total	12619.4102	728	17.3344		
Grand Mean	12.4376				

Reliability Coefficients 9 items

Alpha = .8154 Standardized item alpha = .8228

APPENDIX J

Factor Analysis of SA pretest on the Self-Awareness Test (sum of the scores)

Analysis number 1 Listwise deletion of cases with missing values

	Mean	Std Dev	Label
S1SA41	11.06494	2.14192	
S1SA42	10.63636	2.18794	
S1SA43	12.07792	2.22288	
S1SA44	6.19481	1.73235	
S1SA45	14.76623	4.13552	
S1SA46	13.59740	4.20607	
S1SA47	12.44156	3.85423	
S1SA48	13.44156	5.05885	
S1SA49	6.80519	1.76247	
S1SA410B	11.19481	3.19555	sa(without 1 & 5)

Number of Cases = 77

Correlation Matrix:

	S1SA41	S1SA42	S1SA43	S1SA44	S1SA45	S1SA46	S1SA47
S1SA41	1.00000						
S1SA42	.74072	1.00000					
S1SA43	.65941	.59839	1.00000				
S1SA44	.24123	-.00189	.15660	1.00000			
S1SA45	.37458	.41947	.40135	.19929	1.00000		
S1SA46	.42211	.39137	.35945	.16440	.58455	1.00000	
S1SA47	.20049	.22837	.20326	.06972	.36565	.44697	1.00000
S1SA48	.29118	.26553	.40526	.13119	.43267	.59407	.26992
S1SA49	.35194	.27142	.36329	.15912	.37638	.28215	.11549
S1SA410B	.17883	.20410	.21456	.03822	.23648	.29373	.35615

	S1SA48	S1SA49	S1SA410B
S1SA48	1.00000		
S1SA49	.46578	1.00000	
S1SA410B	.25344	.22643	1.00000

Determinant of Correlation Matrix = .0254016

Inverse of Correlation Matrix:

	S1SA41	S1SA42	S1SA43	S1SA44	S1SA45
S1SA41	3.11022				
S1SA42	-1.69932	2.70216			
S1SA43	-.89496	-.43131	2.08209		
S1SA44	-.57645	.55883	-.03430	1.19912	
S1SA45	.29429	-.44190	-.20512	-.21641	1.82369
S1SA46	-.52613	-.05436	.25334	-.02853	-.71803
S1SA47	.04694	-.04777	-.01766	.00096	-.21403
S1SA48	.29527	.09182	-.46499	.00146	-.01240
S1SA49	-.33874	.09582	-.07600	-.04275	-.33352
S1SA410B	.07478	-.08394	-.08190	.01909	.02438

	S1SA46	S1SA47	S1SA48	S1SA49	S1SA410B
S1SA46	2.30054				
S1SA47	-.42560	1.37778			
S1SA48	-.96285	.01171	1.93201		
S1SA49	.25765	.11556	-.57374	1.47215	
S1SA410B	-.11675	-.33911	-.04999	-.16694	1.22037

1-tailed Significance of Correlation Matrix:

' . ' is printed for diagonal elements.

	S1SA41	S1SA42	S1SA43	S1SA44	S1SA45
S1SA41	.				
S1SA42	.00000	.			
S1SA43	.00000	.00000	.		
S1SA44	.01728	.49348	.08690	.	
S1SA45	.00040	.00007	.00015	.04114	.
S1SA46	.00007	.00022	.00066	.07654	.00000
S1SA47	.04020	.02288	.03811	.27343	.00054
S1SA48	.00510	.00980	.00013	.12771	.00004
S1SA49	.00085	.00848	.00058	.08345	.00037
S1SA410B	.05984	.03750	.03048	.37071	.01920

	S1SA46	S1SA47	S1SA48	S1SA49	S1SA410B
S1SA46	.				
S1SA47	.00002	.			
S1SA48	.00000	.00880	.		
S1SA49	.00646	.15861	.00001	.	
S1SA410B	.00476	.00074	.01307	.02384	.

Extraction 1 for analysis 1, Principal Components Analysis (PC)

Initial Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
S1SA41	1.00000	*	1	3.98900	39.9	39.9
S1SA42	1.00000	*	2	1.28569	12.9	52.7
S1SA43	1.00000	*	3	1.06056	10.6	63.4
S1SA44	1.00000	*	4	.90009	9.0	72.4
S1SA45	1.00000	*	5	.80151	8.0	80.4
S1SA46	1.00000	*	6	.55693	5.6	85.9
S1SA47	1.00000	*	7	.51690	5.2	91.1
S1SA48	1.00000	*	8	.41608	4.2	95.3
S1SA49	1.00000	*	9	.28071	2.8	98.1
S1SA410B	1.00000	*	10	.19252	1.9	100.0

PC extracted 3 factors.

Factor Matrix:

	Factor 1	Factor 2	Factor 3
S1SA41	.74958	-.50297	-.06663
S1SA46	.74914	.31875	.00773
S1SA43	.73559	-.39659	-.05971
S1SA45	.72241	.18173	.09361
S1SA42	.71241	-.45789	-.34960
S1SA48	.67305	.28204	.21919
S1SA49	.57560	-.00877	.34187
S1SA410B	.44033	.42607	-.28786
S1SA47	.49681	.51919	-.30288
S1SA44	.26535	-.02054	.76289

Final Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
S1SA41	.81928	*	1	3.98900	39.9	39.9
S1SA42	.83941	*	2	1.28569	12.9	52.7
S1SA43	.70194	*	3	1.06056	10.6	63.4
S1SA44	.65283	*				
S1SA45	.56366	*				
S1SA46	.66287	*				
S1SA47	.60811	*				
S1SA48	.58059	*				
S1SA49	.44827	*				
S1SA410B	.45829	*				

VARIMAX rotation 1 for extraction 1 in analysis 1 - Kaiser Normalization.

VARIMAX converged in 5 iterations.

Rotated Factor Matrix:

	Factor 1	Factor 2	Factor 3
S1SA42	.89110	.20664	-.05147
S1SA41	.87262	.10261	.21745
S1SA43	.78895	.16969	.22517
S1SA47	.06736	.77624	-.03215
S1SA46	.29450	.67821	.34084
S1SA410B	.08798	.66948	-.04842
S1SA48	.21162	.53616	.49833
S1SA45	.34665	.53379	.39819
S1SA44	-.00532	-.10795	.80072
S1SA49	.31010	.22497	.54908

Factor Transformation Matrix:

	Factor 1	Factor 2	Factor 3
Factor 1	.68489	.59784	.41654
Factor 2	-.67934	.73064	.06834
Factor 3	-.26348	-.32978	.90654

Factor Score Coefficient Matrix:

	Factor 1	Factor 2	Factor 3
S1SA41	.41101	-.15277	-.00542
S1SA42	.45111	-.04474	-.24878
S1SA43	.35069	-.09657	.00469
S1SA44	-.13312	-.20912	.67872
S1SA45	.00476	.18243	.16511
S1SA46	-.04172	.29102	.10178
S1SA47	-.11378	.46368	-.17942
S1SA48	-.08792	.19299	.27263
S1SA49	.01853	-.02502	.35186
S1SA410B	-.07801	.39763	-.17743

Covariance Matrix for Estimated Regression Factor Scores:

	Factor 1	Factor 2	Factor 3
Factor 1	1.00000		
Factor 2	.00000	1.00000	
Factor 3	.00000	.00000	1.00000

APPENDIX K

Mean change in standard scores, Self impact correlation, and Standard score standard deviation of gain

Nia
Spielberger's Trait Anxiety

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = n1.dat
Input values
   Time 1
      Mean =     36.5000
       SD  =     10.4100
      Rel  =  .92
   Time 2
      Mean =     31.7500
       SD  =      8.8100
      Rel  =  .92
   Test retest correlation =  .960
   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =     36.5000
       SD  =      9.9849
   Time 2
      Mean =     31.7500
       SD  =      8.4503
   Test retest correlation =  %1.043
   Sample size N =     8
This analysis corrects for error of measurement.
    The variance in gain scores may or may not be
      evidence of an interaction.  Either all or a large
      portion of the apparent individual differences in gain
      may be caused by error of measurement rather than
      variation in the treatment effect.

    The observed mean gain =    -4.7500
    The standard deviation of observed gain scores      =     3.1459
    The estimated standard deviation of true gain scores =     0.0000
    The reliability of gain scores =  .000

    Using these values and assuming a normal distribution,
      the estimated intervals for individual true gain are --
       68% --     -4.7500  to      -4.7500
       95% --     -4.7500  to      -4.7500

Effect size measures
   Raw score            D =    -4.7500
   Standard score       d =    -0.514
   Treatment correlation r =    -0.249

Size of interaction --
   Raw Score SD       STG =     0.0000
   Standard Score SD    s =     0.0000
   Impact correlation  ir =     0.000
      (correlation of initial level with gain)

Standard errors --
WARNING : This sample data estimates the standard
  deviation of change scores to be 0.  If this is true in the
  population, then the self impact correlation is undefined.
    In any case, estimation of the corrected self impact
   correlation is unstable for this data.  The standard
   error cannot be estimated using current method.

   SE for  D =     1.3373
   SE for  d =     0.247
   SE for  r =     0.1121
   SE for STG =     1.6688
   SE for  s =     0.1804

   t test for mean gain --  t =  -4.27
      Result is in the negative direction.
      Tail probability =  .000
```

```
   The conventional confidence intervals don't work
     for the interaction standard deviation for this
     data.  A point probability at 0 is needed.
   The probability that SD=0 (i.e. no interaction) =  .500
   The significance test for the interaction is NOT significant.


&&&&&&&&&&&&&&&&&&&&&&&&
```

Nia
POMS (Total Disturbance Score)= (ang + dep + ten+ fat+con) - vig

---

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = n2.dat
Input values
   Time 1
      Mean =     27.1300
       SD  =     43.2700
      Rel  =  .92

   Time 2
      Mean =     17.7500
       SD  =     27.1600
      Rel  =  .92

   Test retest correlation =  .620

   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =     27.1300
       SD  =     41.5031

   Time 2
      Mean =     17.7500
       SD  =     26.0510

   Test retest correlation =  .674

   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =    30.7229
   Standard Score SD    s =     0.8867
   Impact correlation  ir =    -0.779
      (correlation of initial level with gain)

&&&&&&&&&&&&&&&&&&&&&&&&
```

Nia
Anger

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = n3.dat
Input values

   Time 1
      Mean =      9.3800
       SD  =     10.5300
      Rel  =  .92
   Time 2
      Mean =      8.7500
       SD  =     10.0300
      Rel  =  .92
   Test retest correlation =  .040

   Sample size N =     8

Corrected basic statistics
   Time 1
      Mean =      9.3800
       SD  =     10.1000
   Time 2
      Mean =      8.7500
       SD  =      9.6204
   Test retest correlation =  .043
   Sample size N =     8
Size of interaction --
```

```
   Raw Score SD       STG =    13.6424
   Standard Score SD    s =     1.3832
   Impact correlation  ir =    -0.710
     (correlation of initial level with gain)

&&&&&&&&&&&&&&&&&&&&&&&&
```

Nia
Depression

```
WITHIN SUBJECTS ANALYSIS RESULTS

  Input disk file name = n4.dat
Input values
   Time 1
      Mean =      9.0000
       SD =      9.8700
      Rel  =  .92

   Time 2
      Mean =      7.2500
       SD =     11.0200
      Rel  =  .92
   Test retest correlation =  .870
   Sample size N =     8

Corrected basic statistics
   Time 1
      Mean =      9.0000
       SD =      9.4670
   Time 2
      Mean =      7.2500
       SD =     10.5700
   Test retest correlation =  .946
   Sample size N =     8

Size of interaction --
   Raw Score SD       STG =     3.4776
   Standard Score SD    s =     0.3466
   Impact correlation  ir =     0.152
     (correlation of initial level with gain)

&&&&&&&&&&&&&&&&&&&&&&&&
```

Nia
Tension

```
WITHIN SUBJECTS ANALYSIS RESULTS

  Input disk file name = n5.dat
Input values
   Time 1
      Mean =      8.6300
       SD =      7.0700
      Rel  =  .90
   Time 2
      Mean =      6.2500
       SD =      3.3700
      Rel  =  .90
   Test retest correlation =  .590
   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =      8.6300
       SD =      6.7072
   Time 2
      Mean =      6.2500
       SD =      3.1971
  Test retest correlation =  .656
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     5.2051
   Standard Score SD    s =     0.9907
   Impact correlation  ir =    -0.886
     (correlation of initial level with gain)

&&&&&&&&&&&&&&&&&&&&&&&&
```

Nia
Fatigue

```
WITHIN SUBJECTS ANALYSIS RESULTS

  Input disk file name = n6.dat
Input values

   Time 1
      Mean =     10.0000
       SD =      7.9800
      Rel  =  .91
   Time 2
      Mean =      7.6300
       SD =      6.7600
      Rel  =  .91
   Test retest correlation =  .780
   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =     10.0000
       SD =      7.6124
   Time 2
      Mean =      7.6300
       SD =      6.4486
   Test retest correlation =  .857
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     3.9217
   Standard Score SD    s  =     0.5559
   Impact correlation  ir  =    -0.532
      (correlation of initial level with gain)

&&&&&&&&&&&&&&&&&&&&&&&&
```

Nia
Confusion

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = n7.dat
Input values
   Time 1
      Mean =      6.7500
       SD =      6.4800
      Rel  =  .83
   Time 2
      Mean =      4.6300
       SD =      4.2100
      Rel  =  .83
   Test retest correlation =  .910
   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =      6.7500
       SD =      5.9036
   Time 2
      Mean =      4.6300
       SD =      3.8355
   Test retest correlation =  %1.096
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     0.0000
   Standard Score SD    s  =     0.0000
   Impact correlation  ir  =     0.000
      (correlation of initial level with gain)

&&&&&&&&&&&&&&&&&&&&&&&&
```

Nia
Vigor

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = n8.dat
Input values
   Time 1
      Mean =     16.6300
       SD =      9.2700
```

```
     Rel  =  .90
   Time 2
     Mean =     16.7500
      SD  =      9.1800
     Rel  =  .90
   Test retest correlation =  .390
   Sample size N =     8
Corrected basic statistics
   Time 1
     Mean =     16.6300
      SD  =      8.7943
   Time 2
     Mean =     16.7500
      SD  =      8.7089
   Test retest correlation =  .433
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     9.3171
   Standard Score SD    s =     1.0646
   Impact correlation  ir =    -0.539
     (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Nia

POMS (ang + dep + ten+ fat+con)

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = n9.dat
Input values
   Time 1
     Mean =     34.5000
      SD  =     25.2000
     Rel  =  .92
   Time 2
     Mean =     43.7500
      SD  =     38.1900
     Rel  =  .92
   Test retest correlation =  .780
   Sample size N =     8
Corrected basic statistics
   Time 1
     Mean =     34.5000
      SD  =     24.1710
   Time 2
     Mean =     43.7500
      SD  =     36.6306
   Test retest correlation =  .848
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =    20.6085
   Standard Score SD    s =     0.6641
   Impact correlation  ir =     0.334
     (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Nia

Physical Emotional Management

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = n10.dat
Input values
   Time 1
     Mean =     60.6300
      SD  =     12.2100
     Rel  =  .89
   Time 2
     Mean =     63.5700
      SD  =     14.5200
     Rel  =  .89
   Test retest correlation =  .830
   Sample size N =     8
Corrected basic statistics
   Time 1
     Mean =     60.6300
      SD  =     11.5189
   Time 2
     Mean =     63.5700
      SD  =     13.6981
   Test retest correlation =  .933
```

```
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     5.1014
   Standard Score SD    s =     0.4031
   Impact correlation  ir =     0.246
      (correlation of initial level with gain)

&&&&&&&&&&&&&&&&&&&&&&&&
```

Nia

Self-awareness - mood (factor 1)

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = n11.dat
Input values
   Time 1
      Mean =     32.5000
       SD  =      4.6900
      Rel  =  .82

   Time 2
      Mean =     34.8600
       SD  =      2.7900
      Rel  =  .82
   Test retest correlation =  .670
   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =     32.5000
       SD  =      4.2470
   Time 2
      Mean =     34.8600
       SD  =      2.5265
   Test retest correlation =  .817
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     2.6241
   Standard Score SD    s =     0.7510
   Impact correlation  ir =    -0.832
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Nia

Self-awareness - tactics (factor 2)

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = N12.DAT
Input values
   Time 1
      Mean =     55.8800
       SD  =     18.0500
      Rel  =  .82
   Time 2
      Mean =     63.5700
       SD  =     10.1100
      Rel  =  .82
   Test retest correlation =  .780
   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =     55.8800
       SD  =     16.3450
   Time 2
      Mean =     63.5700
       SD  =      9.1550
   Test retest correlation =  .951
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     8.1421
   Standard Score SD    s =     0.6146
   Impact correlation  ir =    -0.938
      (correlation of initial level with gain)
```

APPENDIX L

Mean change in standard scores, Self impact correlation, and Standard score standard deviation of gain

Aerobics
Spielberger's Trait Anxiety

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = a1.dat
Input values
   Time 1
      Mean =     38.7900
       SD  =     11.0400
      Rel  =  .92
   Time 2
      Mean =     36.8800
       SD  =      8.5400
      Rel  =  .92
   Test retest correlation =  .830
   Sample size N =    41
Corrected basic statistics
   Time 1
      Mean =     38.7900
       SD  =     10.5892
   Time 2
      Mean =     36.8800
       SD  =      8.1913
   Test retest correlation =  .902
   Sample size N =    41
This analysis corrects for error of measurement.
    The variance in gain scores may or may not be
       evidence of an interaction.  Either all or a large
       portion of the apparent individual differences in gain
       may be caused by error of measurement rather than
       variation in the treatment effect.
    The observed mean gain =    -1.9100
    The standard deviation of observed gain scores      =     6.1892
    The estimated standard deviation of true gain scores =     4.7666
    The reliability of gain scores = .770
    Using these values and assuming a normal distribution,
      the estimated intervals for individual true gain are --
       68% --     -6.6766  to      2.8566
       95% --    -11.2526  to      7.4326

Effect size measures
   Raw score            D =    -1.9100
   Standard score       d =    -0.202
   Treatment correlation r =    -0.100

Size of interaction --
   Raw Score SD       STG =     4.7666
   Standard Score SD    s =     0.5035
   Impact correlation  ir =    -0.671
      (correlation of initial level with gain)

Standard errors --
   SE for  D  =     0.9967
   SE for  d  =     0.112
   SE for  r  =     0.0554
   SE for STG =     0.7491
   SE for  s  =     0.0791
   SE for ir  =     0.1167

   t test for mean gain --  t =  -1.98
      Result is in the negative direction.
      Tail probability =  .028
```

Aerobics
POMS (Total Disturbance Score)= (ang + dep + ten+ fat+con) - vig

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = a2.dat
Input values
   Time 1
      Mean =     29.7800
       SD  =     29.4200
      Rel  =  .92
   Time 2
      Mean =     20.6300
       SD  =     25.2300
      Rel  =  .92
   Test retest correlation =  .780
   Sample size N =    41
Corrected basic statistics
   Time 1
      Mean =     29.7800
       SD  =     28.2187
   Time 2
      Mean =     20.6300
       SD  =     24.1998
   Test retest correlation =  .848
   Sample size N =    41
Size of interaction --
   Raw Score SD       STG =    14.9662
   Standard Score SD    s =     0.5694
   Impact correlation  ir =    -0.515
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Aerobics
Anger

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = a3.dat
Input values
   Time 1
      Mean =      9.8800
       SD  =      7.9100
      Rel  =  .92
   Time 2
      Mean =      7.8300
       SD  =      6.3600
      Rel  =  .92
   Test retest correlation =  .650
   Sample size N =    41
Corrected basic statistics
   Time 1
      Mean =      9.8800
       SD  =      7.5870
   Time 2
      Mean =      7.8300
       SD  =      6.1003
   Test retest correlation =  .707
   Sample size N =    41

      95% --    -12.6732  to       8.5732
Size of interaction --
   Raw Score SD       STG =     5.4200
   Standard Score SD    s =     0.7873
   Impact correlation  ir =    -0.605
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Aerobics
Depression

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = a4.dat
Input values
   Time 1
      Mean =     11.9500
       SD  =     11.4400
      Rel  =  .92
   Time 2
      Mean =      8.3300
       SD  =      7.1800
      Rel  =  .92
   Test retest correlation =  .560
   Sample size N =    41
Corrected basic statistics
   Time 1
      Mean =     11.9500
       SD  =     10.9729
   Time 2
      Mean =      8.3300
       SD  =      6.8868
   Test retest correlation =  .609
   Sample size N =    41
Size of interaction --
   Raw Score SD       STG =     8.7084
   Standard Score SD    s =     0.9506
   Impact correlation  ir =    -0.779
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Aerobics
Tension

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = a5.dat
Input values
   Time 1
      Mean =     11.4500
       SD  =      7.7700
      Rel  =  .90
   Time 2
      Mean =      9.2500
       SD  =      5.6100
      Rel  =  .90
   Test retest correlation =  .670
   Sample size N =    41

Corrected basic statistics

   Time 1
      Mean =     11.4500
       SD  =      7.3713
   Time 2
      Mean =      9.2500
       SD  =      5.3221
   Test retest correlation =  .744
   Sample size N =    41
Size of interaction --
   Raw Score SD       STG =     4.9245
   Standard Score SD    s =     0.7660
   Impact correlation  ir =    -0.692
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Aerobics
Fatigue

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = a6.dat
Input values
   Time 1
      Mean =      8.3200
       SD  =      5.0000
      Rel  =  .91
   Time 2
      Mean =      7.8500
       SD  =      4.7400
      Rel  =  .91
   Test retest correlation =  .720
   Sample size N =    41
Corrected basic statistics
   Time 1
      Mean =      8.3200
       SD  =      4.7697
   Time 2
      Mean =      7.8500
       SD  =      4.5217
   Test retest correlation =  .791
   Sample size N =    41
Size of interaction --
   Raw Score SD        STG =     3.0112
   Standard Score SD    s  =     0.6479
   Impact correlation  ir  =    -0.396
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Aerobics
Confusion

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = a7.dat
Input values
   Time 1
      Mean =      8.0200
       SD  =      4.2000
      Rel  =  .83
   Time 2
      Mean =      7.5000
       SD  =      3.9500
      Rel  =  .83
   Test retest correlation =  .710
   Sample size N =    41
Corrected basic statistics
   Time 1
      Mean =      8.0200
       SD  =      3.8264
   Time 2
      Mean =      7.5000
       SD  =      3.5986
   Test retest correlation =  .855
   Sample size N =    41

Size of interaction --
   Raw Score SD        STG =     2.0084
   Standard Score SD    s  =     0.5407
   Impact correlation  ir  =    -0.372
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Aerobics
Vigor

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = a8.dat
Input values
   Time 1
      Mean =     18.9800
       SD  =      4.6900
      Rel  =  .90
   Time 2
      Mean =     20.1300
       SD  =      4.8300
      Rel  =  .90
   Test retest correlation =  .650
   Sample size N =    41
Corrected basic statistics
   Time 1
      Mean =     18.9800
       SD  =      4.4493
   Time 2
      Mean =     20.1300
       SD  =      4.5821
   Test retest correlation =  .722
   Sample size N =    41
Size of interaction --
   Raw Score SD       STG =     3.3681
   Standard Score SD    s =     0.7458
   Impact correlation  ir =    -0.338
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Aerobics
POMS (ang + dep + ten+ fat+con)

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = a9.dat
Input values
   Time 1
      Mean =     48.7600
       SD  =     27.5400
      Rel  =  .90
   Time 2
      Mean =     40.7500
       SD  =     23.7700
      Rel  =  .90
   Test retest correlation =  .750
  Sample size N =    41
Corrected basic statistics
   Time 1
      Mean =     48.7600
       SD  =     26.1267
   Time 2
      Mean =     40.7500
       SD  =     22.5502
   Test retest correlation =  .833
   Sample size N =    41

Size of interaction --
   Raw Score SD       STG =    14.4630
   Standard Score SD    s =     0.5926
   Impact correlation  ir =    -0.507
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Aerobics
Physical Emotional Management

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = a10.dat
Input values
   Time 1
      Mean =     66.7900
       SD  =     14.8500
      Rel  =  .82
   Time 2
      Mean =     64.1200
       SD  =     10.8100
      Rel  =  .82
   Test retest correlation =  .360
   Sample size N =    41
Corrected basic statistics
   Time 1
      Mean =     66.7900
       SD  =     13.4472
   Time 2
      Mean =     64.1200
       SD  =      9.7889
   Test retest correlation =  .439
   Sample size N =    41
Size of interaction --
   Raw Score SD       STG =    12.6913
   Standard Score SD    s =     1.0791
   Impact correlation  ir =    -0.721
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Aerobics
Self-awareness - mood (factor 1)

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = a11.dat
Input values
   Time 1
      Mean =     35.3200
       SD  =      4.5800
      Rel  =  .82
   Time 2
      Mean =     34.3600
       SD  =      6.7500
      Rel  =  .82
   Test retest correlation =  .140
   Sample size N =    41
Corrected basic statistics
   Time 1
      Mean =     35.3200
       SD  =      4.1474
   Time 2
      Mean =     34.3600
       SD  =      6.1124
   Test retest correlation =  .171
   Sample size N =    41
Size of interaction --
   Raw Score SD       STG =     6.7754
   Standard Score SD    s =     1.2972
   Impact correlation  ir =    -0.458
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Aerobicss
Self-awareness - tactics (factor 2)

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = a12.dat
Input values
   Time 1
      Mean =     70.1300
       SD  =     13.7000
      Rel  =  .82
   Time 2
      Mean =     68.8600
       SD  =     17.1500
      Rel  =  .82
   Test retest correlation =  .480
   Sample size N =    41
Corrected basic statistics
   Time 1
      Mean =     70.1300
       SD  =     12.4059
   Time 2
      Mean =     68.8600
       SD  =     15.5300
   Test retest correlation =  .585
   Sample size N =    41
Size of interaction --
   Raw Score SD        STG =    13.0203
   Standard Score SD     s =     0.9264
   Impact correlation  ir =    -0.255
      (correlation of initial level with gain)
```

APPENDIX M

Mean change in standard scores, Self impact correlation, and Standard score standard deviation of gain

Stretching
Spielberger's Trait Anxiety

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = s1.dat
Input values
   Time 1
      Mean =     45.0000
       SD  =      6.3600
      Rel  =  .92
   Time 2
      Mean =     43.2000
       SD  =      5.7600
      Rel  =  .92
   Test retest correlation =  .940
   Sample size N =     5
corrected basic statistics
   Time 1
      Mean =     45.0000
       SD  =      6.1003
   Time 2
      Mean =     43.2000
       SD  =      5.5248
   Test retest correlation =  %1.022
   Sample size N =     5
This analysis corrects for error of measurement.
     The variance in gain scores may or may not be
       evidence of an interaction.  Either all or a large
       portion of the apparent individual differences in gain
       may be caused by error of measurement rather than
       variation in the treatment effect.
     The observed mean gain =    -1.8000
     The standard deviation of observed gain scores      =     2.1808
     The estimated standard deviation of true gain scores =     0.0000
     The reliability of gain scores =  .000
     Using these values and assuming a normal distribution,
       the estimated intervals for individual true gain are --
        68% --     -1.8000  to     -1.8000
        95% --     -1.8000  to     -1.8000

Effect size measures
   Raw score            D =    -1.8000
   Standard score       d =    -0.309
   Treatment correlation  r =    -0.153

Size of interaction --
   Raw Score SD       STG =     0.0000
   Standard Score SD    s  =     0.0000
   Impact correlation  ir  =     0.000
      (correlation of initial level with gain)

Standard errors --

WARNING : This sample data estimates the standard
  deviation of change scores to be 0.  If this is true in the
  population, then the self impact correlation is undefined.
     In any case, estimation of the corrected self impact
   correlation is unstable for this data.  The standard
   error cannot be estimated using current method.

   SE for  D  =     1.3582
   SE for  d  =     0.365
   SE for  r  =     0.1761
   SE for STG =     1.4827
```

```
   SE for  s  =     0.2548

   t test for mean gain --  t =  -1.85
      Result is in the negative direction.
      Tail probability =  .093
      Since this mean gain is not significant, you had
        better check for low statistical power.

   The conventional confidence intervals don't work
     for the interaction standard deviation for this
     data.  A point probability at 0 is needed.
   The probability that SD=0 (i.e. no interaction) =  .500
   The significance test for the interaction is NOT significant.

&&&&&&&&&&&&&&&&&&&&&&&&
```

Stretching
POMS (Total Disturbance Score)= (ang + dep + ten+ fat+con) - vig

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = s2.dat
Input values
   Time 1
      Mean =     42.6000
       SD  =     22.9600
      Rel  =  .92
   Time 2
      Mean =     26.2000
       SD  =      7.4000
      Rel  =  .92
   Test retest correlation =  .860
   Sample size N =     5
Corrected basic statistics
   Time 1
      Mean =     42.6000
       SD  =     22.0225
   Time 2
      Mean =     26.2000
       SD  =      7.0978
   Test retest correlation =  .935
   Sample size N =     5
Size of interaction --
   Raw Score SD       STG =    15.5927
   Standard Score SD    s =     0.9530
   Impact correlation  ir =    -0.987
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Stretching
Anger

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = s3.dat
Input values
   Time 1
      Mean =     13.6000
       SD  =      3.3600
      Rel  =  .92
   Time 2
      Mean =      8.8000
       SD  =      3.4200
      Rel  =  .92
   Test retest correlation =  .580
   Sample size N =     5
Corrected basic statistics

   Time 1
      Mean =     13.6000
```

```
      SD  =      3.2228
   Time 2
      Mean =      8.8000
       SD  =      3.2803
   Test retest correlation =  .630
   Sample size N =     5
Size of interaction --
   Raw Score SD       STG =     2.7959
   Standard Score SD    s =     0.8598
   Impact correlation  ir =    -0.413
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Stretching
Depression

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = s4.dat
Input values
   Time 1
      Mean =     12.8000
       SD  =      7.7900
      Rel  =  .92
   Time 2
      Mean =     10.6000
       SD  =      7.1300
      Rel  =  .92
   Test retest correlation =  .870
   Sample size N =     5
Corrected basic statistics
   Time 1
      Mean =     12.8000
       SD  =      7.4719
   Time 2
      Mean =     10.6000
       SD  =      6.8389
   Test retest correlation =  .946
   Sample size N =     5
Size of interaction --
   Raw Score SD       STG =     2.4403
   Standard Score SD    s =     0.3407
   Impact correlation  ir =    -0.412
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Stretching
Tension

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = s5.dat
Input values
   Time 1
      Mean =      9.2000
       SD  =      1.7900
      Rel  =  .90
   Time 2
      Mean =      8.0000
       SD  =      1.8700
      Rel  =  .90
   Test retest correlation =  .300
   Sample size N =     5
Corrected basic statistics
   Time 1
      Mean =      9.2000
       SD  =      1.6981
   Time 2
      Mean =      8.0000
       SD  =      1.7740
```

```
   Test retest correlation =  .333
   Sample size N =     5
Size of interaction --
   Raw Score SD       STG =     2.0056
   Standard Score SD    s =     1.1550
   Impact correlation  ir =    -0.552
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Stretching
Fatigue

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = s6.dat
Input values
   Time 1
      Mean =     12.6000
       SD  =      9.9600
      Rel  =  .91
   Time 2
      Mean =      9.6000
       SD  =      5.8600
      Rel  =  .91
   Test retest correlation =  .980
   Sample size N =     5
Corrected basic statistics
   Time 1
      Mean =     12.6000
       SD  =      9.5012
   Time 2
      Mean =      9.6000
       SD  =      5.5901
   Test retest correlation =  %1.077
   Sample size N =     5
Size of interaction --
   Raw Score SD       STG =     2.6694
   Standard Score SD    s =     0.3425
   Impact correlation  ir =    -1.304
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Stretching
Confusion

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = s7.dat
Input values
   Time 1
      Mean =      8.8000
       SD  =      5.5900
      Rel  =  .83
   Time 2
      Mean =      6.0000
       SD  =      1.0000
      Rel  =  .83
   Test retest correlation =  .760
   Sample size N =     5
Corrected basic statistics
   Time 1
      Mean =      8.8000
       SD  =      5.0927
   Time 2
      Mean =      6.0000
       SD  =      0.9110
   Test retest correlation =  .916
   Sample size N =     5
Size of interaction --
   Raw Score SD       STG =     4.2742
```

```
   Standard Score SD    s  =     1.1684
   Impact correlation  ir  =    -0.996
      (correlation of initial level with gain)

&&&&&&&&&&&&&&&&&&&&&&&&
```

Stretching
Vigor

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = s8.dat
Input values
   Time 1
      Mean =     14.4000
       SD  =      5.5900
      Rel  =  .90
   Time 2
      Mean =     16.8000
       SD  =      4.4400
      Rel  =  .90
   Test retest correlation =  .940
   Sample size N =     5
Corrected basic statistics
   Time 1
      Mean =     14.4000
       SD  =      5.3031
   Time 2
      Mean =     16.8000
       SD  =      4.2122
   Test retest correlation =  %1.044
   Sample size N =     5
Size of interaction --
   Raw Score SD       STG =     0.0000
   Standard Score SD    s  =     0.0000
   Impact correlation  ir  =     0.000
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Stretching
POMS (ang + dep + ten+ fat+con)

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Job title is rerun
  Input disk file name = s9.dat
Input values
   Time 1
      Mean =     57.0000
       SD  =    18.4900
      Rel  =  .92
   Time 2
      Mean =     43.0000
       SD  =      6.8900
      Rel  =  .92
   Test retest correlation =  .630
   Sample size N =     5
Corrected basic statistics
   Time 1
      Mean =     57.0000
       SD  =    17.7350
   Time 2
      Mean =     43.0000
       SD  =      6.6087
   Test retest correlation =  .685
   Sample size N =     5
Size of interaction --
   Raw Score SD       STG =    14.0600
   Standard Score SD    s  =     1.0506
   Impact correlation  ir  =    -0.940
```

(correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&

Stretching
Physical Emotional Management

WITHIN SUBJECTS ANALYSIS RESULTS
Input disk file name = s10.dat
Input values
Time 1
Mean = 49.8000
SD = 9.6800
Rel = .89
Time 2
Mean = 66.0000
SD = 12.4500
Rel = .89
Test retest correlation = %-.260
Sample size N = 5
Corrected basic statistics
Time 1
Mean = 49.8000
SD = 9.1321
Time 2
Mean = 66.0000
SD = 11.7453
Test retest correlation = %-.292
Sample size N = 5
Size of interaction --
Raw Score SD STG = 16.8528
Standard Score SD s = 1.6020
Impact correlation ir = -0.745
(correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&

Stretching
Self-awareness - mood (factor 1)

WITHIN SUBJECTS ANALYSIS RESULTS
Input disk file name = s11.dat
Input values
Time 1
Mean = 24.2000
SD = 5.3100
Rel = .82
Time 2
Mean = 31.2000
SD = 4.3200
Rel = .82
Test retest correlation = .600
Sample size N = 5
Corrected basic statistics
Time 1
Mean = 24.2000
SD = 4.8084
Time 2
Mean = 31.2000
SD = 3.9119

Test retest correlation = .732

Sample size N = 5

This analysis corrects for error of measurement.
Size of interaction --
Raw Score SD STG = 3.3010
Standard Score SD s = 0.7531

```
   Impact correlation  ir  =    -0.590
      (correlation of initial level with gain)

&&&&&&&&&&&&&&&&&&&&&&&&
```

Stretching
Self-awareness - tactics (factor 2)

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = s12.dat
Input values
   Time 1
      Mean =     57.0000
       SD  =      9.9200
      Rel  =  .82
   Time 2
      Mean =     73.4000
       SD  =     10.4500
      Rel  =  .82
   Test retest correlation =  .380
   Sample size N =     5
Corrected basic statistics
   Time 1
      Mean =     57.0000
       SD  =      8.9829
   Time 2
      Mean =     73.4000
       SD  =      9.4629
   Test retest correlation =  .463
   Sample size N =     5
Size of interaction --
   Raw Score SD       STG =     9.5632
   Standard Score SD    s  =     1.0365
   Impact correlation  ir  =    -0.481
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

APPENDIX N

Mean change in standard scores, Self impact correlation, and Standard score standard deviation of gain

Yoga
Spielberger's Trait Anxiety

```
WITHIN SUBJECTS ANALYSIS RESULTS
 Input disk file name = y1.dat
Input values
  Time 1
     Mean =     37.1300
      SD  =      6.5800
     Rel  =  .92
   Time 2
     Mean =     29.1300
      SD  =      5.9600
     Rel  =  .92
 Test retest correlation =  .630
  Sample size N =     8
Corrected basic statistics
 Time 1
     Mean =     37.1300
      SD  =      6.3113
   Time 2
     Mean =     29.1300
      SD  =      5.7166
   Test retest correlation =  .685
  Sample size N =     8
This analysis corrects for error of measurement.
    The variance in gain scores may or may not be
      evidence of an interaction.  Either all or a large
      portion of the apparent individual differences in gain
      may be caused by error of measurement rather than
      variation in the treatment effect.
    The observed mean gain =    -8.0000
    The standard deviation of observed gain scores      =     5.4226
    The estimated standard deviation of true gain scores =     4.8062
    The reliability of gain scores =  .886
    Using these values and assuming a normal distribution,
     the estimated intervals for individual true gain are --
      68% --    -12.8062  to      -3.1938
      95% --    -17.4201  to       1.4201

Effect size measures
   Raw score            D =    -8.0000
   Standard score       d =    -1.329
   Treatment correlation r =    -0.553

size of interaction --
   Raw Score SD       STG =     4.8062
   Standard Score SD    s =     0.7982
   Impact correlation  ir =    -0.499
     (correlation of initial level with gain)

Standard errors --
   SE for  D =     2.3050
   SE for  d =     0.920
   SE for  r =     0.2658
   SE for STG =     1.2604
   SE for  s =     0.2093
   SE for ir =     0.3069

   t test for mean gain --  t =  -4.17
     Result is in the negative direction.
     Tail probability =  .000

&&&&&&&&&&&&&&&&&&&&&&&&
```

Yoga
POMS (Total Disturbance Score)= (ang + dep + ten+ fat+con) - vig

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = y2.dat
Input values
   Time 1
      Mean =     39.8800
       SD  =     43.1300
      Rel  =  .94
   Time 2
      Mean =     15.8800
       SD  =     35.0700
      Rel  =  .94
   Test retest correlation =  .940
   Sample size N =     8
Corrected basic statistics
  Time 1
      Mean =     39.8800
       SD  =     41.8161
   Time 2
      Mean =     15.8800
       SD  =     34.0016
   Test retest correlation =  %1.000
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     7.8145
   Standard Score SD    s =     0.2051
   Impact correlation  ir =    -1.000
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Yoga
Anger

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = y3.dat
Input values
   Time 1
      Mean =      7.3800
       SD  =      3.2900
      Rel  =  .92
   Time 2
      Mean =      3.3800
       SD  =      2.9700
      Rel  =  .92
   Test retest correlation =  .300
   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =      7.3800
       SD  =      3.1557
   Time 2
      Mean =      3.3800
       SD  =      2.8487
   Test retest correlation =  .326

   Sample size N =     8

Size of interaction --
   Raw Score SD       STG =     3.4944
   Standard Score SD    s =     1.1624
   Impact correlation  ir =    -0.637
      (correlation of initial level with gain)

&&&&&&&&&&&&&&&&&&&&&&&&
```

Yoga
Depression

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = y4.dat
Input values
   Time 1
      Mean =     14.6300
       SD  =     14.5200
      Rel  =  .92
   Time 2
      Mean =     10.1300
       SD  =     12.8000
      Rel  =  .92
   Test retest correlation =  .910
   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =     14.6300
       SD  =     13.9271
   Time 2
      Mean =     10.1300
       SD  =     12.2773
   Test retest correlation =  .989
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     2.5375
   Standard Score SD    s =     0.1933
   Impact correlation  ir =    -0.703
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Yoga
Tension

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = y5.dat
Input values
   Time 1
      Mean =     10.8800
       SD  =     10.9900
      Rel  =  .90
   Time 2
      Mean =      6.8800
       SD  =      7.0400
      Rel  =  .90
   Test retest correlation =  .960
   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =     10.8800
       SD  =     10.4260
   Time 2
      Mean =      6.8800
       SD  =      6.6787
   Test retest correlation =  %1.067
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     2.1813
   Standard Score SD    s =     0.2491
   Impact correlation  ir =    -1.514
      (correlation of initial level with gain)

&&&&&&&&&&&&&&&&&&&&&&&&
```

Yoga
Fatigue

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = y6.dat
Input values
   Time 1
      Mean =     11.2500
       SD  =      6.5800
      Rel  =  .91
   Time 2
      Mean =      7.8800
       SD  =      6.5100
      Rel  =  .91
   Test retest correlation =  .770
   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =     11.2500
       SD  =      6.2769
   Time 2
      Mean =      7.8800
       SD  =      6.2101
   Test retest correlation =  .846
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     3.4639
   Standard Score SD    s =     0.5548
   Impact correlation  ir =    -0.295
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Yoga
Confusion

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = y7.dat
Input values
   Time 1
      Mean =      8.6700
       SD  =      4.6600
      Rel  =  .83
   Time 2
      Mean =      7.0000
       SD  =      5.1800
      Rel  =  .83
   Test retest correlation =  .980
   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =      8.6700
       SD  =      4.2455
   Time 2
      Mean =      7.0000
       SD  =      4.7192
   Test retest correlation =  %1.181

   Sample size N =     8

Size of interaction --
   Raw Score SD       STG =     0.0000
   Standard Score SD    s =     0.0000
   Impact correlation  ir =     0.000
      (correlation of initial level with gain)

&&&&&&&&&&&&&&&&&&&&&&&&
```

Yoga
Vigor

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = y8.dat
Input values
  Time 1
     Mean =     12.8800
      SD  =      9.4200
     Rel  =  .90
   Time 2
     Mean =     19.3800
      SD  =      7.5000
     Rel  =  .90
   Test retest correlation =  .950
   Sample size N =     8
Corrected basic statistics
   Time 1
     Mean =     12.8800
      SD  =      8.9366
   Time 2
     Mean =     19.3800
      SD  =      7.1151
   Test retest correlation =  %1.056
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     0.0000
   Standard Score SD    s =     0.0000
   Impact correlation  ir =     0.000
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&&
```

Yoga
POMS (ang + dep + ten+ fat+con)

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = y9.dat
Input values
   Time 1
     Mean =     52.7500
      SD  =     36.8200
     Rel  =  .92
   Time 2
     Mean =     35.2500
      SD  =     31.4600
     Rel  =  .92
   Test retest correlation =  .920
   Sample size N =     8
Corrected basic statistics
   Time 1
     Mean =     52.7500
      SD  =     35.3165
   Time 2
     Mean =     35.2500
      SD  =     30.1754
   Test retest correlation =  %1.000
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     5.1411
   Standard Score SD    s =     0.1565
   Impact correlation  ir =    -1.000
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&&
```

Yoga
Physical Emotional Management

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = y10.dat
Input values
   Time 1
      Mean =     61.4300
       SD  =     10.4200
      Rel  =  .89
   Time 2
      Mean =     75.8300
       SD  =     10.7000
      Rel  =  .89
   Test retest correlation =  .780
   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =     61.4300
       SD  =      9.8302
   Time 2
      Mean =     75.8300
       SD  =     10.0944
   Test retest correlation =  .876
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     4.9597
   Standard Score SD    s =     0.4978
   Impact correlation  ir =    -0.198
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Yoga
Self-awareness - mood (factor 1)

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = y11.dat
Input values
   Time 1
      Mean =     34.5000
       SD  =      4.1400
      Rel  =  .82
   Time 2
      Mean =     39.1400
       SD  =      4.1800
      Rel  =  .82
   Test retest correlation =  .930
   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =     34.5000
       SD  =      3.7489
   Time 2
      Mean =     39.1400
       SD  =      3.7852
   Test retest correlation =  %1.134
   Sample size N =     8

Size of interaction --
   Raw Score SD       STG =     0.0000
   Standard Score SD    s =     0.0000
   Impact correlation  ir =     0.000
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Yoga
Self-awareness - tactics (factor 2)

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = y12.dat
Input values
   Time 1
      Mean =     62.6300
       SD  =     16.0300
      Rel  =  .82
   Time 2
      Mean =     82.1400
       SD  =     14.4600
      Rel  =  .82
   Test retest correlation =  .940
   Sample size N =     8
Corrected basic statistics
   Time 1
      Mean =     62.6300
       SD  =     14.5158
   Time 2
      Mean =     82.1400
       SD  =     13.0941
   Test retest correlation =  %1.146
   Sample size N =     8
Size of interaction --
   Raw Score SD       STG =     0.0000
   Standard Score SD    s =     0.0000
   Impact correlation  ir =     0.000
      (correlation of initial level with gain)
```

APPENDIX O

Mean change in standard scores, Self impact correlation, and Standard score standard deviation of gain

Tai chi
Spielberger's Trait Anxiety

```
WITHIN SUBJECTS ANALYSIS RESULTS
Input disk file name = tai-1.dat
Input values
  Time 1
    Mean =     37.2000
     SD  =      9.1300
    Rel  =  .92
  Time 2
    Mean =     35.2000
     SD  =      8.4400
    Rel  =  .92
  Test retest correlation =  .930
  Sample size N =    20
Corrected basic statistics
  Time 1
    Mean =     37.2000
     SD  =      8.7572
   Time 2
    Mean =     35.2000
     SD  =      8.0954
  Test retest correlation =  %1.011
  Sample size N =    20
This analysis corrects for error of measurement.
    The variance in gain scores may or may not be
      evidence of an interaction.  Either all or a large
      portion of the apparent individual differences in gain
      may be caused by error of measurement rather than
      variation in the treatment effect.
    The observed mean gain =    -2.0000
    The standard deviation of observed gain scores      =     3.3562
    The estimated standard deviation of true gain scores =     0.0000
    The reliability of gain scores =  .000
    Using these values and assuming a normal distribution,
      the estimated intervals for individual true gain are --
       68% --     -2.0000  to      -2.0000
       95% --     -2.0000  to      -2.0000
Effect size measures
  Raw score            D =    -2.0000
  Standard score       d =    -0.237
  Treatment correlation  r =    -0.118
Size of interaction --
  Raw Score SD       STG =     0.0000
  Standard Score SD    s =     0.0000
  Impact correlation  ir =     0.000
     (correlation of initial level with gain)
Standard errors --
WARNING : This sample data estimates the standard
  deviation of change scores to be 0.  If this is true in the
  population, then the self impact correlation is undefined.
     In any case, estimation of the corrected self impact
   correlation is unstable for this data.  The standard
   error cannot be estimated using current method.

  SE for  D  =     0.8013
  SE for  d  =     0.110
  SE for  r  =     0.0539
  SE for STG =     1.5090
  SE for  s  =     0.1789

  t test for mean gain --  t =  -2.66
     Result is in the negative direction.
     Tail probability =  .006
```

```
   The conventional confidence intervals don't work
     for the interaction standard deviation for this
     data.  A point probability at 0 is needed.
   The probability that SD=0 (i.e. no interaction) =  .500
   The significance test for the interaction is NOT significant.
&&&&&&&&&&&&&&&&&&&&&&&&
```

Tai chi
POMS (Total Disturbance Score)= (ang + dep + ten+ fat+con) - vig

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = tai-2.dat
Input values
   Time 1
      Mean =     28.8900
       SD  =     27.3000
      Rel  =  .92
   Time 2
      Mean =     19.0000
       SD  =     27.7000
      Rel  =  .92
   Test retest correlation =  .860
   Sample size N =    20
Corrected basic statistics
   Time 1
      Mean =     28.8900
       SD  =     26.1852
   Time 2
      Mean =     19.0000
       SD  =     26.5689
   Test retest correlation =  .935
   Sample size N =    20
Size of interaction --
   Raw Score SD       STG =     9.5337
   Standard Score SD    s =     0.3614
   Impact correlation  ir =    -0.142
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Tai chi
Anger

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = tai-3.dat
Input values
   Time 1
      Mean =      7.3700
       SD  =      5.2700
      Rel  =  .92
   Time 2
      Mean =      5.6000
       SD  =      5.9900
      Rel  =  .92
   Test retest correlation =  .810
   Sample size N =    20
Corrected basic statistics
   Time 1
      Mean =      7.3700
       SD  =      5.0548
   Time 2
      Mean =      5.6000
       SD  =      5.7454
   Test retest correlation =  .880
   Sample size N =    20
Size of interaction --
   Raw Score SD       STG =     2.7243
   Standard Score SD    s =     0.5035
   Impact correlation  ir =     0.001
```

(correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&

Tai chi
Depression

WITHIN SUBJECTS ANALYSIS RESULTS
Input disk file name = tai-4.dat
Input values
Time 1
Mean = 9.7400
SD = 8.8700
Rel = .92
Time 2
Mean = 7.3500
SD = 7.9200
Rel = .92
Test retest correlation = .900
Sample size N = 20
Corrected basic statistics
Time 1
Mean = 9.7400
SD = 8.5078
Time 2
Mean = 7.3500
SD = 7.5966
Test retest correlation = .978
Sample size N = 20
Size of interaction --
Raw Score SD STG = 1.9080
Standard Score SD s = 0.2366
Impact correlation ir = -0.564
(correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&

Tension

WITHIN SUBJECTS ANALYSIS RESULTS
Input disk file name = tai-5.dat
Input values
Time 1
Mean = 9.4400
SD = 5.6700
Rel = .90
Time 2
Mean = 8.1000
SD = 5.4200
Rel = .90
Test retest correlation = .750
Sample size N = 20
Corrected basic statistics
Time 1
Mean = 9.4400
SD = 5.3790
Time 2
Mean = 8.1000
SD = 5.1419
Test retest correlation = .833
Sample size N = 20
Size of interaction --
Raw Score SD STG = 3.0456
Standard Score SD s = 0.5788
Impact correlation ir = -0.359
(correlation of initial level with gain)
Standard errors --
&&&&&&&&&&&&&&&&&&&&&&&&

Tai chi
Fatigue

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = tai-6.dat
Input values
   Time 1
      Mean =      8.2100
       SD  =      5.8000
      Rel  =  .91
   Time 2
      Mean =      8.2000
       SD  =      5.9100
      Rel  =  .91
   Test retest correlation =  .540
   Sample size N =    20
Corrected basic statistics
   Time 1
      Mean =      8.2100
       SD  =      5.5328
   Time 2
      Mean =      8.2000
       SD  =      5.6378
   Test retest correlation =  .593
   Sample size N =    20
Size of interaction --
   Raw Score SD       STG =     5.0375
   Standard Score SD    s =     0.9019
   Impact correlation  ir =    -0.434
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Tai chi
Confusion

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = tai-7.dat
Input values
   Time 1
      Mean =      8.1600
       SD  =      5.7500
      Rel  =  .83
   Time 2
      Mean =      7.7000
       SD  =      5.0900
      Rel  =  .83
   Test retest correlation =  .880
   Sample size N =    18
Corrected basic statistics
   Time 1
      Mean =      8.1600
       SD  =      5.2385
   Time 2
      Mean =      7.7000
       SD  =      4.6372
   Test retest correlation =  %1.060
   Sample size N =    18
Size of interaction --
   Raw Score SD       STG =     0.0000
   Standard Score SD    s =     0.0000
   Impact correlation  ir =     0.000
      (correlation of initial level with gain)
&&&&&&&&&&&&&&&&66
```

Tai chi
Vigor

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = tai-8.dat
Input values
   Time 1
      Mean =     16.2100
       SD  =      6.4700
```

```
     Rel  =  .90
   Time 2
     Mean =     17.9500
      SD  =      5.5500
     Rel  =  .90
   Test retest correlation =  .620
   Sample size N =    20
Corrected basic statistics
  Time 1
     Mean =     16.2100
      SD  =      6.1380
   Time 2
     Mean =     17.9500
      SD  =      5.2652
   Test retest correlation =  .689
   Sample size N =    20
Size of interaction --
   Raw Score SD       STG =     4.5684
   Standard Score SD    s =     0.7989
   Impact correlation  ir =    -0.550
     (correlation of initial level with gain)

&&&&&&&&&&&&&&&&&&&&&&&&
```

Tai chi
POMS (ang + dep + ten+ fat+con)

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = tai-9.dat
Input values
   Time 1
     Mean =     44.6700
      SD  =     25.8500
     Rel  =  .90
   Time 2
     Mean =     36.9500
      SD  =     25.5200
     Rel  =  .90
   Test retest correlation =  .910
   Sample size N =    20
Corrected basic statistics
   Time 1
     Mean =     44.6700
      SD  =     24.5235
   Time 2
     Mean =     36.9500
      SD  =     24.2104
   Test retest correlation =  %1.011
   Sample size N =    20
Size of interaction --
   Raw Score SD       STG =     0.0000
   Standard Score SD    s =     0.0000
   Impact correlation  ir =     0.000
     (correlation of initial level with gain)
   The conventional confidence intervals don't work
     for the interaction standard deviation for this
     data.  A point probability at 0 is needed.
   The probability that SD=0 (i.e. no interaction) =  .500
   The significance test for the interaction is NOT significant.
&&&&&&&&&&&&&&&&&&&&&&&&
```

Tai chi
Physical Emotional Management

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = tai-10.datInput values
   Time 1
     Mean =     58.1700
      SD  =     12.4800
     Rel  =  .89
```

```
  Time 2
     Mean =     68.3000
      SD  =     13.2900
     Rel  =  .89
  Test retest correlation =  .220
  Sample size N =    20
Corrected basic statistics
  Time 1
     Mean =     58.1700
      SD  =     11.7736
  Time 2
     Mean =     68.3000
      SD  =     12.5378
  Test retest correlation =  .247
  Sample size N =    20
Size of interaction --
  Raw Score SD       STG =    14.9277
  Standard Score SD    s =     1.2274
  Impact correlation  ir =    -0.581
     (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Tai chi
Self-awareness - mood (factor 1)

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = tai-11.dat
Input values
  Time 1
     Mean =     32.4000
      SD  =      6.6400
     Rel  =  .82
  Time 2
     Mean =     34.3500
      SD  =      5.7600
     Rel  =  .82
  Test retest correlation =  .450
  Sample size N =    20
Corrected basic statistics
  Time 1
     Mean =     32.4000
      SD  =      6.0128
  Time 2
     Mean =     34.3500
      SD  =      5.2159
  Test retest correlation =  .549
  Sample size N =    20
Size of interaction --
  Raw Score SD       STG =     5.3793
  Standard Score SD    s =     0.9557
  Impact correlation  ir =    -0.586
     (correlation of initial level with gain)
&&&&&&&&&&&&&&&&&&&&&&&&
```

Tai chi
Self-awareness - tactics (factor 2)

```
WITHIN SUBJECTS ANALYSIS RESULTS
  Input disk file name = tai-12.dat
Input values
  Time 1
     Mean =     61.0000
      SD  =     14.7400
     Rel  =  .84
  Time 2
     Mean =     71.1500
      SD  =     14.9000
     Rel  =  .84
  Test retest correlation =  .650
  Sample size N =    20
```

```
Corrected basic statistics
   Time 1
      Mean =     61.0000
       SD  =     13.5094
   Time 2
      Mean =     71.1500
       SD  =     13.6561
   Test retest correlation =  .774
   Sample size N =    20
Size of interaction --
   Raw Score SD       STG =     9.1367
   Standard Score SD    s =     0.6727
   Impact correlation  ir =    -0.322
      (correlation of initial level with gain)
```